

THE ROLE OF IRON IN THE HISTORICAL ARCHITECTURE ON THE BASIS OF
EXAMPLES FROM THE GDR

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The law for preservation of historical monuments (1975) provides the basis for preservation and conservation of the GDR's cultural heritage, and consequently for that of historical, scientific, and artistic witnesses of the use of iron.

Thus, following the law, the examples of the use of iron are taken care of and legally protected by respectively responsible organisations (Ministry of Culture, district councils, city councils). The registration and documentation of the existing examples of the use of iron proceeds in connection with the general inventory of the historical monuments in the GDR. A special exhaustive research to this effect, particularly from the point of view of monument preservation, is still in its initial stage. There are numerous examples of the restoration work on iron planned and already conducted. The scientific and practical experience extends from mechanical, electrolytic, and chemical procedures to recasting some badly damaged parts. Developing a suitable, worth of generalisation methods of preservation of iron is based on this experience.

With this report I would like to give a survey of the examples of the use of iron existing in the GDR, and try to show some trends of its development.

It was ironworks and iron-foundries of the 18th and 19th centuries that created a broad production basis and with the use and spreading of artistic and constructive iron made a substantial contribution to the beginning of the industrial revolution, which began in Germany later compared with England and France.

At first, however, the use of iron was limited to the production of stove plates, reliefs, ornamentation of buildings, statuettes, monuments, etc.

Already in 1725 the Lauchhammer works were founded, whose production flourished under Count Einsiedel. In 1806, from Gleiwitz, where iron had been cast since 1796, the King's iron foundry was established in Berlin. Alongside with these big ironworks and foundries a lot of smaller ones came into being, such as in Bernsdorf in Saxony, and Königshütte and Ilsenburg in the Northern Harz Mountains.

Through their work the new, easily moulding material penetrates into the building industry. In 1791, in Wörlitz park, the first landscape park laid out after the English fashion on the continent in the 18th century, the first iron bridge in Germany was built. It was a small wrought iron copy of the cast iron Severn bridge in Coalbrookdale, England. Already in 1781 a wrought iron chain bridge was built in Wörlitz park. In 1796 another wrought iron bridge, the so-called 'Sun Bridge', followed. But it was cast iron that prevailed in the new foundries at first. Four cast iron bridges remained in Schwerin Castle park. Their origin in 1840 is due to the plans of Lenné to redesign and expand the park. These bridges, which consist of three braced arches each, were cast supposedly in the most efficient foundry in the surroundings of Güstrow.

In the King's iron foundry of Berlin, founded in 1804, all kinds of iron casting were practised. Alongside with the cast iron creation which will be later our concern such works of the iron-casting art were produced as the three portals of the Friedrich Werder church, designed by Schinkel in 1824-1828. Or the ornamented parts of the Berlin Castle bridge, called Marx-Engels bridge now, both designed

by Schinkel, too, in 1819. Of these cast iron parts only those of the parapet remain in situ. They show intricate arabesque seahorses alternating with tritons and dolphins.

The King's iron foundry of Berlin reached a high artistic level because apart from Schinkel a group of other prominent artists such as Schadow, Rauch, Tieck, etc. was connected with it. They not only made models, but steadily improved the technique of iron casting. In this way the Berlin foundry achieved great successes in the field of sculpture. Here in 1827/28 the four groups of horse-taming Dioscuri, which are standing in front of the Old Museum, were cast by Christian Friedrich Tieck after the antique model. Sculptural creations of the King's foundry of Berlin were preceded by those of the foundry in Lauchhammer in the electorate of Saxony. In 1780 Count Einsiedel, the owner of the foundry, began to make copies of antique statues and reliefs. The famous monument to the fallen Count Einsiedel, dating back to 1793 has been preserved in the church of Wolkenburg in Saxony. To the best creations of the Lauchhammer foundry belongs the monument to Victor Moreau, built in 1814. It was built on the battlefield in Recknitz near Dresden, designed by G. Thormeyer, and may be considered as an important monument of classicism in Dresden.

The Wars of Independence gave new impulse to the cast iron architecture. The combination of a classicistic feeling for style and patriotism born in the Wars of Independence woke a special preference for cast iron which was understood almost ethically because of its unpretentiousness (1). This is also an explanation of the cast iron jewelry, which was very popular during the wars and, at the same time a symbol of the sacrifice of the people. Cast in 1810, the jewelry of Queen Luise became famous as a document of a movement which emerged as a preparation for the wars for independence: 'I gave gold for iron'.

In the same way as moulds made by Schinkel served as the basis for this jewelry, Schinkel's designs were used for iron monuments which were to be erected at the greatest battlefields of the years 1813-1815 after the victorious liberation wars to keep alive the memory of these days. Four of these monuments were cast in the King's foundry of Berlin. All of them have the same form and differ only in the cast-in texts. These monuments, two of which still exist, were erected in 1817 in Grossbeeren (district Zossen), Dennewitz (Jüterbog), in Grossgörschen (Weissenfels), and Waldberg on the Elbe. These monuments were neo-gothic ornamented pyramids 18 feet high (about 5.60 metres) with a Prussian military order 'Iron Cross' on the top. The order was also cast after the design of Schinkel in the foundries of Berlin and Gleiwitz since 1813. Of these four only the monuments in Dennewitz and Grossgörschen still exist. The monument to those fallen in the battle of Grossgörschen had to be pulled down because of its poor state. Some parts have been preserved.

The cast iron parts of the above-mentioned monuments were strongly oxidised and partly completely dissolved by the influence of water condensing inside the monuments and by weather influence. It has been suggested that the monuments should be completely restored by recasting the necessary parts. In the case of the Grossgörschen monument 75 % of all parts must be cast anew. All other options proved to be unrealisable. The remaining and the newly cast parts would be glued together to prevent water condensation (2).

Special importance is attached to the preservation as a part of the maintenance of the military-political heritage of the GDR of the so-called 'Schinkel pyramids', which narrate about the victories of Prussian army corps over parts of the French army and thus present a worthy memorial to the national liberation war of 1813.

Already in 1811 (18.10.) a monument cast in the King's foundry and designed by Schinkel in memoriam of the laying-in-state of Queen Luise was inaugurated in Gransee. The citizens of Gransee and the neighbouring district Prignitz had collected 2000 taler to have this monument erected.

There is a drawing by Schinkel, which is probably identical with the design, and shows the market in Gransee with the monument. The sarcophagus - a simple coffin with the raised head part - is on a pedestal covered with an ogive canopy placed on the light cast iron columns. Luise's monument exists at present and is in good state. Schinkel did also the design of the cast iron canopy for the Luther memorial on the Market Place in Wittenberg, which was built in 1817-1821. It covers the bronze figure of Luther standing on the granite pedestal. In 1967 this canopy was restored with the help of parts cast in Lauchhammer. The canopy was originally in green hue, perhaps to harmonise with the bronze statue. Incidentally, the cast iron canopy of the Melanchton monument was made 30 years later. Another important existing example is a 10 meter high canopy over the Gustav-Adolf memorial stone in Lützen, which was designed by Schinkel, too. This canopy was erected on the occasion of the 200th anniversary of the death of the Swedish king in 1837 at the place where supposedly Gustav-Adolf fell in 1632 and which since then had been marked by a boulder, the so-called 'Swedish stone'. The canopy of Lützen was cast in Lauchhammer.

Today, apart from the above-mentioned construction, a memorial chapel from 1907, and a Swedish blockhouse there is also a memorial place of a Swedish Gustav-Adolf Foundation, which is under the spiritual supervision of the archbishop of Uppsala. In 1976 the restoration of the canopy began. It transpired that the damage was too great, it was essentially a question of bendings and cracks. The monument was then dismantled. The parts of the construction are being repaired and conserved now. Almost no original parts are missing. The reconstruction is to be completed in 1978/79.

From 1810 till the end of the thirties of the 19th century Schinkel supplied designs and models for a series of the most important creations of the monumental art in cast-iron, partly in neo-gothic, partly in classicistic style. One of his chef-d'oeuvres is the already shown 18 metre high neo-gothic monument on Kreuzberg in West Berlin (1818-1821).

The dawn of the industrial revolution is connected with classicism. That is why cast-iron creations had classicistic or romantically-gothic forms. There was almost no branch of architecture where the new building material, iron, was not tested for its applicability. More than ever before it came in close contact with the dogmas of the traditional architecture. The process of design assimilation was therefore especially difficult and contradictory. Solutions found ranged from hiding the iron parts used as an auxiliary means of construction to the visible moulded form of iron. There were also various attempts to imitate stone forms by special treatment of the iron surface, or to mould iron parts according to the principles of classical tectonics.

These first attempts to use a modern material in inherited forms are especially typical for the beginning - it is evident that iron casting evolves from artistic casting and not from architecture. Cast iron could be brought practically into every desirable form. It could be of use in all provinces of the tradition-indebted building art without destroying the world of traditional forms. As examples of the above said I-ll show same cast-iron works of the foundries in Northern Harz.

An obelisk was erected in Mägdesprung in 1812. It was cast in the foundry of this place, stood on basalt base with cast-iron stairs and was built of four 14 metre long cast-iron plates. Because of its decay in 1975 the obelisk had to be pulled down with the consent of the Institute for Preservation of Memorials of the GDR. The large plates were preserved and will be exhibited in a foundry museum which will be organised in Ilsenburg in future. The idea of an obelisk will not be abandoned, because of its landscape-forming character - initially done in sentimentally romantic style. The obelisk will be reconstructed, and although it is not yet decided whether it will be cast or built from rolled plates, the important thing is that it will be rebuilt in its original form. The material should not play the major part, taking into consideration that the obelisk will be given a black protective coating.

The foundry in Mägdesprung has existed since 1646. There still exist samples of the cast-iron architecture scattered in Mägdesprung and Alexisbad as it was at the beginning of the 19th century. One can mention the entrance building of the so-called Alexisstollen dating back to 1830 with a cast-iron Doric front of the temple or the cast-iron columns of the former bath-house in Alexisbad. Or the cast-iron Temple of Luise at the same place, cast 1823 after an antique model. The same model one can trace in the stone structures of the parks of Wörlitz (with its Temple of Venus, 1794) and of Sanssouci (with its Temple of Friendship, 1772/73). A well in Weida in Thuringia belongs to this group as well. Here the formal and materially realized attempt to imitate natural stone by cast iron is especially apparent. Cast iron won a strong position in architecture. Apart from its aesthetic qualities, its technological advantages were of perhaps great import. The whole construction blocks from cast iron - above all columns and entablature - were used. The King's foundry, erected presumably according to Schinkels plans in Harz in 1824 is characteristic in this respect. It is probably the first installation that can be regarded as a factory with many buildings in which all necessary production processes took place. During the construction of this foundry cast iron was used not only for lintels, window-sills and window frames. There's an eight-column Doric portico at the main building. The entablature constructed of cast-iron plates is supported by the high cast-iron columns. This monumental portico gives more than functional dignity to the industrial building (3).

This example shows that constructional possibilities provided by the new material as a result of a rapid technical progress remained unapplied to the creation of new building forms. Behind historical facades lay constructional possibilities and realised constructions of the new time. This masquerade of design was overcome, especially in the industrial building, only in our century. Industrial buildings were branded with ugliness, and that was the driving force of the attempts to give these buildings a 'face-lifting' (4). That is how the gable of the King's foundry is to be understood - as an evidence of the gap between the design and the function existing at that time.

Iron is still cast in the King's foundry. In 1960 the corroded portico of the historical building, which had been reconstructed to keep pace with technical progress of the foundry was pulled down. Its reconstruction is impossible due to the present-day problems of space in production.

The newly introduced construction parts were further fusing into a building form. In England cast iron pillars and stair-cases came into being (J. Nash built the Royal Pavilion in Brighton in 1815-1816). Schinkel, who highly valued these works (5), later used the English model in some buildings of his. He used cast iron pillars in

Schauspielhaus to carry the tiers (1818-1821), or cast iron staircases in the palaces of Prince Karl (1827-1828) and Prince Albrecht (1830-1832).

In the initially existing glass-roofed court of the hunting seat Granitz on the island of Rügen, built in 1836 according to the plans of a Berlin architect Steinmeyer, in 1844 there was added a 38 meter high look-out tower designed by Schinkel. It had a winding cast iron staircase inside. The 1.25 metre wide free-carrying curved flights of stairs, constructed of richly perforated trapezoidal stairs building a stable unity with the "Wangen" and bannisters, are carried by the landings supported with consoles. Three flights of stairs lead in a somewhat dizzy ascent to a look-out platform, from which one has a wonderful view of Rügen.

Today the seat of Granitz is a much-visited museum. A comprehensive reconstruction work, which includes the cast iron staircase, which is still functioning and is used in summer by more than 5000 visitors daily, will be concluded in 1985. As for the staircase - an additional casting and replacement of some parts is indispensable. There is, moreover, a suggestion to build in new corbels between the landings and to fasten steel cables to them, which will support the cast-iron stairs (6). Another winding staircase, which was built earlier in the beacon tower designed by Schinkel in 1825 and erected in 1829 on Cape Arkona on the island of Rügen, also proves that the widespread and easily mouldable material rapidly found application in building industry. Architecture got a completely new basis. Cast iron occupied an important position even where very strict requirements were to be met.

As an example of this a cast iron staircase in Schwerin Castle could be mentioned. Built in 1857 under the direction of Stüler, and destroyed in a fire in 1913, it was to lead to the former Golden Hall and was cast in the Runge factory. An important achievement of iron casting is also the magnificent cupola of the entrance to the castle in Schwerin. It was built in 1851-1857 after the design of Stüler. But an earlier and a more important work is the cupola of the Nicholas church in Potsdam, which was destroyed in the Second World War. It was built in 1843-49 under the supervision of Ludwig Persius, and after his death after that of August Stüler and Gustav Emil Prüfer. It was a realisation of the project by Schinkel (1829) to crown the central building with a double cupola. As suggested by Ludwig Persius the outer cupola was not built from wood, but a special iron construction was built in the Berlin machine factory and in Borsig's foundry. It consisted of 56 double arches put on small cylinders (7). This cupola was destroyed in 1945. In 1955-60 it was rebuilt as a steel construction covered with copper after the original drawings from Borsig factory from 1848.

The New Museum is one of the earliest examples of ironwork openly exposed in its function as perforated support where it was attempted to give an artistic form to its constructive function. Of special notice is the use of supporting constructions of almost 10 metre span on the second floor. These 9.73 metre long cast-iron binders are made of two-part cast iron low arches, and are kept together by two wrought iron tie rods made of 7 forged rods each. The cast iron tie-beams are layed on the flanges in the middle of the section area of the binders. Inbetween there are brick curvatures, which are built so flat that after plastering the ceiling it looks like one whole vault (8). This visible iron construction made by Borsig factory has a richly gilded ornament from zinc or stamped brass.

The use of iron constructions made it possible for Stüler to build spacious rooms of great height, limited by the demand not to raise

the New Museum too high above the Old Museum by Schinkel. In one room on the upper floor the ceiling, made as a late gothic star vault, has ribs from wrought iron, the copings from wire netting covered with plaster - the construction which later came to be known as 'Rabitz'. The New Museum is to be rebuilt and will serve as museum again. At present the work to secure the building destroyed in the Second World War began. The inner rooms partly preserved in their original form are the last witnesses of an extremely important stage in the Berlin building tradition on the Island of Museums. They are witnesses of the time of high qualities of art and handicraft and of the exceptional engineering and technological achievements.

In the park of Pillnitz Castle near Dresden there exists a hothouse (the so-called 'Palm House'), built in 1879 by Anhagen. Although it was built relatively late, it occupies a prominent position in the history of glass and iron building, because of its architecture, which uses almost only glass and iron, and is concentrated on the function. As a model for the central part of this house served evidently the hothouse designed by van der Straten for Brussels. The round central part has been changed, however, into an octagon, but like the house of the Botanical Garden in Brussels it has wings (9).

The Palm House is not used to-day, because of the bad state it is in - through corrosion it is mostly glass that holds it together. But it is preserved to provide for a possible new casting and reconstruction. A remarkable achievement is also the outlook tower for the Löbauer mountain built in 1854 in the Bernsdorf factory. Octagonal in layout it rises to 28 metre height. There are three outlook platforms at 12, 18 and 24 metres. A 120-steps winding staircase connects these platforms. Except the ground floor, all seven floors are of perforated filigree work. The language of the forms follows gothic models and corresponds naturally to the character of iron casting. The densely perforated wall plates were put into the grooves of the three metre long, floor-high columns. The 8 outside columns are anchored and braced with the inner columns, which support the staircase, building thus a single spatial structure. The seams between the cast parts were filled with lead. The tower was constructed in 1854 within 2.5 months.

In the years 1965-1966 this interesting instance of the use of iron was restored. It was necessary to cast 300 parts. The work was done in Lauchhammer, with high quality, by the VEB Steel and Iron Works. The tower on the Löbauer mountain is further used as an outlook tower.

Steadily development in the first half of the 19th century industry put a new task - construction and designing of its technology. From the standpoint of the history of arts the dawn of the industrial revolution coincides with classicism. Gothic was viewed as a generator of the building system of the future. Therefore the machines of this time received gothic or classicistic forms. An example of a happy union of purpose and beauty of form is the Schwarzenberg air-pipe for the blast furnace of the former Anton's foundry. This neogothically designed installation, which began operating in 1831, was cast allegedly after the plans of the Freiberg machine director Christian Brandel using some models of the machine-building works in Halsbrücke. In 1925 this air-pipe, which had worked for 94 years and was driven by water, was put out of operation. Not because it was unable to work, but because the power of water could be used more efficiently by a turbine. To-day it is put in a special protective house on the territory of the old Elisabeth's pit near Freiberg as a technical monument to the art of machine-building.

The intention to give technical devices and machines a form with the help of architectonics its limits for design in 1841-1842 in the steam-engine house for supplying the park fountains of Sanssouci with water. The house was designed by L.Persius, and, being made of glazed bricks in the form of a Moorish mosque with a cupola made it possible to disguise the chimney as a minaret with a cast iron top part. The cast iron frame and parts of the machine by August Borsig join this ensemble. And the richly decorated engine-room under a cupola also speaks the same language through its galleries of cast iron columns ornamented with tin in Arab style. It is planned to restore the whole installation and open it for the general public. The history of the development and use of this new building material which made its way into architecture after centuries of the domination of wood and stone passed from the casting of jewelry, stove plates, and building ornaments to the casting for constructive purposes, such as pillars, supports, cupolas and skeleton constructions. The new technology developed for these purposes showed already the essential traits of an industrial production. We could infer that with the use of iron in architecture in the first half of the 19th century the industrialisation of the building industry began.

Notes

- 1) Reallexikon zur Deutschen Kunstgeschichte, Vol.IV.,P.1130-1133.
- 2) H.Gummelt, Verband Bildender Künstler/DDR; H.Korf, Institut für Denkmalpflege/DDR; Gutachten und denkmalpflegerische Zielstellung zur Restaurierung der Gedenkstätte Grossbeeren vom 5.4.1978. In: Akten der Abteilung Geschichtsdenkmale des Instituts für Denkmalpflege/DDR.
- 3) Chr.Schädlich: Das Eisen in der Architektur des 19.Jhs., Beitrag zur Geschichte eines neuen Baustoffes - Habilitationsschrift HAB - Weimar, 1967.
- 4) H.H.Friedrich: Die bauliche Gestaltung deutscher Eisenhüttenanlagen seit Beginn des 19.Jhs. - Sonderdruck aus "Stahl und Eisen" 80 (1960), Heft 22, P.1636.
- 5) Zeitschrift für Bauwesen 1865, Tf. 57.
- 6) W.Freiss, Dresden: Gutachten vom 24.1.76 zur Instandsetzung der Treppe in Schloss Granitz. In: Akte "Schloss Granitz" der Arbeitsstelle Schwerin des Instituts für Denkmalpflege/DDR.
- 7) Institut für Denkmalpflege - Abt. Bestandsforschung: Die Bau- und Kunstdenkmale in der DDR - Bezirk Potsdam, Henschelverlag, Kunst und Gesellschaft 1978, P.322,323.
- 8) A. Stüler, Berlin: Das Neue Museum in Berlin. Verlag von Ernst & Korn, 1862, Tf. I-XII.
- 9) H. Magirius: Notizen zur baugeschichtlichen Bedeutung des Palmenhauses im Schlosspark Dresden-Pillnitz vom 24.1.73. In: Akte "Schlosspark Pillnitz" der Arbeitsstelle Dresden des Instituts für Denkmalpflege/DDR.
- 10) K.Bernert: "Der Aussichtsturm auf dem Löbauer Berg" aus: Denkmalpflege in der DDR, 1975/2, P.51-54.