

ity of mathematised structures induced respect for technology. Even today, we still have this attitude towards technology, borne by a mixture of uneasiness and respect.

However, this deficit of theory on the technical side also makes it so difficult for technology to devote itself to a method of observation which is again seeking to keep this complexity in view.

I would recall that technology gives the appearance of being so especially efficient because by tendency it dissolves connections in the framework of complex relationships and reduces them to linear structures. As thus only one part of the whole is seen, it is then hardly any wonder that it does not only not see the side effects, but also its own boundary conditions, and consequently also does not reflect. Boundary conditions are the result of nature as it exists in its limited form although technology regards it as an inexhaustible source of material and in which it dumps those of its products which it does not want or no longer requires. This is of particular importance because this does not occur in a closed circuit, as is the case in undisturbed nature in which the circuits return what they have extracted. In this respect there is a balance.

The efficiency of technology also comes about because, on the other hand, by human standards, it leaves an uneven balance because the reciprocal effect between nature and technology is not organised in such balanced circuits.

As the framework of criteria for technology is not directed at such phenomena, technology only inadequately understands the criticism levelled against it. This criticism is not only felt to be a nuisance, but also as being unseemly. Because, of course, in technology's opinion, everything is very rational and also successful, and hence not open to criticism.

Concluding discussion under the chairmanship of Prof. Dr. C. BEUTLER

After Bornheim's supplementary contribution, Beutler points out the similarity between Moller's cupola in Mainz and Madern Gerthener's tower top for Frankfurt Cathedral, which burnt down in 1860, and regards this as a romanticising imperial iconography. There are no simple solutions for the question of iron architecture even after 1850, instead there is a complicated and manifold relationship. It was proposed that the following individual points should once again be particularly emphasised:

1. Problems of theory.

They must be differentiated, especially as the theory is often not formulated until after the practice, and requires a great deal of fantasy. Werner's paper on the theory of technique is printed here as a separate contribution (pp. 139-145). Strobel draws attention to the mechanisation of the building industry as a decisive prerequisite for the innovations in engineering construction in the nineteenth century. The boom in technical sciences took place outside the universities (technical institutes of education). It was not until the end of the nineteenth century that engineers were granted doctoral degrees. The social component plays a major and prominent role in the century's great projects.

2. Problems of history of style and building typology.

On the basis of considerations of the history of style, Wörner asks at what other point of time in the history of art iron could have been adopted as a construction material to a greater extent. The slender forms of the plans for Neo-Gothic virtually demanded a material with which this could be expressed. He refers to the term of the desire for art in Alois Riegl's work. Beutler believes that iron was available at the right moment in the required amount. The mass society which was coming into existence required new structures (halls, railway stations, department stores, large libraries, etc.). Iron proved to be a material which could be cheaply and quickly processed. It is the concurrence of various phenomena which explains the appearance form of iron architecture. Ulrich refers to the lack of an independent building typology for the architecture of the second half of the nineteenth century, which up to now has primarily been regarded from the aspect of Historicism in the history of art. The bases for the development of iron architecture have still to be found. The building types were, it is true, already formulated as a new construction task in the first half of the century, but it was not until the second half of the century that they really came into their own, when they were given a social function and it was possible for them to be technically realised. According to Nikolaus Pevsner (A History of Building Types, London 1976), the main principle in the development of building types is their differentiation, which Wehdorn considers could be better described as organisation of space. In England and France, the notion of building type is rejected anyway. Königs refers to a partial aspect of construction theory, namely the theory of building forms and building aesthetics which contribute a retarding element to progressive technical theory, as forms taken from stone and wooden architecture are adopted for iron architecture. Beutler mentions the difficulty art historians have in understanding iron architecture which is governed by other laws (e.g. the need for expansion joints). This fact is seconded by Peters. The art historian, with his dependence on visual impressions, cannot necessarily adopt the differing prerequisites of technology, as also the influence of increasing mathematisation on our understanding of the world. Libal supplements this with a reference to the increasing

specialisation in science. As the technical constructions must also be understood by the art historian, interdisciplinary cooperation is necessary. Sperlich regards such considerations as coming too late, as they have already been dealt with in Viollet le Duc's Gothic theory. Schulz refers to the magic figure of the middle of the century, and the self-exhaustion of a style which only led to a yearning after stone after certain types of mixed forms had been tried out. Iron is again understood in a serving role. Königs again refers to the interrelationship between art and technology. Himmelheber sees a similar relationship between the criticism and enthusiasm for iron during the nineteenth century. There are now also reactions from iron construction on stone construction, particularly exterior architecture, e.g. balconies, railings in front of façades, etc. In particular he emphasises the importance of the new, shallow span cupolas, which at the same time become an element of style. This is also true for the building form for department stores, which also comes from iron construction.

3. Material questions and building forms.

Peters refers to the continued predominance of iron for bridges. One problem is, however, the poor fire safety, particularly the greater coefficients of expansion of wrought iron and steel, which practically led to cladding. Hartung once again emphasises the link between technical iron constructions and ship construction, particularly in England. The major buildings of the period were, in particular, reinforced stone structures. Wehdorn adds that iron was being adopted to an ever increasing degree in general building practice. For reasons of fire safety, legal measures for the cladding of iron were demanded; in Germany in the 1880's, in Austria as a building ordinance from 1907 on. Mayr asks whether the second half of the nineteenth century was really a caesura in the development of iron construction. He sees this, rather for the period around the First World War, in particular also in artistic respect, and regards a third colloquium to conclude this series as useful. Alt emphasises the importance of fire safety measures for the course of the transformation of iron architecture. Modern architects seldom employ steel visibly. Swittalek once again underlines the shock which the fire in the Burgtheater on the Ringstrasse in Vienna caused. After that, the laws on fire safety in Austria were considerably tightened up. Their influence on architecture forms is thus considerable. Wörner supplements this with a reference to the skyscraper fire in Chicago in 1893. Himmelheber regards the most perfect iron cladding as being reinforced concrete, something which Wehdorn in particular expressly rejects. Werner once again emphasises the increasing problems concerning expansion joints.

4. The problem of traditional art historical terms.

Ullrich refers to the divergence between the thinking of architectural historians and technicians. On the basis of the basilical plan for structures, Beutler demonstrates that this form is particularly well suited for large, covered assembly rooms, including churches. He considers it necessary for the terms used in art scholarship to be considered anew, including function and Historicism. Historicism is probably gradually acquiring different dimensions.

RESOLUTION

At an International Colloquium of the German National Committee of ICOMOS in Bad Ems in 1981, the role of iron in the historical iron architecture of the second half of the nineteenth century was dealt with from a scholarly aspect.

Among those present were the President of ICOMOS, Monsieur Parent, Paris. A summary of the subjects covered and the speakers is attached. The participants at the colloquium had the opportunity, in the course of a lecture illustrated with slides, of becoming acquainted with the 1886 Kurhaus theatre in Augsburg-Göggingen. They saw that the framework of the Kurhaus theatre was restored after the fire in 1973 in such a way that the substance no longer seemed immediately endangered. However, they learnt with dismay that there is no intention at the moment of restoring this monument which is so important for the history of European architecture.

The importance of the Kurhaus theatre lies both in its extremely modern construction for the time of its building and its coloured and decorative interior appointments. These can be reconstructed for the most part.

The participants at the colloquium thus request that the planning and financing of a restoration, keeping as close to the original as possible, should be ensured in order to restore the building and its interior. Thanks to its great variety, it would also be possible to find a modern use for this so important structure.