Discussion on the paper by F. F. Peters

Ulrich would be very interested to learn more about the practical cooperation between J. Paxton and the Fox & Henderson company, particularly about their respective participation in the technical development work. For J. Paxton had experimented with wood in his greenhouse constructions in Chatham in Derbyshire—particularly in his "Great Stove." Thus he has also not been clarified how much Paxton owed to J. C. Loudon's previous studies concerning the use of cast iron instead of wood. For his glasshouses in Bayswater in London, Loudon, together with the firm of Bailey, had developed a wrought-iron bearing glass-holding section, the renowned "cast bar" which permitted a much higher passage of light by comparison with the wood constructions. But just how difficult it is to gather research material on technology is described by Hix in his book "The Glass House" for his source research on R. Turner who constructed the Palm House in Kew together with D. Burton. Peters refers to Fox & Henderson's great experience in railway and bridge construction. Kernow observes that the phenomenon of heat expansion was taken so little into consideration by many architects. Steel and reinforced concrete change by 1 mm in length for a length of 10 m with a change in temperature of 10°. In the case of the first iron bridge, that at Coalbrookdale that was also not taken into account. Traditional building forms were gradually translated into the new material iron. Cologne Cathedral as a stone construction has no expansion joints as the heat expansion coefficient of stone is very much less. The Crystal Palace was able to stand despite its construction faults (cf. E. Werner: Der Kristallpalast zu London 1851, Düsseldorf 1970). The theory of technology only gradually adopted physical and mechanical principles for all the iron constructions of this kind. Butler supplements this with the reference that the successor building at the universal exhibition in 1855, the Palais de l'Industrie, looked different with its glass roof in the manner of the railway station sheds. This was probably a correction of the weaknesses of the Crystal Palace. Peters supplemented this with a reference to the South Kensington Museum of 1862. Kneussler asks what materials were used for the Crystal Palace, which, according to Peters, were wooden beams, cast and wrought iron. He also remarks that precisely these not calculated initial possibilities and held as a result. The facade in wood also bore itself. Ulrich refers in this connection to the numerous successor constructions which took the Crystal Palace as a model, either as a whole or in part. Particularly worth mentioning is A. Bedborough's "Royal Aquarium, Summer and Winter Garden" in Westminster in London from 1875-76. The building, which no longer exists in existence today, was built on the site of a former palace and its iron construction with Paxton's Sydenham Palace of 1854, e.g. in the pillar cross sections with their four bevelled, rib-like reinforcements for side connections. Or as far as the characteristic division of the gothic (24.98 m) - in Sydenham 72 feet - span arched girders with two diagonal gusset above each other are concerned, the fourfold pillar positioning of the main bearing structures in front of the alignment of the side wings and their cast-iron stiffening latticework which are continued as girders - clearly visible from the room - beneath the gallery ceilings, the radial spans of the glazed galley areas, everything recalls Paxton's proven constructions. Peters emphasizes that the adoption of the idea of the glasshouse with its breadth, size, brightness, the slender dimensions and the filigree characteristic of the iron is more important than the almost forgotten elements which were being constantly technically improved. The triumph of British industry linked with the production of the required quantities of cast iron impressed the world. Sartory stresses that it was precisely the transparency of the Crystal Palace which impressed the public, as contemporary descriptions. The removal of the technical faults of this building by building round the structure led to the abandoning of the building's main characteristic, namely its transparency. Thus successor buildings of this kind are regressive. Peters doubts whether the transparency of buildings was progressive. Sartory refers to railway station sheds which did not have fixed roofs. Forbeish supplements this with a reference to the striving for extended rooms since the Baroque period (Orangeries and tent-like rooms, right down to the Olympic Stadium in Munich). Ulrich mentions the importance of transparent rooms in the literature of the nineteenth century. Botta asks about the strange foundations of the Crystal Palace which Peters thinks were perhaps made necessary by the short period of construction.

Discussion on the paper by D. Dercsey

Botta praises the achievement of the Hungarian department for the preservation of monuments. In Germany, by contrast, numerous important technical cultural monuments have been preserved in recent years. Keller points out the similarity between the Budapest station and the Gare d'Austerlitz in Paris. To reply to a question by Breitling on the composition of the Budapest prize jury which pushed through the preservation of the station, Dercsey only mentions one curator of monuments, all the rest were railway specialists and state engineers. Kernow asks about the art historical importance of the Budapest pillars, for which Werner and Butler mention Viollet le Duc's paper and the nineteenth century's understanding of Gothic.

Discussion on the paper by R. M. Ulrich

Butler stresses the difficulty of the documentation for this group of buildings on account of the numerous changes. Basically it is a building type with a large interior courtyard in which daylight and the weather were important. The relationship between interior courtyards, storey height and display area. Ulrich confirms this. Light was required as light from above as the side areas of the buildings were storage areas. It was in department stores that the gallery floor type of structure was first carried through and varied systematically. The origins are the Crystal Palace. The stock exchanges in Paris and London are stone structures. See also the Parthenon Theatre in Dijon. Ulrich describes the gallery structures as a basic type of skeletal structure with its forerunner in Baroque theatre construction. The link proposed by Custodia between palace galleries and medieval priest's church, as a gallery structure was not accepted. Butler sees rather a link with the bazar.
type and, over and above this, a typically French achievement of the
nineteenth century. Alt mentions costs and construction time. Ulrich
adds that England did not adopt the building type because of the
danger of fire, but Germany did in trade-fair buildings. Slotte asks
whether with a double-skinned cupola. Ulrich mentions the
department of store builder, Boileau. The cupolas served to avoid
the formation of condensation and variations in temperature, and
also for aesthetic reasons. Werner mentions the multi-skinned design
of the cupolas as characteristic for Paris.

Discussion on the paper by Chr. Beutler

Ulrich stresses the importance of the Grand Palais for the develop-
ment of the conception of the building to be formed in the nineteenth century
on account of the difficulty of linking glass and iron constructions
to masonry structures. Werner points out the similarity of this exhi-
bition building to department stores, also to the GUM building in
Moscow. This is perhaps due to the fact that the observer came more
to the fore for the objects on exhibition and goods on display. He
asks whether this could be determined from contemporary documents.
Beutler replies that there are probably no sources available on this.
The requirements made of a building were varied, even if both repre-
sent an emphasis on the optical aspect. The department stores are
here more modern in structure and form. In the exhibition building,
on the other hand, there is a clear iconographic programme. Both
proclaim their loyalty to tradition and at the same time offer a
prospect of the future. Thus iron construction and building tradition
stand alongside one another. This was also the content of the national
architectural contributions during the universal exhibition of 1900
which avoided any biased definition. Werner refers to the differences
between a museum and an exhibition hall. Bornheim supplements this
with a reference to the top-light halls which can be common to both
museums and department stores, and inquires about the origins which
Beutler says were the no longer extant staircase in the palace of
Versailles and also further examples from the eighteenth century.
Ulrich refers to the fact that the department stores adopted the
element of display from the exhibition hall. Alt calls the subject a
guide to buildings for students of architecture, it which was not at
that time possible to develop for department stores, so that it was
likely that ideas were adopted from museums or exhibition building
construction. Werner refers to the technical possibilities and the
purpose of the girder webs which should not be unnecessarily weakened
in their measurements as they transmit the thrust. In the examples
shown, the web surfaces are completely covered with decoration.

Discussion on the paper by M. Wehborn

Peters stresses the fact that the constructions employed for the
false ceilings in the Burgtheater are, in fact, a preliminary form
of reinforced concrete. Both steel (iron) skeletal structures and
reinforced concrete structures were employed towards the end of the
nineteenth century alongside each other. Beutler refers to the French
stone constructions of the same period which were erected completely
independently of the steel constructions and did not aim for any
permanence of both possibilities. Wehborn calls the glasshouse cre-
cated in 1905 in the garden of the Hofburg in Vienna an example of
separate construction, with a glass roof above a stone plinth.
Werner reminds us of the fact that there was no corresponding
architectural theory in existence for this, but these constructions
were brought into practice. Bornheim provides a further example of the
existence of both types alongside each other with a few examples of
herrenchimae. Ulrich sees a link between the ever more frequent
and more complex steel skeletal construction employed and the new
large room programmes which Wehborn would have known as
building organisation in the case of the in part gigantic structure.
Bornheim expresses the conviction that the Prussian surbase barrel
vault, which came into use along the Rhine from about 1850 onwards
with Zwirner, continues the tradition of vaulted rooms as much; the
circles in the iron constructions' spandrels came from Gothic architecture, particularly that of France. Keohorn refers once again to the connection between the constructions described and the first Viennese Building Ordinance of 1529, which in particular laid down fire safety regulations and thus prescribed barrel vaulting. In the case of rooms for representation purposes this construction was thus partially concealed.

Discussion on the paper by B. Libal

Skittalek points out the parallels between an Innsbruck exhibition building and the Prague Machines Hall of 1899. According to Libal it is quite possible that it was adopted there from Prague. Ulrich emphasises the importance of the glasshouse in Lednice for the development of glass and iron architecture.

Discussion on the paper by A. Tomaszewski

Sperlrich emphasises the question of iron architecture in Poland as a special problem within the Colloquium. Wörner recalls the decrease in enthusiasm for technical architecture towards the end of the nineteenth century in Europe in general. The development can be traced in Poland, emphasised by the country's political and economic fate. Of especial interest here too is the influence of Berlin architecture in the Russian-occupied part of Poland. He asks for more details on this. Tomaszewski has deliberately not produced a catalogue of forms of those forms which were extant in Europe anyway, but has been drawn on those aspects in the development of Poland's iron architecture which are of importance for Europe, especially also the relationship between architect and engineer. Beutler is particularly interested in the change from stone to iron for the pillars in the Raczyński town mansion in Poznań (Poznán) at the owner's request. Tomaszewski confirms that they were painted in stone colour.

Discussion on the paper by H.D. Wörner

Ullrich stresses the importance of the Handbook of Architecture by Durm on account of its details of sources and literature. Various participants, including Ulrich, Lieppe and Hoberg dispute art nouveau's alleged hostility towards iron.

Discussion on the paper by B. Hoberg

Sperlrich asks about the construction of the Turkish tent in the park at Brotningholm which, according to Hoberg, is a wood and copper construction.

Discussion on the paper by G. Hartung

Schulz asks about the influences on the construction of winter gardens and whether elements were adopted from ship construction, as a ship-building nation's desire for form could see its models here. Hartung refers to the available construction experience gained in ship-building (I.K.Brunel, Britannia Bridge, etc.). Wörner refers to the wealth of new forms in the major British bridges, e.g. The Royal Albert Bridge, Tower Bridge or Britannia Bridge, especially through the attempts at stiffening made necessary under the influence of the railways. He refers further to the withdrawal of iron from building