et les bureaux. Derrière: en caves, le chauffage, les centrales sanitaires et électriques, etc., au rez-de- chaussée la réception des marchandises, plus haut les WC, vestiaires et l'installation de conditionnement d'air. Construction: devant, construction en acier, derrière en béton armé. Façades montrant clairement la construction portante. Isolement des appuis de façade par éléments préfabriqués de béton gazeux de 15 cm d'épaisseur. Stores à lames intérieurs à commande automatique. Bâtiment sur cuvelage étanche.

Bâtiment administratif Sulzer, Winterthur (pages 317—320)

Terrain limité par trois rues. Grandes surfaces de bureaux pour usages multiples devant permettre des agrandissements ou transformations ultérieures. On détermina d'abord les dimensions optimum de tous les bureaux en tenant compte des diverses fonctions et opérations. L'analyse aboutit aux mesures suivantes pour tous les bureaux:

Entr'axes de fenêtres	190 cm
Profondeur de bureau	665 cm
Hauteur nominale de bureau	322 cm

L'uniformité des mesures entraîne certes quelques désavantages, qui sont cependant compensés par l'universalité des bureaux.
Tentant de conserver les belles surfaces de verdure, l'architecte projeta un bâtiment-tour simple et économique, mais les autorités refusèrent les plans et demandèrent une construction faite dans le cadre de la législation. Il en résulta un long bâtiment de 5 étages longeant la Schützenstrasse et comprenant deux corps reliés par un immeuble central et profitant d'un merveilleux éclairage est-ouest. Ce groupe peut à l'avenir être agrandi par un bâtiment plus élevé, orienté du nord au sud. La division en deux corps de bâtiment mena à une concentration des cages d'escaliers, ascenseurs et salles annexes en trois points: l'immeuble central et les extrémités nord et sud. Ceci crée deux surfaces de bureaux de 950 m² par étage, divisées par des parois démontables consistant en une construction portante en métal léger et en éléments acoustiques de remplissage soit pleins, soit vitrés. Ainsi, le bâtiment peut être réarrangé presque sans frais pour satisfaire aux exigences constamment changeantes des services qu'il abrite.
Construction: structure en acier. Supports extérieurs portants en acier tous les 190 cm, supports intérieurs de corridor tous les 570 cm. Poutres soudées perpendiculaires à la façade portant les planchers de 10 cm d'épaisseur. Les vides servent de conduites à l'installation de conditionnement d'air. Façade extérieure auto-portante en dalles de pierre naturelle de 8 cm avec isolement de liège. Bâtiment central et pignons en béton armé.

Installations techniques:

a) Conditionnement d'air et chauffage: étage supérieur du bâtiment central contenant la machinerie (filtres électriques et mécaniques, épuration, chauffage et refroidissement de l'air, etc.); conduites principales d'amenée et d'évacuation aux sous-stations des étages; système de canaux introduisant l'air dans les bureaux par les plafonds creux et perforés assurant une bonne ventilation. Ce système se charge de 60% du chauffage, le reste étant produit par des radiateurs sous les fenêtres, ce qui évite les courants d'air et l'eau de condensation.

b) Installations électriques: propre station de transformateurs distribuant le courant aux deux ailes. Eclairage par 3 rangées d'armatures à deux lampes fluorescentes 60W à écrans en plexiglas.

c) Téléphone: situé au sous-sol du bâtiment central, pour le groupe entier.

d) Ascenseurs: ascenseur/monte-charge dans la cage sud; 3 ascenseurs et 1 monte-charge dans le bâtiment central, ce dernier servant au transport de personnes aux heures de pointe.

e) Monte-charge pour documents et plans: ce problème, étudié à fond, est en relation directe avec le classement, le contrôle et la multiplication des plans et documents, et avec le courrier interne. Ces opérations sont abritées dans deux sous-sols des ailes nord et sud. Quatre monte-charge opérés à chaque étage par une personne destinée à ce travail, transportent les documents et copies de plans du 1er sous-sol au 4e étage; deux autres relient le contrôle et l'héliographie avec le classement. Distribution horizontale par des messagers.

Summary

Thinking in Terms of Steel (page 289)

Building comprises a long series of procedures, methods of construction and means of expression in terms of which the architect has to have learned how to think. They can all be sharply distinguished from one another: wall construction with all its law of materials, construction, static conditions is a fundamentally different thing from framework construction. And ferro-concrete construction is utterly different from steel construction. Each of these sectors speaks its own language; each of these languages possesses its own syntax. And what's more, each of these languages is a distinctive autonomous mode of thinking. Well-known are the extraordinary engineers in ferro-concrete, the inspired builders in steel, the people who already in the very beginnings of this profession had mastered their idiom. It is well-known that these engineers have produced creations the boldness and farsightedness of which have had a fundamental and decisive influence on their branch of building, and have even had some influence far beyond their special sphere. The essence of this engineering craft was thinking in terms of arithmetical categories. Of less significance for them was the conception of a creation as a whole in the architectural sense.
Things have changed. Calculation to be sure retains its old role with the engineer; now as before, and in an age of increased specialization, of steadily ramifying techniques and procedures, more than ever. It may be regretted or not: the engineer's craft today can no longer create what it could in the early days. Modern large-scale construction is today no longer a keyboard for the engineer to play on without danger, but a special science of expression which has to and seeks to subordinate itself to tasks imposed from without. In this respect it may be compared with the work of theoretical mathematics. Today architect and engineer are so closely bound together, are involved in such an intimate dialogue, as it were, that only a realization of this phenomenon—a very characteristic one for our time—can a building be viewed and properly assessed.
Everyone who has ever learned a foreign language with any thoroughness knows that the learner only achieves a real mastery of the language when he is able to think in the foreign language. There is a gulf between what is thought in one's own language and its translation in the foreign language, which can only be bridged if the learner takes the time and effort to acquire bit by bit every single substantial, ideational and structural element of the foreign language. All this applies to all our specialized technical procedures, to the new and complex construction methods and especially to steel construction. The fundamental question can be phrased in this way: What are the categories of steel construction? Can they be grasped intellectually? In other words, can they be defined? In attempting to do so, we merely come up against commonplaces. Steel construction is the mode of construction with an extremely large number of possibilities open to it, all of which, however, are subject to a strictly technological law. Steel construction is specifically infinitesimal: the whole of a steel structure determines the detail, and the detail determines the whole—more than in any other type of construction. Building in steel means precision down to the last millimeter. It means not seeking to mould a recalcitrant material but to integrate it in the whole organization. It demands a knowledge of the latent possibilities of the profile section and a capacity to feel them, an ability to apply them where they make sense and where they and they alone are correct. Every attempt to "create" architecture with steel comes to grief, and that with deadly certainty, on—steel. It proclaims immediately where the error was perpetrated. It is ridiculous to attempt to lie with steel. But to learn the proper essence of steel construction calls for tireless labour and experiment; collaboration among many very highly disciplined techniques; an affair of the most exact co-ordination, and conscientious preciseness. It is relentless opposition to all shapeless generalization. Finally it is a questions of leisure. Steel construction can never be reduced to workaday routine. It is and always was hard and conscientious intellectual labour; it calls for penetration and intuition.

If things are viewed in this light, steel construction could be described as one of the highest stages of contemporary architecture.

Steel Tubular Construction (page 290)

In the early days of steel point-house construction exclusive use was made of statically determined framework constructions, assembled from profile members, and those tie and thrust members. The builder was limited in advance by the early incidence of buckling. But even then boldly conceived structures could be erected, although builders were restricted by the static possibilities of the profile members. In contrast thereto the tube, with uniform distribution of material in cross-section, is the ideal building element, marked by high elasticity and a resistance moment equal in all directions. To be sure, at first, tubular construction could be used only to a limited extent as long as ways had not been discovered to bind tubes together securely and economically. It was only progress in welding techniques that made tubular construction technically and economically feasible. Possibilities offered by round cross-section were exploited to the full so that rivets and gusset plates could be dispensed with, thus facilitating the development of roof headers which resulted in up to a 50 % saving in weight as against standard riveted construction. Although tubes are expensive and electro-welding is relatively costly, this process made working with long spans economically feasible, and in the case of lengths in excess of 15 m. actually resulted in a cost advantage. The longer the tubular header the more economical, as experience reveals. Scientific tests prove that welded joints without gusset plates are especially effective. The light weight of tubular construction leads to further advantages which frequently contribute to a reduction of overall building costs. It results in an appreciable reduction in transport costs and facilitates speedy and simple assemblage with light-weight tools. The round shape of the tubes and the way in which they are joined prevents accumulation of dampness and dirt and reduces the danger of corrosion. The protective surface to be applied is negligible in proportion to the weight of the material, as tubes need only to be protected on the outside. All tubular constructions are welded air-tight so that no corrosion can take place on the inside. Since only one side is subject to attack the rust danger as against open profile construction is reduced by one half. Light construction is of especial importance today when conditions demand that builders be as economical as possible in their use of steel. The great advantage as against constructions with steel profiles lies in the considerable saving in weight. A comparison may make this clear: two simple pendulum stanchions about 5 m. high, one a tube 133 x 4, the other an INP profile 28, both under uniform load of 10 t. The profile support necessary at this load weighs, on basis of overall length, 3.8 times as much as the tubular support. The seamless steel tube is superior to the profile even if account is taken of the differential price of both rolled products. The superiority of a tubular construction increases with length. Its utilization makes possible today the erection of large shed roofs for factory and warehouse buildings with open roof construction at great saving in costs. The advantages of such open rooms as against others in which operations are constantly interrupted by supports getting in the way of the flow of production are well-known. The slightly extra cost of installation is made up for in reduced operating costs as against production in less rationally organized lay-outs.

Traffic Pavilion at Bucheggplatz Zurich (pages 291—295)

Re-arrangement and improvement of Bucheggplatz rendered necessary by steadily increasing traffic in Zurich, as this important intersection of several busy streets is also a key tram and bus stop and transfer point. Pavilion needed to house various units such as waiting-rooms, newsstand, public convenience with attendant's room a well as storage for municipal traffic department and street inspector. All these various rooms were comprised in one building by architect. Plan square 14.70 m. along side. Supporting structure steel skeleton, consisting of 21 columns and the roof girders, divides plan into a central area with 4 square fields each 5 x 5 m. and a gallery 2.5 m. wide with 4 smaller squares in corner sections. Squares, depending on their function, in part left open, in part closed in by transparent glass elements or aluminium-coated wall slabs. This alternation of glazed, transparent units with closed-in cubicles combines with the rhythmic distribution of these different sections over the whole plan to give the severe and simple design of the building as a whole a plastic variety on the inside and an interesting variety of cubic relationships on the outside. As this is only a one-storey building, the steel structure could be left uncoated. This demonstrates once again the creative possibilities open to the architect when he can use the steel structural elements at the same time as structural parts of an architectural conception. In the case of buildings of more than one storey, the fire laws still in force require that the steel elements be insulated with fireproofing, which seems unnecessary nowadays that large cities are equipped with modern fire-fighting services.

Steel constructions at the exhibition E 55 Rotterdam (pages 296—300)

The Dutch National Exhibition arose in the summer of 1955 between Rotterdam harbour, the Maas Tunnel and the express highway. Standard halls: three decisive presuppositions involved in their construction: 1. Materials to be re-used after exhibition. 2. Design should lead to flexibility in grouping and utmost possible freedom in choice of kinds of display. 3. Should contrast harmoniously with old park landscape with its ponds and tall trees. 12 m. span with 6 m. distance between trusses and 4 m. headway. Combined steel, wood and glass construction. Ends with wind bracing sheathed with wood, whereas sides entirely glazed with horizontal wooden rundles. Sports hall: to remain after exhibition, in middle arena for sports and gymnastics, on sides seating stands for spectators, 14 outside stairways. New section: large part of main hall of exhibition devoted to theme Building and Home. Latest methods of construction, design and town-planning represented. We shall report on the Dutch »Town of the Future« for 30000 inhabitants in the Prince Alexander Polder.

Clubhouse "Neptune" (pages 301—305)

The Neptune Rowing Club of Constance wished a clubhouse of modern design, appointed Hermann Blomeier as architect, noted for modern buildings in Constance and neighbouring towns. Encountered opposition on part of local building authorities with prejudices in favour of traditional styles. Long negotiations and arguments by steadfast architect and owners finally broke down resistance of authorities, who did everything possible to hinder the architect or at least to force him to compromise. The clubhouse has now been completed eight months. Local opinion is divided, but is becoming more and more favourable. Site: on bank of Rhine. The ground floor houses a large boat shed, cloakrooms and shower rooms for men and women, a rowing pool and next to it a covered terrace leading to the river. Large workshop in west part behind rowing pool. The upper floor houses a large social room with an open terrace in front, a hall the glazed outside walls of which provide a free view over river and countryside, and behind a conference room. In addition on the upper floor are the necessary utility rooms for the refreshment service and a two-room flat for the caretaker. It is planned later to extend the building to the street. On ground floor there is to be a second, larger boat shed, workshop, etc. On upper floor of second section will be set up a bowling alley. Visible steel skeleton bears all the weight, its steely rigidity and structural exactness contrast sharply with landscape, yet open terraces and glass walls bring house into intimate touch with surrounding nature. Concrete and masonry walls as well as suspended window structures clearly apparent as distinct elements. Construction and design form one whole. Engineer (Gartner Brothers, Gundelfingen) and Architect share equally in creation. Steel skeleton bright cobalt, panels and supporting structure of windows, doors, parapets painted medium-grey. Aluminium parts left in natural colour.

Technical Institute, Darmstadt Shop of machine-engineering faculty
(pages 306—307)

Relatively restricted site. Faculty for Engineering Construction combined with Institute and Work Shed. Arrangement of building determined by close tie-in between Institute building, at the present time under construction, and the shed. Like factories of medium size, this arrangement brings administration and planning into close connection with factory sheds. As circumstances change the sheds will have to serve other purposes than those provided for at present. This consideration led to the creation of a flexible lay-out, making possible later extensions and alterations. Intermediate section kept low so as to give unobstructed light to shed (skylights could be dispensed with). Building has steel skeleton and has independent elevation elements in glass or in hard burnt brick. Skeleton throughout ultramarine-blue, other parts kept yellow or brownish.

Home of an architect near Olten
(pages 308—312)

Site: difficult but interesting, on steep north slope with view on the valley side toward the Jura. Delays and changes of plan, now, with collaborator Mr. Peter Disch project is progressing, final plan has at last emerged. A small house but a large building assignment. Space for a family of 6. Possibility of housing the office. In this way entire lower floor utilized despite outcropping of rock. When an architect wishes to experiment, he may certainly do so with his own home provided that his wife submits to being a guinea pig. (Our house known locally as the Aquarium). Experiments are attempts to house a relatively big family in a more or less divided-up space and furthermore to see how far the exterior walls can be worked out in glass. Today we feel that both experiments have been a success. Transparency of rooms has a liberating effect, sunshine in all rooms, continuous ceiling makes the small rooms appear larger. Large glass front of Poly-Glass proved its value during the severe winter. Radiant solar heat helps to reduce heating costs. For summer the replaceable blinds must still be built into the projection of the skeleton as sun shield. The entire house has steel skeleton frame. Subject to the laws of the Modulor which was applied and carried out as a further experiment, with one exception, the height of the storey in the ground floor (following building regulation 2.40 m.). The lower floor ceiling and the three concrete sections serve to stiffen the skeleton. Upper floor has roof structure of Durisol slab beams, covered with gravel stucco roofing. Additional glass wool insulation laid over wooden ceiling. The static calculations made by Ernst Schild, Eng. Basel. Furniture designed by Architect BSA Haller, Solothurn.

Project for a tower house Mannesmann at Düsseldorf (pages 313—314)

New Administration Building of Mannesmann Company in Düsseldorf. Slender towering building with severe planes and crystalline transparence forms harmonic contrast to the broad massively organized Peter Behrens Building. Construction: long side runs north and south, which is unusual for buildings of this type. Departure from norm demanded by special situation on Rhine and restricted building site. Concrete core in middle houses lifts, air shafts etc. Around this core on east, south and west offices approached by corridor 1.60 wide. Steel ceilings attached to the ferro-concrete core resting on the outside again on Mannesmann tubular supports which are worked out as pendulum stanchions. In front of these tubular pendulum stanchions hangs the outer skin consisting of Aluwindow sections. Windows fitted with fixed Thermopanes, as entire building is air-conditioned.

New Department Store AG (pages 315—316)

A department store to be erected with several support-free rooms one above the other as well as sufficient storage space in basements. Site: 15 x 45.5 m., to be fully utilized. Organization: sales area in front, utility area in rear. Two basements of sales area for storage, ground floor and 1st floor sales rooms, 2nd floor bar-restaurant, 3rd floor kitchen and offices. In utility area heating installation, electric installation, etc. Construction: steel construction in sales area, utility area ferro-concrete. Elevations to reveal clearly the supporting structure. Elevation insulation furnished by prefabricated 15 cm. thick porous concrete elements. Automatically controlled Venetian blinds. Badly drained site demanded elaborate system of underground waterproofing: whole building resting in watertight basin. Underground stream led under basement back into its original course through system of pipes lying under basin.

Sulzer office building, Winterthur
(pages 317—320)

Building for Firm of Sulzer Brothers AG. Site: area bounded by Zürcherstrasse, Neuwiesenstrasse and Schützenstrasse. Space for offices serving manifold purposes to be designed so as to permit subsequent extensions and re-arrangements as need arises. Preliminary analysis necessary to determine optimum dimensions for all offices, taking full account of all the various functions and operations to be housed. Analysis resulted in determination of following dimensions for all rooms:

Window axial measurement	190 cm.
Room depth	665 cm.
Headway	322 cm.

These dimensions, uniform for all rooms, entail certain disadvantages, but these are put up with for the sake of overall flexibility.
Park land with stand of tall trees intended to be kept as intact as possible, offices installed in economically arranged point-house, in line with city-planning requirements, but the building authorities could not agree to these considerations and demanded a building in keeping with the building legislation. Result: a 5-storey spread-out structure along Schützenstrasse in two sections with a central connecting building with ideal east-west illumination. This group can later on be enlarged by a higher building alined north and south. Arrangement in two large sections led to a concentration of stairs and subsidiary rooms at three points: the connecting building and the north and south ends. In this way there is created between these fixed points a coherent office area capable of being partitioned as desired measuring about 2 x 9.50 sq.m. per storey. Rooms divided by easily dismountable partitions of light metal frame with acoustic panel elements partly solid, partly glazed. In this way building can easily and economically be re-arranged to meet new needs arising from the steadily developing operations of the various departments.

Construction: Steel frame structure. Steel elevation supports bearing the weight 190 cm., interior corridor supports 570 cm. apart. Perpendicular to elevation are welded girders which support the 10 cm. thick ceiling slabs. Resulting hollow spaces serve as distribution conduits for air-conditioning system. Exterior elevation proper worked out in 8 cm. thick native stone slabs with cork insulation entirely self-supported. Connecting building and ends ferro-concrete, take most of the force of the wind.

Technical Installations:

a) Air-conditioning and heating: The top floor of the connecting building houses the central air-conditioning plant (electrofilter, mechanical filter, heater, cooler, etc.) in two parts facing north and south wings. Slightly recessed sections between connecting building and office areas house fresh air and exhaust conduits leading to sub-stations in separate floors. Air introduced into individual offices through hollow ceiling ensuring uniform ventilation throughout rooms. This system takes care of 60% of heating requirements, rest covered by radiators built into window parapets, preventing drafts and steamed window-panes.

b) Electrical installations: The group possesses its own transformer station from which distribution is made to both wings. 220 volts. Artificial illumination by three rows of two-flame fluorescent mountings 60 W with Plexiglass covering.

c) Telephone: The telephone installation for whole works situated in basement of connecting building.

d) Lift installations: With exception of a separate goods-passenger lift in south stair-well all passenger and goods lifts are concentrated in connecting building. Three roomy triplex-group lifts with completely automatic doors supplemented during rush hours by large goods lift which moreover serves for moving furniture and materials.

e) Document and plan transport: The greatest attention was devoted to problem of vertical transport and distribution of documents and copies of plans. In close connection with this problem of transport was the question of filing, plan and document duplication, internal mail distribution, etc. These operations housed in two lower floors in south wing and in north wing. Four document lifts, which on each floor are operated by a person specially assigned for this purpose, are reserved for transport of copies of plans and documents from 1st lower floor to 4th upper floor. Arrangement of whole guarantees smooth operation and eliminates confusion and errors. Horizontal distribution on individual floors by messengers.

Inhaltsverzeichnis

H. G. Rebitzki, Architekt, München	Denken in Stahl	289
Dipl.-Ing. Hartwig Damm, Architekt Düsseldorf	Stahlrohrbau	290
Jacques Schader, Architekt BSA/SIA, Zürich	Verkehrspavillon am Bucheggplatz	291—295
Prof. Ir. J. H. van den Broek und J. B. Bakema, Architekten, Rotterdam	Stahlbauten an der Ausstellung E 55, Rotterdam	296—300
Hermann Blomeier, Dipl.-Architekt Konstanz	Klubhaus Ruderverein Neptun, Konstanz	301—305
Staatliches Hochschulbauamt Darmstadt	Technische Hochschule Darmstadt, Halle der Fakultät für Maschinenbau	306—307
Hans Zaugg, Architekt BSA/SIA, Olten	Architektenhaus bei Olten	308—312
Dipl.-Ing. Paul Schneider-Esleben, Architekt, Düsseldorf	Projekt für das Mannesmann-Hochhaus in Düsseldorf	313—314
Burckhardt, Architekten BSA/SIA, Basel	Projekt für die Neue Warenhaus AG, Filiale La Chaux-de-Fonds	315—316
Suter + Suter, Architekten BDA/SIA, Basel	Bürohaus Sulzer, Winterthur	317—320
	Stahlmöbel	321—324
	Chronik	
	Konstruktionsblätter	