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The power station of Elektrizitätswerk Schlesien AG in Siechnice. An industrial plant in the 20th century – a work of an engineer and an architect-artist

Introduction

The power station of Elektrizitätswerk Schlesien AG (E.W.S. AG; Kraftwerk Tschechnitz, Niederschlesien until 1945; currently Czechnica CHP Plant, Lower Silesia) constructed in Siechnice near Wrocław in 1910, was in a state of constant expansion until 1944 under the pressure of technological development and electricity demand. Its architectural quality constituted evidence of the implementation of the Deutsche Werkbund reformist idea by the management of the Company. It also showed the collaboration of an engineer and architect-artist in its creation[1]. This idea, justified by the views of modernist architects before the World War I, was then implemented in socialist Poland in the 1960s.

Sources and state of research

The article is based on research that was carried out in 2019 and 2020 at the request of the owner of the plant – Zespół Elektrociepłowni Wrocławskich Kogeneracja S.A., a subsidiary of PGE Energia Ciepła from the PGE Group, preceding the planned closure of the power plant in 2024. The historical, architectural, and conservation study of the structures of the Czechnica Combined Heat and Power Plant along with the company housing estate in Fabryczna Street in Siechnice was carried out by a team of researchers from the Department of the History of Architecture, Art and Technology of Wrocław University of Science and Technology [9].

The study was based on field research, a query of source materials and texts in the professional press as well as iconography from the years 1910–2019. The most important historical source was the "Nachrichtenblatt der Elektrizitätswerk Schlesien A.-G." periodical, which was published by E.W.S. AG in the years 1925–1935 (available at the University Library in Wrocław). In the years 1925–1935, the history of the construction of the power plant in Siechnice and other investments of the company in Lower Silesia were presented along with numerous photographs. No occasional publications or monographs of the power plant in Siechnice before 1945 have been found[2].

Articles by architects Richard and Paul Ehrlich in the branch architectural journal "Ostdeutsche Bau-Zeitung", which were published in 1926, contained authors' original descriptions of the production buildings of the power plant from the years 1924–1926 [10] and a housing estate from the years 1912–1926 [11]. In the absence of the preserved original design documentation, it is one of the few sources enabling the attribution of designs before 1945. Photographs of the power plant from 1929 were published in the renowned architectural magazine "Die Form", which was published in Berlin [12]. Photos of the power plant, which were deposited at the Herder-Institut für historische Ostmitteleuropaforschung (collection of *Poklekowski*) [13],

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[1] In the years 1909–1912, inter alia Peter Behrens, Hans Poelzig and Walter Gropius, architects associated with Werkbund, in the magazines "Das Kunstgewerbeblatt" and "Der Industriebau", called for cooperation between an engineer and an artistically educated architect in designing industrial architecture. This issue was the subject of studies. See [1]–[8].

[2] All source texts translated by A. Gryglewska.

showing buildings and machines from the years 1910–1926, also come from the same period. There are no written sources from the beginning of the 1940s when the power plant was remodeled and modernized. Determining the scope and chronology of this remodeling was possible only thanks to the photographic and cartographic collections deposited in the State Archives in Wrocław, such as photos showing the state of preservation of the power plant in the years 1948–1949, after the devastation and robbery of equipment in the first years after World War II and before its reconstruction in the 1950s. Aerial photographs of the Siechnice region from 1927 and 1941 are particularly valuable.

The oldest preserved original design and measurement documentation for the power plant and the housing estate comes from the years 1949–1950 and is in the owner's collection in the Technical Archives of the Czechnica CHP Plant in Siechnice. Only a few publications on industrial monuments in Lower Silesia [14], Wrocław power plants [15, pp. 77–99] and the history of Siechnice [16] provide information on the history of the plant.

The research allowed us to determine the process of creating and then transforming the power plant, to a large extent who was responsible for it (investor, designer, contractor), what kind of valuable solutions it resulted in, and finally what of the original architectural substance has survived to this day and should be covered by conservation protection.

The aim of the article is to present the architecture of the power plant with a historical background, taking into account the role of an engineer and an artistically educated architect in its construction.

History and spatial transformations

Rich lignite and hard coal deposits, high energy potential of the Oder River tributaries and developed industry contributed to the flourishing of power engineering in Lower Silesia, which was one of the earliest electrified regions in Europe at the end of the 19th century [17]. The construction of the power station in Siechnice was a consequence of the establishment of Elektrizitätswerk Schlesien AG on November 19, 1909, in Wrocław on the initiative of engineer Richard Wolfes PhD from Wrocław (the company's director until 1924) and with the participation of the Association of Electric Companies (Gesellschaft für elektrische Unternehmungen) in Berlin, later part of AEG Berlin. The established company was also the owner of two other power plants in Miłków near Ludwikowice Kłodzkie (Ludwigsdorf-Mölke) and Wałbrzych (currently non-existent). Thanks to modern management and courage in taking risks, it became the second enterprise producing electricity in Silesia and the largest one in Lower Silesia until the World War II [17]. The company's significance grew as it supplied electricity to large rural areas and small towns, filling a gap on the market, which previously comprised mainly large cities and industrial centers [18].

The Tschechnitz Power Plant was located in the village of Siechnice, approximately 12 km south-east of Wrocław, by the railway line from Wrocław to Laskowice, opened in 1909, and further to Opole and Upper Silesia, which provided fuel transport. The Oława River flowing nearby provided cooling water [19]. The plant was built in 1910 to the south of the railway tracks, on a parallel east-west axis, after the wetland was hardened [18]. The buildings of the first power station were situated next to each other, i.e. the boiler hall from the north, the engine hall with two steam turbines and the electrical switching station from the south. A chimney was built on the west side, whereas a free-standing residential building (present gatehouse) was designed to the south-west of the compact building complex. The size of the plot, despite its limitations with the neighboring rural buildings, made it possible to further develop the plant.

The plant was significantly extended in the years 1912–1914. According to the original plan, the volume of the existing power station was doubled by extending the main buildings to the east – the boiler hall and engine hall as well as the electrical switching station. From the very beginning, the extension of the plant was carried out according to the shortest route of electric cables and steam installations. To the west, along the access road, the first building of the housing estate with factory apartments was constructed.

The works were continued from 1917 to 1923. They resulted in a further extension of the compact development to the south, where, among other things, a new switching station was built along with a connecting bridge. To the east, a second boiler house, two chimneys, two cooling towers, a regulated water tank and coal storage with a transport railway were built. At the same time, the factory housing estate was extended by two more buildings.

In the years 1924–1928, the next phase of the extension brought major changes in the spatial structure of the plant (Fig. 1). During that phase, the southern switching station was extended to the east and a series of buildings were erected. These included a new boiler hall adjoined to the second boiler house, a new engine house – the most important element of the extension, and a pump station adjacent to it from the east. To the east of it, there was a new cooling tower and a carpentry workshop. Coal was stored behind these buildings. In addition, a hall and a garage for mechanical workshops were built on the edge of the power station site. At the end of this extension phase, the site of the power plant was extended further east. It was developed into an open-air electrical transformer station with a guardhouse for supervision located on the plant side. The last building of the housing estate was completed during this phase. The extension of the plant was accompanied by the development of a network of railway branch lines, which led to girder cranes of the most important buildings – new engine house and mechanical workshop. In the years 1924–1926, the power station extension project and construction management were entrusted to Richard and Paul Ehrlich by E.W.S. AG, who were probably employed in designing the power station from its very beginning [10], [11].

Another extension of the plant took place during the World War II. In the years 1939–1941, the oldest boiler

hall was rebuilt and raised, and the adjacent buildings from the west were connected and made taller. In the centrally located section of the power plant, between the switching stations, a control house was built (the device of the boiler house central control station, similar to the electric control house), and in the south-east – a new twelve-sided cooling tower. In the years 1941–1944, smaller power station buildings, which were scattered over a larger area (to the west and east), were constructed. On the west side, a warehouse and administration complex, a water de-ironing building, a smaller warehouse and a garage were completed. To the east, mainly between boiler houses and the oldest cooling towers, numerous small technical buildings, which were inventoried and demolished after 1950, were built. Around 1942, a magnificent administrative edifice was erected with a meeting room on the third floor and a water treatment plant in the northern part of the ground floor. During the last years of the war, the highest 135-meter chimney was built and located centrally among the power station buildings and connected to the new boiler house. Reinforced concrete hyperboloid cooling towers were also built, along with the last, unfinished coal mill north of the railway line (with a bridge connector to the boiler house suspended above the railroad tracks). On February 16, 1945, the power plant was occupied by the Red Army with minimal damage; however, its equipment was dismantled and gradually transported deep into the USSR [21, p. 4].

After the end of World War II, Siechnice was granted to Poland, together with the Recovered Territories. The Poles took over the power plant from the Soviet army in 1947, and then the reconstruction and construction of a new power station began with the use of the old buildings and infrastructure (1947–1959). A new, higher boiler hall was built with partial use of foundations and individual elements of the steel structure of the former "new boiler hall". The pump station was extended to the east and supplemented with a casing of degassers. The three oldest cooling towers were demolished. The factory boundary was partially moved to the south along with the railway siding, thanks to which there was space for the construction of a fire station and warehouse buildings. To the north of the railway line, a locomotive shed was built and the construction of the central coal mill, which was interrupted during the war, was completed. The central warehouse hall was completed in the western part of the site.

There were no major changes in the spatial development of the plant prior to the power plant's transformation into a combined heat and power plant after 1974. A cooling tower was built in the 1960s (dismantled around 2002). Buildings from the period when the function was changed into a heat and power plant – cooling water pump station, carpentry workshop, degassers tower, demineralized water pump station and others – were built between the earlier facilities in a dispersion, on the eastern side of the main complex. In the years 1992–1993, a housing estate (currently owned by Inter-enterprise Housing Cooperative "Czechnica") was privatized. In 2018, the owner of the Czechnica CHP Plant Kogeneracja S.A. sold the open-air electrical transformer station with a switching station control house to TAURON Dystrybucja S.A. The current view of the power station is presented in Figure 2.

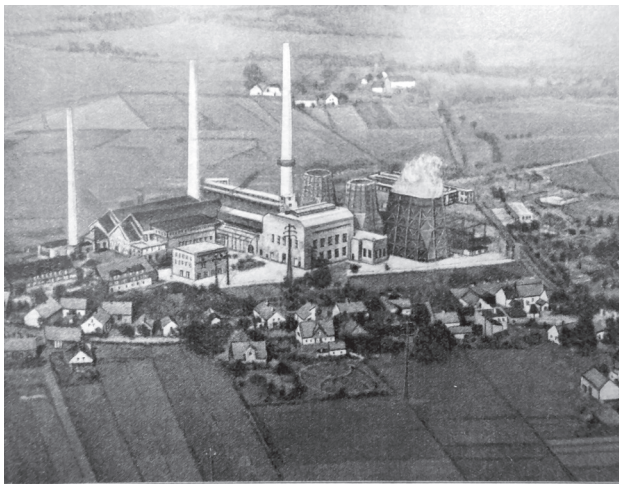

Fig. 1. View of the power station building complex after the completion of extension in the years 1925–1926. Aerial photograph (retouched), south-west, circa February 1928. (source: [20], in the collection of the Wrocław University Library)

Il. 1. Widok zespołu budynków elektrowni po zakończeniu rozbudowy w latach 1925–1926. Zdjęcie lotnicze (retuszowane), od południowego zachodu, ok. lutego 1928 r. (źródło: [20], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

Composition of the power station and the factory housing estate in the context of the rural development of Siechnice at the beginning of the 20th century

The complex of the large-scale power station buildings is flanked from the main entrance (west) by a picturesque small factory housing estate. It consists of four multi-family, two-storey houses, which were built on a narrow strip of land, on both sides of the curved access road (Fig. 3a). It forms a connector between the industrial complex and the low residential and economic, rural development of Siechnice. In the largest of the houses, which is situated transversely at the end of the street, there is a gateway flanked by the avant-corps of staircases resembling towers, reminiscent of the gatehouse leading to the outer ward of a brick medieval fortress (Fig. 3b). It was impossible to find a similar concept of a patronage housing estate in Silesia at the beginning of the 20th century. It is probably an attempt at responding to the then postulates of skillful incorporation of a factory into the landscape of a village or a small town in order to […] *not painfully disturb the small-town or rural character of the area by the clumsy planning of huge plants* [3, p. 101].

Individual buildings of the housing estate in Siechnice were erected in stages in the years 1912–1926, along with the extension and growing housing needs of the plant. Detached houses, which were arranged freely along the street (at different angles, without keeping one line of buildings), with pre-gardens, gave the impression of a picturesque

Fig. 2. Top view of the Czechnica CHP Plant, 2018,
1 – first boiler hall, 2 – first engine hall, 3 – first switching station, 4 – first residential building (gatehouse),
5 – new switching station, 6 – new boiler hall, 7 – new engine house, 8 – pump station, 9 – mechanical workshop hall,
10 – main administration building, 11 – warehouse and administration complex, 12 – water de-ironing building,
13 – cooling towers, 14 – coal mill, 15 – fire station, 16 – central warehouse, 17 – residential buildings of the company housing estate
(prepared by M. Rabiega with the use of the orthophotomap from [22])

Il. 2. Widok z lotu ptaka na Elektrociepłownię Czechnica, 2018 r.:
1 – pierwsza kotłownia, 2 – pierwsza maszynownia, 3 – pierwsza rozdzielnia, 4 – portiernia, 5 – nowa rozdzielnia, 6 – nowa kotłownia,
7 – nowa maszynownia, 8 – pompownia, 9 – hala warsztatów mechanicznych, 10 – główny budynek administracyjny,
11 – zespół magazynowo-administracyjny, 12 – odżelaziarnia wody, 13 – chłodnie kominowe, 14 – młynownia, 15 – straż pożarna,
16 – magazyn centralny, 17 – budynki mieszkalne osiedla zakładowego
(oprac. M. Rabiega z wykorzystaniem ortofotomapy z [22])

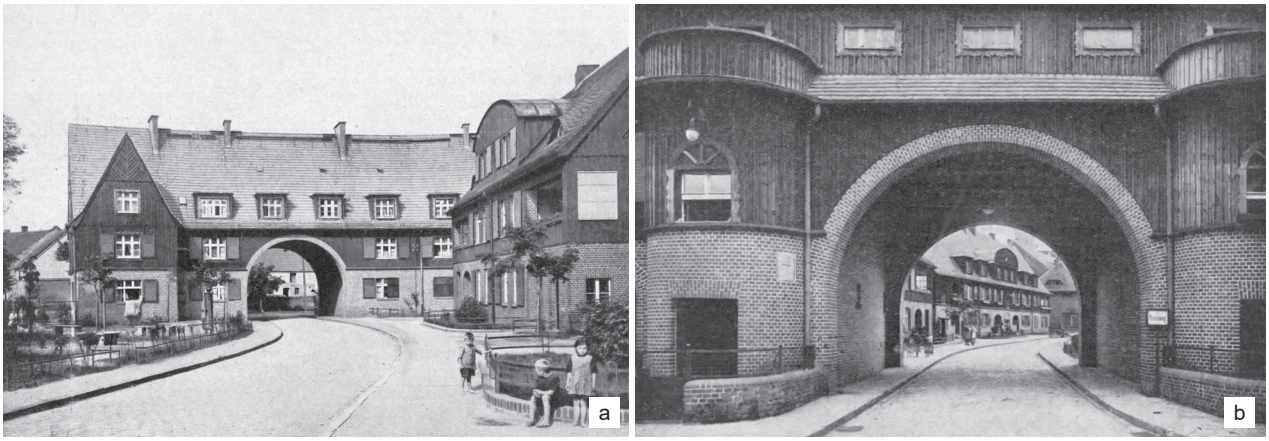

Fig. 3. The housing estate with company apartments:
a) a view of the branch of Fabryczna Street towards the west direction, 1926,
b) gate between residential buildings leading to the power station (to the east), 1926
(source: [11], in the collection of the Wrocław University Library)

Il. 3. Kolonia domów z mieszkaniami zakładowymi:
a) widok zabudowy sięgacza ul. Fabrycznej w kierunku zachodnim, 1926,
b) brama między budynkami mieszkalnymi prowadząca w kierunku elektrowni (na wschód), 1926
(źródło: [11], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

rural corner. The residents had access to the sun and greenery. In the southern part of the plot, there was a modest garden with a playground for children, a spring and a paddling pool [11].

Most of the houses had sunny verandas (from the south and west). On the ground floor, there were also entrances to the apartments – "enlivened by boxes with flowers" [11]. The housing estate was designed by Wrocław architects

Richard and Paul Ehrlich around 1912[3]. They gave the architecture the features of the Heimatschutz style, inspired by the simplicity of a country house, regional forms, materials, colors and textures. The houses were contrasted with the neighboring power station in terms of their scale and the way they were shaped. However, the material common to both complexes, i.e. red brick, was preserved.

The complex of houses constitutes an interesting example of a small-scale urban layout, which bears the features of the aestheticizing trend of Camillo Sitte's school. Thanks to providing the residents with light, air and greenery, the housing estate also meets the demands of the Garden City Movement (Gartenstadtbewegung) and is a synthesis of the city and the countryside. To this day, it has been preserved in its original form without changes to the urban layout and the buildings themselves.

Architecture of the power station in the years 1910–1923. From historicism to functionalism

The construction of the power station, which began on March 14, 1910, proceeded so quickly that the buildings were completed in the raw state within a few months. On August 18, 1910, the chimney [18], an external trademark of the company visible on the premises, was completed. A month later, the interiors were ready for the installation of devices – boilers and two steam turbines of 1,000 kW of power [18]. A compact complex of red brick buildings was erected parallel to the railway tracks. It consisted of boiler and engine halls, a four-storey switching station building, a chimney and outbuildings for ash and cinder collection as well as a water container (Fig. 4a). Both halls, 22-m high, were crowned with gable roofs, whereas the switching station was covered with a lean-to roof. The rhythm of the mighty buttresses along the entire length of the northern façade and the high tower, made the power station's body similar to medieval architecture. On the west side, the gable walls of both halls were adjoined by lower segments, probably containing rooms with administrative and social functions. The walls of the halls above their roofs were made as walls of a light iron structure filled with glass (Fig. 4b). Over the ridge of the roof of the boiler house, lanterns for ventilation were made and a large part of the roof of the engine house was glazed. The façades of the power station, with a carefully made smooth brick face with shallow recesses creating delicate vertical divisions and light concrete framing of the gables, constituted an example of the phenomenon of modernizing historical styles characteristic for the beginning of the 20th century.

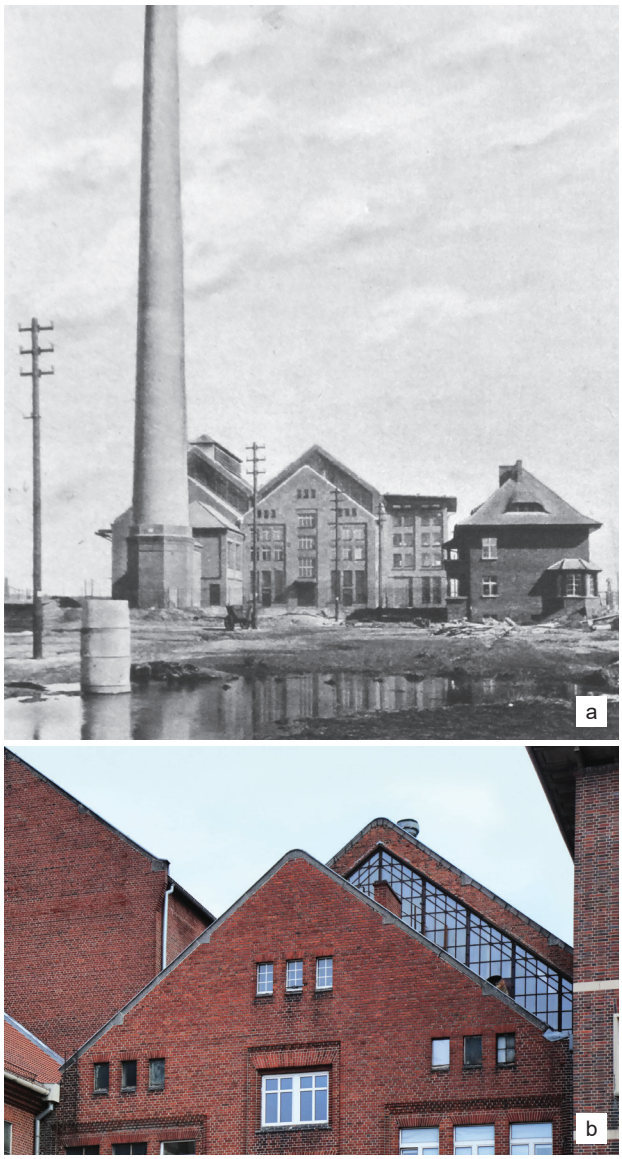

Fig. 4. View of the power station from the west:
a) building complex in 1910 (source: [18], in the collection of the Wrocław University Library),
b) gable of the I engine hall (photo by A. Gryglewska, 2019)

Il. 4. Widok elektrowni od zachodu:
a) zespół budynków w 1910 r. (źródło: [18], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu),
b) szczyt budynku maszynowni I (fot. A. Gryglewska, 2019)

At that time, it was visible in the architecture of Berlin's "temples of power" by Peter Behrens, which was based on historical models. The buildings were made of brick, reinforced concrete and steel. The Wrocław Gebrüder Huber Company was employed to build the reinforced concrete structure (pillars and ground floor ceiling) [18].

On December 10, 1910, the inauguration of the power station took place in the engine hall. Its representative function was no exception at that time. The appearance of the original interior design, which was made with special care and most probably with the participation of a decorator, was presented in archival photographs from 1910 and 1929 (Fig. 5). The walls of the engine room were rhythmically divided by means of pillars ending with

[3] Richard (1866–1942) and Paul (1870–1943) Ehrlich graduated from Technische Hochschule in Berlin-Charlottenburg with the title of government architects (Regierungsbaumeister). Their projects showed a large thematic and stylistic diversity [23]. Prestigious orders, cooperation with outstanding architects, such as Hans Poelzig, Heino Schmieden, participation in opinion-forming and professional bodies, such as Schlesischer Bund für Heimatschutz [24, p. 418], Bund Deutscher Architekten and Architekten- und Ingenieurverein, made the Ehrlichs one of the most important creators of the Wrocław milieu in the first thirty years of the 20th century.

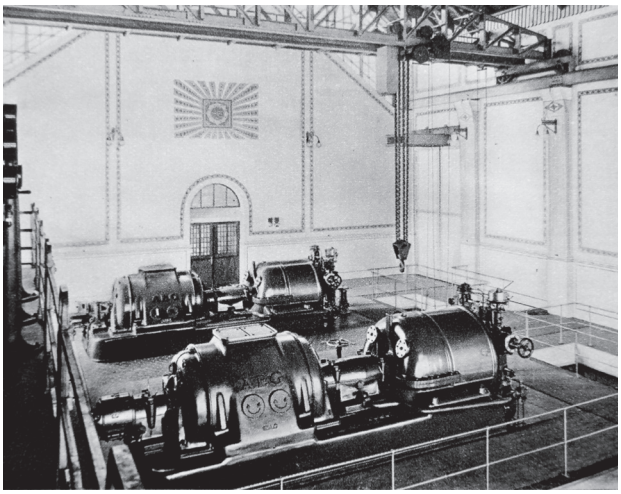

Fig. 5. Interior of the first engine room during its opening in 1910. View to the west overlooking two turbines with a capacity of 2,000 kW (source: [18], in the collection of the Wrocław University Library)

Il. 5. Wnętrze pierwszej maszynowni w czasie otwarcia w 1910 r. Widok w kierunku zachodnim na dwie turbiny o mocy 2000 kW (źródło: [18], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

heads with decorative, geometric relief and a colored template drawing on which the crane runway beams rested. On the southern wall, there was a narrow entresol of the control room with a decorative balustrade. All walls featured a high dado made of square, white, glazed tiles with inserts in the form of delicate dark green stripes, and a painted decoration above it – rectangular frames made of geometric multi-colored template friezes. Above the entrance to the hall, there was a large graphic sign, which was connected with the symbolism of electricity, in a square surrounded by rays. Large fragments of ceramic wall cladding and a fragment of the entresol balustrade made of riveted iron profiles and pressed sheet metal have survived to this day. The engine room was lit by modern electric wall lamps. The girder crane, which has survived to this day, probably dates back to the time of the extension of the engine house in 1914. The interiors of the remaining buildings received practical and durable finish with a wall surface, rounded corners of pillars and arcades made of clinker brick.

The extension of the plant in the years 1912–1914 was probably planned as early as 1910. The boiler hall, the engine hall and the switching station were extended by doubling their area according to the original design. It was a method frequently used at the beginning of the 20th century (e.g., at Klingenberg Power Plant in Berlin, 1926–1927) [25].

The next extension took place in 1917, when the Wacker-Chemie Werk Tschechnitz Electrochemical Factory was built in the vicinity of the power station. In the existing engine room, a turbine exceeding the power of all the existing ones [19] was connected and the construction of a new boiler hall to the east of the existing group of buildings began. By 1923, the administrative building and a new switching station were completed, followed by a connecting bridge between the old and the new one supported on semicircular arcades, two chimneys and a pump station. Objects from this phase of the power plant's construction were demolished or rebuilt during the subsequent stages of plant transformations. Only the new switching station building survived in its entirety – an example of simple, geometrical, functional and matter-of-fact architecture with a flat façade surface and carefully designed brickwork, but without any decorations. Its architecture shows new trends in the German architecture of the interwar period. The boiler hall, with a form closely related to its function, was then constructed as a modern steel and brick structure. It was made of multi-pitched lattice girders supported by two internal rows of lattice columns. The sloping roofs made it possible for them to be glazed and the vertical (lantern) provided windows for ventilation [10]. The external walls of the building, which were devoid of a structural function, constituted only a thin barrier separating the production process from external weather conditions. Their so-called iron-framed structure (Eisenfachwerk-Konstruktion), which was made of a grid of rolled, riveted and brick-filled profiles, was a cheap and quick-to-build system of curtain walls, saving the usable floor space of buildings. It was probably popularized thanks to the construction of the Exhibition of Industry and Craft of North Rhine-Westphalia in Düsseldorf in 1902, and in eastern Germany – due to the Upper Silesian Tower in Poznań from 1911, designed by Hans Poelzig. In the 1920s and 1930s, the iron fachwerk was already widely used in German industrial architecture.

No design documentation has survived, and there are no written sources unambiguously confirming the authorship of Richard and Paul Ehrlich of the power station project from the years 1910–1923. They may be indicated by the extension of the boiler hall, which was carried out by them in the following years on the basis of an identical method, as well as some articles by architects in the professional press with a competent description of the investment from 1910 [10], their presence in Siechnice from at least 1912 in connection with the construction of the housing estate, and finally consistency in creating homogeneous architecture of the complex with geometrical forms and brick material.

Mechawerk mechanical workshop in the years 1924–1925 – "objectivity inspired by the rhythm of spiritual technique"

The large workshop and warehouse hall with a construction area of 1,400 m^2, which was designed by the Ehrlich Brothers, was completed in the years 1924–1925 [10]. It was located in the north-eastern part of the power plant area, ensuring convenient rail and car transportation (Fig. 6a–c).

The development of electrification and the construction of power stations equipped with transformers, motors and electric meters made it necessary to organize well-equipped and specialized repair workshops [27]. The plant's own equipment – motors, transformers and devices, were repaired and external services were performed in the hall

known as Mechawerk, which was operated by Mechanische Werkstätten Schlesien GmbH Breslau, and established by E.W.S. AG.

The structure of the two-aisle hall was made of steel lattice columns on which both a light roof structure was placed, consisting of lattice trusses with a lantern, with a raised lower and polygonal higher belt, and beams for crane systems. Longitudinal lanterns were used to ventilate the hall. The curtain external walls were made of a grid of rolled profiles filled with brick as the iron-framed structure.

The hall was equipped with panache and *whatever the cost, with modern aids and machinery* [27]. In its project, the priority was the shortest transport route, which would be achieved thanks to the appropriate location of various departments and crane systems. In the Wrocław press, the facility was called the Silesian "electrical clinic" because […] *here the patients* [devices] […] *are handed over to expert doctors* [engineers] [26, p. 215]. The architecture of the workshop hall was described with admiration, i.e. *Already externally, in its smooth geometric architecture with long and wide roofs and walls dominated by a transparent glass plate, this building is a symbol of a clear, precise, large-scale spirit, modern technical spirit, which stands in peculiar contrast to the silence of the arable fields* […]. *Inside the factory building* [there is] *the same impression of objectivity which is inspired by the rhythm of spiritual technique. The space is full of light and willingness to work. High up, under the glass roof, a mathematical ornament of blue and orange iron trusses, which appear thin and brittle at height, but are really compact and carry loads, e.g. two girder cranes and their considerable load weight.* […] *A few meters up, there is the "commandant's house" which is kept in pretty blue and white. It is entered via a spiral staircase and its shape resembles a railway control room* [26, p. 213].

This company investment should be treated as one of the most important and the most modern. The building has survived to this day in an almost unchanged shape with slightly transformed façades, original crane systems, a control cabin, and even colors similar to the original ones. The work of the Ehrlichs was perceived by contemporaries as a futuristic vision of a perfect mechanism, set in motion and supervised by man hovering above workplaces, so that the work was performed in an ideal rhythm. The project fulfilled the idea of Walter Gropius – constructing a palace for the working class, the beauty of which was not expressed in ornamentation, but a functional space of the workplace full of light and air.

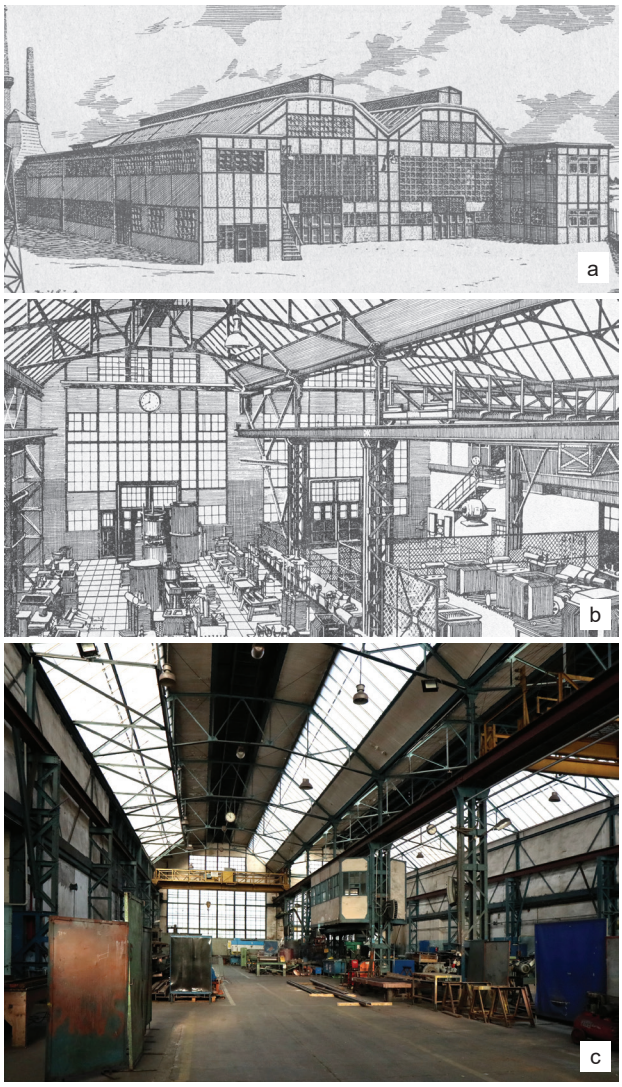

Fig. 6. Building of the mechanical workshop Mechanische Werkstätten Schlesien GmbH:
a) the south-west view, 1926 (drawing by P. Burke, source: [26], in the collection of the University Library in Wrocław),
b) view of the interior of the hall from the north. A winding room for electrical devices on the left, a control station on the right, 1926 (drawing by P. Burke, source: [26], in the collection of the Wrocław University Library),
c) interior of the former mechanical workshop, 2019 (photo by A. Gryglewska)

Il. 6. Budynek warsztatów mechanicznych Mechanische Werkstätten Schlesien GmbH: a) widok od strony południowo-zachodniej, 1926 (rys. P. Burke, źródło: [26], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu),
b) widok wnętrza hali od strony północnej, na lewo nawijalnia przyrządów elektrycznych, na prawo – stanowisko kontrolne, 1926 (rys. P. Burke, źródło: [26], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu),
c) wnętrze dawnego warsztatu mechanicznego, 2019 (fot. A. Gryglewska)

Architecture of the power station in the years 1925–1926. A combination of functionality and prestige

After the World War I and the crisis of 1924–1925, the Management Board of E.W.S. AG, anticipating a large increase in electricity consumption, decided to enhance the current efficiency of machines and extend the power station. This was done on a grand scale [28] (Fig. 7). In June 1925, the Swiss company Brown, Boveri u. Cie, was commissioned to build the largest steam turbine east of the Elbe, with a capacity of 30,000 kW. New buildings, i.e., the engine house (1,000 m^2), pump station (585 m^2), extension of the boiler house (1,100 m^2, no longer existing), were completed in 1926. In terms of cubature and capacity of the devices located in them, they were prepared for the

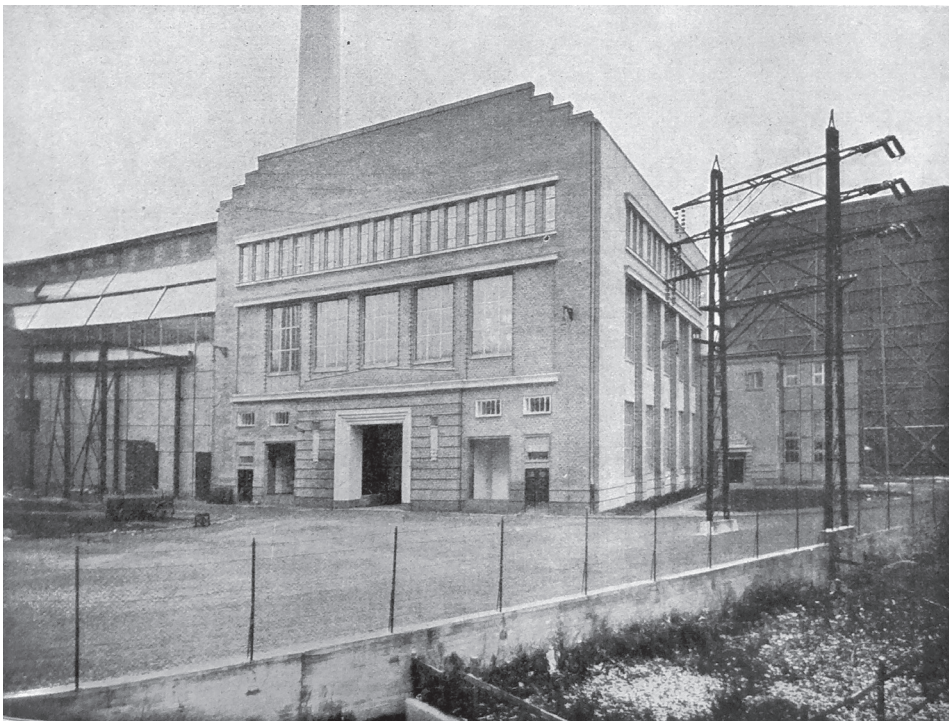

Fig. 7. Completed in 1926, buildings of the new engine house, the former "new boiler hall", pump station, new cooling tower (in the background). The south-west view, February 1927 (source: [28], in the collection of the Wrocław University Library)

Il. 7. Ukończone w 1926 r. budynki nowej maszynowni, dawnej „nowej kotłowni", pompowni, nowej chłodni kominowej (w głębi). Widok od strony południowo-zachodniej, luty 1927 (źródło: [28], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

insertion of this turbine and another machine, equally as large [29]. Thanks to the new investment, the plant's operating capacity increased by about 100% [10] and during the 16 years of the plant's operation – twentyfold [18].

The installation of such a large machine resulted in further achievements – a cooling tower with a capacity of 10,000 m^3 of water per hour (non-existent) and a 43,000 kVA transformer (AEG. Transformatorenfabrik, Berlin), among the largest that had been built so far [28]. A girder crane, which was used to lift and move parts of the turbine, by Unruh u. Liebig from Leipzig – the largest one in Silesia, with a span of 30 m and a weight of approx. 90 tons – was installe on the first floor of the engine house [30].

The company entrusted the project of extending the power station and managing its construction to Richard and Paul Ehrlich [10]. Construction works were carried out by reputable companies, mainly from Wrocław. The reinforced concrete structures were calculated and made by a team of two specialized companies, i.e., Gebrüder Huber and Huta AG under the supervision of engineer Fischel and Marcus PhD [10]. The aboveground part of the engine house was built by the aforementioned companies together with Simon & Halfpaap. Linke-Hofmann-Lauchhammerwerke built the iron structure of the boiler hall and the engine house, whereas Eisenwerk Trelenberg – of the pump station and the cooling tower. All the construction work was managed by Kley and Weigt [10].

The most important and difficult task of this stage of the investment was the construction of a new engine house, especially foundation work, in order to "fix this huge machine safely and in a shock-free manner" [28]. The foundations of the turbine were insulated from the foundations of the building. Due to the unfavorable ground and water conditions, the machine house was built on approximately 1000 reinforced concrete piles [28]. A turbine was set up in the engine room on the first floor, which was 17 m high and lit from three sides. The roof structure with a span of 30 m was supported by lattice trusses with a lantern for ventilation.

The interior of the engine room was designed and made by a painter-decorator (Fig. 8). As in the case of the interior of the engine room from 1910, it was arranged with exceptional care as a representative space, emphasizing the company's rank. The painting works were carried out by famous Wrocław artist Hans Rumsch who collaborated with the Ehrlichs at least since 1900[4]. *The functional interior of the engine room was arranged very simply. It was given* […] *a 2-m high green ceramic dado; the coffered ceiling, which was made of reinforced concrete slabs, and the walls were kept in two bright shining shades of yellow. The iron roof structure and the large girder crane were supposed to be light gray or dark green, and the floor was to be covered with tiles – with a green-and-gray interlace pattern* [10, p. 414]. The building, which was described by the architects, has survived to this day almost in its original condition along with a crane; however, without the original interior design.

The Ehrlich brothers adapted the new architecture to the existing complex. *In the engine house, the raw brick surfaces were divided by concrete cornices which at the same time showed to the outside stiffening reinforced concrete ribs, necessary in certain places due to the large span and height of the perimeter walls.* […] *The visible*

[4] Hans Rumsch (1855?–1908) was the author of interior decorations of, inter alia, Wrocław public buildings, the Exhibition of Crafts and Applied Arts (Ausstellung für Handwerk und Kunstgewerbe, 1904), president of the Arts and Crafts Association in Wrocław and the Province of Silesia (Kunstgewerbereverein für Breslau und die Provinz Schlesien). After his death, the company Hans Rumsch Malergeschäft was run by Max Streit, a painter-decorator.

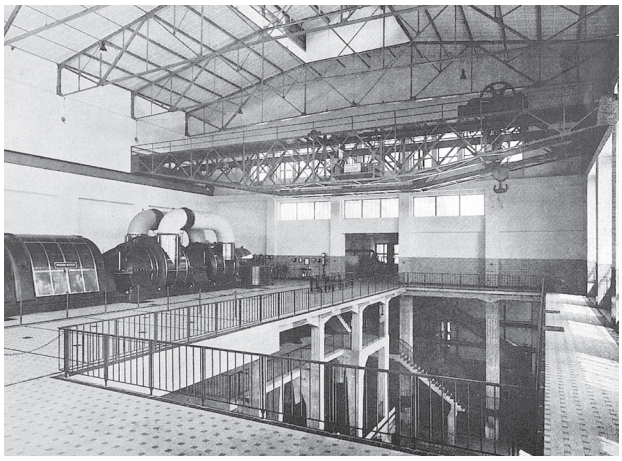

Fig. 8. Interior of the new engine house.
A view towards the east, 1929 (source: [12])

Il. 8. Wnętrze hali nowej maszynowni.
Widok w kierunku wschodnim, 1929 (źródło: [12])

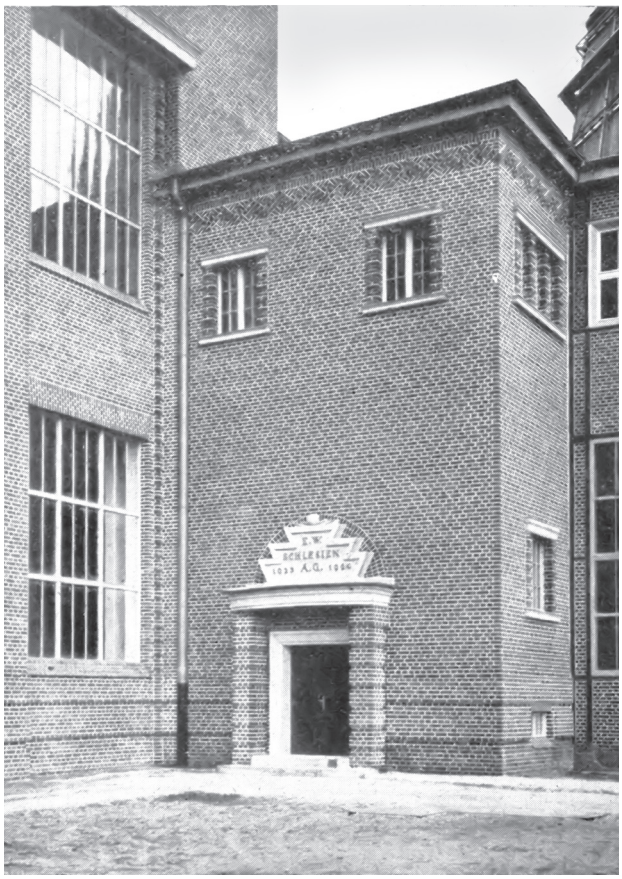

Fig. 9. Fragment of the western façade of the staircase between the buildings of the new engine house and pump station with a decorative entrance portal with the inscription: E.W. SCHLESIEN 1925 A.G, 1926
(source: [10], in the collection of the Wrocław University Library)

Il. 9. Fragment zachodniej elewacji klatki schodowej między budynkami nowej maszynowni i pompowni z ozdobnym portalem wejściowym z napisem: E.W. SCHLESIEN 1925 A.G, 1926
(źródło: [10], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

iron parts of the iron framing walls [of the pump station and boiler house], *as well as the iron windows, were kept in two strong green shades, whereas white and gray were chosen for the wooden windows of the workrooms and the iron windows of the engine house. The outer doors and gates were bright red and green* [10, p. 414].

Modern architecture with cubic forms and smooth façades resulting from the function is in line with the tendencies of the interwar New Objectivity architecture. In this context, the forms that give it a "ceremonial" character and emphasize the company's prestige are surprising. On the symmetry axis of the front façade of the engine house, between the niches for devices (oil switches), there is a geometrized antiqued gate portal crowned with a triangular pediment, with brick jambs with a rustication texture, similar to the details of Behrens factories in Berlin. Decorative brickwork bonds of window jambs and zigzag friezes, cast stone lamps (with the texture of a diamond grid resembling torches), star-shaped forms (concrete supraporte of the portal leading to the engine house staircase with the inscription E.W. SCHLESIEN 1925 A.G. 1926; Fig. 9) and the off-set top of the engine house show the relationship of this architecture with the Brick Expressionism of Northern Germany formed in the Hamburg environment in the 1920s.

100,000 V overhead station in the years 1927–1928. Illumination as an advertisement for the company

The open-air electrical transformer station was built in the years 1927–1928 on an elongated plot of 8,500 m^2, adjacent to the Wrocław–Laskowice railway line from the south and a mechanical workshop hall from the east. Its modernity consisted in the fact that all transformers, switches and auxiliary devices were placed in the open air without any casing, which was to increase the safety of energy exploitation [31].

The structure of the transformer station consisted of rows of a grid of riveted iron transposition pylons and beams connecting them in two directions. There were foundations and riveted stands for devices (transformers, switches, etc.) between the pylons. Some of these authentic elements have survived to this day.

The switching station control house, also known as the guardhouse, served as the station's "brain". One guard could therefore handle the entire layout on his own [31] (Fig. 10). The body of the building was symmetrically designed and crowned with a low-hipped roof with a lantern. On its flat brick façades, windows were placed rhythmically, and on the side of the station – a wide, polygonal, glazed bay in order to observe the station. The upper storey in the form of a hall housed a control room with measuring devices with a visible structure made of riveted plate girders. This valuable example of matter-of-fact industrial architecture could have also been the work of designers Richard and Paul Ehrlich, who completed the largest extension of the plant in 1926. However, no confirmation of their authorship was found.

A night photograph of the transformer station, which was taken before 1935, apart from the technical function

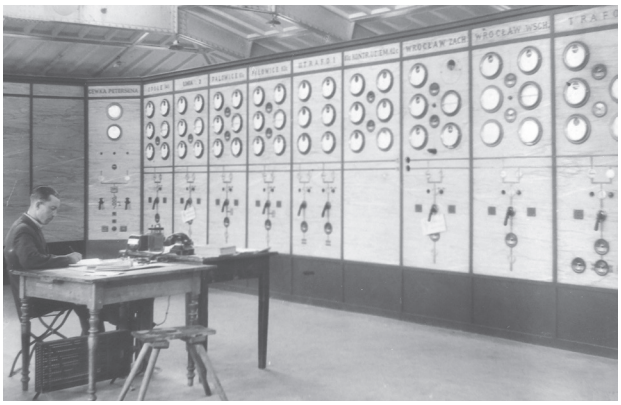

Fig. 10. Interior of the control house of the 100 and 40 kV overhead station with measuring devices on the first floor, 1949 (source: [32])

Il. 10. Wnętrze hali nastawni napowietrznej stacji 100 i 40 kV na piętrze, z urządzeniami pomiarowymi, 1949 (źródło: [32])

include the designs of the AEG High Voltage Factory in Berlin or postcards issued on the occasion of the East German Exhibition in Poznań with the representation of The Upper Silesian Tower [8, pp. 94, 96].

Murals by Tadeusz Ciałowicz in the 1960s. Cooperation between artists and industry

Cooperation between artists and industry flourished in Poland in the 1960s. In 1965, the exhibition entitled Plastic Arts in the Industry, during which 302 exhibits related to 44 industrial plants were presented, took place in Wrocław [35, p. 30]. It was then written: *The necessity of strict specialization, due to the requirements imposed on engineers, creates a situation in which the presence of an artist who is familiar with the specifics of industrial design is necessary* [36, p. 201]. The idea of bringing art and culture to the working class led to the employment of artists in industrial plants.

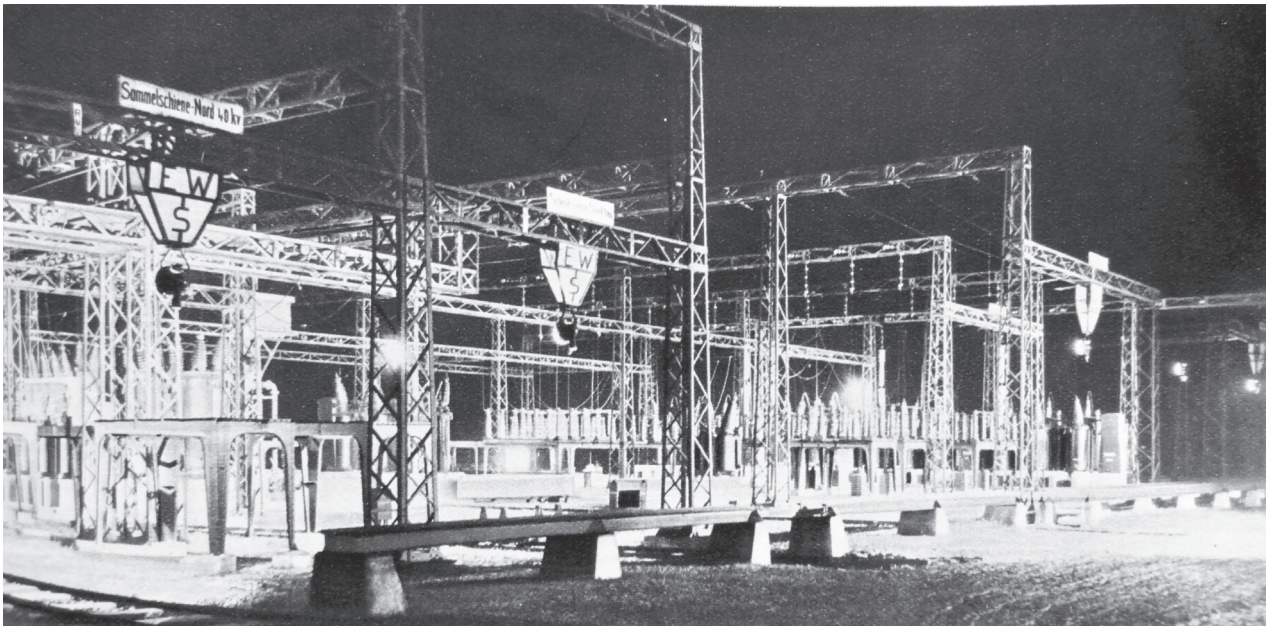

Fig. 11. Night illumination of the overhead transformer station with a voltage of 100,000 V, around 1928–1935 (source: [19], in the collection of the Wrocław University Library)

Il. 11. Nocne oświetlenie napowietrznej stacji transformatorowej o napięciu 100 000 V, ok. 1928–1935 (źródło: [19], w zbiorach Biblioteki Uniwersyteckiej we Wrocławiu)

of its lighting (night supervision over devices), also shows the advertising function for selling the product – electrical energy (Fig. 11). The structure of the station, thanks to its theatrical illumination, floodlights and trapezoidal glass lamps with the name of E.W.S. AG, created an "artistic" installation, probably drawing the attention of passengers of the nearby railway route. On the eve of the World War I, industrial architecture was often depicted in night lighting to advertise the company [33, p. 82][5]. Examples

At the end of the 1960s, high-class artistic wall paintings outside and inside selected buildings of the power station in Siechnice were made by visual artist Tadeusz Ciałowicz[6]. One of the murals preserved to this day was created at the height of the second floor of the southern façade of the switching station building (Fig. 12). Ciałowicz made

[5] The issue of illumination of architecture was popularized still before World War I by Bruno Taut and Paul Scheerbart (Werkbund Exhibition, Köln, 1914), then in the 1920s by Joachim Teichmüller (from: [34, pp. 63–77]).

[6] Tadeusz Ciałowicz (1927–2019), a graphic designer and interior architect. He was a man of many talents and designed neon signs, posters, graphic identification of institutions, furniture, interiors, and various decorations on a large and small scale [35].

Fig. 12. Building of the switching station of sections P1-4 and P-7 (new electrical switching station from 1917–1923) on the south side, the wall with a mural by T. Ciałowicz from the late 1960s (photo by A. Gryglewska, 2019)

Il. 12. Budynek rozdzielni sekcji P1-4 i P-7 (nowa rozdzielnia elektryczna z lat 1917–1923) od strony południowej, ściana z muralem autorstwa T. Ciałowicza z końca lat 60. XX w. (fot. A. Gryglewska, 2019)

a wide frieze presenting human figures separated by geometric motifs in an abstract way. The other mural, known from literature and the oral tradition of the power plant employees, has not survived. It was located in the conference room of the fire station building and presented a panorama of the power plant with cooling towers, traction lines, as well as the course of the technological process [35, pp. 188, 189]. Ciałowicz painted it together with Waldemar Chwedczuk. The above-mentioned artworks are the last ones discussed in this article and fit into the issue of cooperation between an engineer and an artist in the field of industrial architecture at the power plant in Siechnice.

Summary

The architecture of the former Tschechnitz Power Plant until the end of World War II, was consistently kept in red brick and ceramic roofs with smooth walls and linear geometric divisions along with bright accents of concrete details. At the beginning of the 20th century, it was an example of the phenomenon of simplification of historical styles and it was in line with the tendency, visible in German architecture, to assign a factory building the rank of an important architectural issue. This approach also determined the next phases of the plant's extension. Investments, which started at the end of the World War I, already had the features of modernist architecture, the New Objectivity, as well as expressionism. The basic features of the existing buildings were consistently continued both in the realities of the Third Reich and after the World War II in Poland, when tradition-inspired architecture bore the stigma of the political system.

Elektrizitätswerk Schlesien AG and its power station in Siechnice performed an important role at the beginning of the 20th century in the process of electrification of Lower Silesia and in supplying the region with electricity. Before World War II, the company was the largest electricity supplier in Lower Silesia, and the technical solutions as well as devices used at that time were record-breaking in this part of Europe. However, it is difficult to compare its size with the then large coal power plants which were situated in the area of today's Germany[7].

Contrary to the majority of German and Polish historic power plants, the urban layout and the building character of the plant in Siechnice, which was established at the beginning of the 20th century, have remained almost unchanged to this day. The complex has not undergone radical reconstruction or modernization after 1945 and is in good technical condition. The Czechnica CHP Plant in Siechnice will be closed in 2024, when its role will be taken over by a modern plant, which is going to be built in the vicinity and will be powered by low-emission gas fuel. The letter of intent signed in 2019 by the owner of the plant and the mayor of the town of Siechnice on the revitalization of the industrial facilities of the combined heat and power plant by giving them new functions began the process of preparing this project, whose first stage was

[7] Out of more than 50 German power plants from the 1st half of the 20th century which survived to the post-war times, several now produce energy after modernization connected with the transformation, demolition, or adaptation of historic architecture, e.g. Berlin Klingenberg (1926–1927), West (1931) and Moabit (1900, 1923). Some power plants were lost, inter alia, Heegermühle in Eberswalde (1909–1912), Zschornewitz (1915, in 1918 with the largest turbines in Europe) and Trattendorf near Cottbus (1910–1914). Several power plants, designed, inter alia, by Georg Klingenberg, Werner Issel and Paul Bonatz, were adapted for museum, culture, trade and administration purposes, such as Main-Weser in Borken (1923), Wölfersheim (1913), Rottweil (1915–1916), Westkraftwerk in Dresden (1895) [37], [38]. In Poland in Silesia, Bobrek Power Plant in Bytom, currently Szombierki, one of the largest in Europe (1920, designed by Georg and Emil Zillmann) was protected by entry into the register of monuments in 2013, which did not prevent the devastation of its equipment.

to develop the history and valorization of the plant's architecture. As a result of the research and assessment of the preservation level of the buildings, it was concluded that the entire complex and its individual buildings should be covered by monument protection. The preservation of this important industrial heritage is required by the rich history of the power plant, the high level of technology "east of the Elbe" in the 1st half of the 20th century, the value of architecture, especially its aesthetic aspect, as well as the authorship of the outstanding Wrocław architects Richard and Paul Ehrlich. An important reason is also the fact that the plant as a workplace was connected with the lives of many generations of the inhabitants of Siechnice.

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Abstract

The power station of Elektrizitätswerk Schlesien AG in Siechnice. An industrial plant in the 20th century – a work of an engineer and an architect-artist

The subject of the article is the architecture of the Tschechnitz Power Plant (currently Czechnica CHP Plant) in Siechnice near Wrocław. The plant, built during the period of intensive development of the power industry in Lower Silesia at the beginning of the 20th century, was the result of cooperation between an engineer and an architect-artist, postulated by architects associated with Deutscher Werkbund. The aim of this article is to present the history of the construction and development of the power plant as well as artistic shaping of the urban layout, façades, representative interiors of the machine rooms, mechanical workshops as well as facilities with an advertising function. The analysis of the history and the present condition of the complex was possible thanks to field research carried out by the authors, a query of source materials and texts in the professional press as well as iconography from the years 1910–2019. The conducted research is the basis for defining the scope of monument protection and for revitalizing the power plant, which will be closed in 2024 with regard to the policy of decommissioning coal-fired power plants in Poland.

Key words: industrial architecture of the 20th century, art, power station, Siechnice, historicism, functionalism

Streszczenie

Elektrownia spółki Elektrizitätswerk Schlesien A.-G. w Siechnicach. Zakład przemysłowy w XX w. – dzieło inżyniera i architekta-artysty

Tematem artykułu jest architektura elektrowni Tschechnitz (obecnie Elektrociepłownia Czechnica) w Siechnicach pod Wrocławiem. Obiekt budowany w okresie intensywnego rozwoju przemysłu elektroenergetycznego na Dolnym Śląsku na początku XX w. był efektem postulowanej przez twórców związanych z Deutscher Werkbund współpracy inżyniera i architekta-artysty. Celem pracy jest prezentacja historii i przekształceń elektrowni, artystycznego kształtowania jej układu urbanistycznego, elewacji, reprezentacyjnych wnętrz maszynowni, warsztatów mechanicznych i obiektów o funkcji reklamy. Analiza historii i stanu obecnego kompleksu była możliwa dzięki przeprowadzonym przez autorów badaniom terenowym, kwerendzie materiałów źródłowych, tekstów w prasie fachowej oraz ikonografii z lat 1910–2019. Przeprowadzone badania stanowią podstawę dla określenia zakresu ochrony konserwatorskiej oraz rewitalizacji tego zakładu po jego planowanym zamknięciu w 2024 r. wskutek polityki likwidacji elektrowni węglowych w Polsce.

Słowa kluczowe: architektura przemysłowa XX w., sztuka, elektrownia, Siechnice, historyzm, funkcjonalizm