lette d'acier, l'entrepôt a des colonnes-champignons en béton armé. L'élément reliant les deux bâtiments n'est vitré qu'au nord. Chaque détail constructif a sa part dans la présentation des bâtiments. Les travaux actifs du séchage et du nettoyage sont si différents des travaux passifs de l'entreposage qu'on a prévu deux bâtiments correspondants: le bâtiments d'exploitation avec l'installation de séchage, les machines de nettoyage, les laboratoires d'examen de la fertilité des graines et les bureaux, puis un bâtiment pour l'entreposage des graines. Ces graines ayant une valeur très élevée, il fallait prévoir une protection efficace contre le feu. L'entrepôt est divisé par des dalles de béton en trois étages résistant au feu, et les communications verticales (escalier et ascenseur) sont disposées en dehors du bâtiment. Le bâtiment d'exploitation est séparé de l'entrepôt; le mur extérieur donnant sur l'entrepôt est exempt de fenêtre, mais comporte des surfaces de briques en verre qui empêchent l'incendie de se propager. Le côté sud du couloir de communication est ouvert pour que ce couloir n'agisse pas comme une cheminée en cas d'incendie. Le bassin sur le côté ouest du bâtiment d'exploitation sert de réserve en cas d'incendie. Le squelette en acier du bâtiment d'exploitation circonscrit un cube de 13,70 m de côté, placé sur un socle en briques glacées bleu. Les planchers sont en madriers reposant sur des treillis d'acier. Grâce à ces madriers les changements nécessités par l'installation de nouvelles machines ou par un nouvel arrangement des conduites et lignes se font sans difficulté. Les piliers du squelette sont distants de 4,52 m entre axes. La hauteur d'un étage est de 2,70 m; les planchers peuvent supporter env. 1100 kg/m^2. Le cadre en acier a été sablé puis recouvert au pistolet d'une couche anti-corrosive de zinc. A l'exception de vasistas à verre clair, il n'y a que du verre opaque absorbant les rayons. Les remplissages de briques sont glacés blanc, les constructions en acier sont peintes en rouge cramoisi foncé; les cadres en bois des fenêtres à verre transparent, les portes, les lattes derrière le verre et les faces inférieures des plafonds sont peints en blanc, les impostes de ventilation en bois en bleu foncé. L'entrepôt consiste en trois plates-formes superposées, tenues par des colonnes-champignon distantes de 4,52 m entre axes. La hauteur nominale des étages est de 2,70 m. Les planchers sont prévus pour une charge d'env. 1100 kg^2/m. Le verre non-actinique retient les rayons du soleil. Afin de pouvoir stocker séparément les différentes sortes de graines et de satisfaire aux exigences changeantes, on a développé un système permettant de changer rapidement et simplement les barrières divisant les surfaces de stockage à l'aide de tubes d'acier et de planches (voir feuille détachable). Les encorbellement des dalles servent aussi à l'accès extérieur aux impostes si celles-ci sont obstruées par la marchandise entreposée. La construction en acier est peinte en rouge cramoisi, les portes, cadres en bois des impostes, remplissages en tôle d'acier de la cage d'escalier, faces inférieures de plafond et les lattes protégeant le verre sont peints en blanc. Les colonnes-champignons sont brutes, les tubes des barrières sont noirs.

Summary

Industrial Planning
(pages 154—169)

No industrial building in the world—be it the finest or the most beautiful—can be better than the totality of the complex economic area in which it is situated. However thoroughly we study and scale our industrial architecture with reference to constructional qualities, function, industrial physiology, general psychological factors and aesthetics, its environs or hinterland remains the same: the total economic-geographical region receives thereby no better ordering. It is possible to attain the critical limits of the best use of available resources in a constructional complex and then be able to go no further, unless we are to undertake the alteration of the initial situation itself, in that we proceed, for example, to plan on a district or regional basis. Such a procedure would require an exact analysis of the three fundamental types of capacity (surface, population and economic) which, as we know, are of basic significance for any regional area development—and especially in the planning of industrial zones.

Looking at our globe from the point of view of the three previously-cited types of capacity, we may see revealed overwhelming contrasts which are distorting the world: on the one hand a gigantic economic potential, on the other an alarming population potential (Ill. 1). Even if these contrasts are not so vital and appear less striking than they do in the three world maps in Ill. 1 with reference to the following remarks, we may yet state that it is not indicated that in this matter we should not wish to take them into consideration. Today there can be hardly any further dispute to the effect that, as a consequence of the grouping together of certain industrial and commercial forces, urbanization and the flight from the land are distorting our social scene and bringing about emergency conditions such as the plight in housing and traffic. Further correlated effects of these appearances of distortion in our economic field, such as post-war land speculation, the economic boom, the antiquated (from the point of view of planning) bases of law, the sharp increase in the number of cars, and, going hand in hand with this, the far too little effective traffic planning, have the following, generally unhappy, consequences in large towns, especially in industrial or other production areas: muddled and unreasonable distribution of building-land, disconnected building-up of land, incomplete and badly-arranged exploitation and consequently bad utilization; all of which are not uncommon in such zones. Quite often good district planning is worked out, which, however, is directed on the housing-problem exclusively, whereas the industrial zones are dealt with less thoughtfully; indeed, they are sometimes totally neglected. The development of such zones is anyhow unpredictable—so it is said—and their planning therefore impossible.

Zurich with its 430,000 inhabitants can be cited as an example of a typical case in Central Europe of a heavily industrialized and commercialized metropolitan area. In the 17th and 18th centuries, when a pure agrarian economy was no longer sufficient to provide a means of livelihood for the agricultural population, a secondary form, that of work in the home, was introduced. Originally it was a question here of the textile industry. Thanks to transit trade in the city of Zurich, it also became possible to manufacture textiles for abroad and Zurich thereby gained importance; the way to its position as a centre of trade and finance stood open. The area grouping of economic forces was then effected: the journey to work should be as short as possible; optimal traffic conditions were provided for men and goods; and good trade relations, a flourishing market for capital and a lively cultural life resulted.
Only since 1946 have there been industrial zones in the Zurich building regulations (mostly where there were industrial districts anyhow).
The basic conditions of the building regulations run as follows:
"The industrial and trade zones are designated for the settlement of industry and trade, especially for those heavy industries which, on the basis of § 96 of the building laws of the Canton of Zurich, may be forbidden from operating in residential districts (that is, not expressly forbidden!)."
The construction of dwellings in industrial zones is generally forbidden; on the other hand, the setting up of industrial buildings in residential or core districts is not unequivocally forbidden. This enables neither our official administrative agencies nor our private planning experts to differentiate residential from industrial functions in a clean-cut manner. Small wonder then that Zurich—converted into agglomerated areas (Ill. 18) — possesses three times more industrial premises outside its official industrial zones than it does inside them. The consequence of this is that many districts of Zurich are "mixed zones"—it is not the task of this brief study to describe the ensuing disadvantages of this state of affairs.
In planning new industrial zones it is not uninteresting to ascertain how great is the need for undeveloped land per each employed person, divided according to separate economic groups. Some representative examples follow, which appear to us to be extremely informative:

Economic sector	Agglomerated area in m^2/Employed person
General industry and handicrafts	71
General building trade	133
General wholesale business . .	173
Breakdown according to branch	
Metal and machine industries . .	55
Textile and clothing industries .	45
Wholesale	173
Chemical industries	126
Paper, leather, rubber	
Artificial resin	55
Food and beverages	95
Building trade	133
Wood, cork	214
Stones, earth	360

Specific Cubic Metre Building-Volume According to Individual Economic Sectors

Economic sector	m^3 Building-volume/ Employed person
General industry and handicrafts	200
General building trade	300
General wholesale business . .	655
Breakdown according to branch	
Metal and machine industries .	150
Textile and clothing industries .	220
Wholesale	655
Chemical industry	332
Paper, leather, rubber	
Artificial resin	220
Food and beverages	320
Building trade	300
Wood, cork	570
Stones, earth	380

If no new industrial land reserves are created and planned until some time round 1975 and if the problem of "land, population and economy" is not clarified before then, new haphazard industrial zones will automatically spring up in the suburbs outside our town, which will bring to nothing all our social and town-planning endeavours.
There is no need to comment any further on the fact that the organized planning of industrial zones is the primary requisite for functionally and economically productive industrial systems. Of all types of constructional activity industrial architecture is that which is the most closely related to the general problems of distribution, production and consumption. The need, therefore, for precise planned standards is here at its most pressing. If we may be allowed to draw up a little diagram as a balance sheet of our findings, we should like to represent industrial architecture symbolically in the following way: (See illustration page 166).

Transformer factory and General Plan of the Oerlikon Machine Factory, Zurich (pages 170—172)

For some years an overall building-scheme has been worked out within the scope of the architectural development in question for the existing works site, which was to take in the piece of land to the east acquired later. Going hand in hand with this, the disposition of track, the canalization and industrial mains have been replanned. Using the overall scheme as a foundation, it is now possible to build in small stages without distorting the industrial or architectural unity of the plan. A building-height of 6 m. was chosen as the standard unit because extensive calculations had shown that a 6 m. spacing of pillars in the case of both concrete and steel approached the economic limits, and that industrially and architecturally favourable hall spans of 12, 18, and 24 m. were possible with this unit. In the planning of a new complex, architects are given certain fixed requirements right from the start. The main responsibility, therefore, rests upon the works' engineer above all, as he has to ascertain the basic requirements for production flow, size, height and other dimensions.

Atomic Power Station, Hinkley Point
(pages 173—174)

This atomic power station with an output of 500,000 KWH is being built on the south side of the Bristol Channel about 12 km. from Bridgewater. The requirements of an atomic power station are extremely varied. In order to avoid compromises in the elaboration of the constructions and in order to obtain the greatest possible flexibility of design, the various operations have been distributed amongst different buildings.
The two 55 m. high reactor buildings have three heat converters on each side and their auxiliary blast-engine stations. A cooling basin is planned on the south side of each of the reactor buildings.
The turbines are set up on the long narrow tract on the north side. A work shed and a group of buildings containing the office block, the canteen and the welfare building adjoin the turbine-house on the east. These four buildings are connected to one another by means of covered ways.
The outer wall of the turbine-house is covered with sheet aluminium and the windows provided with wired glass. The heat converters and both the reactor buildings have a skin of clear glass superimposed on a little aluminium covering, so that the heat converters remain visible through the glasswork. The face walls of the administrative and the welfare buildings are executed with quarry stone taken from the environs.
The architect reports that it was his endeavour "to harmonize the natural beauty of the surrounding country and the nearby Quantock Hills with the mass of the building-layout. In order to emphasize the harmony of the buildings with the coast the large wall surfaces will be covered with sheet aluminium, because ths metal takes on a patina of a soft grey powder whose colour largely corresponds to that of the stone of the coastal area. All the upper surfaces of the buildings will be kept as simple as possible; the use of projecting design elements has been renounced and therefore there will be no shadows produced but rather the impression of size. The completely glazed outer skins of the reactor buildings will weaken their silhouettes, because, seen from the corners, the building will be transparent.

Industrial Settlement of Temple Fields Harlow (pages 175—176)

Temple Fields is one of the two most important industrial sites of the satellite town of Harlow which, when fully built up, is intended to accommodate 80,000 people. The site covers 60 hectares. It has been built up principally for light industrial works. The individual factories are so laid out that they can be enlarged at the back on the side away from the street.
The settlement is made up generally of four types of factory. The ordinary factory contains a production surface of about 1400 m^2 and a one-storey office building of 500 m^2, a boiler-house, and a fuel-store. The building-layout is planned on the basis of a unit of 7.50 x 7.50 m.
The factory sheds are continuous and erected on steel skeletons; the outer walls consist either of sheet steel or of reinforced-concrete slabs. The inside of the outer walls is, as a rule, covered with insulating panels.

Large-scale Printing-enterprise in Massy (pages 177—179)

The printing-works in Massy is intended to complete the organization of the parent firm of the publishers, Edition de Montsouris, in Paris. The publishers produce periodicals in large editions.

Up till now 8000 m² of a site of 17000 m² have been built up. The buildings have been so planned that they make a highly rationalized work procedure possible.
The paper is delivered, in rolls and partly in reams, on the east side, and is brought from the ramps into the paper-warehouse. The rotary printers, which are over two-storeys high, are set up in halls next to the paper-storerooms. Three of the five halls planned have been built up till now. Once it has passed through the machines, the paper will be taken automatically, after being printed, to the upper storey and there bound and sorted.
The refuse under the cutting- and binding-machines is collected mechanically, conveyed to the basement, cleaned and packed in bales. It is then taken on moving belts to the exit ramps on the west side.
The printed matter goes from the binding-section to the dispatch section on the same level, and from there to the dispatch-ramp .The binding-section, which covers 4,500 m², is joined to the two-storey-high hall where the rotary machines are set up and the dispatch section and dispatch ramp in the form of an ear of corn.
In the basement of the four-storey main building on the south side there are entrances and cloakrooms for 400—500 people, the heating system, the transformer station, and the preparation room for the reams of paper; on the ground-floor is the main entrance, the offset-litho machines and the main store; on the first floor the photographic department; and on the top floor, which is set back, the administrative and management offices.

Pintable Factory in Bingen
(pages 180—181)

The N.S.M. Machine Construction Co. Ltd., had its works premises distributed throughout the whole of West Germany. It has acquired a site in an industrial zone in Bingen which will enable it to concentrate its activities on one spot and allow enlargements to be made in stages. An overall building-scheme has been worked out for this purpose.
In the first part of the construction plan a works premise and an office-building have been erected till up now.
The work premise contains a display hall on the ground-floor, the commercial and technical offices on the upper floor, and the draughting-room on the gallery floor. The reinforced-concrete building is made up of storey-high frames with the outer supports in the form of socketed stanchions. The girders do not lie under but above the ceiling panels, so that the under surface of the ceilings runs through without a break. The upper surface of the ceilings is filled up with pumice gravel to the height of the girders. The power lines are laid in the pumice bed.

Cooper Taber Warehouse, Witham
(pages 182—188)

The first glance at the building-layout gives the impression that it is a design element which has been created where no need for attention to practical or constructive requirements was demanded. Illustration 3 on page 182, which shows the connecting passage between the two buildings, gives only a first impression of the methods of approach of the architects. And further observation makes it apparent that the configuration of the complex has been derived with all its consequences from the problem confronting them. In order to shield the stored goods in the warehouse from the radiation of the midday summer sun appropriately, and to hamper the passage of fire from one storey to another along the length of the elevation, the ceilings have been thrown outwards. The stairway of the warehouse is installed on the outside of the body of the building as it must be separated from the storerooms in a way which is proof against fire. In the production building the form of the ground-floor differs from that of the three upper floors corresponding to use. The outer skin is of glass down to the floor, with the exception of the parapets on the ground-floor, which are walled in order to reduce the danger of glass breakage. Battens are mounted in front of the windows inside to protect them: to the height of the parapets in the production building; and in the warehouse, on account of the height of the stored goods, up to the air vent below the ceiling. The glazing of the production building is only transparent up to half its height. The air vents in the production building consist of wooden boarding on wood frames; the vents are horizontal and narrow so that they do not project far when opened. The production building and stairwell have a steel skeleton construction; the warehouse is constructed with mushroom supports of reinforced concrete. The connecting building has only been glazed on the north side. Each constructional detail has its share in the form of the buildings (see design sheets). The active processes of drying and cleaning are so different from the passive role of the warehouse that the lay-out has been split up into two separate buildings: the production building with the drying-plant, the cleaning-machines, the laboratories for research into the fertility of the seeds, and offices; and the warehouse for the storage of seed.

The high value of the stored seed necessitates effective protection against fire. The warehouse is divided into three fireproof storeys by means of concrete slabs, and the vertical communications (stairs and lift) are set outside the building. The production building is separated from the warehouse in that the outer wall has no window but is finished with glazed brick to hinder the spread of fire. The connecting passage between the two buildings is open on the south side, so that it will not act as a chimney in the event of fire. The water basin on the west side of the production building serves as a reserve supply for fire-fighting.

The steel skeleton of the production building is in the form of a cube of 13.70 x 13.70 x 13.70 m., and stands upon a blue-glazed brick base. The floors consist of wooden planks, which rest upon the steel framework. The planks allow for easy alterations, should they be required because of the installation of new machines or a new disposition of the power lines.

The axial interval between the supports of the steel skeleton is 4.52 m. The storey height amounts to 2.70 m., the floors have a carrying capacity of around 1,100 kg/m². The steel framework has been sprayed with sand before painting and protected against corrosion with a coating of zinc. With the exception of small casements of clear glass, non-transparent ray-absorbent glass is used. The brick fillers are glazed white; the steel construction has been painted dark crimson; the wooden frames of the casements ot clear glass, the doors, the battens behind the windows and the undersurface of the ceilings are white, the wooden air-vents dark blue.

The warehouse consists of three concrete platforms placed once upon the other on mushroom supports with an axial interval of 4.52 m. The storey height amounts to 2.70 m. The floors have a carrying capacity of around 1,100 kg/m². Absorbent glass cuts down the amount of radiation from the sun. In order to be able to store different types of seed and to do justice to varying requirements a system has been elaborated, with the aid of steel tubing and battens, which permits the stalls which partition the storage areas to be easily regrouped (see design sheet). The projecting floor tiles serve as means of access to the air-vents, in addition to being fire-preventive elements; in this way they can be used when the access routes within the warehouse are blocked by stored goods.

The steel construction is dark crimson; doors, wooden air-vent frames, the sheet-steel surfacing of the ceilings and the protective battens behind the windows are painted white. The mushroom supports remain untreated; and the movable stall-tubing inside is black.

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