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Summary

Franz Füeg, Solothurn

The planning of scientific institutes

(Pages 273–284)

This report deals, in its first section, with the planning work on the Scientific Institute of the University of Fribourg (Architects: Jean Pythoud and Franz Füeg). The designated planning organs – architects and engineers – started their assignment in 1961. The decisive part of the job was ended when the first systematic work for large universities, such as Marburg and others, became known. Without having been given any special commission and with the ordinary fees in keeping with a global project of Fr. 20,000,000, the architects developed a construction system which they expect it will be possible to apply to the building of other institutes.

Commission

The assignment was to erect the Institutes of physics, of theoretical physics, of mathematics, of physiology and of physiological chemistry. There was not in existence any precise development plan for the University. The spatial programs were mainly determined by the directors of the respective Institutes.

Survey

In order to verify whether these programs were "in balance" with one another, calculations were made in the already existing institutes.
The documentation studied was an invaluable aid in the work undertaken by the planners. During the setting up of the project, it permitted a precise examination of the requirements and wishes of those utilizing the facilities and enabled the planners to grasp those requirements the reasons for which cannot always be explained by users of the plant, although this is desirable in defining the project.

Questionnaires and site plans

The planners studied the requirements on and the disposition of the different facilities, in collaboration with the users, on the basis of a utilization questionnaire. The users added what was missing. In collaboration with the planners they had their attention drawn to certain problems owing to questions which turned out to be superfluous. Judging by the evaluation of the replies, verification was made of the aptitude of the construction system adopted, and corrections were introduced. Many questions turned out to be useless, so that certain measures taken could be eliminated.
Then there was drawn up for each operating facility (auditorium, studio, laboratory, etc.) a number of sketches on the scale of 1:50 with plan, succession of partition elements and underfaces of the ceilings. Then, with the users of the facilities, there was determined the sitting of all the facilities, the outlets and connections of the mains and, to some extent, the construction materials to be employed.

Modular construction system

The tendency was in favour of a supporting system adapted to all scientific institutes, either involving the method of in situ concrete construction or that of concrete or steel pre-fabrication, and whose procedures permit divisions favourable to the interior construction system.
A relatively flexible interior construction presupposes, as a general rule, that the deck loads are not carried by the partition elements but by props. The intervals between the props depend above all on functional requirements, unless exceptionally large spans are employed.
This is the suitable procedure for small units and for laboratory tables, ducts, sanitary facilities, lockers, doors, switchboards, etc.
The following unit sizes: 12–15, 25, 35–40, 50, 100 and 200 square meters dominated the spatial program. With the modulus of 250 cm and the dimensions of the rooms we get the following correspondences: 250×500 cm
500×500 cm
500×750 cm
750×750 cm,
it being possible to constitute 85% of all units with a tolerance of ± 10%.

Dependence between prop intervals, large moduli and costs

Taking into consideration the chemistry institutes, which will be built later on but which will contain the same facilities in greater number, the planners tried to determine the costs for a large modulus of 125 cm. The spatial division should be feasible every 125 cm instead of every 250 cm. The window axes follow at the same shorter distance and every 125 cm; the mains and ducts should be capable of being introduced directly into the units. Merely for the reduction of the modulus from 250 to 125 cm, there is calculated for the windows and the sunbreaks a supplementary cost of around 1.5% on the total cost. With the same degree of flexibility there is estimated for the technical installations and the interior finishing an additional cost of 1.5 to 2%.
Such are the principal supplementary costs which, in a flexibly designed building, permit, literally, the purchase of spatial dimensions ranging from 3.5 to 4 meters (on condition that the smaller dimension is around 2.5 meters).
The intervals between the props determine the depth dimensions of the units, unless there are chosen especially large spans.
In the early days of planning, chemistry laboratories were still recommended in the specialized literature, and by reason of the experience of users, to have basic dimensions of around 600×300 cm. The spatial areas of the program were mainly adjusted to these basic dimensions. It was up to the architects to prove that support dimensions of 750×750 cm did not involve any reduction of constructed volume and any functional deterioration. Finally, in the case of a support interval of 300×600 cm, there resulted an 8% increase in volume.

Expansion

The expansion of an institute is realizable by replacing another. The load limit of the decks and the installations system, as well as the support system and the interior construction, take into account such an expansion possibility.

Unit partition elements

All the face elements, steel frames measuring 720×350 cm, furnished with glass or sandwich panels, are set between the supporting construction parts. They are not placed in front of or behind the props, so that they can be utilized, keeping to the same dimensions, for the interior courtyards as well.
The walls on the inside are 120- and 60-cm assembly partitions of the width and height of a room unit. The door elements in the walls have the same dimensions as the partition elements. The elements have a thickness of 10 cm.
The partitions between the rooms and the corridors constitute a complex system of assembly and functions.
The unit partition elements have a depth dimension of 90 cm, and, beneath the level of possible suspended ceilings, they consist of

door elements
110×210×90 cm
lockers
110×210×30 or 60 cm
autoclaves
110 or 220×250×90 cm
water outlets
110 or 220×210×60 cm
pulverizing booths
220×210×90 cm
electrical distributor boxes
110 or 220×210×60 cm.

The installation system, the perforations of the ceilings and the modular system permit the free arrangement of these elements inside the modular division of 240 or 120 cm and their connection with the lines and ducts.

The wooden faces, the cables, the ducts and the piping are affixed to three-dimensional metal frames which were suspended adjustably to the ceilings. The impost is suspended from the metal frames. The latter and the wooden face permit the ducts and the piping to be run rather easily into the units.

Modular dimension

The basic modular dimension unit is the modulus of 10 cm, upon which is constructed a three-dimensional grille. This grille is a geometrical system by means of which the position of the construction parts can be determined.

The construction parts limiting the units measure 10 cm multiples of 10 cm, deducting the joints. Thus, the dimensions of the units are also multiples of 10 cm. In the plan, the series of dimensions 30, 60, 120, 240 and 720 cm is the basis of the planning grille.

There was assigned to the props a special grille field of 30 cm. This decision, stemming from various considerations, only much later revealed how important it had been.

The rather unusual procedure was adopted of carrying out the rough construction, except for the supports, in concrete poured in situ and the interior construction in prefab elements.

II

The second part is devoted to a competition project for the Faculty of Medicine and Natural Science of the University of Zurich (1966, architects: Füeg & Henri, associate: Peter Rudolph). It stems from a proposal rejected for the University of Fribourg, and it is based on the planning experiences described in the first part. At the time of the drawing up of the plan for the University of Zurich, it was found that the most important problems are generally the same for the same job, despite the greater magnitude of the spatial programs.

Building Department of the University of Freiburg im Breisgau

Chemistry Institute of the University of Freiburg im Breisgau

(Pages 285–291)

The new building of the Institute of Chemistry III is situated on the University ground where there also stand nearly all the Institutes of mathematics, natural sciences and theoretical medicine.

After the Second World War, the different Institute buildings were grouped around one site. The next development stage now envisages the concentration of the isolated Institutes, in accordance with the structural modifications that have occured, in larger units so as to form a complex that is an annex to the other disciplines.

The Building Department of the University of Freiburg has planned a flexibly divisible laboratory unit. It is a structure of pre-fabricated parts used for the first time in the new complex of the Institute of Chemistry III, and it will serve as a basis for later buildings to go up on the Institute's ground.

The construction and the installations are separate. The small installations shafts have been concentrated in two large shafts which are situated beside the laboratory unit. There are accommodated at that point all the vertical mains. The different levels are served by horizontal mains and lines placed in the intermediate ceilings.
Owing to this feature, the plan is relieved of all fixed installations, which makes it entirely flexible. The Institute of Chemistry III of Freiburg im Breisgau is the first example in Germany of a strict concentration of technical installations.
The high-riser is an isolated 14-floor building. It is a supporting structure of prefab elements. The cruciform plan permits extensions in four directions.

Eva and Nils Koppel, Lyngby

Institute of Technology Lundtofte

(Pages 292–296)

Planned in 1959
Building period: between 1959 and 1972
Planning commenced in 1959. Expansion within the inner area of Copenhagen was no longer possible. The decision was therefore made to put up the buildings at Lyngby, in the vicinity of the city.
The Engineering School of Denmark, founded in 1829, has been attached to the University. Up to the present time, its buildings have been scattered across the city. In 1972 construction will have been terminated. The cost will amount to 564 million Danish Crowns.
The site measures 105 hectares. It is possible to extend it. A highway separates the whole complex into two sections. The east area is reserved for student residences. The north area accommodates the administration building, the library, the canteen, study and reading rooms, etc. The auditoriums and the laboratories are located in the west area.
In the Engineering School wing proper, 500 rooms are reserved for students. In addition, a further 2200 rooms are set aside for students in the neighbourhood. The auditoriums have a total seating capacity of 7200.

Bruno & Fritz Haller, Solothurn

Technical College at Windisch-Brugg

Associates: Armin Rigert & Josef Iten
Steel construction: Wartmann & Cie, Brugg
Reinforced concrete: Alfred Bodmer & Walter Schmidt
Sanitary installations: Bösch & Co, Zurich
Air-conditioning: Walter Wirthensohn, Lucerne. Luwa SA, Zurich
Planning: 1962
Realization: 1964 to 66

(Pages 297–312)

The Technical College of Windisch-Brugg is a new institution under the jurisdiction of the Canton of Aargau. The construction program was drawn up with a view to the maximum number of foreseeable changes that will occur in teaching methods and in educational structures.
The school comprises a main building measuring 54×54 meters and made up of 4 floors and a basement as well as a laboratory building measuring 27.60×106.80 meters with two floors and a basement and a building measuring 27.60×27.60 meters. The latter, which accommodates the auditorium and the dining hall, has only one floor above grade level, but two basements.
The main building contains the library, the computing centre, the technical installations centre, the staff rooms, the conference rooms, the administration, the classrooms and draughting-rooms for electrical engineering, machine construction, infrastructure and superstructure.
In the second building we have the laboratories, the workshops, the installations facilities, the transformer station, the auditoriums and the collections. Finally, the third building is reserved for the main hall in the shape of a large auditorium and the dining hall with a seating capacity of 300.
All the buildings have a steel frame structure, and the interior is entirely equipped with Jetair ventilation.