The Architects' Journal

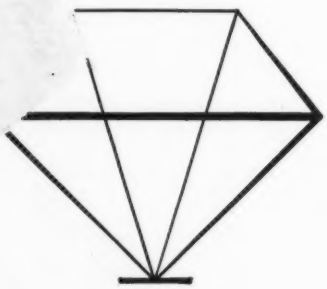
May 29, 1958. Vol.127 No.3300. Registered as a newspaper. One shilling

Architects for the British Government Pavilion:
Howard V. Lobb and John C. Ratcliff;
for the British Industry Pavilion:
Edward D. Mills & Partners;
Consulting Engineers for Space Decks Ltd:
Bolton, Hennessey & Partners

at the Brussels Universal Exhibition 1958

SPACE DECKS

were chosen by the architects for the flat roof and covered way of the British Government Pavilion and the entrance canopy to the British Industries Pavilion.



The basic unit is an inverted pyramid 4 ft. square at the top and 3 ft. 6 in. deep

SPACE DECKS provide the solution to roofing problems in factories, halls, etc., where large, economical, spans are necessary. Unobstructed areas of 50 ft. square are strictly competitive with any other known roofing system. Spans of over 100 ft. can be easily achieved at very low cost per sq. ft. Many other advantages include shallow truss depth, ample gantry loading, efficient and economical insulation, etc., etc.

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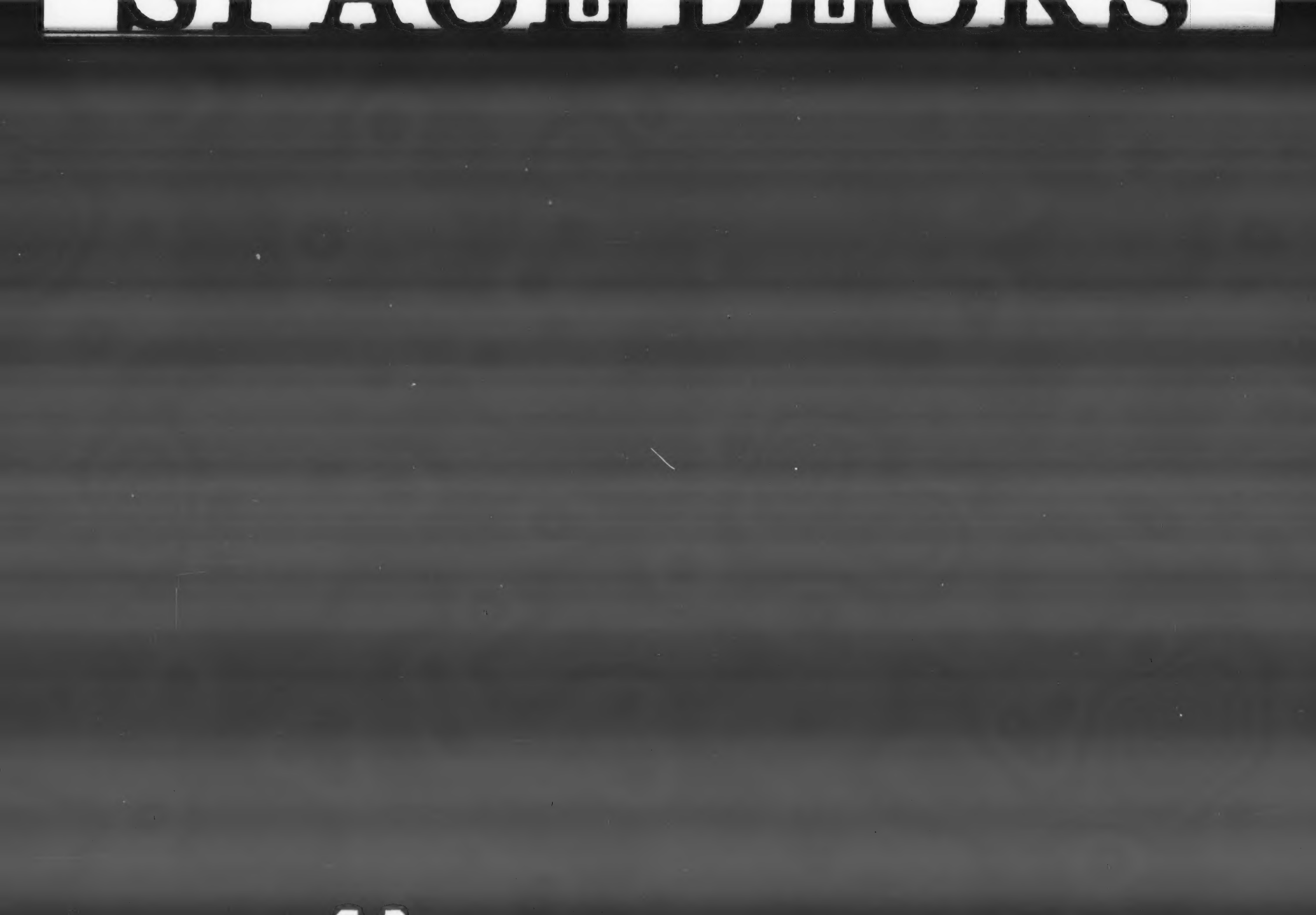
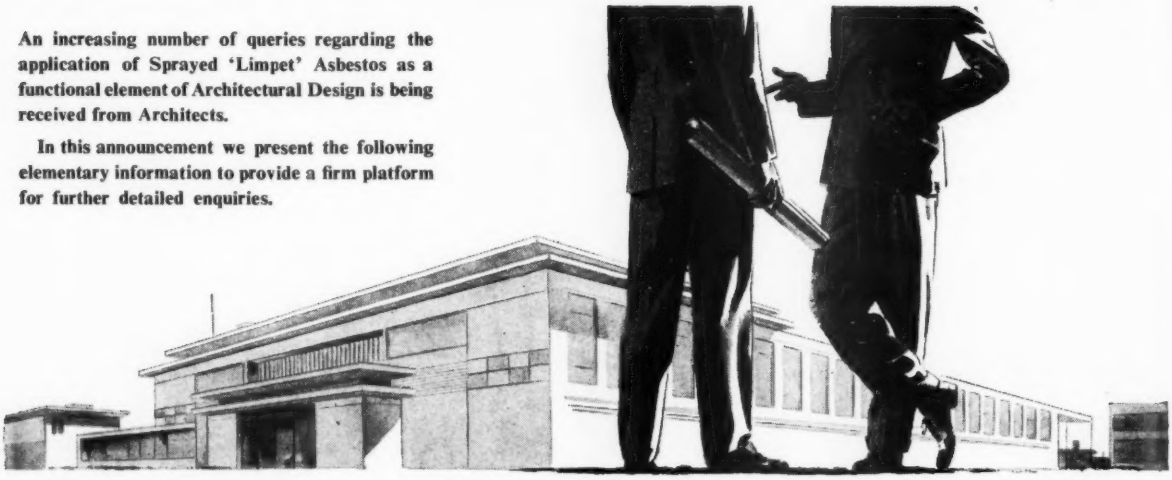

BLACK BLOCKS

An increasing number of queries regarding the application of Sprayed 'Limpet' Asbestos as a functional element of Architectural Design is being received from Architects.

In this announcement we present the following elementary information to provide a firm platform for further detailed enquiries.



an architect asks questions about Sprayed 'Limpet' Asbestos by NEWALLS

REGD.

"What do you consider is the major advantage of Sprayed 'Limpet' Asbestos?"

Probably the most important element is that the 'Limpet' process gives intimate surface contact, sealing all joints, covering rivets, irregularities and protrusions in a continuous coat that entirely eliminates air spaces—a significant factor in itself.

"I understand that Sprayed 'Limpet' Asbestos has two insulating properties?"

Correct. In addition to providing a high degree of thermal insulation, it is an excellent material for absorbing sound. Indeed, many firms have specified the process for correcting acoustic distortions alone.

"Being largely Asbestos, I suppose the process gives a measure of fire protection?"

Most certainly! Again, it is often used solely because of its fireproofing properties. In fact, this method was the first to be approved for Class A fireproofing of ships under the 1948 Convention.

"Being porous, isn't the treatment liable to premature rotting where condensation exists?"

On the contrary. Asbestos is chemically inert. It is rotproof, verminproof and undamaged by water. Condensation is deffused preventing dripping and allowing for speed re-evaporation to the atmosphere from the warm surface of the coating.

"It seems too versatile for words. It's a Thermal and Acoustic Insulant, rotproof and verminproof, fire-resistant, prevents condensation, resists vibration . . . anything else?"

Well. It has been used extensively purely as an anti-corrosion measure on metals subject to severe corrosive conditions, but we'd have to know the particular application you had in mind to give our full recommendations.

"Naturally. And if we did want Thermal and Acoustic Insulation—and Fire protection in one coating—I suppose it would cost the earth?"

Frankly—no. You see, the erection of timber grounds is not necessary. In application there is no cutting to waste, and the density and thickness is controllable to a very fine degree by highly efficient operators. It compares favourably with conventional insulation methods and materials.

Sprayed 'Limpet' Asbestos is a particularly suitable multi-purpose insulant in schools, public buildings and the like. Our considerable experience in this field will be gladly placed at your disposal.

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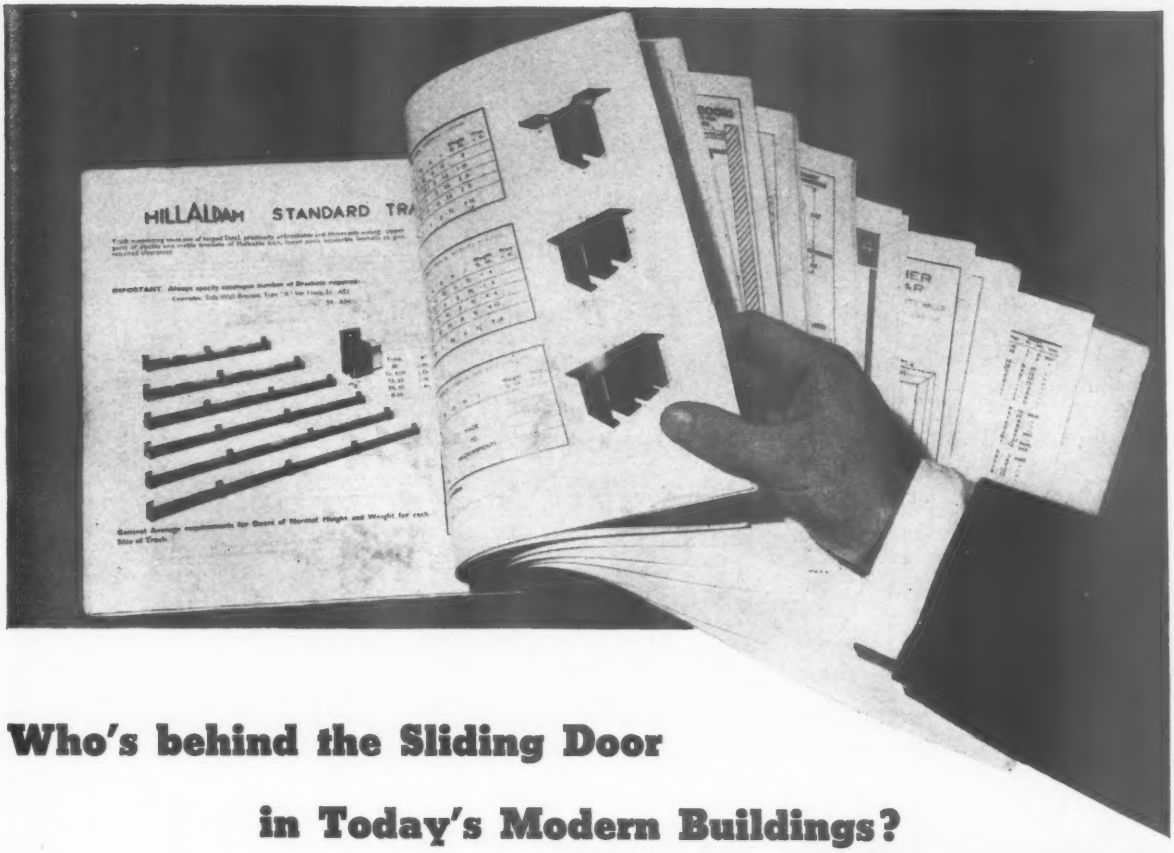


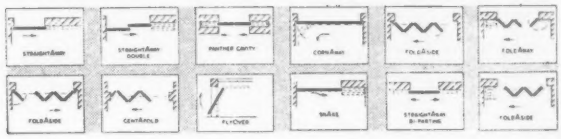
Who's behind the Sliding Door in Today's Modern Buildings?

The best way to get inside information about doors that slide is to send for our book. This is no scrawny pamphlet, but a thick and helpful volume. It provides the key to any door problem likely to worry you. It shows joinery and steelwork details, weights to be carried, allowances for adjustments, scale drawings of tracks, trolleys, guides and a host of other useful information.

Above we illustrate part of Reigate Fire Station. Here, where the doors must open smartly at a touch, some seven sets of our QUIKADOR were installed.

Our technical representatives cover Britain. But don't forget our book! Architectural Edition 27.

FOR EVERY DOOR THAT SLIDES



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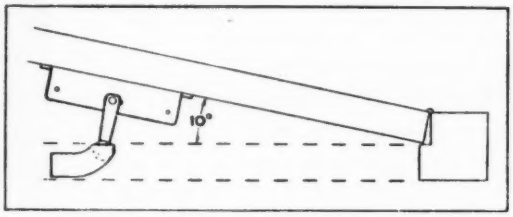
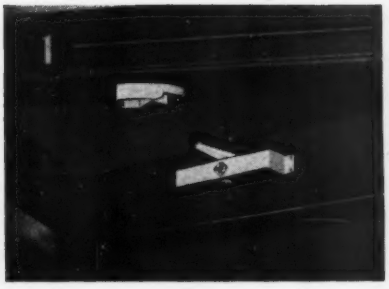
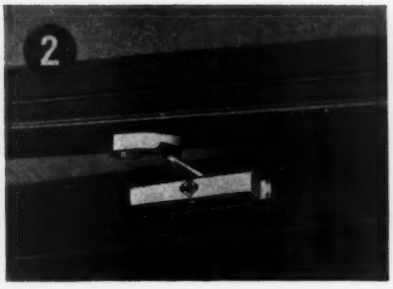
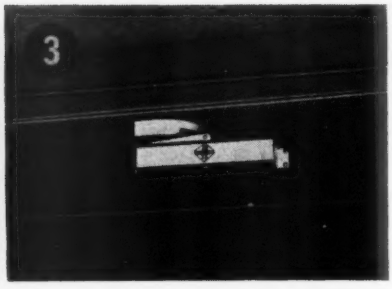


William Newman & Sons Ltd. HOSPITAL STREET, BIRMINGHAM, 19







Auditorium seating

Both in this country and abroad, the reputation gained by Cox for tip-up seating is exceptionally high. For example, they were chosen for the installation of the Royal Festival Hall and of the Free Trade Hall, Manchester. In Venezuela they installed the seating for the great conference hall of the Instituto de la Ciudad Universitaria at Caracas.

Cox are concerned not only with large installations: here are shown models suitable for various sizes of hall.

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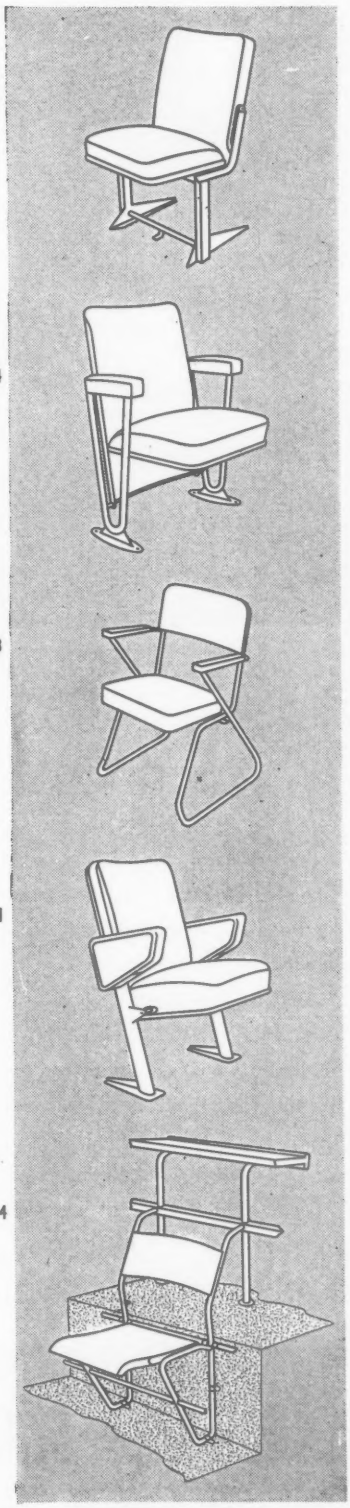

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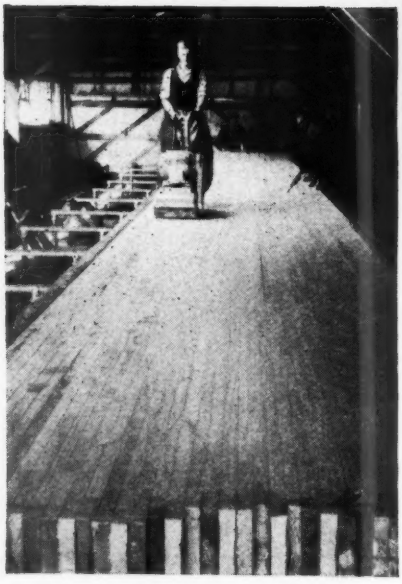
UP OVER DOWN UNDER

The new grandstand of the Matamata (New Zealand) Racing Club is notable for its cantilever timber roof, using laminated beams of radiata pine, constructed by the Lamwood Division of the Fletcher Timber Co. Ltd. at Auckland. These beams each measure 46 ft long, 12½ in. wide and taper from 43 in. to 16 in. deep. Each pair of beams was cut from a block of laminated wood weighing over four tons, and containing 5,000 super ft of timber. The radiata pine was kiln dried to a specific moisture content, which was kept constant by special 'black heat' tubes. Aerodux 185 resorcinol resin glue was used throughout, because of its unequalled durability, resistance to all weathers and stability in the event of moisture changes occurring in the wood.



Cleaning the surface of one of the 4-ton laminated blocks by means of a floor sander.

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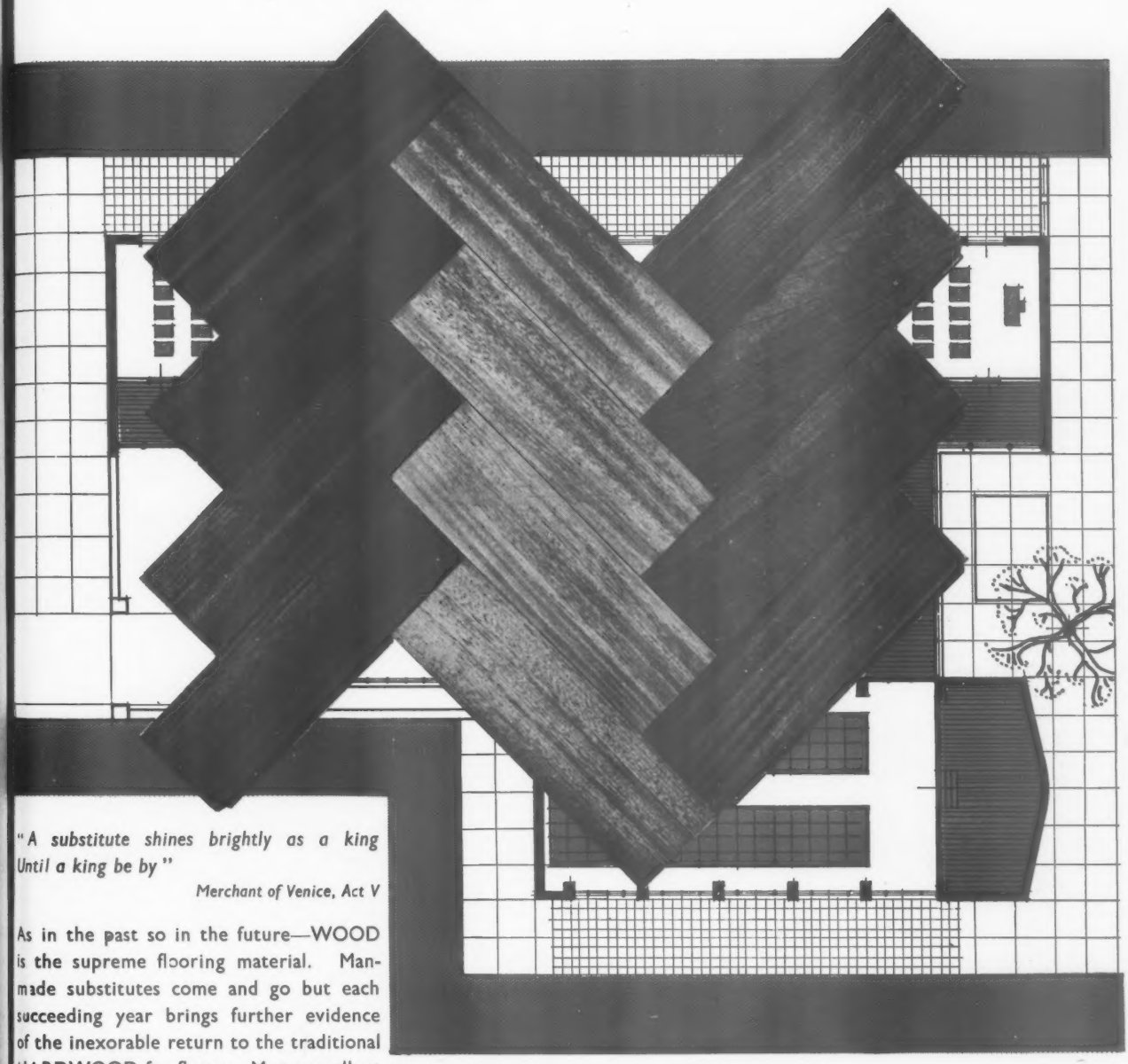

"A substitute shines brightly as a king Until a king be by"

Merchant of Venice, Act V

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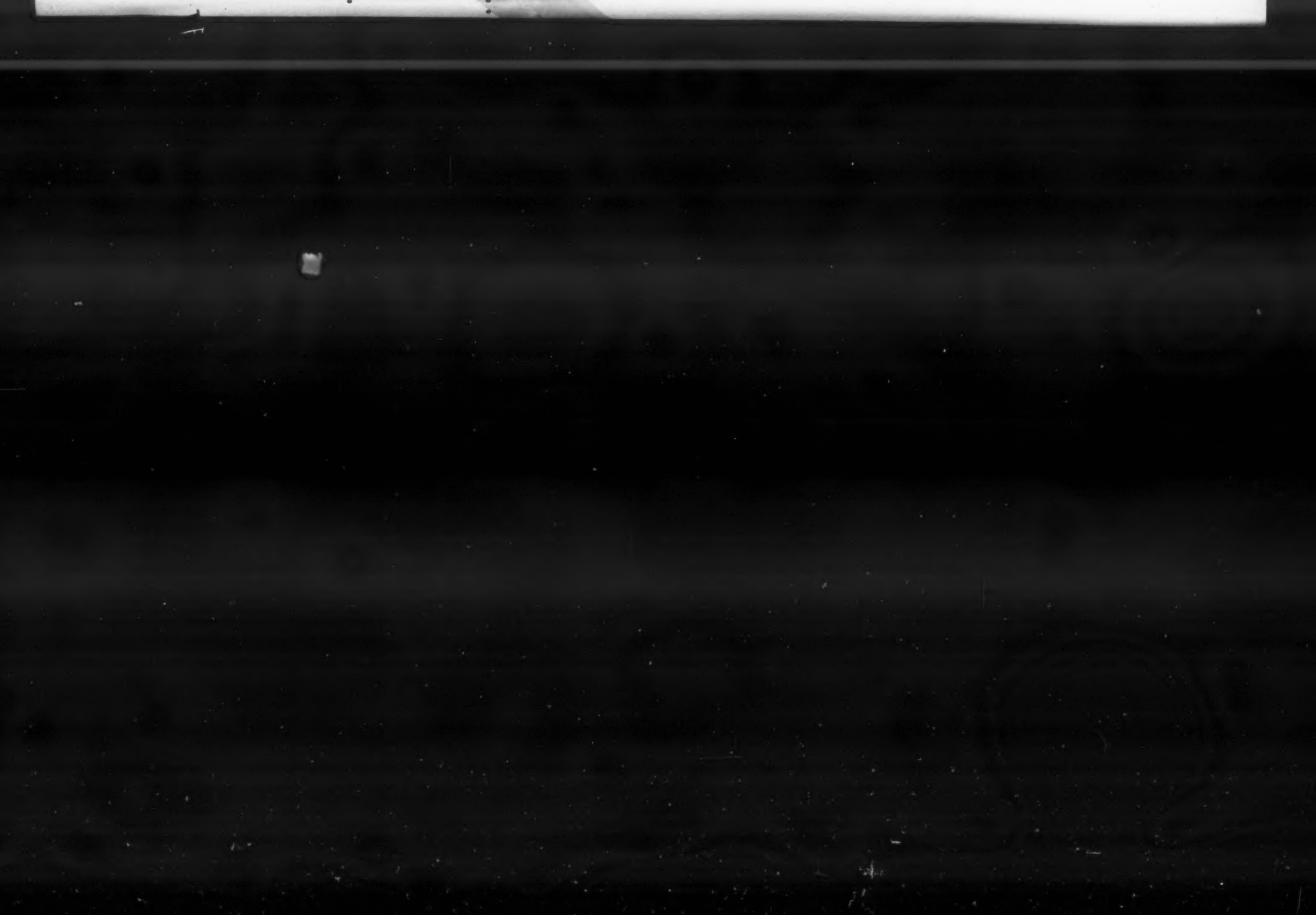

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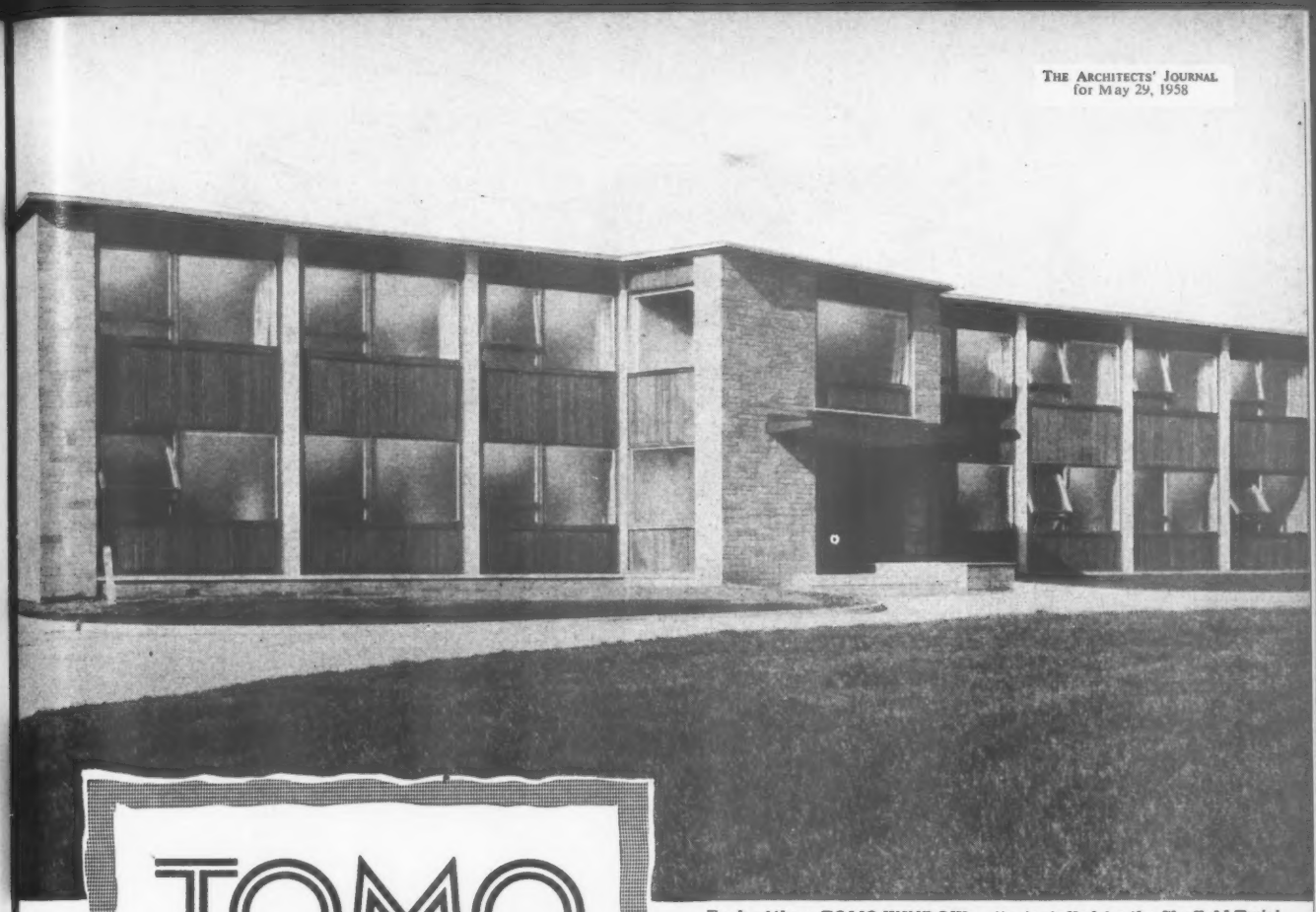

Each of these TOMO WINDOW units, installed for the Sheffield Twist Drill Co. Ltd., consists of a horizontal-pivot-hung light and two fixed lights.

Architects: Ogden and Raine, A.R.I.B.A.

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Sealing of " Perspex " glazing

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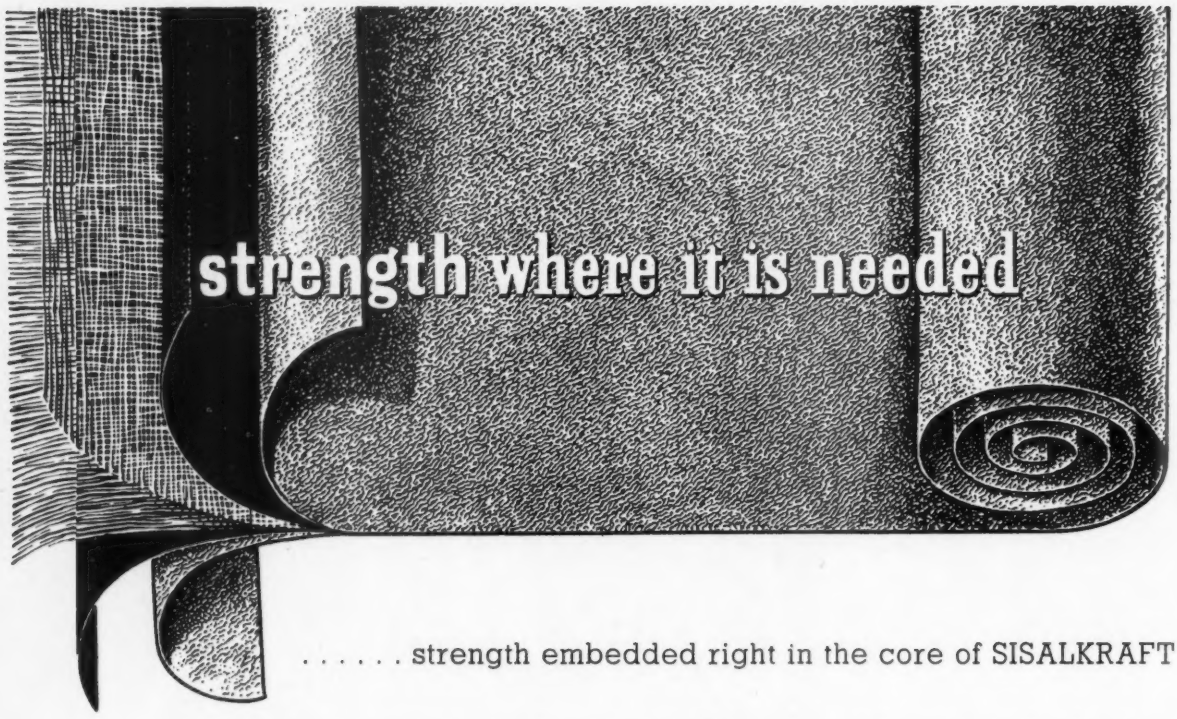

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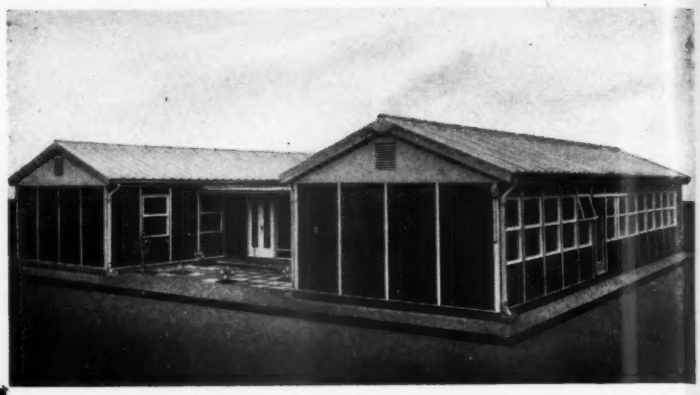

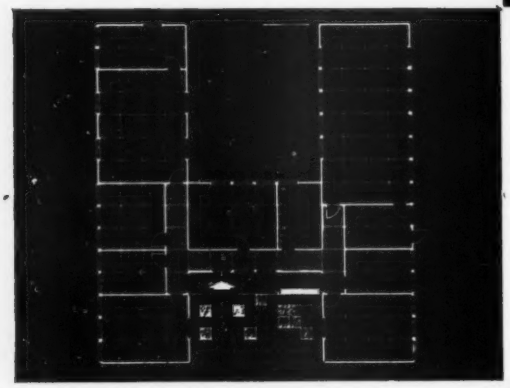

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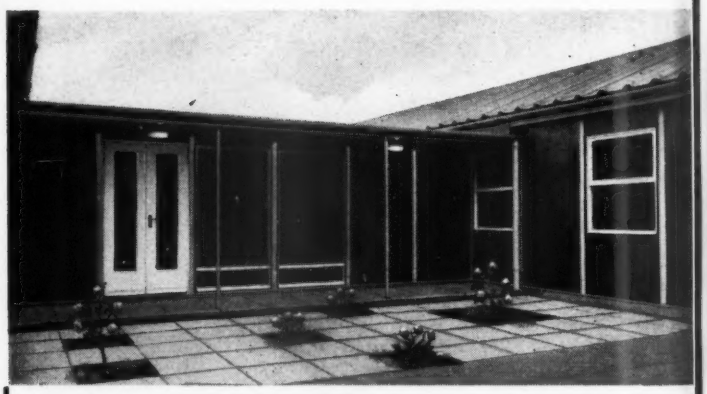

Illustrated brochure giving full details of the 'Middlesex' system available on request.

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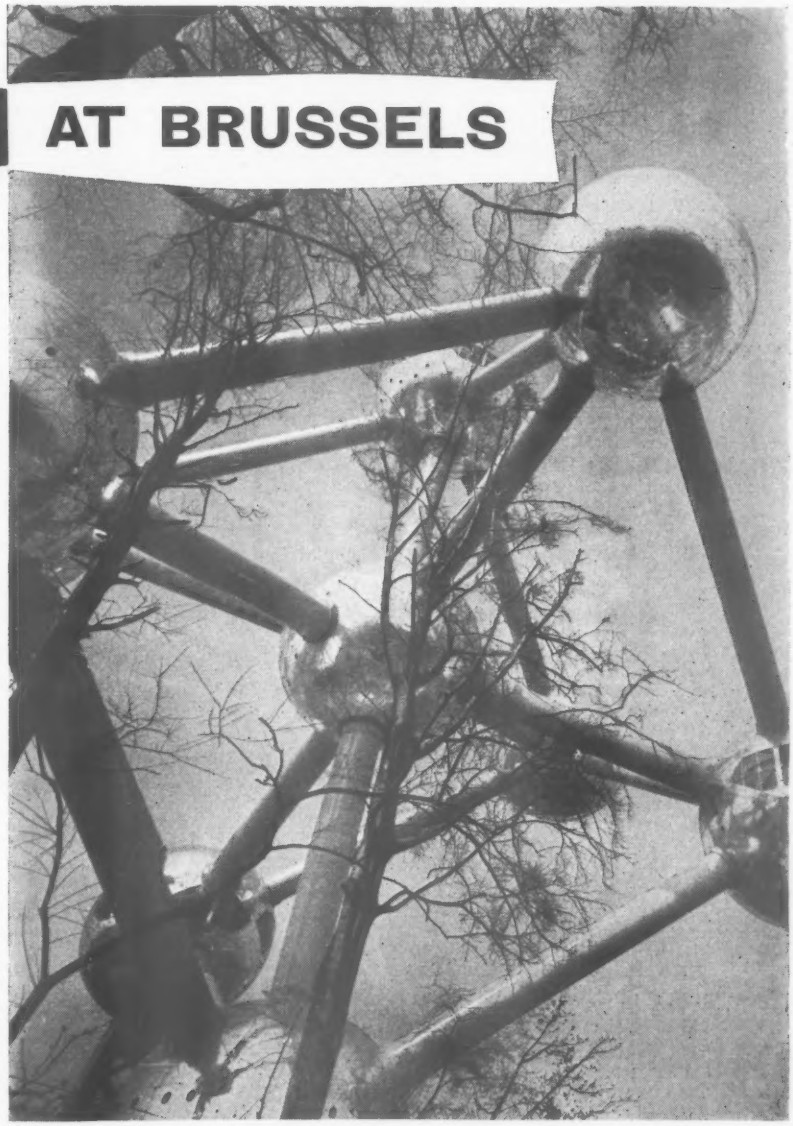

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- Canada
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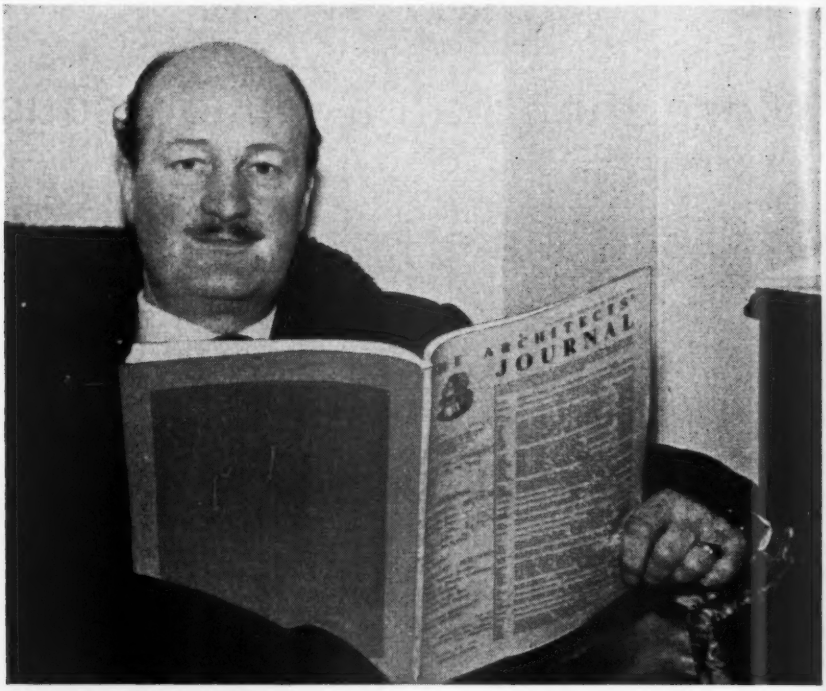

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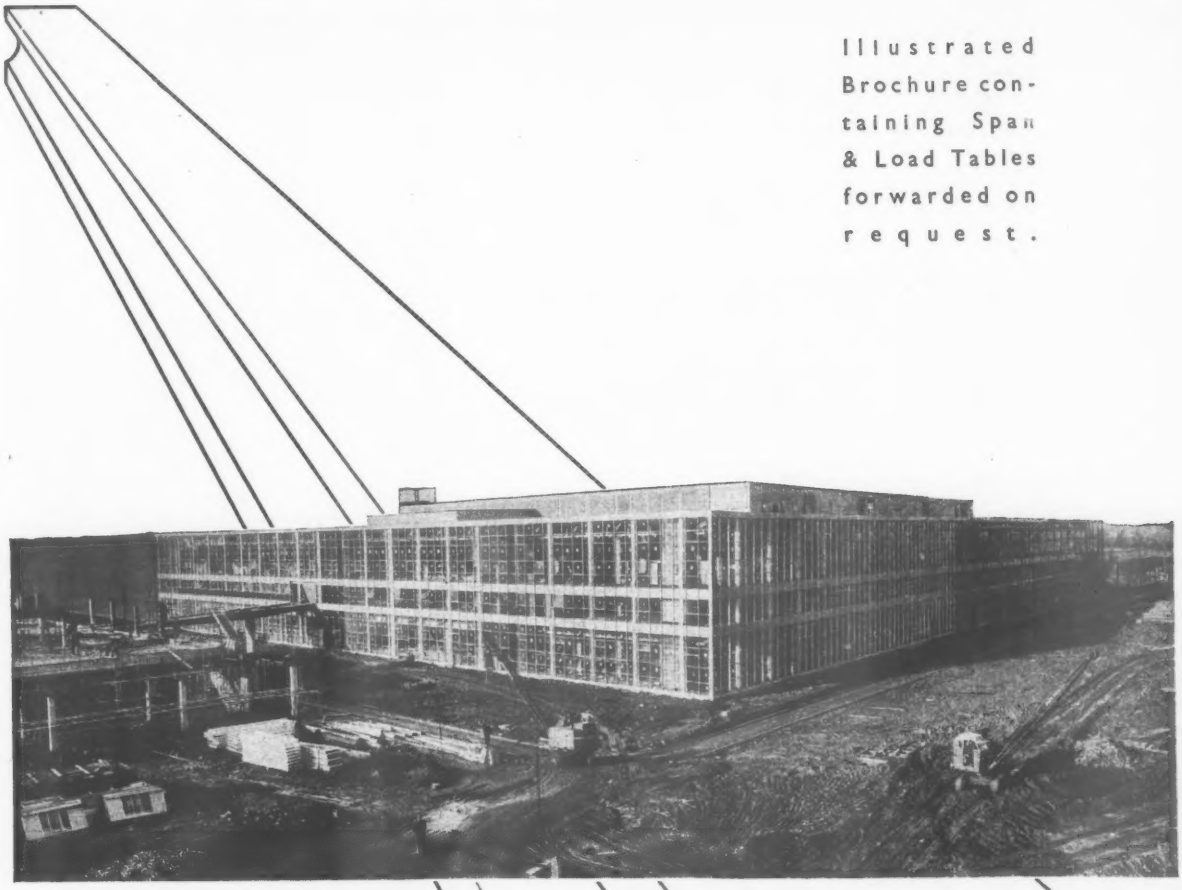

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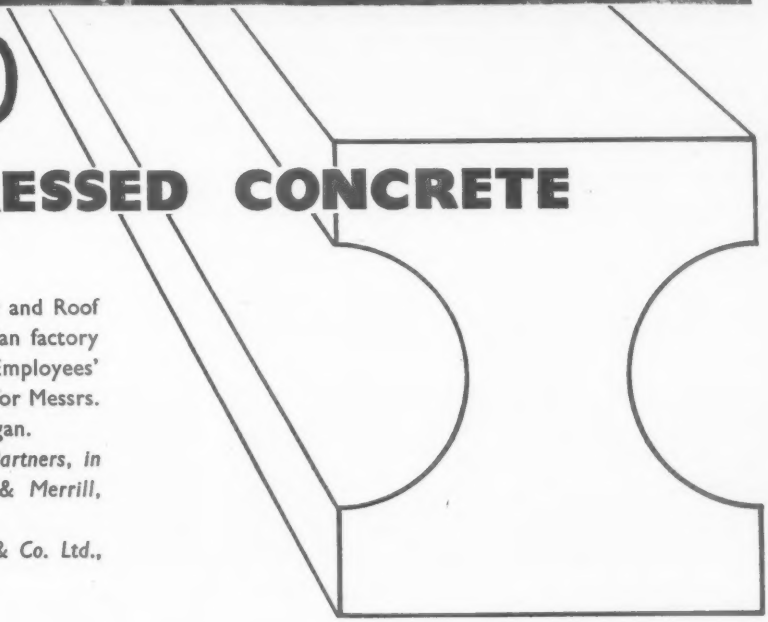

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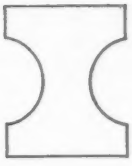

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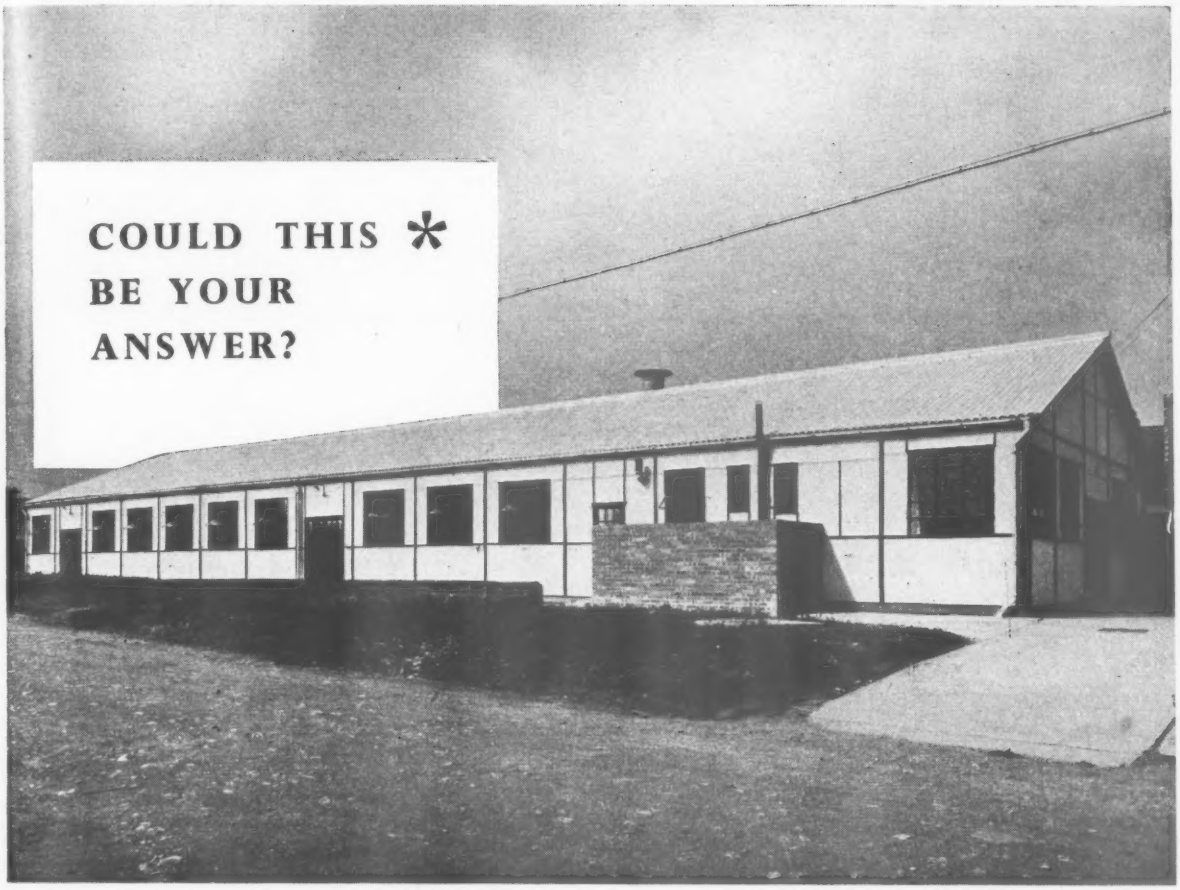
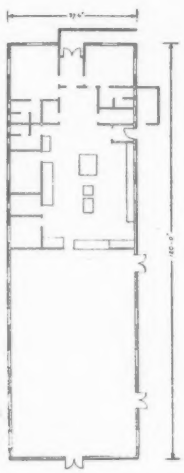


Photograph by courtesy of Thomas Harrington Ltd., Hove, Sussex.



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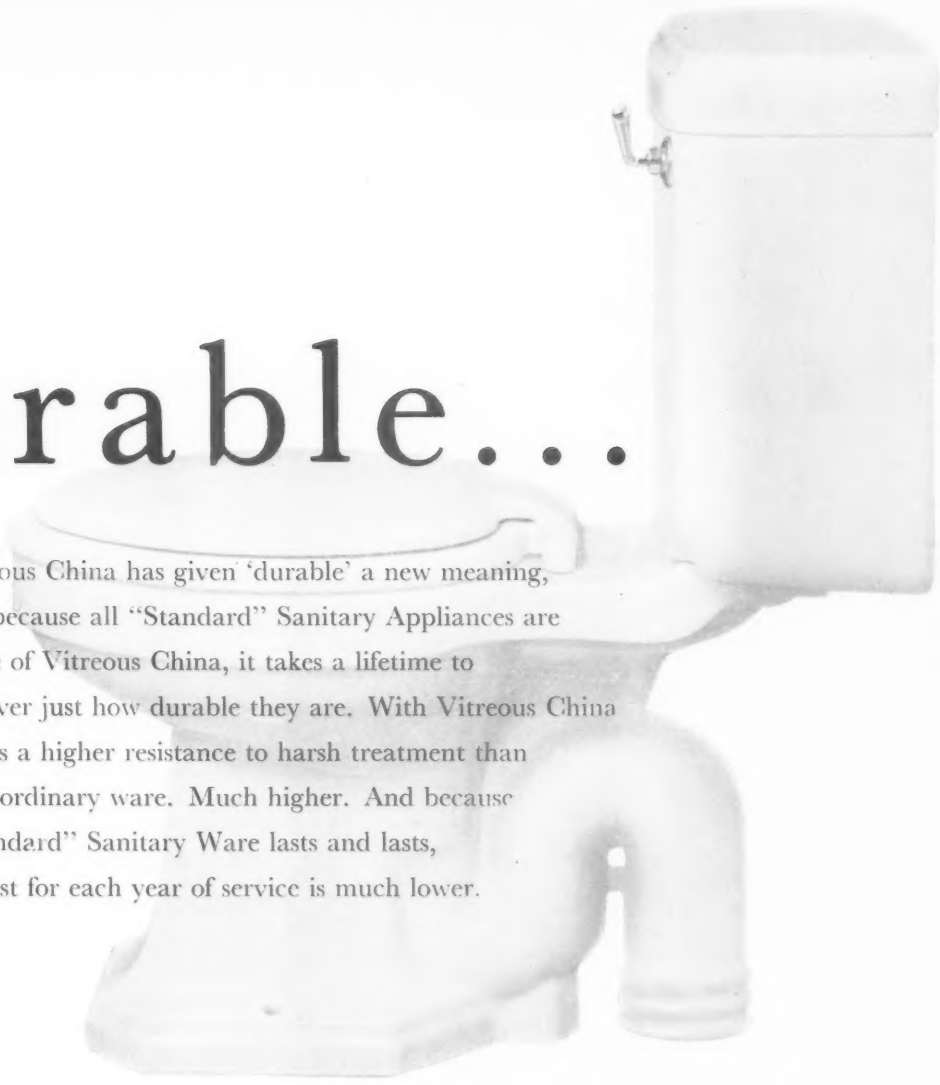

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THE BRUSSELS EXHIBITION

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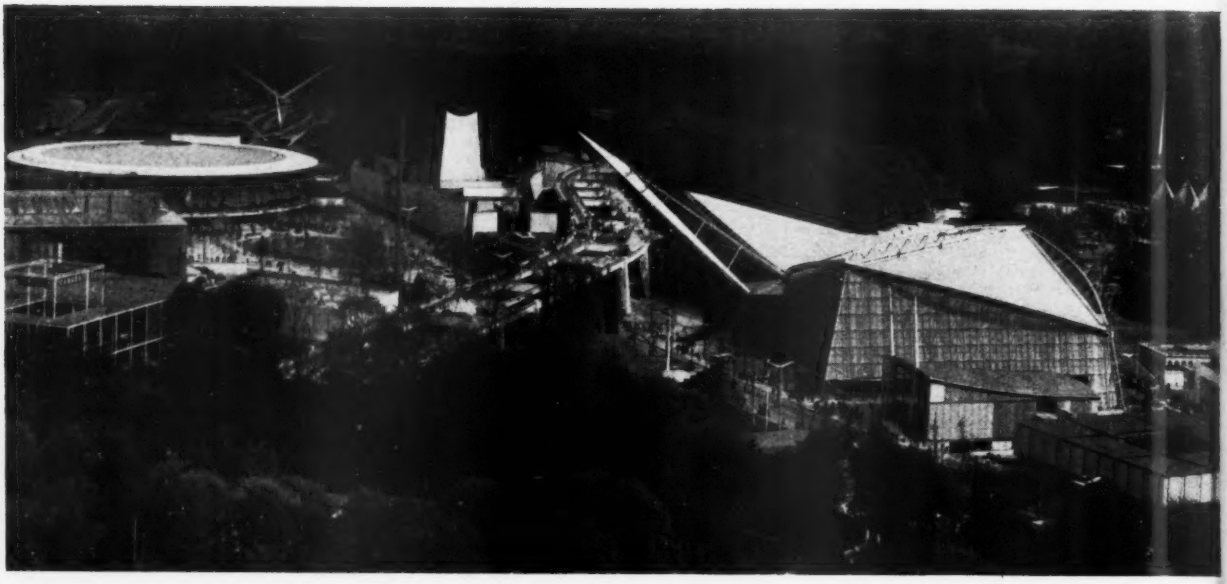
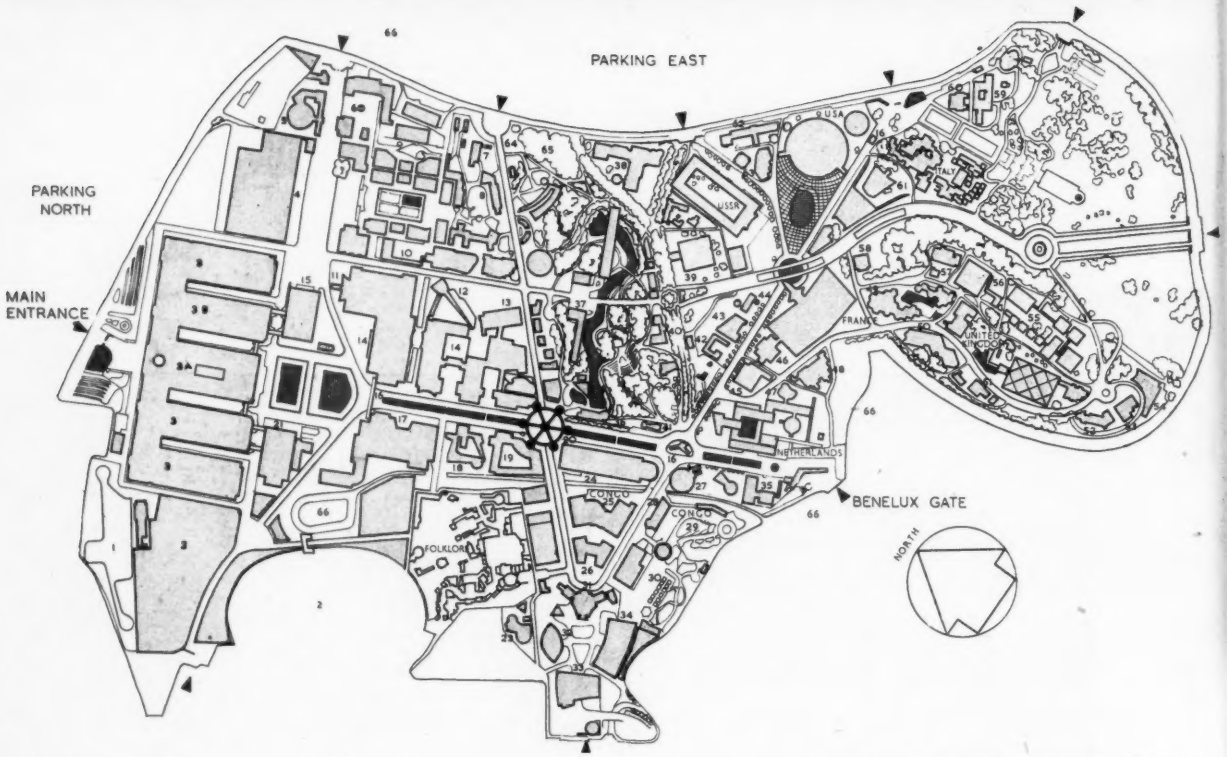




Layout plan of the Exhibition site [Scale: 1" = 400 yds.]

KEY

1. Heliport
2. Funfair
3. *Grands Palais*
3A. Hall of Welcome
3B. International Hall of Science
4. Air, Sea and Land Transport
5. Post and Telecommunications
6. Lamp Manufacturers
7. Model Farm
8. Agriculture, Horticulture
9. Glass, Ceramics
10. Town Planning
11. Food Industry
12. Civil Engineering
13. Building, Housing
14. Various Industries
15. Concert Hall
16. Chairlift stations
17. Electricity
18. Oil
19. Metallurgy
20. Atomium: Nuclear Energy
21. Fine Art
22. Stadium
23. Planetarium
24. Congo
25. Agriculture (Congo)
26. Catholic Missions
27. Fauna
28. Mines
29. African village
30. Tropical Gardens
31. UNO
32. OEEC
33. International Co-operation
34. European Steel and Coal Community
35. Luxembourg
36. Shops
37. Commercial Centre (wines, restaurants, etc.)
38. Czechoslovakia
39. Canada
40. Israel
41. Protestant Churches
42. Norway
43. Finland
44. Argentine
45. Austria
46. Paris and France
47. Philips
48. Morocco and Tunis
49. Switzerland
50. Spain
51. Turkey
52. Venezuela
53. Mexico
54. Brazil
55. Germany
56. Portugal
57. Yugoslavia
58. Thailand
59. Japan
60. Iran
61. Vatican
62. Hungary
63. Arab States
64. Miniature Village
65. Children's Kingdom

The two photographs below give, together, a view of the Foreign Section from the top of the Atomium. On the left, the square Canadian and rectangular Soviet pavilions lie in front of the circular U.S. pavilion. The passerelle *cuts between the Vatican and France (with its projecting boom), the U.K.'s three spires are visible in the background, extreme right. Below, looking down the Avenue du Congo and Avenue du Benelux to the Benelux Gate, with its vertical feature. Le Corbusier's Philips' pavilion can be seen on the left, between Tunis, Austria and the Netherlands. The oddly-shaped structure at the crossroads is a chairlift station.*

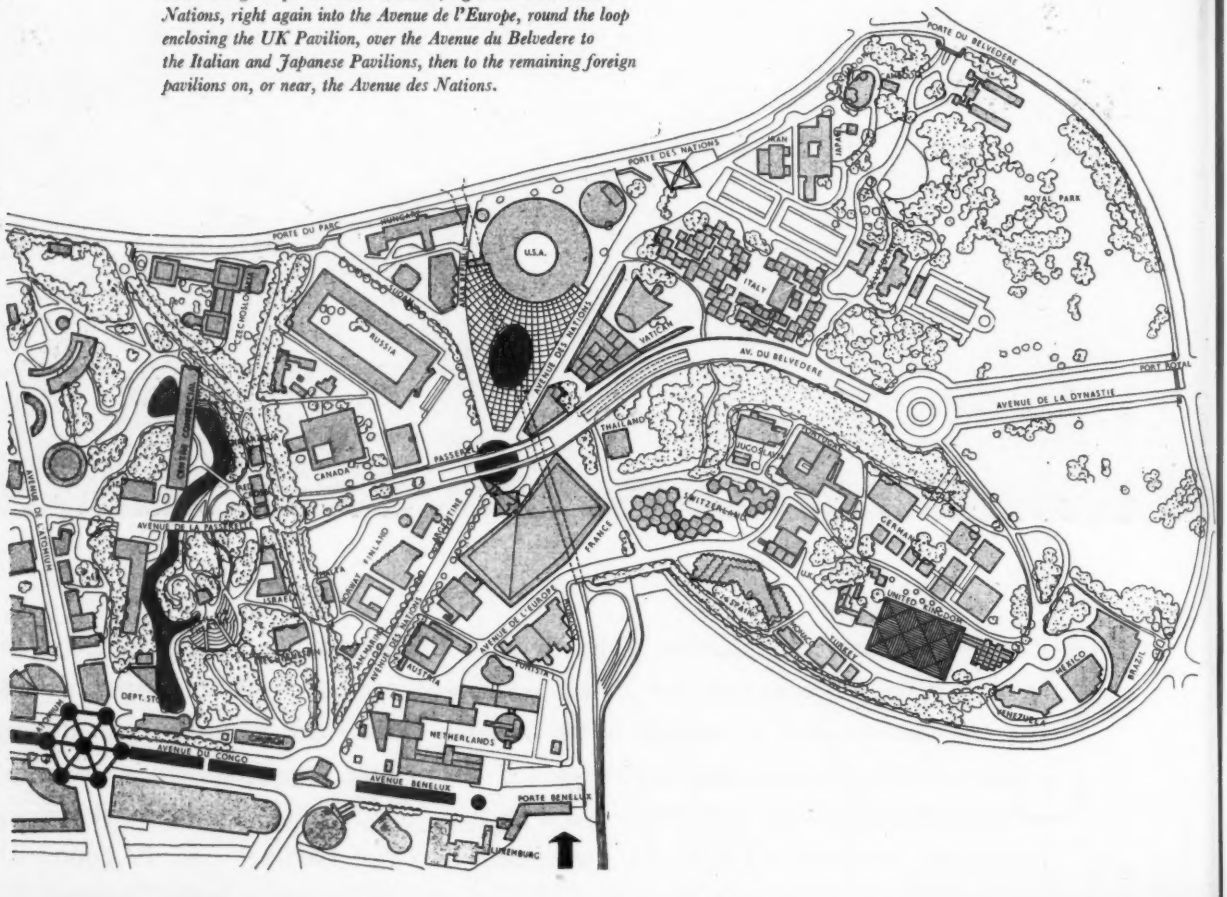
The Brussels Universal and General Exhibition is the most important architectural event of 1958. In the following pages we present as complete a record and as informative a guide as it has been possible to assemble in the time and in the space at our disposal. It is by far the most complete presentation yet made and will, we believe, be exceptionally interesting to architects everywhere, and doubly useful for those who intend to see the Exhibition for themselves. Architect-in-Chief: M. Van Goethem. Chief Engineer: M. P. Bonduelle.

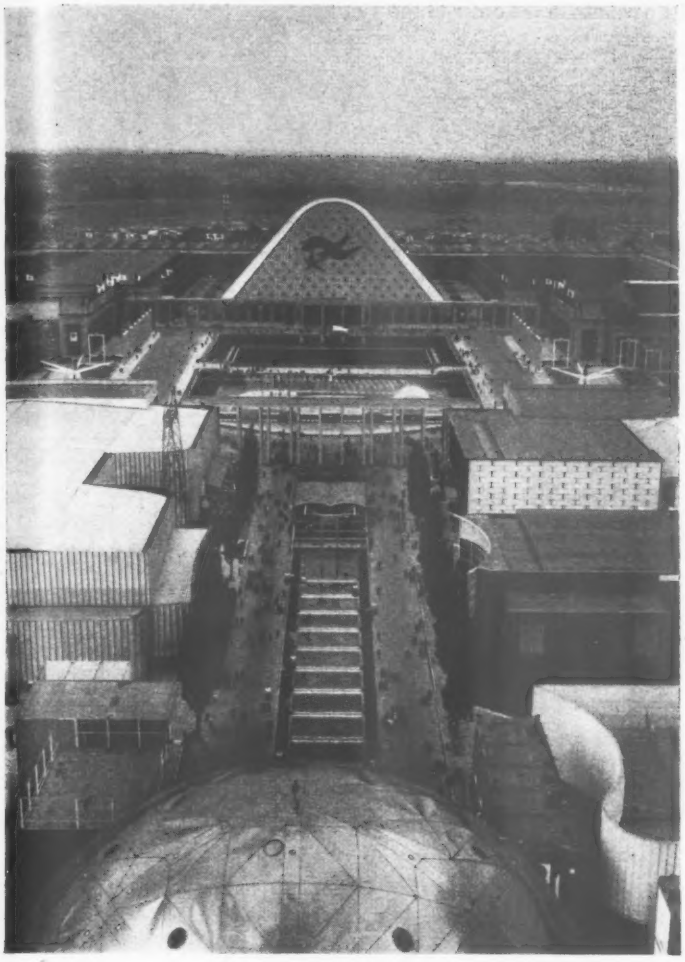
INTRODUCTION

Universal and International Exhibitions do not happen very often and for this reason tend to be very large. In this, Brussels 1958 is no exception. To see it fully—that is, to give its exhibits the attention they deserve and without taxing mind or body unduly—would take about a week. For, in addition to being very large, it is also a very good exhibition and deserves this leisurely treatment. At the same time we have the impression that most architects will not be able to give it this treatment: they cannot afford the time or the money. For Brussels in Exhibition time is expensive. Some will only be able to spare one day, others three or four days. Realizing this we have sent a small team of investigators over to Brussels to find out what is most worth seeing and to set it down in the form of an architect's guide. In doing this they have borne in mind that the architect is two persons rolled into one: he is a professional man with a specialized, technical interest in the Exhibition structures; but he is also an ordinary educated man with a general interest in the kind of things which interest ordinary educated people. In making their abridgement of the Exhibition our team have decided to put his professional interest first, which means, in effect, to give an unashamed and heavy bias in favour of those pavilions which seemed to be architecturally most interesting.

One rather embarrassing result of this policy is that it leads to an apparent cold-shouldering of the Belgian share in the Exhibition. It is Belgium's misfortune that she tends to take her architectural cues from France, who has a very poor grasp of what modern architecture is about, instead of from Holland, who knows so well. As a result you have the curious anomaly that this technically advanced and highly civilized nation has no modern buildings of interest to show. For this reason we advise our readers to go straight to the Foreign Section and only to look at the Belgian Section afterwards, if they have time to spare. Having given this advice we must add that it would be a pity to miss the Belgian section altogether. There is, for instance, a first rate *Exhibition of Modern Art* (until July 21: to be followed by an exhibition covering art from prehistoric times to the present day) and there is some particularly good exhibition *montage* in the *Electrical Energy* and *Tobacco* Pavilions. There is no doubt, however, that if architecture is the criterion, the real highlights of the Exhibition are the pavilions of the *Netherlands* (including, of course, Le Corbusier's little pavilion for *Philips of Eindhoven*), *Western Germany* and *USA;* and that if you still have

Below: plan of the Foreign Section. [Scale: 1" = 200 yards]
The route we recommend begins at the Benelux Gate (arrow) from which one goes up the Avenue Benelux, right into the Avenue des Nations, right again into the Avenue de l'Europe, round the loop enclosing the UK Pavilion, over the Avenue du Belvedere to the Italian and Japanese Pavilions, then to the remaining foreign pavilions on, or near, the Avenue des Nations.





From the Atomium, looking towards the main entrance, Porte des Grands Palais, one can see the new facade given to the permanent Hall of Welcome as a face-lift for the Exhibition. This area consists largely of the permanent buildings of the Belgian Trade Fair.

time to spare you should see the pavilions of *Austria, Norway* and *Finland,* which are conveniently grouped together; also those of *Switzerland, Yugoslavia, Brazil* (with a fine hanging roof) and—tucked away in a far corner—*Japan. Israel, Mexico* and *Canada* have good interiors and the inside of the church in the "*Civitas Dei*" (*i.e.,* the Vatican Pavilion) is worth a look. Lastly there is an interesting roof on the *OEEC* Pavilion, near the World Gate. And, of course, one takes it for granted that our readers will go to see the British pavilions. There are certain landmarks which you cannot miss, though their architectural interest is small, but which you ought to see as you will certainly be questioned about them afterwards; among these are the *Atomium,* and the pavilions of *France* and *Russia.*

The Landscape

Before we start on our itinerary, something must be said about the Exhibition as a whole, regarded as a visual spectacle. It is probably true to say that when buildings are conceived traditionally, as solid points of interest, it is the buildings themselves which must provide unity; but where they are conceived in terms of modern architecture this is provided by the site itself. This point is worth making because in fact the Exhibition falls into two well-defined parts. The part occupied by the Belgian sections is relatively flat and (except for formal planning) treeless, and is dominated by the formal layouts of the *Esplanade,* the *Place* and *Avenue de Belgique* and by the buildings which line them (including, of course, the Atomium); while the part occupied by the Foreign section is undulating and wooded. This, though perhaps fortuitous, was certainly fortunate insofar as the Foreign section was concerned, since the buildings in this section are mostly in an authentic modern idiom and are able to use the wooded, interesting site to good effect. If you look at the Belgian sections from the Atomium (see photographs on this page and page 841) you get the impression of an ungracious jumble; but on the ground it is not so bad. The system of formal waterfalls and the double line of trees which accompany you from the *Place de Belgique* to the Benelux Gate mitigate this effect, and the views which you keep getting of the Atomium go a long way towards redeeming it altogether. Nevertheless, it is only when you reach the Foreign section that you begin to become aware of the contribution of the Modern Movement to the art of landscaping. Here there are two distinct *milieux.* There is first the sort of "market place" created at the further end of the *Avenue des Nations* by the forecourts of the American and Russian Pavilions, which illustrate the emotional excitement generated by very large glass-walled buildings when seen at a reasonable distance. Second, there is the more intimate *milieu* where the trees and accidented ground determine the character and the buildings recede and form a frame to them. Such an area is that traversed by the *Avenue de l'Europe* and by good fortune the great majority of pavilions which lie there respect it. Whether you are in or near the Pavilions of Spain, Switzerland, Yugoslavia, Portugal or Western Germany, you are still emphatically in the *Parc du Heysel*: though if you go on to the French or UK Pavilions you might as well be in the *Gare du Nord* or Earl's Court. In general, one gets the impression that the co-ordinating architect has not been very successful, particularly in those details which must, presumably, have been under his control. For example, the *passerelle* that carries foot passengers across the centre of the foreign section is a most clumsy structure, blocks the main vista along the *Avenue des Nations,* and marches most uneasily alongside the French pavilion. Lack of attention to detail shows itself in the inadequate signposting (you will search in vain for a signpost directing you to the lavatories), and the official guide is a miserable affair (it's much better to buy a good pocket map). The trim is nasty: wherever you go, you are liable to come across large waste-paper bins, which are, in fact, loudspeakers, and trivial signs made of fancy coloured glass. These detract from the total impression, though not too disastrously; on the credit side is the sound complement of the exhibition, good marks in particular going to the carillons of the Netherlands and Vatican Pavilions, which make a very distinctive and gay racket.

We now begin our tour of the Foreign Section, visiting the pavilions in the order of the itinerary we recommend, beginning at the Benelux Gate.

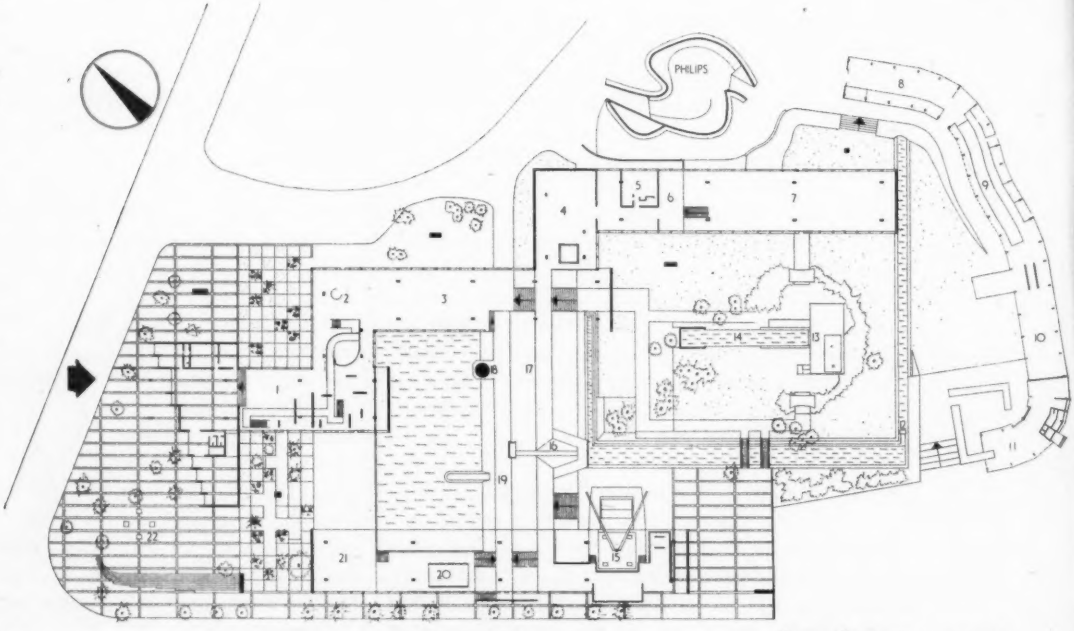
Netherlands

The first pavilion to catch the visitor's eye is the Netherlands, seen here at night from the Benelux Gate. The mast and ship's bridge mark the shipping exhibit.

If you stand at the Benelux gate and face towards the Atomium, the first pavilion on your left is that of LUXEMBURG (architects Mailliet, Reuter and Biwer). In fact this is the only "foreign" pavilion on this side since the others belong to the Congo section. The Luxemburg pavilion is a steel and glass structure with typical French detailing. Though it looks well lit up at night it is not really worth a visit either for its architecture or for its contents, unless one wants to sample its cuisine in the rather expensive restaurant. On the right is the NETHERLANDS Pavilion (architects van den Broek and Bakema, Boks, Peutz and Rietveld), which is probably the best in the whole Exhibition. It is important that you should go into this pavilion by the main entrance (on the right up the hill) and that you should walk round it in the official clockwise

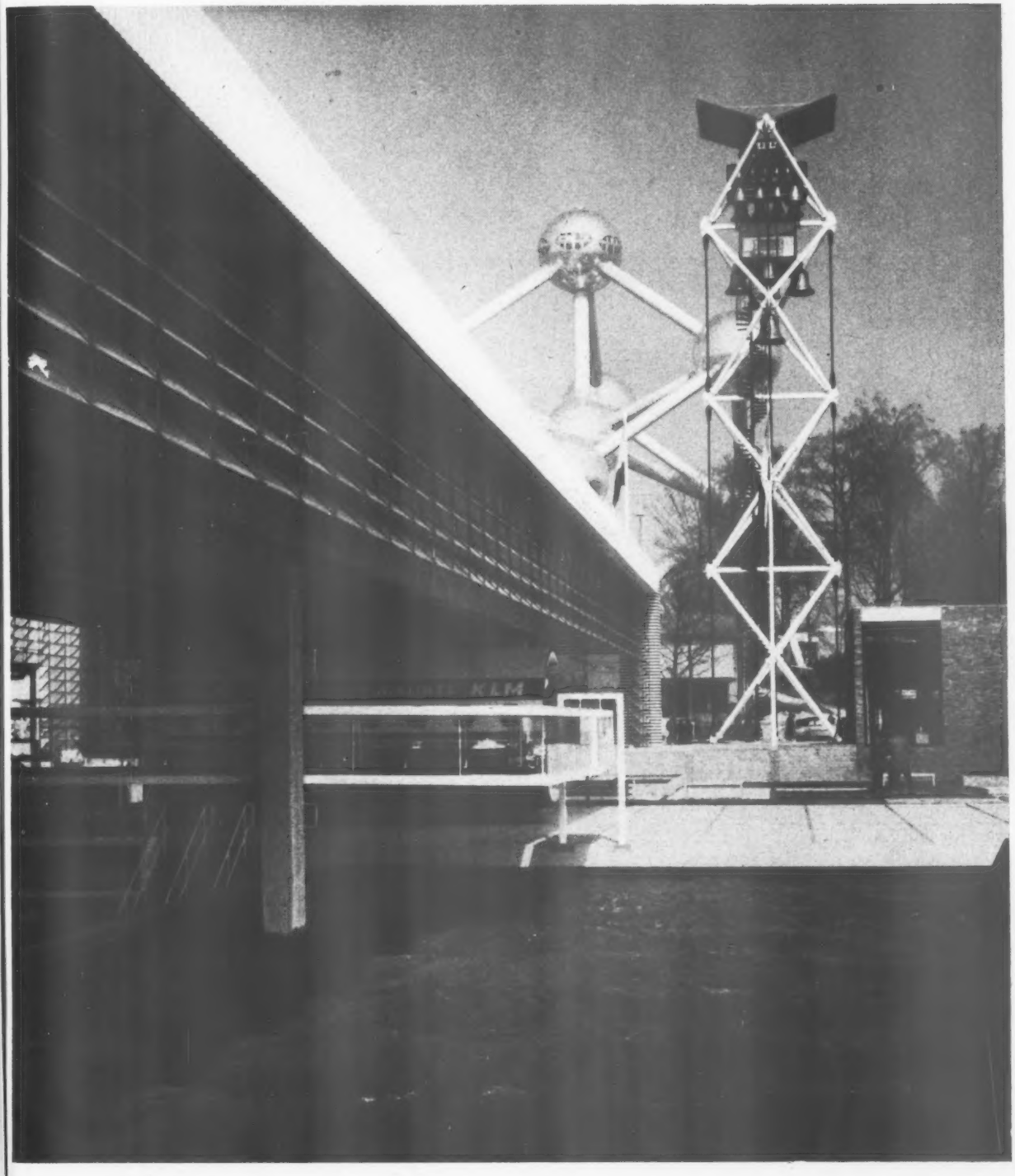
KEY

1. Pavilion of the Netherlands Kingdom
2. Information centre
3. Metal industry
4. Chemical industry
5. Modern house-furnishing
6. Glass industry
7. Textile industry
8. Pigs and poultry
9. Cattle
10. Agricultural research
11. Cafe-restaurant
12. Watermill
13. Zuider Zee
14. Wave channel
15. Shipping
16. Pumping station
17. Dike
18. Lighthouse
19. Pier with beacon
20. Harbour
21. Aviation
22. Carillon

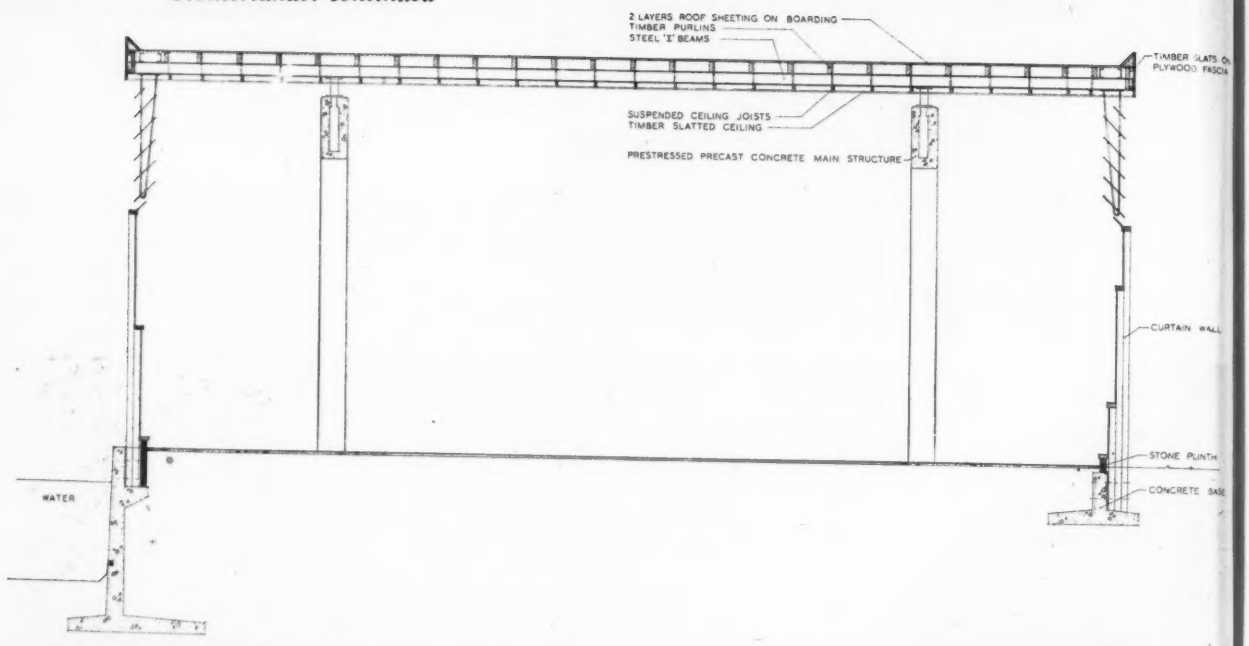


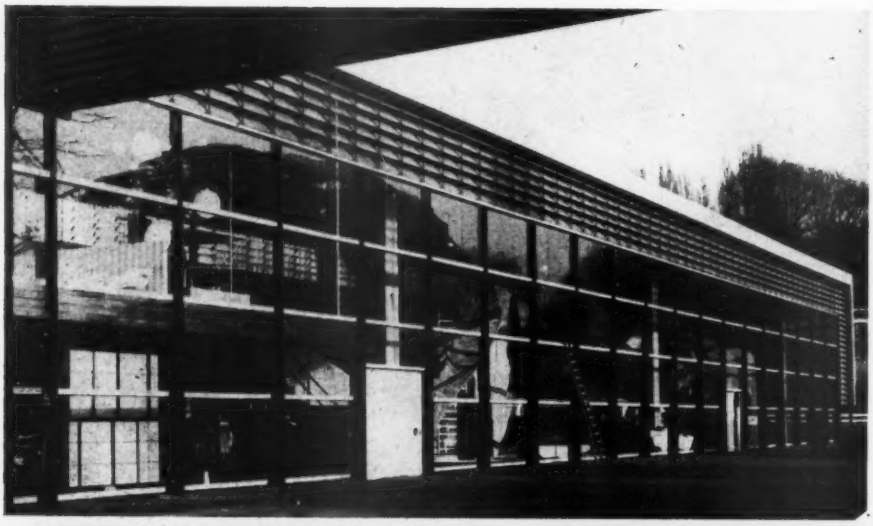
Layout plan [Scale: $\frac{1}{16}$" = 1' 0"]

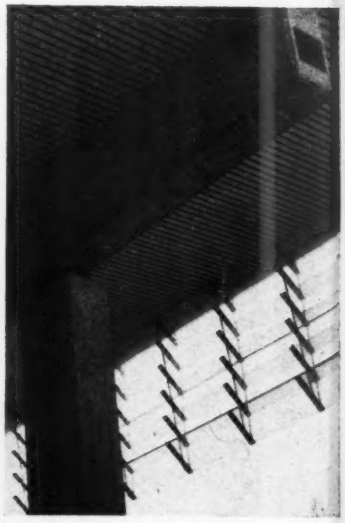
Left, the entrance to the Dutch Pavilion, and below, a view across the Dutch "Sea" (complete with waves) to the carillon.



Netherlands: continued



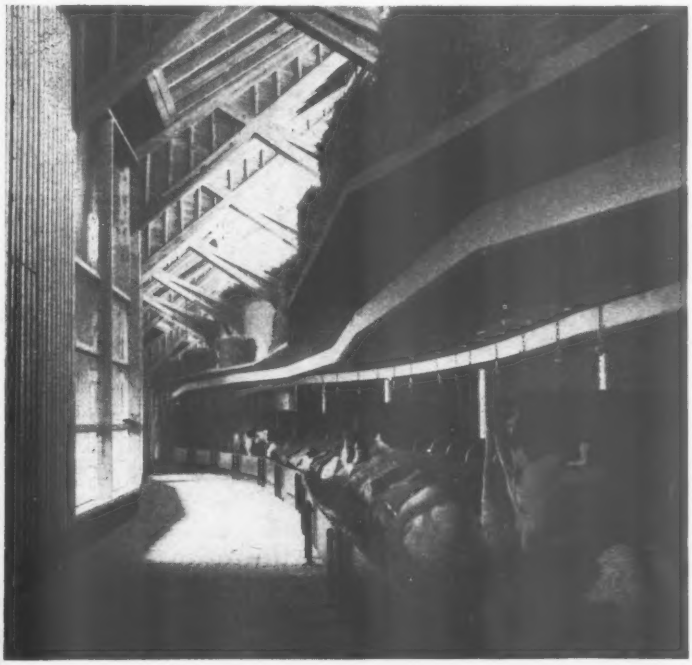




Top, typical section through "show-case" type Exhibition Hall in Netherlands Pavilion [Scale: ⅛" = 1' 0"] *Above, left, view of hall housing the textiles exhibition. Above, detail of entrance canopy, showing contrast between precast concrete structural members and slatted ceiling; also the suspension of louvres. Left, detail of screen formed of lengths of laboratory tube "post-tensioned" by an internal wire.*

The chemical section of the Dutch Pavilion.

The Dutch farm is housed in a timber barn. If the cows want shade (or is it privacy cows want?) the windows can be screened: there is clerestory lighting above.



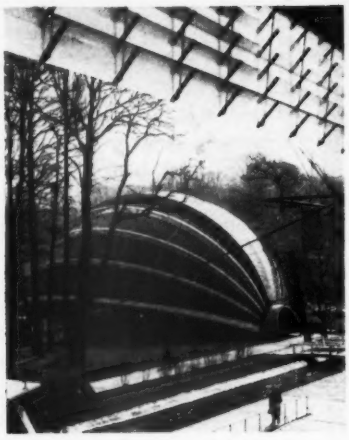
direction, *i.e.*, as shown on our plan. Adjoining it and on the same site is the tent-like form of the PHILIPS Pavilion (architect le Corbusier).

The layout and construction of this pavilion is simple. If we exclude Corb's part (which is approached separately anyway), the lighthouse tower and the carillon tower (which you cannot climb up) it comprises three kinds of structure. First there is the group of four long glass-walled showcase buildings which run against the contours and are joined together by connecting links of similar section. Next there is the round shell-like structure in the middle of the layout which shelters the Zuider Zee exhibit. Lastly, there is the long, curving timber building which runs along the bottom of the site and houses the agricultural sections and a restaurant. The showcase buildings (as can be seen from the drawing) have steel-framed roofs, the construction of which is completely concealed by a small scale pattern of painted slats. The roofs are supported by two lines of precast post-tensioned concrete beams running the length of each pavilion (one pair of beams is 280 ft. long) and supported at 70-ft. centres by columns of the same material. The glazed walls are in two parts: the wall proper is formed of sheets of plate glass held in timber transomes. These transomes are supported on mullions built up of up to four 4 in. by 2 in. steel r.s.j's. welded flange to flange. Each of these r.s.j. sections supports a mullion and is cut off at the point of support. This gives each mullion a stepped profile, the added thickness towards the base compensating for the fact that the wall is virtually unsupported at the head. The sheets of plate glass are joined at the ends by vertical lead cames, a detail which is very characteristic of van den Broek and Bakema. The top part of each glazed wall comprises a range of glass louvres suspended from the roof. These louvres play a very important part in the design; for in addition to their normal function they serve to provide a louvred overhang at the ends of each block and also to close the surrounding wall surfaces wherever a linking section runs into a main block at a low level (see above left).

The timber pavilion which houses the livestock is of virtually constant cross-section throughout its length and is formed by a long series of raking trusses designed to give a deep clerestory to light the passageway and to give good ventilation and shading control for the animals (see photograph).

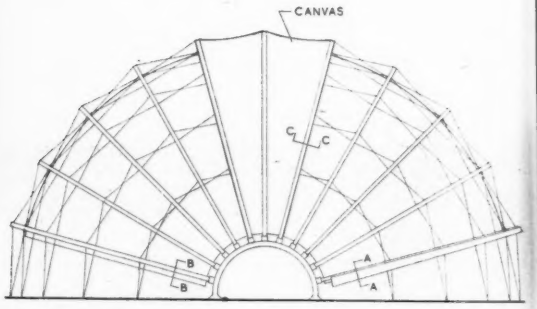
Inside the shell-like structure which stands in the middle of the site an artificially-produced wave is breaking continuously in a glass-sided trough, so that one sees the wave in section (photograph, p. 798). The structure owes its shape to the desire to reproduce the reverberant sound effect of waves breaking on the shore. It is built up of a series of welded lattice steel trusses with curving top and bottom booms which rise at each end from an *in situ* steel "hub." Brackets project from the bottom booms of the trusses and to these is welded the steel mesh reinforcement of the shell itself. Concrete is then sprayed on to this, both sides, to give a skin of about 2 in. thick. The skin is then painted blue. The concrete shell stops short at the two top segments to give light inside and these are covered with a translucent canvas.

Netherlands : continued



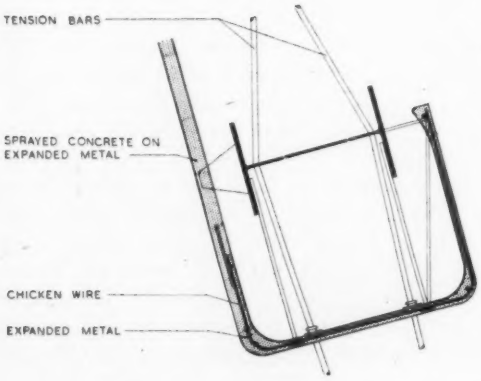
Top, the shell enclosing the Dutch Zuider Zee display, with wave-making machine in foreground and, above, a close-up to illustrate the structure. Below, detail drawings of the shell. [Scale: $\frac{1}{8}$" = 1' 0"]

A very important part of the Netherlands pavilion is the landscaping of the courtyard areas. These areas have been excavated and relaid to simulate the Dutch landscape. There is a length of canal with a footbridge, a dyke with a pump for raising the water from the lower to the upper level and a fine stretch of sea water with a lighthouse and its own system of artificial waves. If we except some too-optimistic areas of grass the trim is everywhere excellent. No pavilions are more successful than this one either in reproducing all that is best in the home atmosphere or in evolving an architectural frame which marries with and sets off the exhibits. For it is characteristic of this pavilion that you remember not only the buildings but the exhibits also. The Dutch have succeeded in creating in miniature a complete system of dykes, polders, bosoms (as the Dutch call their feeder canals), canals, and pumping stations, made all the more exciting by the two artificial wave-making machines. In the shell-shaped pavilion the illusion of being at the water's edge, with the noise of the sea in one's ears, is remarkable. One comes away, if one is prepared to spend a little time, with a much better understanding of Holland's never-ending struggle for mastery over the water, a struggle which has had so deep an effect on the national character. The shipbuilding exhibit, a section of a merchant ship, cunningly tied in with the miniature sea, is first-class and contains, incidentally, the most comfortable laze-about chairs that the authors discovered in the exhibition. There are some fine engineering models, and a good display of modern art, but not much on architecture or town-planning. Don't be surprised if you see a sheep on the grass, or hear a cock crowing; the farm is not to be missed.



ELEVATION [Scale: $\frac{1}{32}$" = 1' 0"

SECTION -AA-



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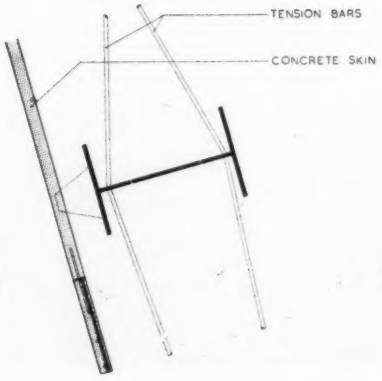
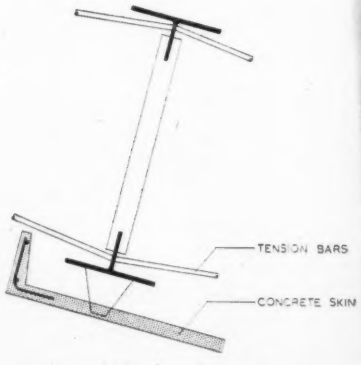
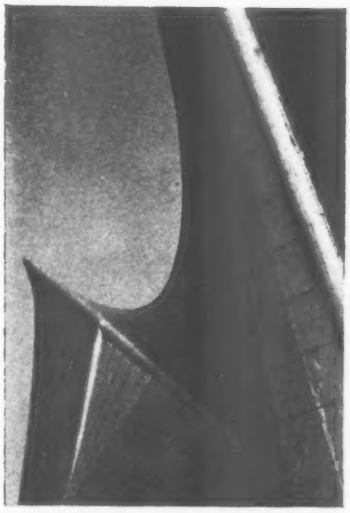


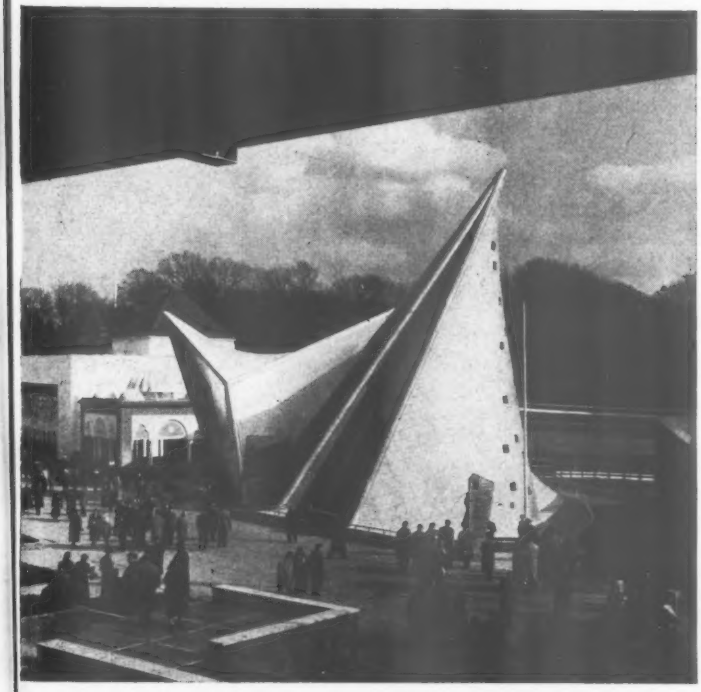
SECTION -CC-



Philips Pavilion



Above, a detail of the envelope and, below, the clash of style between Philips and its neighbour Tunisia, on its left.



The Philips pavilion is technically part of the Netherlands, but for practical purposes is separate, and is best reached by turning down the *Avenue de l'Europe*. Le Corbusier, on being given the commission to design this pavilion, is reported to have said: "I will not make a building, I will make an *electronic poem* in which lights, colours, images, rhythm, sound and architecture will be seen to fuse together in such a way that the public will be subject to all the things that Philips does."

The building has a tent-like form built over a plan which was conceived as a stomach. The floor area is about 500 sq. yd. The tent rises to three peaks of 65 ft., 60 ft., and 42 ft., and is clothed with a concrete envelope formed of 12 hyperbolic paraboloids. This very complex form was chosen to meet certain conditions of acoustics and lighting: reverberation time had to be short, double echoes had to be avoided. Furthermore it was calculated that the avoidance of parallel surfaces would give rise to interesting reflections and that the curved radiating forms would assist sound amplification and the play of light. The inner surface of the walls is lined with sound absorbents and 300 loudspeakers are built into it.

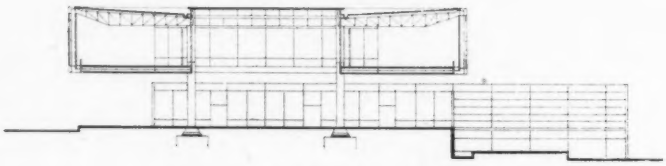
The geometrical form was worked out by the mathematician B. Lafaille, the construction by the engineer, H. C. Duyster. Elaborate tests on a model were carried out at the University of Delft before the work was put in hand.

The main structure comprises a series of reinforced concrete ribs which rise from the floor slab and which lie along the lines of intersection of the hyperbolic paraboloids. Seven-millimetre diameter cables are anchored to these ribs and pretensioned. Pre-formed concrete slabs, each about 2 in. thick and about 1 yd. square, are then laid along the slopes and are tied to the cables by iron ties.

The heavy equipment and the accommodation for those serving the stand are housed in a three-storied bulge at the side of the entrance. The performance, which takes place within the pavilion, is in fact an eight-minute "Son et Lumière" designed and scripted by Le Corbusier, the sound accompaniment having been written specially by Edgar Varese, with animation and light effects by Louis Kalff. The realization of the pavilion and of the show which it houses has been described by Janis Xanadis, Le Corbusier's chief assistant on the job, in the following terms:

"The technical framework of the realization was determined in close accord with Le Corbusier's scenic sketches: tilted walls of panoramic design which in their continual movement form pictures and dissolve them again; equipment which casts flashes of light and darkened colours—brief illuminations passing from revelation to the invisible; clouds cast by film projectors and twisted horizons formed alternatively of flame and of ice; optical illusions and tragedies; plastic representations of the movement of living things . . . all these countless media and effects leave the public, during the eight minutes of the performance alternately bewildered and suddenly enlightened, placed in a world in which they can no longer grasp the sequence of light and sound waves."

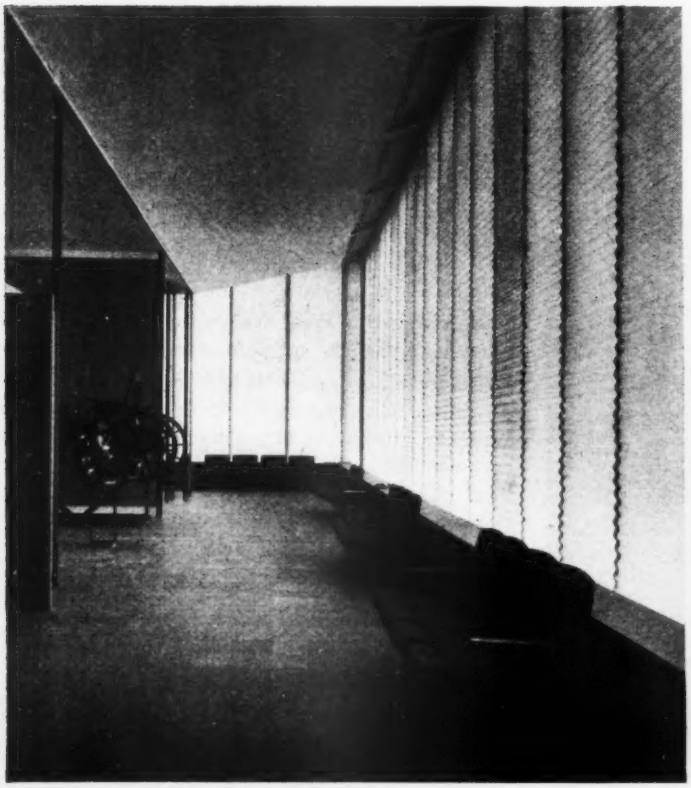
Austria

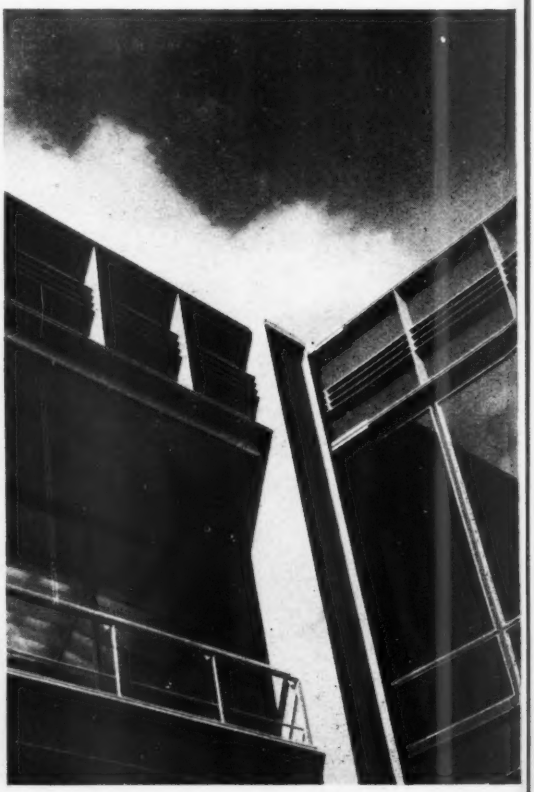


Above, section through the Austrian Pavilion.
Below, the interior of the Austrian pavilion. Below right, close-up of a corner in the internal courtyard.

Opposite the Philips Pavilion is that of AUSTRIA (architect Karl Schwanzer). This too is admirable. The exhibition space consists of a hollow square raised to first floor level and wholly supported on four built-up stanchions placed in the internal corners. The structure is welded steel. As can be seen best from the section, left, I sections which are nearly 6 ft. deep connect the stanchions at first floor and roof levels and a second series of I sections runs round the periphery of the exhibition space at floor level. It will be seen that these deep sections are so arranged that they do not at any point interfere with the circulation: on the contrary, the upper flange of the peripheral beam (as can be seen from the interior photograph) has been used to form a ledge. The roof is formed of welded lattice beams which are fully enclosed and which taper from two-thirds of their span to clear the fenestration. The walls are clad with a translucent glass fibre corrugated sheeting. The galleries, therefore, are fully enclosed, *i.e.*, you can't see out of them. The detailing is very good and the diffused light of the interior gives the clear-cut steel trim its full value.

The pavilion is intended to symbolise Austria's position as a bridge between east and west, at the heart of European civilisation. Its most remarkable feature, which shows the part that music plays in Austrian life, is a conservatoire where music lessons are being given. There are some original manuscripts of Mozart and other composers. If you associate Vienna more with waltzes, however, there is a Viennese café as well as a Tyrolean restaurant. The large hydro-electric turbine in the forecourt is intended to remind you that the turbine, like the ship's propeller, is an Austrian invention.



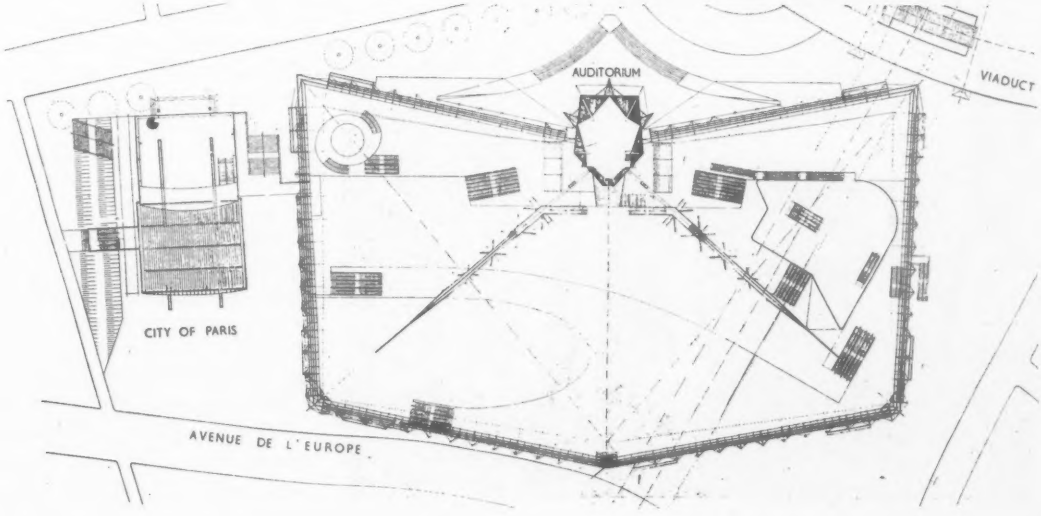


France

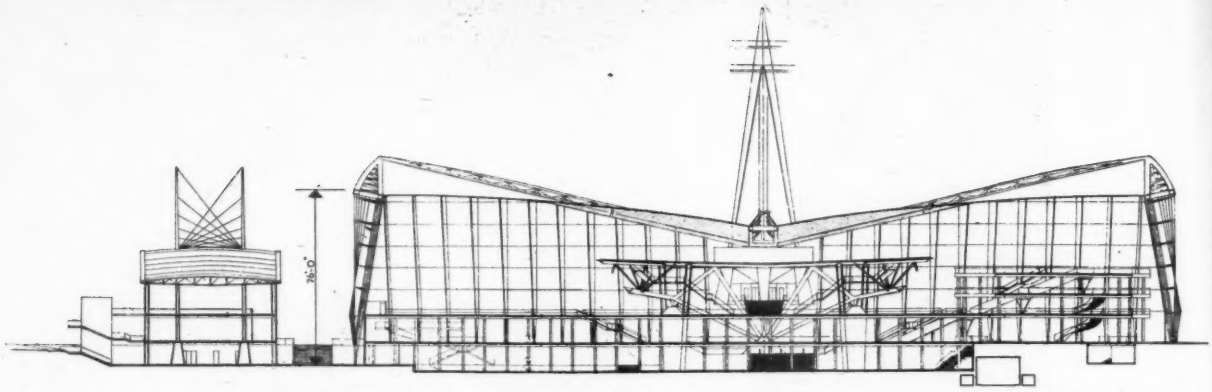
Immediately next to Austria is the Pavilion of the CITY OF PARIS, which is itself an adjunct to the Pavilion of FRANCE, the architect to both being Guillaume Gillet.

The French Pavilion, which may fairly be described as an "Exhibition Building" in the traditional meaning of the word, embodies a double structural *tour de force*. The first concerns the development of the sus-

Layout plan [Scale: $\frac{1}{32}$" = 1' 0"]



France: continued



Section through the City of Paris and the French Pavilions [Scale: $\frac{1}{16}$" = 1' 0"] *The vertical feature is a combined structural spar and television mast.*

pended roof system, the second the dodge of using the more-or-less vertical feature to counterbalance the weight of the roof and to make it possible to concentrate the greater part of the foundations in one spot. The City of Paris has little of technical interest, though like its vast neighbour it has a suspended roof. All the weight of the structure is carried from four piers sited in the back third of the building. From the two foremost of these are cantilevered two tapering steel beams, which, craning forward like giraffes' necks, hold the forward edge of the roof. The back piers extend upwards to hold the back edge and between these two planes of support is slung a chain of transverse trusses. The roof covering is effected by cocooning.

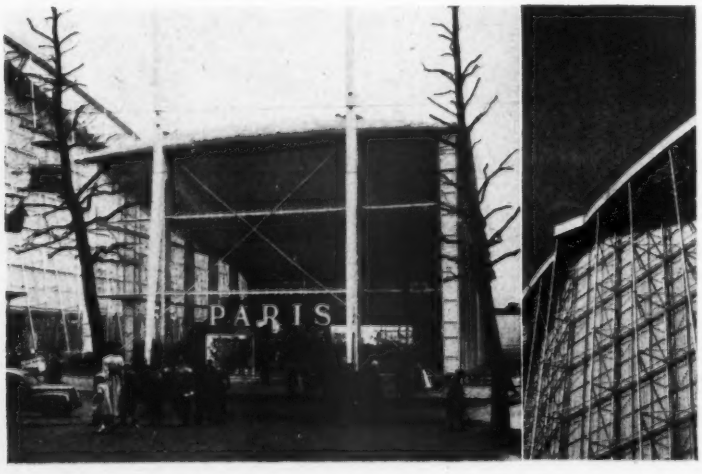
The main pavilion comprises on plan two adjacent twisted rectangles which are nearly (but not quite) twisted squares, each with an area of approximately 44,000 sq. ft. These are roofed by means of two hyperbolic paraboloids constructed of steel cable and clad with polyester sheeting. The greater part of the weight of this roof is carried by two cast steel arches which span from a common point at one end of the line of junction to the opposite corners of each twisted rectangle. The sides of each figure are formed of trussed edge beams tilted at a gradient of 1:5. The load-bearing cables run from edge beam to edge beam passing over and at right angles to the supporting arch and at about 1-ft. 4-in. centres; the cables which serve to tension the roof pass over and at right angles to the loadbearing cables, the pretensioning of the latter being effected by securing the two adjacent edge beams slightly above their final position in order to attach the cables to them and by then allowing them to fall back into place.

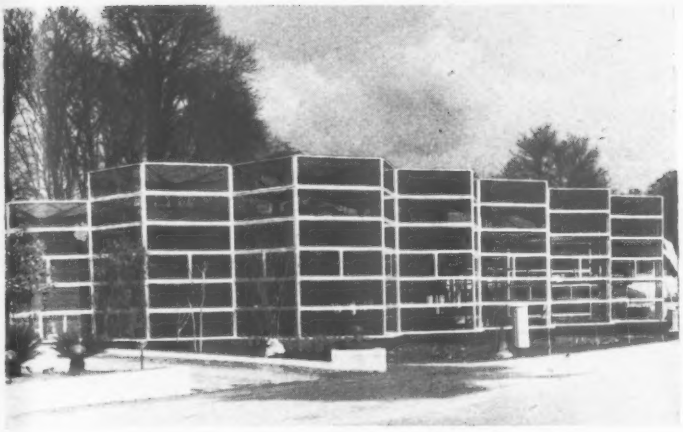
The two steel arches are secured at their point of junction to a steel spar which projects outwards and upwards from the building and serves as a counterweight not only to the roof but also to the upper floor. The floors are of pre-cast concrete supported on a steel framework which is partly cantilevered in a manner very similar to that described for the City of Paris Pavilion. It is claimed that this concentration of 80 per cent. of the load of the structure on a comparatively narrow area reduced the total weight of the pavilion (as against traditional construction) by one half. Within this vast envelope the main floor structures (which are of flowing asymmetric form on plan) rise independently on traditional steel piers. The topmost floor, however, corresponds on plan to the diagonal arches of the roof and like them is cantilevered out from the main foundation "hub" with only minor support at the extremities. Lastly, a small auditorium to seat about 200 people has been contrived within the "cage" formed at the springing of the projecting spar, the edge beams and the diagonal arches.

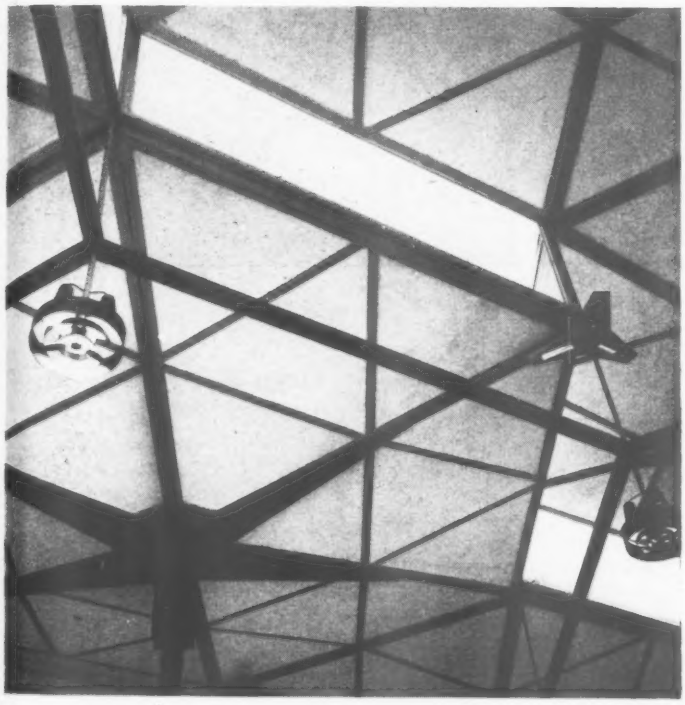
The French Pavilion was late in opening, having experienced great misfortunes in construction. Most of these were due to the poor subsoil; but one cannot altogether suppress the thought that the design raised more problems than it solved. The plan shows that on the ground floor, by the main entrance, there are considerable areas devoted to interior design and kitchen equipment (to the right), architecture (straight ahead), and building technique and town planning (to the left). The intermediate floor is divided between Algeria and the French colonies and the chemical industry, while the upper floor (reached by escalator) is divided between science and the arts.

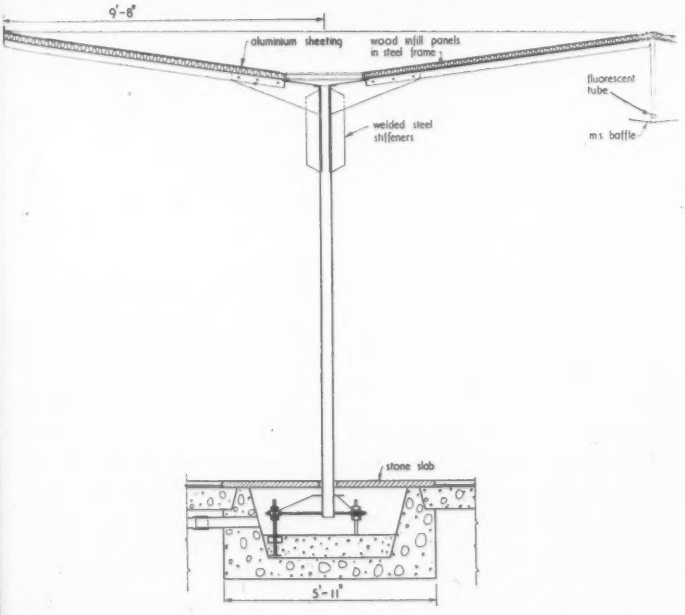
Immediately opposite the French Pavilion are a pair of semi-detached Muslim Pavilions, those of TUNIS and MOROCCO, which have a certain theatrical charm.

Left, City of Paris Pavilion: right, wall of main pavilion.



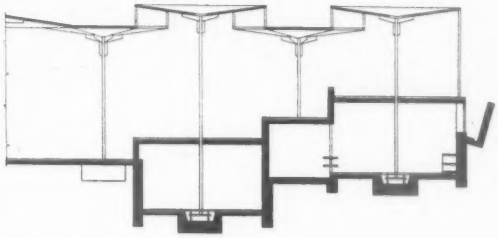






Spain

Continuing up the *Avenue de l'Europe* you come to the Pavilions of SWITZERLAND (on your left) and of SPAIN (on your right). These are both (in their different ways) highly successful pavilions and are both built up of a series of hexagonal units. Here, however, the similarity ends. In the Spanish Pavilion (architects R. Vasquez-Molezun and J. A. Corrales Gutierrez) the units are placed contiguously to form a single irregularly shaped interior, being of different heights, and raised or lowered to take in the unevennesses of an uneven site. Another important difference from

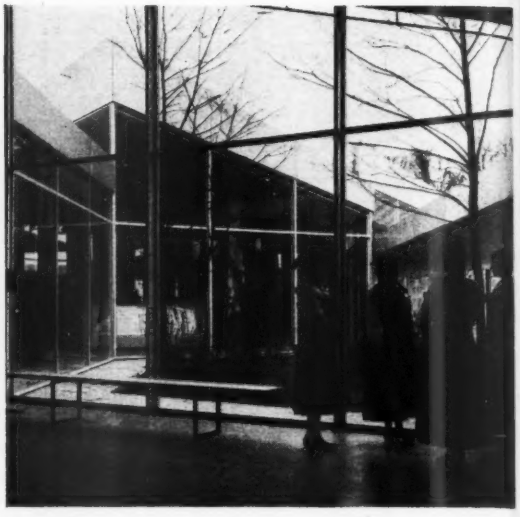


Cross section [Scale: $\frac{1}{24}$" = 1' 0"]

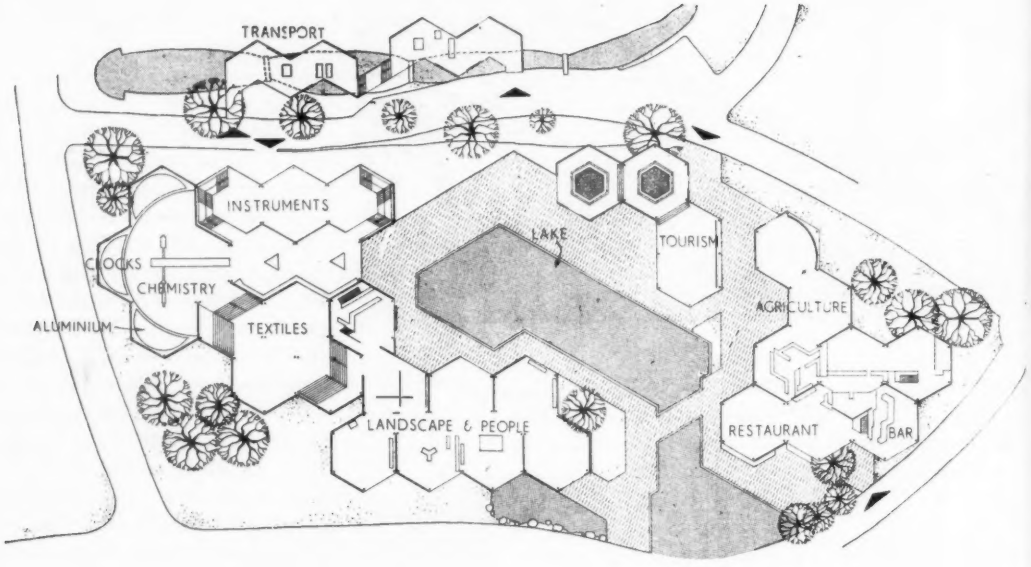
the Swiss Pavilion is that the units are in effect only units of roof: the layout of the floor beneath does not follow their pattern. These roof units are best described as a series of umbrellas. In the centre of each, on plan, is a tube support. The head of this tube is stiffened by six welded steel fins. This stiffened tube head then receives the roof proper which comprises six triangular frames formed of welded mild steel T-sections with timber infilling panels (see drawing). These are bolted at the centre to a special "steel capital" with six supporting arms welded to a central tube which drops inside the tube column. Each triangular section of roof is bolted along its edges to adjacent triangular sections and the whole is covered with aluminium. The tubular columns also serve as down pipes and, as they are in line, they are connected beneath the floor by a drain laid to falls. The bounding walls are partly of brickwork and partly glazed. Along certain sections of the façade the glazing alternates with the brickwork. This arrangement, which conceals the source of daylight when seen by viewers approaching from the blind quarter, is exceedingly effective. At night the pavilion is lit by screened fluorescent tubes which follow the bounding lines of the hexagons. Owing to delays in completion we were unable to see the exhibits.

Top left, general view of the Spanish Pavilion. Centre left, close-up of the roof. Left, detail drawing showing "umbrella" construction of roof.

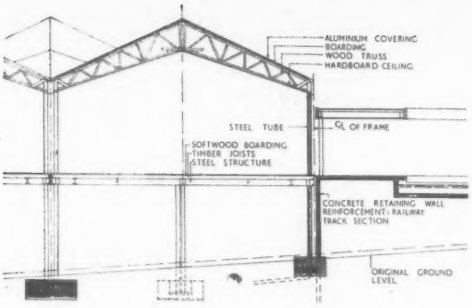
Switzerland

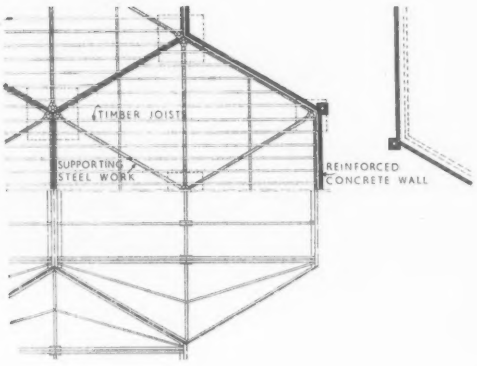


Above, general view of the Swiss Pavilion. Right, an interior view. Below, layout plan [Scale: 1" = 80'

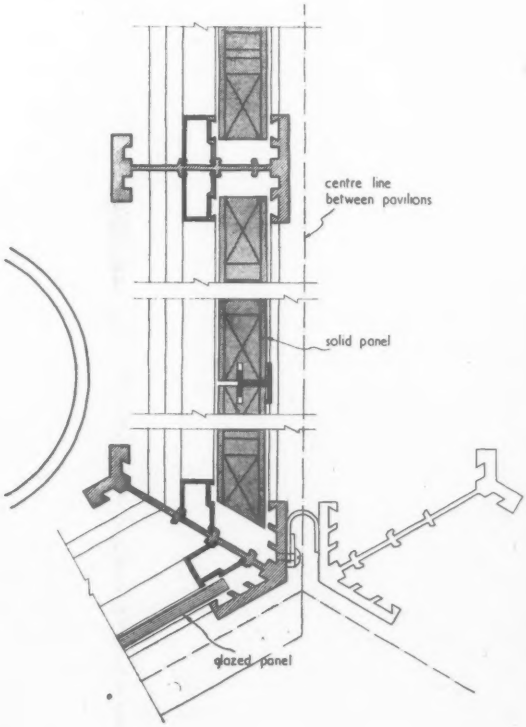


The Swiss pavilion (architect Werner Gantenbein), like the Spanish, is composed of a series of small repetitive units. The motive in this case, however, is not only to accommodate a hilly site (the roofs are level, the floors are not) but to express the Swiss Federal idea, a preference for the human scale and (which follows) a rejection of the monumental. Each unit (there are 31 in all, plus one double unit to form an assembly room) is six-sided with a double pitch roof which invariably runs on the north-east-south-west axis, an arrangement which enables contiguous hexagons to obtain clerestory lighting along the planes of the roof verge. The construction is very simple (see drawing). Support is provided by tubular columns, one just inside each external angle, with a seventh column beneath the centre of the floor. The roof of each unit is spanned by a set of lattice timber trusses and clad in aluminium sheet. The external walls are mostly glazed, and where opaque clad with sheet aluminium. This same metal is used for the wall framing, for which a most interesting set of extrusions have been specially designed. These comprise uprights and head and sill members which are substantially of I section with finned webs to receive clip-in aluminium





Top, section and, above, roof plan of typical unit [Scale: $\frac{1}{16}$" = 1' 0"] *Below, plan section through curtain wall (scale: quarter full size).*



General view of interior of Swiss site, looking across the lake.

beads in two alternative positions according to whether the panel to be received is opaque or glazed. The site is well supplied with trees and in the centre is a handsome artificial lake.

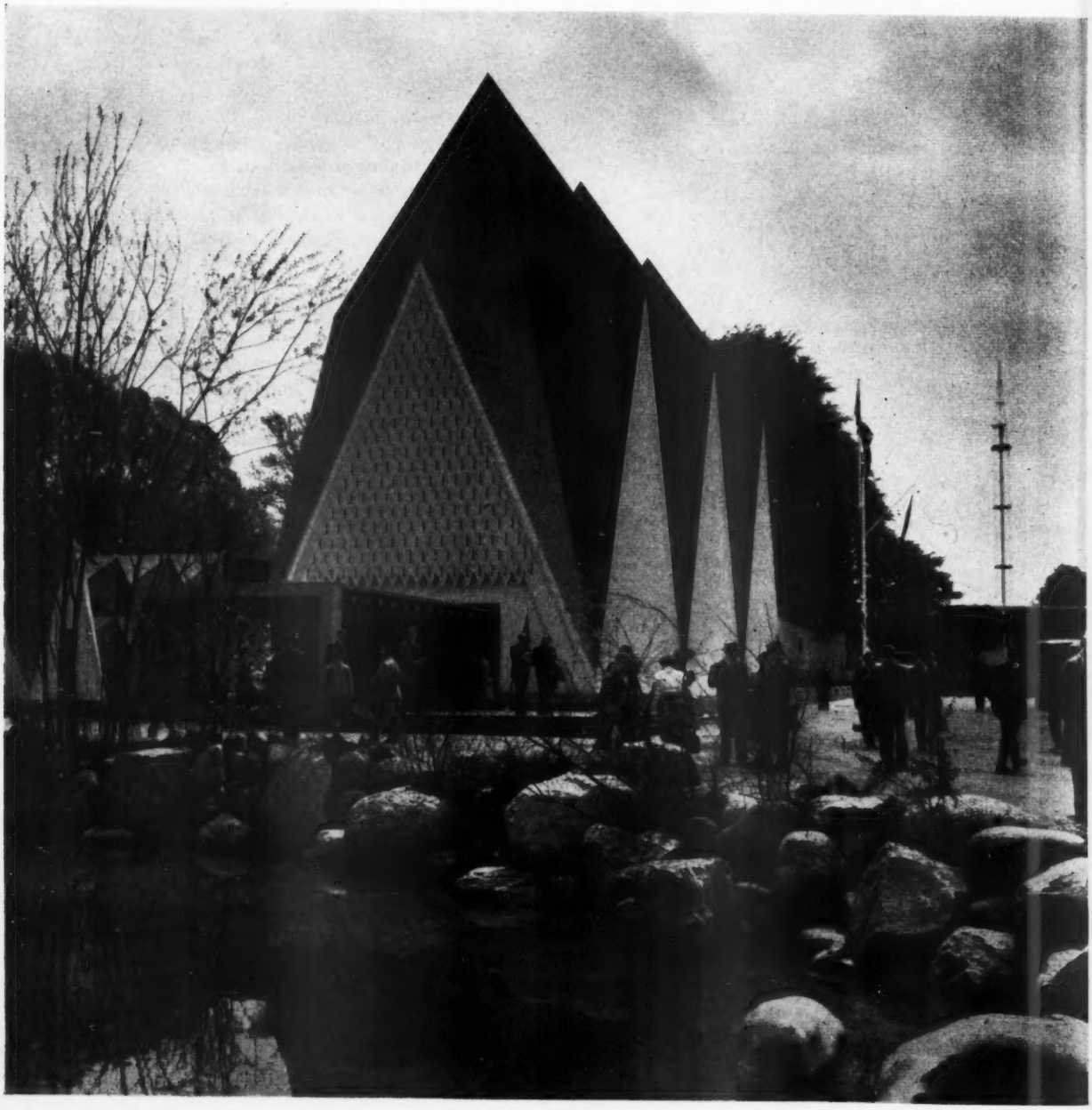
Inside, it is worth having a look at the precision machinery if you have time, particularly the clock and watch section, where there is an "atomic clock" accurate to 1/10,000 part of a second a day. The textile show is a real eye-catcher. A glass screen divides the viewers, who are almost in darkness, from a brilliantly lit exhibition of clothes and materials in bold colours, worn by artificial mannequins in gilt, or pouring in drapes from nine enormous black shuttles. For a quick snack, you can hardly beat the toasted cheese offered in the Swiss Picnic, and the terrace is an agreeable place to have a coffee and a rest—but expensive.

Looking up the "pedestrian street" at rear of Swiss Pavilion.

United Kingdom

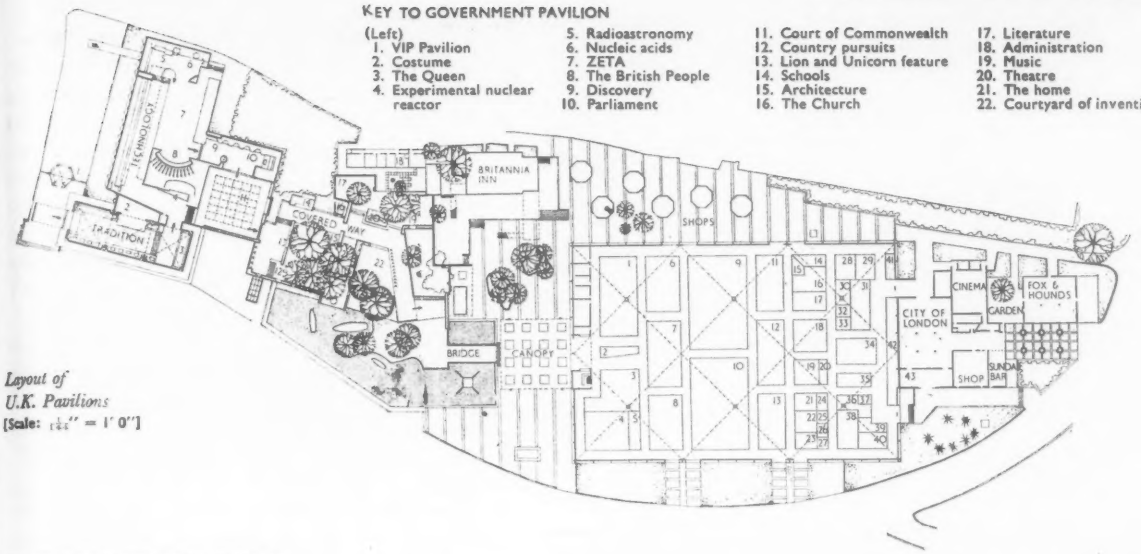
Immediately next to Switzerland on the left-hand side of the *Avenue de l'Europe* is the Pavilion of the UNITED KINGDOM; the near section (*i.e.*, with the three crystalline spires) is the British Government Pavilion (architects Howard Lobb and Partners), beyond is the huge glazed hall of the British Industries Pavilion (architects Edward Mills and Partners), and between the two is the Britannia Inn (also by Edward Mills and Partners). As this pavilion was described in detail in the ARCHITECTS' JOURNAL of May 1, 1958, we do not describe it again here.

Below, the crystalline spires of the British Government Pavilion. Right, the British Industries Pavilion seen through the bridge of the Britannia Inn.



KEY TO GOVERNMENT PAVILION

(Left)
1. VIP Pavilion
2. Costume
3. The Queen
4. Experimental nuclear reactor
5. Radioastronomy
6. Nucleic acids
7. ZETA
8. The British People
9. Discovery
10. Parliament
11. Court of Commonwealth
12. Country pursuits
13. Lion and Unicorn feature
14. Schools
15. Architecture
16. The Church
17. Literature
18. Administration
19. Music
20. Theatre
21. The home
22. Courtyard of invention



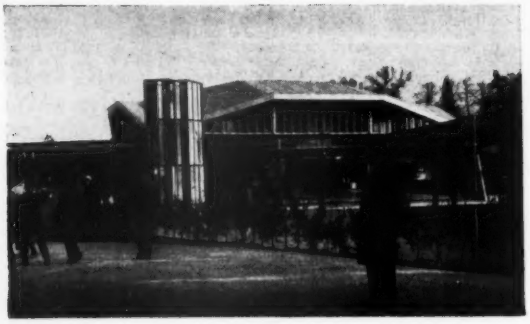
Layout of U.K. Pavilions
[Scale: 1/16" = 1' 0"]

KEY TO BRITISH INDUSTRIES PAVILION

(Right)
1. British Iron and Steel Federation
2. Petroleum Bureau
3. National Wool Textile Ex. Corp.
4. Triple Crown feature
5. Scottish industry
6. Birmingham Exchange and Eng. Centre
7. Imperial Chemical Industries Ltd.
8. Distillers Co. Ltd.
9. Nuclear Power Plant Co.
10. British Electrical and Allied Industry section
11. Standard Telephones & Cables
12. Atomic Energy Authority
13. Babcock & Wilcox, English Electric Ltd. & Taylor Woodrow Ltd.
14. British Timken
15. Renold Chains Ltd.
16. Showcase Feature I
17. Clarke Chapman
18. Rolls-Royce
19. B.B.C.
20. Pamphonic Reproducers Ltd.
21. Darlington Chemicals Ltd.
22. Acrow (Engineers) Ltd.
23. Hoover Ltd.
24. Wilmot Breeden Ltd.
25. British Cycle
26. Secomastic Ltd.
27. Trico-Folberth
28. Singer Sewing Machines
29. Vono Ltd.
30. British Vacuum Cleaner & Eng. Co.
31. Doulton & Co.
32. Gestetner
33. Fed. Assn. of Boot & Shoe Mfrs.
34. Courtaulds Ltd.
35. BEA and BOAC
36. Revo Electrical Co. Ltd.
37. W. S. Crawford Ltd.
38. Thomas De La Rue & Co. Ltd. (Formica)
39. Bovril Ltd.
40. Tootal Broadhurst Lee
41. Copeland & Sons Ltd. (Spode)
42. COID
43. Agricultural Engineers Assn. Ltd

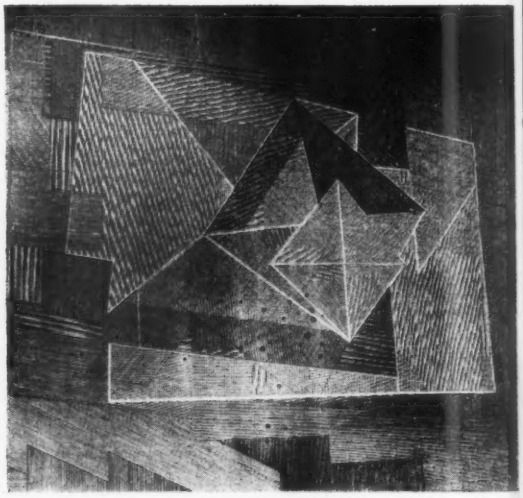
Turkey

On the other side of the Avenue de l'Europe, next to Spain is the small pavilion of MONACO (architect Charles Gamba), a glazed box with rather coarse French detailing, and next to Monaco is the pavilion of TURKEY (architects Izgi, Sensoy and Turegun). This is a very elegant and up-to-date job comprising two glass walled buildings joined by a low ceramic wall, by B. R. Eyubollu. These are both plate glass and steel structures but the top storey of the smaller building (which is a restaurant and café) is enclosed by an excellent lattice wood screen—which is, perhaps, the only case in the whole Exhibition where an item of traditional craft detailing has been convincingly applied to a modern building. The pavilion is designed for re-erection later in Ankara. Like the British Industries Pavilion opposite, the Turkish Pavilion offers the great advantage to the hurried visitor that you can get a very good idea of the exhibits without having to go inside, unless you want to sample Turkish cooking, Turkish coffee or Turkish delight, or to take a look at the carpets, fabrics and other handicrafts in the bazaar. Continuing on past the British Industries Pavilion you come to a group of three Latin-American Pavilions, those of Vene-



zuela, Mexico and Brazil, in that order. The Pavilion of VENEZUELA (architect Dante Savino) is a small but complex steel-framed structure. Seen from the road it appears to be a single-storied building roofed by a flattish steel dome, square on plan (see photograph); but in fact the ground falls away rapidly behind and a lower storey shoots forth at an angle from beneath. The interior, with its clerestory lighting, the strong horizontal accent enforced by the open suspended ceiling, the pink colouring and the profusion of tropical plants, is pleasant but rather incoherent, and the detailing is insufficiently well thought out. Two exhibits worth a mention are the two reliefs in welded steel wire by the Venezuelan sculptor Soto. These are made in two planes, the one in front of the other, and make you feel agreeably cross-eyed as you walk past them. The bar seems to be the only one in the Exhibition that offers free coffee and rum, and the hostesses alone are worth seeing, they are unquestionably the prettiest at the Exhibition.

Venezuela



Top, general view of the Venezuelan Pavilion. Above, the interior. Right, a relief in welded steel wire by Soto.

Mexico

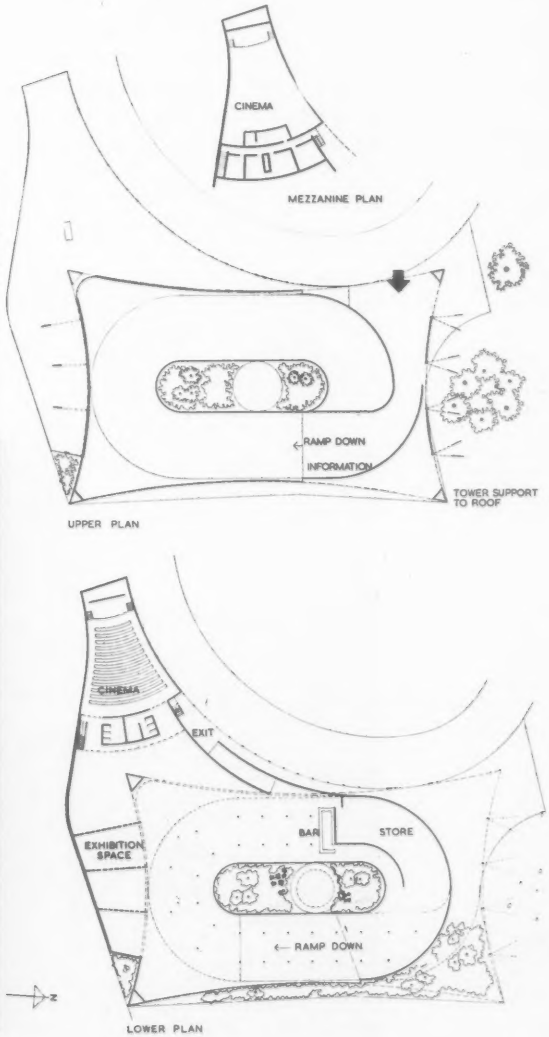
The next Pavilion is that of MEXICO (architects Pedro Ramirez Vasquez and Rafael Mijares). The Exhibition Hall of this pavilion is a small steel-framed building with trusses made with castellated beams. The façade facing the road is clad with screens of varnished cedar in the openings of which are inserted 6-in. square panes of stained glass. The cedar members are 4 in. square in section. The interior is high, dark and very successful, though impossible to do justice to in a photograph, its designer Fernando Gamboa (who was responsible for the Mexican Art exhibition in London) having made remarkably good use of the limited floor space by taking advantage of the height to display photographs which form, in effect, a false ceiling. There is an excellent display of Mexican art of the pre-Spanish, colonial and modern periods, including a mural in the vestibule by Orozco, and some excellent Mexican handicraft work is on sale. There promises to be some interesting performances of ballet and of music in the cinema-hall.

Brazil

The third South American Pavilion, that of BRAZIL (architects Sergeo Bernardes and Nicolai Fikoff) is technically the most interesting of the three, if only because it has a hanging roof. This (which will be the subject of a Working Detail in a future issue) is the most expressive hanging roof in the Exhibition, chiefly because it is structurally independent of the enclosing walls below. The plan of the building is simple, being stadium shape with a continuous spiral concrete and steel ramp, at the foot of which is a small cinema. The roof is rectangular on plan and is slung from four steel angle towers: the lattice edge beams, which follow the sag of the roof, are of tubular steel, and there is a round hole in the middle of the roof which is trimmed with an annular steel built-up girder. The roof itself is formed of concrete laid on a permanent shuttering of asbestos cement. This in turn is laid on m.s. angles which pass over and are clipped to the high tensile steel cables, except at the roof-edge.

At the entrance to the pavilion is the statue of the prophet Habakuk by Aleijadinho (1730-1814), a masterpiece which has not been seen in Europe before. And few architects will wish to miss either the photographic exhibit on architecture and town-planning, or the model of the new capital, Brasilia, which is about half way down the ramp.

Below, close-up view of the hanging roof of the Brazilian Pavilion. Right, floor plans. [Scale: $\frac{1}{16}$" = 1' 0"]

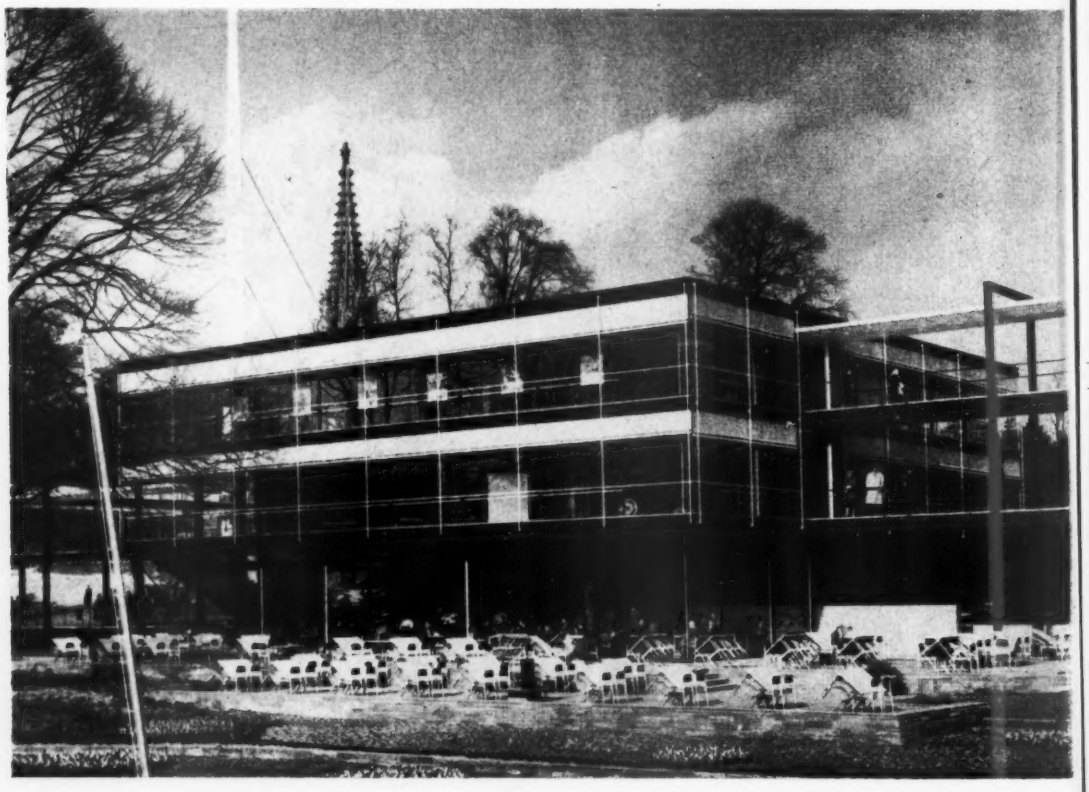


Western Germany

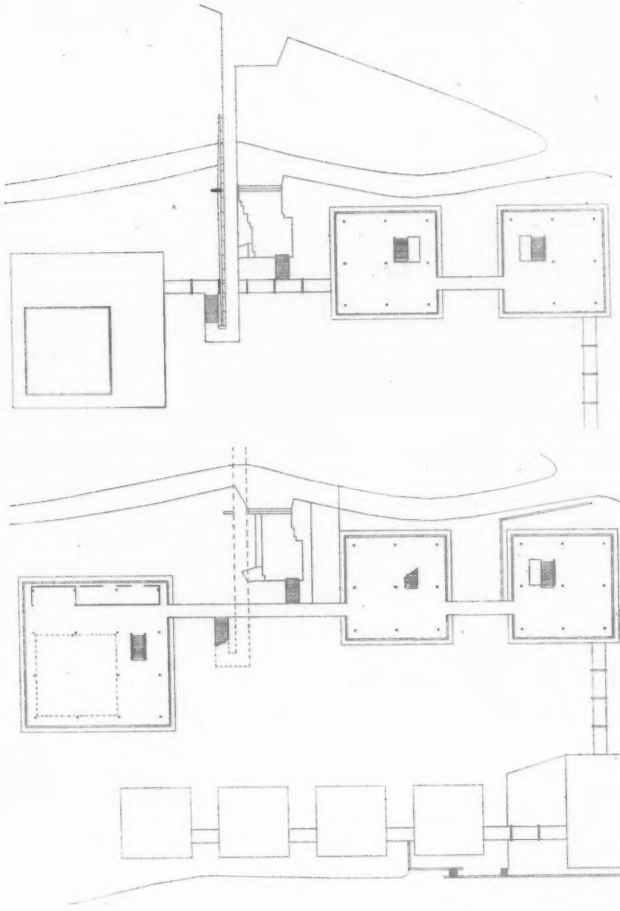
Left: units 2 and 3 (in the foreground, of the German Pavilion) and below, unit 7.

From the Brazilian Pavilion you pass up the *Avenue du Pacifique* until you reach the bridge which leads on to the Pavilion of WESTERN GERMANY (architects Egon Eiermann and Sep Ruf). This, like the Netherlands Pavilion is unquestionably one of the highlights of the Exhibition and—also like the Netherlands—should be visited in the sequence intended by the designers. The pavilion comprises a chain of fully glazed showcases linked by bridges. The five pavilions on the lower side of the site are two-storied, the three

Below, unit 2: the Gothic spire in the background is Belgium's Albert Memorial (to Albert 1). To the left is the pylon supporting the building.

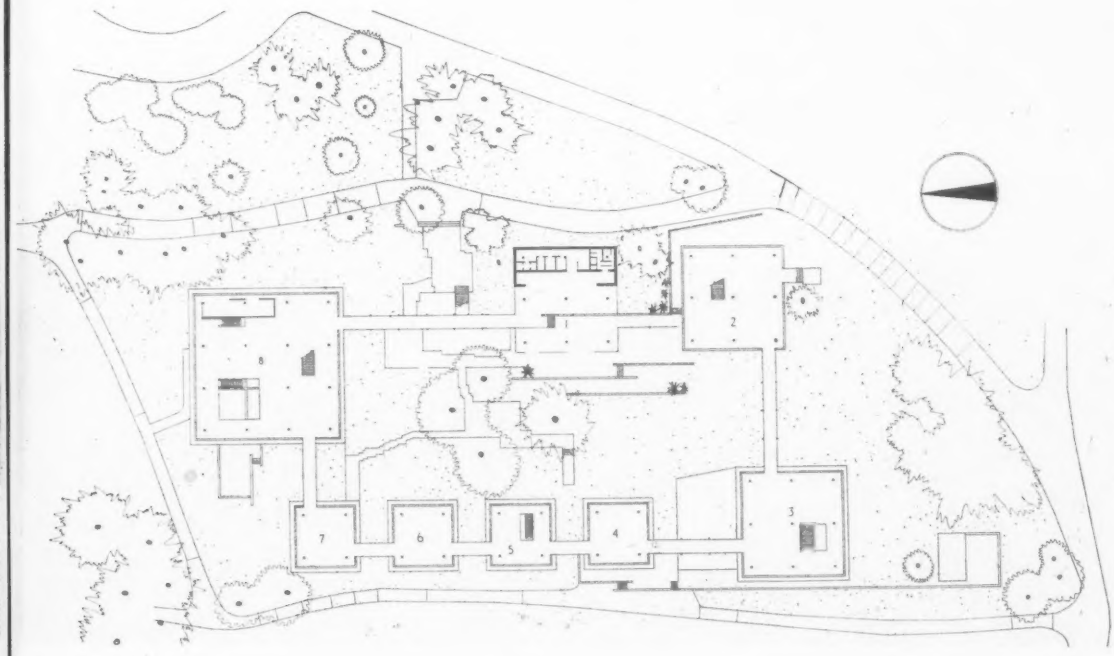


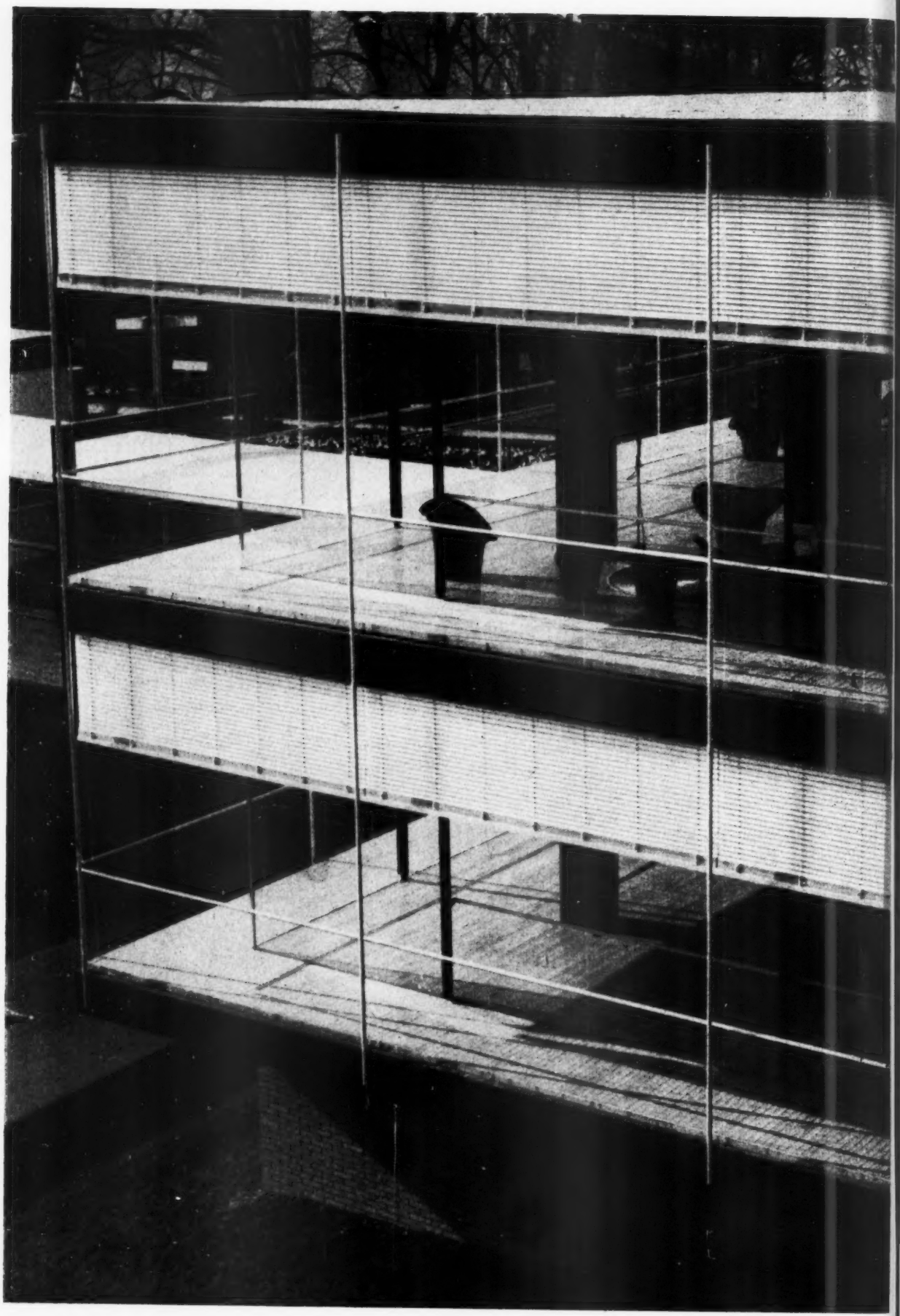
on the upper side three-storied. The construction is of welded steel, each pavilion being supported on 4, 9 or 16 box stanchions. These are set at about 30-ft. centres, the outside stanchions being invariably placed some six feet inside the glazed wall which is itself placed three feet inside the roof and floor edge to give room for an outside passage-way. The steel fascias



Above, steel pylon, from below, showing cables supporting the bridge shown on the plan, top left. Left, floor plans: top, second floor plans of units 1 *and* 2*; centre, first floor plans of units* 1, 2 *and* 8*; bottom, ground floor plan of units* 1, 2 *and* 8, *and first floor plans of remainder.*
[Scale: $\frac{1}{16}$" = 1' 0"]

KEY
1. Ground floor: restaurant
   First floor: Agriculture
   Second floor: Handicraft
2. Industry
3. Housing and Town Planning
4. Ground floor: Wine Bar
   First floor: Personal Needs
5, 6. Ground floor: Recreation
   First floor: Social Welfare
7. Health and Welfare
8. Basement: w.c.
   Ground floor: Education, Information
   First floor: Assembly hall

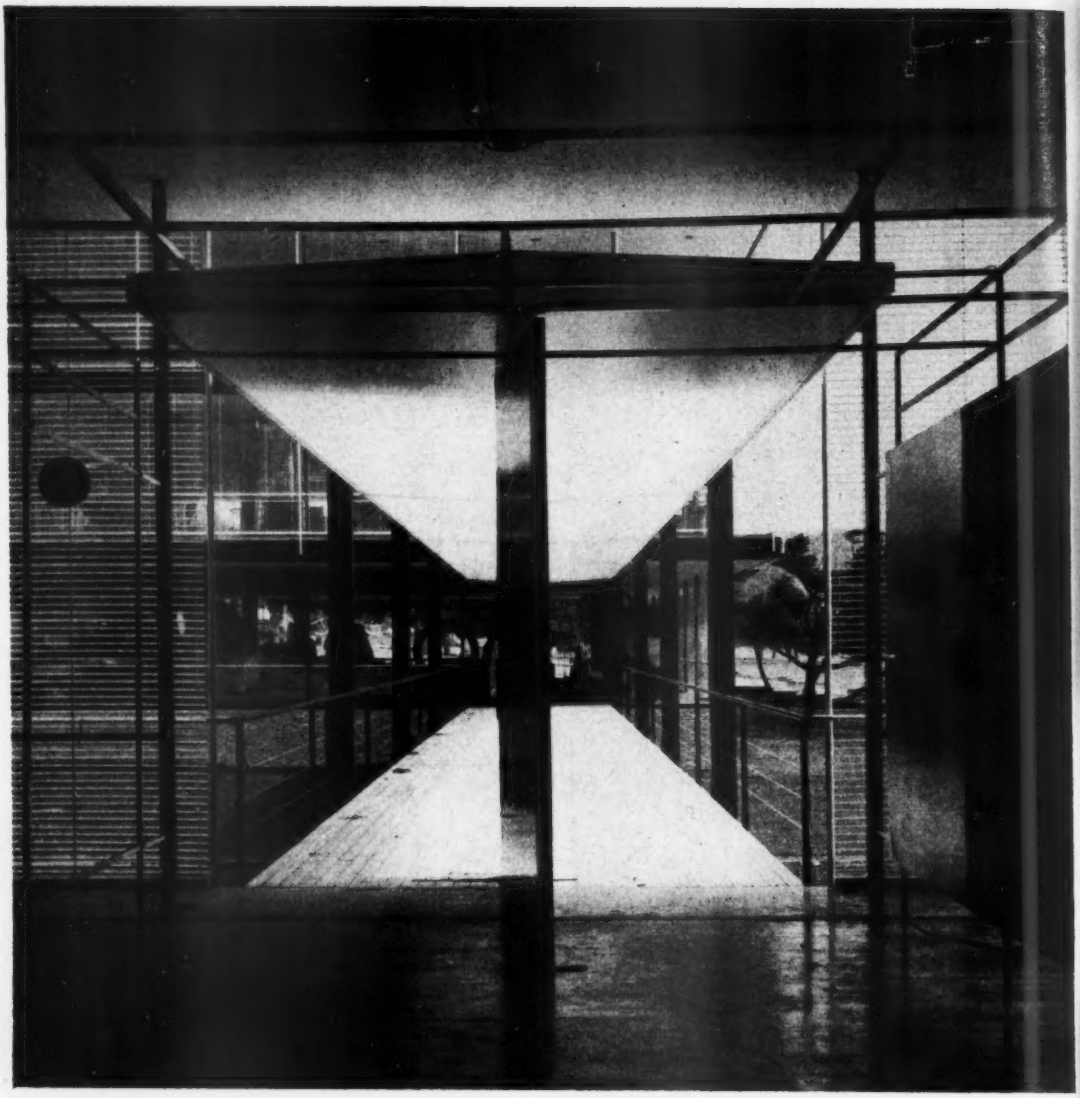




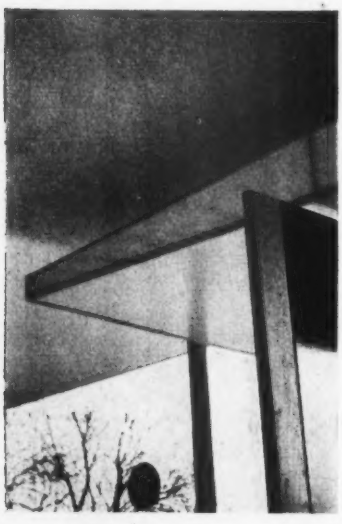
Opposite page, view looking down on angle of pavilion 8 from entrance bridge. Left, detail of corner, showing the rails which link the steel fascias. Above, view under entrance bridge and stair. Spinal cantilever is integral with vertical feature (see page 810). Below, basket furniture in forecourt of pavilion 8.

which conceal floors and roofs are linked together by steel stiffeners bracketed out an inch or so proud of the fascia line and to these is welded a line of tubular rails. The floors are of white pine decking (which in the connecting bridges and in areas open to the weather are caulked); an exception being the industrial pavilion where they are of steel plate. The glass stops short of the ceiling to ensure natural ventilation, and every façade is provided with electrically-controlled white venetian blinds which operate as a single unit.

The entrance bridge is a particularly unusual structure, being suspended by cables from the 150 ft. high steel pylon which rises on one side (see photo. p. 811). Other

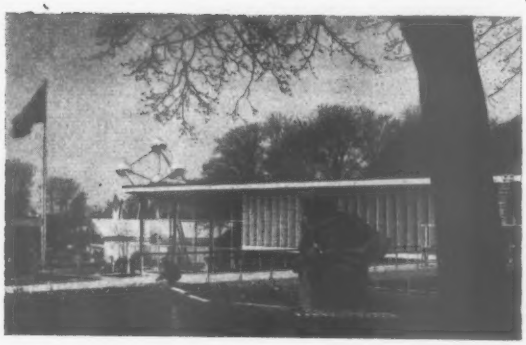


Above, looking along the bridge connecting unit 3, in foreground, to unit 2. Below, a closer view of the canopy and the centrally pivoted door at the junction with the bridge.



details of special interest are the canopies over the connecting bridges which are of polythene stretched over tubular steel frames, the internal stairs of which the steps are of solid timber, and the centrally pivoted double doors which face on to the connecting bridges and serve to close the separate "showcases" at night. All parts of the pavilion were fabricated in Germany and it is planned to re-erect it elsewhere when the Exhibition is over. The total effect of walking round this exhibition is overwhelming. The only criticism which can be made is that the architectural diagram is everywhere so strong that it tends to eclipse the exhibits: though these are always well conceived it is difficult to remember any of them. But the most effective is almost certainly pavilion 2, which is entirely devoted to industry, and leaves an impression of good workmanship and design. Pavilion 3 (town and dwelling), has an exhibit on town-planning on the upper floor, and furniture and materials on the lower floor which are worth seeing although they are unlikely to tell the architect anything he did not know before. In addition to the restaurant (very Germanic, lots of sauerkraut, with a fine open air terrace) there is a wine bar in pavilion 4.

Portugal

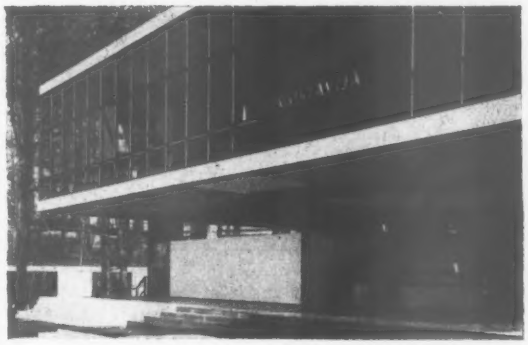


Above, general view of Portuguese pavilion. Left, view of interior, showing use of photomontage in glass curtain walling. Note brises soleil behind.

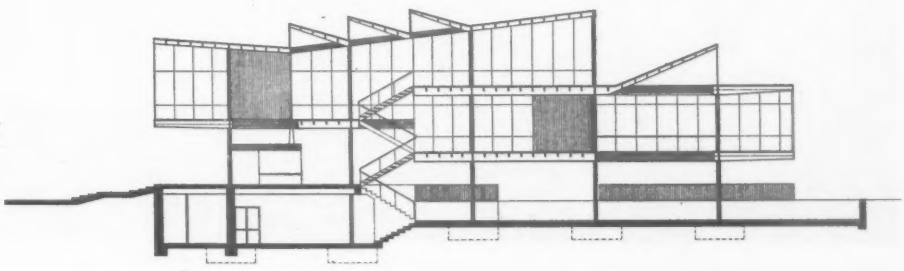
Leaving the German Pavilion by the main entrance and walking down the slope, you first pass the Pavilion of PORTUGAL (architects Jose Maria da Silva Segurado and Pedro Cid). This is a good building of the showcase type, square on plan, with a steel structure and glazed walls. The fascias and eaves soffits are of plaster and the roof structure is concealed by a plaster suspended ceiling. The floors inside are ramped and the glazed walls are screened by aluminium vertical *brises soleil* and by ceramic grilles. One variation of exhibition montage which is particularly effective in this pavilion is the incorporation of photographs in the glazed wall itself.

Yugoslavia

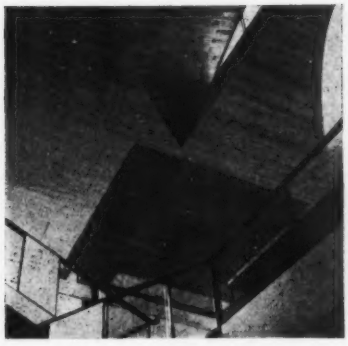
Next comes YUGOSLAVIA (architect Vjenceslav Richter). From the architect's point of view this is one of the undoubted successes of the Exhibition, perhaps because the pavilion does not merely house the exhibition but *is* the exhibition. From the planning point of view it is a most interesting essay in the inter-penetration of space: three rectangular galleries of different heights and at different levels are raised above ground and inter-penetrate round a common staircase. The structure is of steel throughout, the steel stanchions being placed invariably some 14 ft. inside the building line. The pavilion differs from all others in that it is completely impossible to close it: the ground floor is open and there is no barrier at the foot of the stairs to bar the way to the galleries above. Light penetrates the complex from above by means of a series of

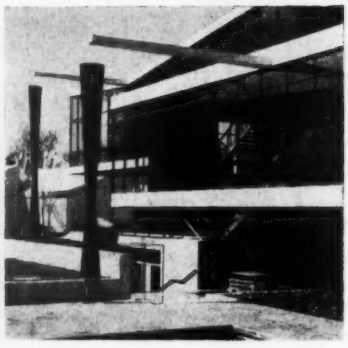


Above, entrance of Yugoslav pavilion. Below, section [Scale: $\frac{1}{16}$" = 1' 0"] *Extreme left, detail of vertical feature.*



Yugoslavia: continued





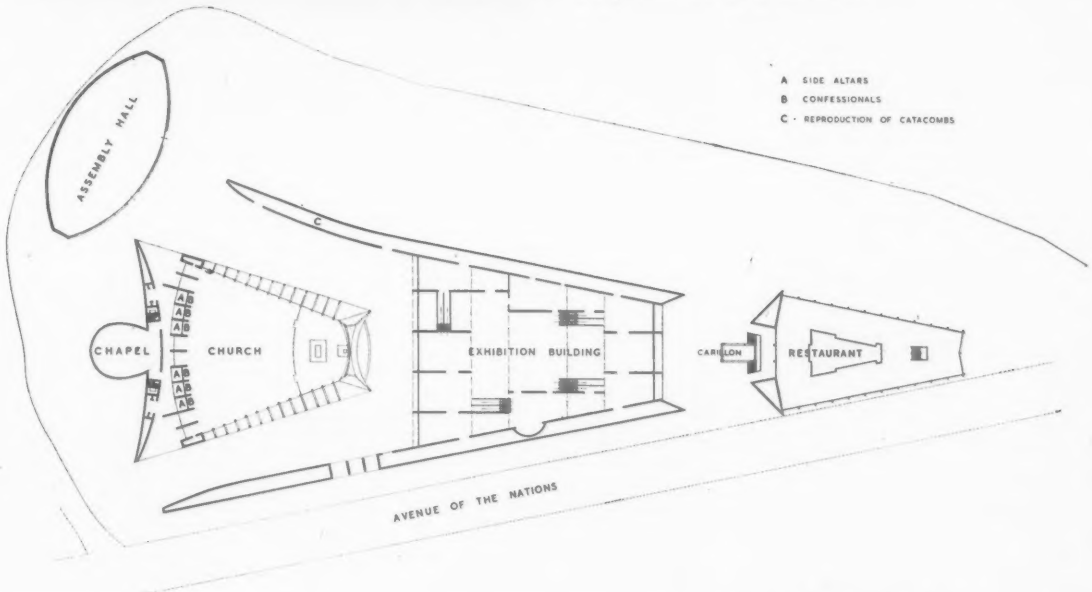
Right, general view of side elevation. Left, detail of roof, showing formation of clerestory lights. Below, view at night from the rear of the pavilion.

clerestory lights which are curved on elevation. In fact the " ceiling-scape " of this building has been carefully thought out: all ceiling surfaces are ceiled with close timber slatting which is so arranged to throw out relief changes in contour. Fascias are of hard-board and painted white and the occasional sections of solid walling are clad in vertical weatherboarding stained purple. The ground floor is laid with a fine polished marble which is splendid to look at but very slippery. A charming little building, with a café bar upstairs and a restaurant below, straddles a stream in its wooded glade. The Yugoslav exhibits are scanty, telling (as so many other pavilions do in a similar way) the story of the country's social and economic structure. The gallery above the entrance is of some interest for its display of contemporary art and some rather dull architecture.

Vatican

Above, Looking up at hanging roof of Vatican church. Below, view of interior.

Continuing down the hill you pass the Swiss Pavilion which extends on both sides of the timber pedestrian way to form an admirable little street. Turning right you pass the little gilded pavilion of THAILAND (architect Binich Sampatsiri). Although in the traditional form of a temple it contains a display of national decorative art and handicrafts. You then pass under the viaduct, cross in front of the Vatican Restaurant (which, incidentally, was, at the time of the opening, the only place in the Foreign section where you could get a cheap meal) and arrive in the wide open space formed by the forecourts of the US and USSR Pavilions. Walking up the *Avenue des Nations* you reach the entrance to the Church which is the most interesting building on the surprisingly large VATICAN site. The architect to this group of buildings (conference hall, church, exhibition building and restaurant) is Paul Rome. If we exclude the restaurant, which is of steel with a steel-framed curtain wall, the construction generally is timber framing with rendering sprayed on to expanded metal—a method of construction which, before the era of extroversion, used to be the rule for exhibitions. The church is interesting both for its plan, which is of the fan-shaped auditorium type, with sloping floor and splayed side walls, and for its hanging roof. This follows a steeper gradient than any of the other hanging roofs in the Exhibition since the cables are slung from the tall vertical feature which stands at the liturgical east end (actually due west) and the core of which is of *in-situ* reinforced concrete. The side walls are glazed from floor to ceiling, with timber buttresses for mullions. The interior furnishing of the church was the joint responsibility of the Catholics of France and Germany. The general effect is undoubtedly very successful. The exhibition building itself is of no architectural interest, but to be found there is a superb historical collection of the images of Christ, also some charming modern sculptures by Hans Claesen and Jack Keykamp. There is a steel-framed carillon on the site, and in the thickness of one of the screen walls is a reproduction of a catacomb.

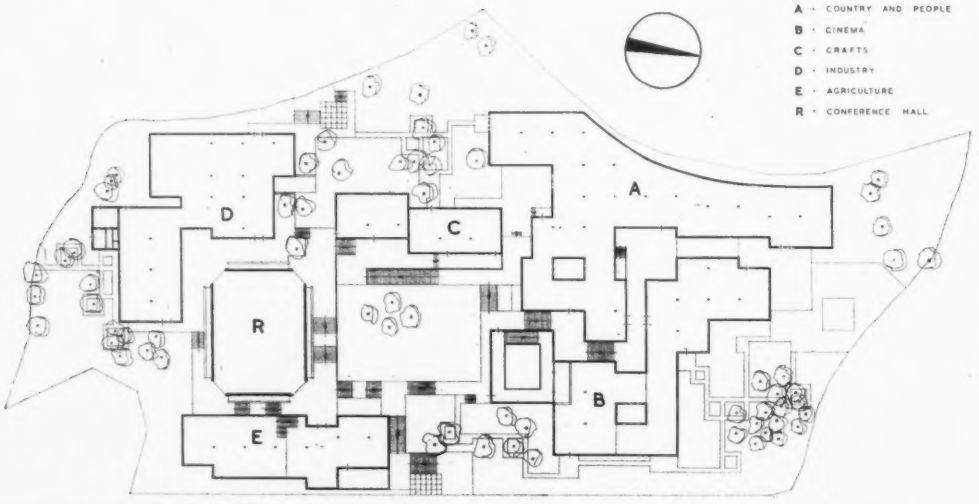


Layout plan [Scale: $\frac{1}{128}$" = 1' 0"]

These four views of the Italian "cittadina" show the narrow passageways, and white-painted brick walls with bright blue cornices.

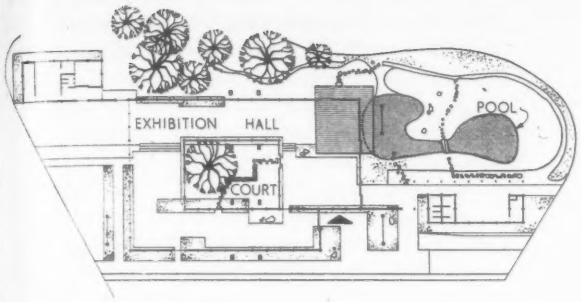
Italy

On past the Vatican site lies the Pavilion of ITALY. This is one of the great puzzles of the Exhibition, partly because it has been a long time finishing and it had not been possible at the time of writing to judge its final effect; but chiefly because of the extraordinary decision of the architects. These include most of the really good Italian architects: Lodovico Belgioioso, Ignazio Gardella, Amadeo Luccicenti, Vincenzo Monaco, Enrico Peressutti, Giuseppe Perugini, Ludovico Quaroni and Ernesto Rogers. This distinguished team decided to abandon modern constructional technique and, indeed, all that we mean by "modern architecture," and, instead, to pepper the site (which is a hilly one) with a large number of very solid rectangular buildings with loadbearing walls. These are rendered, painted white, and provided with an exceedingly unbecoming cornice painted bright blue. Most of the pavilions are one-storied, though there is one taller than the rest near the top of the site which houses an assembly hall. The windows throughout are vertical in form with outlines reminiscent of the Italian Renaissance, though they are asymmetrically arranged and are each glazed with a single pane of plate glass. The object of all this is described in the guidebook as to represent, in modern style, a picturesque "cittadina"; though this intention was energetically denied by one of the architects (Enrico Peressutti) who described the aim, rather unconvincingly, as to escape from the boredom of the glass box. When you walk inside the site up (or down) the narrow white-walled passageways, the view is almost completely enclosed. This is in itself a restful change from the over-stimulation of the Exhibition ground as a whole, though, curiously, the "passage-scapes" are not so skilfully contrived as they might be. The best part of the pavilion is undoubtedly the interiors which are always interesting, with a pleasant workshop-style detailing. Each is so small that one does not so easily get tired of looking. The only building which requires separate description is the assembly hall. This is a tall square building with ceiling height stained glass windows on the angles. The object of these is to light the walls which are lined with an exhibition of Italian craftsmanship. The assembly hall (which is at first floor level) is approached from underneath by means of stairs which bring you to the middle of the room. A vast venetian glass chandelier, 12 ft. high and nearly 9 ft. wide hangs from the ceiling. The attractions include a non-stop cinema, a restaurant, tavern and bar. A section of the cultural and scientific display is given over to architecture and town planning.

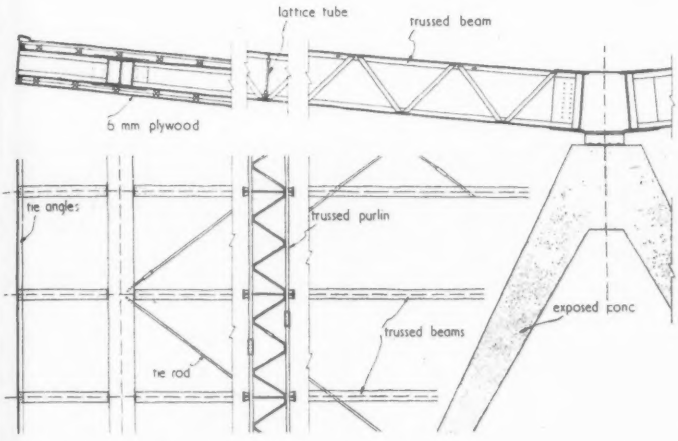


Layout plan [Scale: $\frac{1}{64}$" = 1' 0"]

Japan



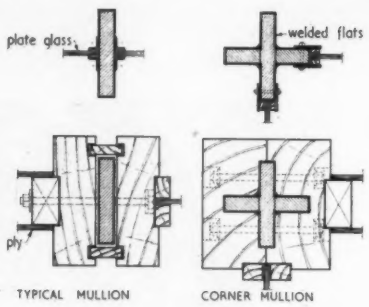
Layout plan [Scale: $\frac{1}{16}$" = 1' 0"]



Continue on, across the foot of the formal gardens of the Belvedere Palace and you reach a group of four Asiatic pavilions: those of PERSIA, JAPAN, the PHILIPPINES and CAMBODIA. To these must be added a fifth pavilion which does not really belong here, that of the DOMINICAN REPUBLIC. Of these five, only the Japanese Pavilion is worth a visit. This is to be found crouching behind the garish and fearsome Persian pavilion, which, unfortunately, hides it almost completely from the public view. The architect is Kunio Mayekawa. In plan the pavilion is a single-storied hollow rectangle with projections from the two shorter sides. The main rectangle is covered with a butterfly roof which is open over the central courtyard. The principal support for the roof is four pairs

Above left, detail of roof construction of Japanese pavilion [Scale: $\frac{1}{16}$" = 1' 0"]
Left, view of internal court.

Japan: continued



Above, details of mullions and glazing
[Scale: 1" = 1' 0"]

of reinforced concrete "legs" (see photograph) over which pass two I-section deep steel girders resting on steel pads. Additional support is provided by columns placed at 8 ft. centres round the enclosed area. These columns are made from $1\frac{1}{4}$ in. by 3 in. m.s. flats stiffened through the bottom half of their height by timber framing (see detail). It was originally intended that the roof should be assembled in large prefabricated units, but in the event it was site fabricated. Lattice girders run down the length of the roof. These are connected laterally by tie beams and stiffened by diagonal tie rods. Since the roof oversails the walls at both ends along the long axis, it is held down at these ends by four pairs of cross wires. The greater part of

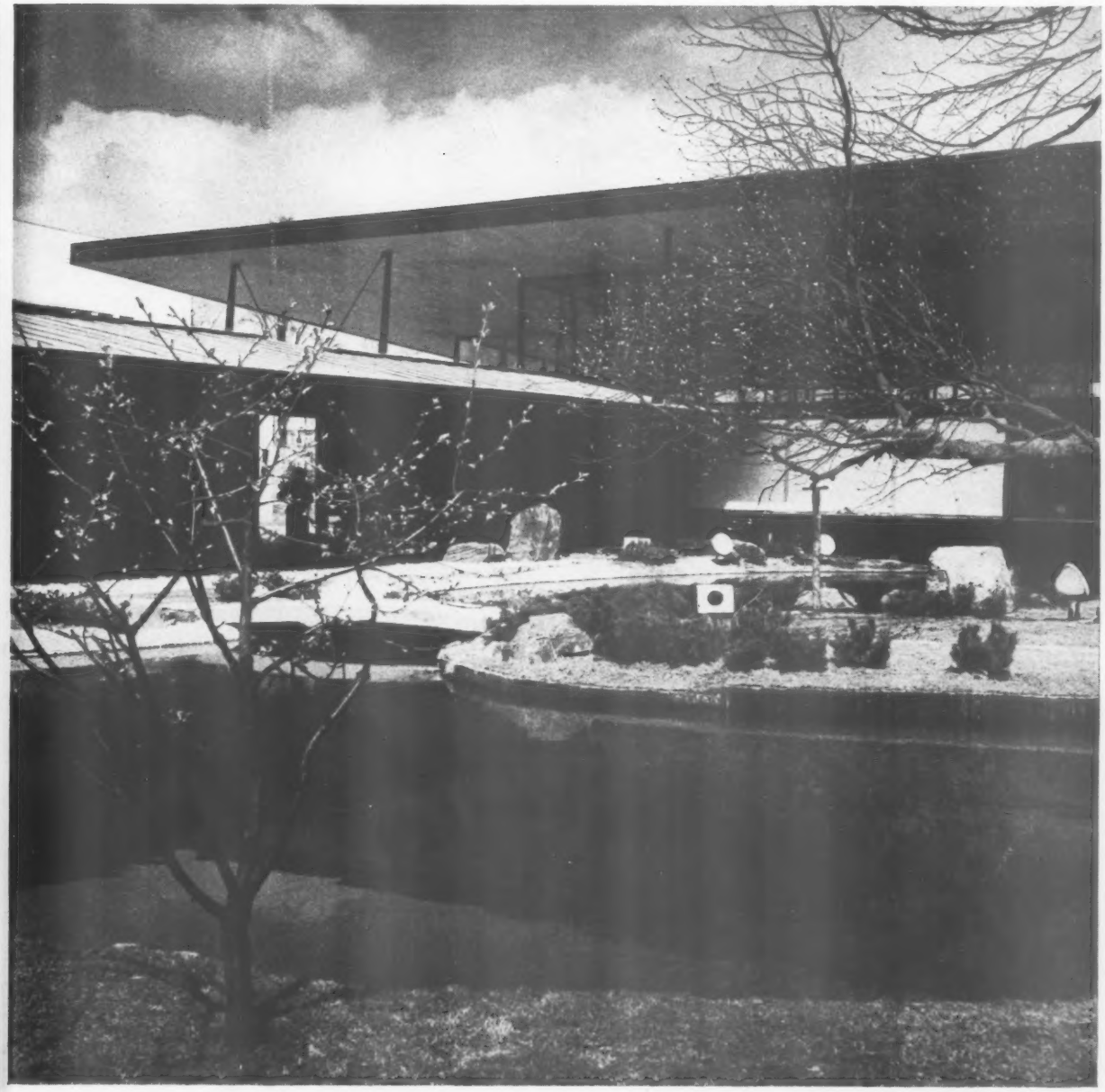
Below, view of interior. Note invasion of outdoor "trim," including rocks brought from Japan.

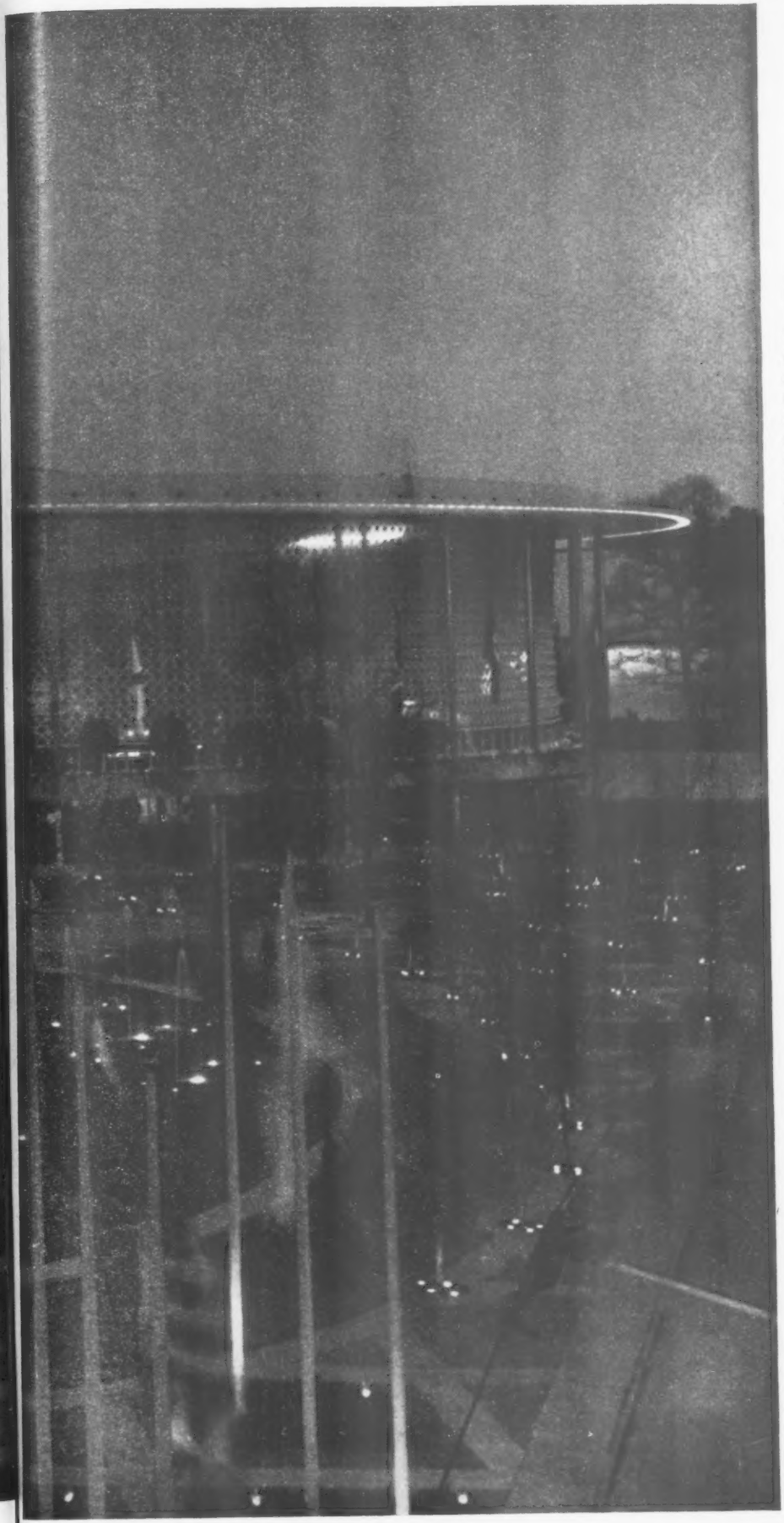
the walls which enclose this building are of plate glass and the floor has been deliberately contrived so that the traditional Japanese garden floorings—moss, cobbles and white gravel—pass freely inside the enclosing walls. The fascias are of sheet steel, the roofs are sheathed in copper, and the timber is creosoted.

At either end of this large pavilion are two smaller pavilions of traditional Japanese timber construction, one of them housing the restaurant and the other staff accommodation and (rather inappropriately) the electrical substation. Elegant as the buildings are, the real Japanese pavilion is the site itself, which has a stream with stepping stones and a pond with a flat stone bridge. The trim is everywhere exceedingly accomplished. Note particularly the edging to the pond formed of contiguous log piles. The rocks were imported from Japan where they enjoy a social prestige almost equal to pieces of sculpture.

Although there is a small industrial exhibit (which includes a very large tipping lorry that comes as a great surprise when one finds it) the main emphasis is on Japanese art and culture, including a tantalizingly small section on traditional art. But most people will find the Japanese garden a haven of rest on a tiring day. This is the ideal place to recover one's strength before mounting an assault on the formidable obstacles that lie ahead: the American and the Soviet pavilions.

View taken across the pool. The low building on the left is the café.

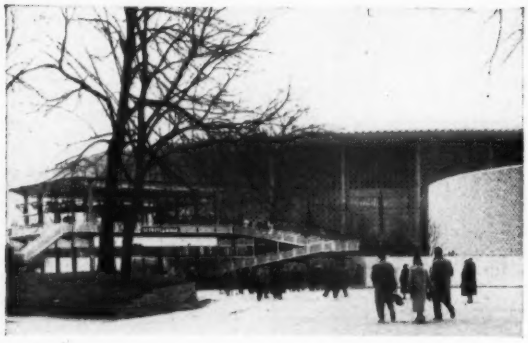




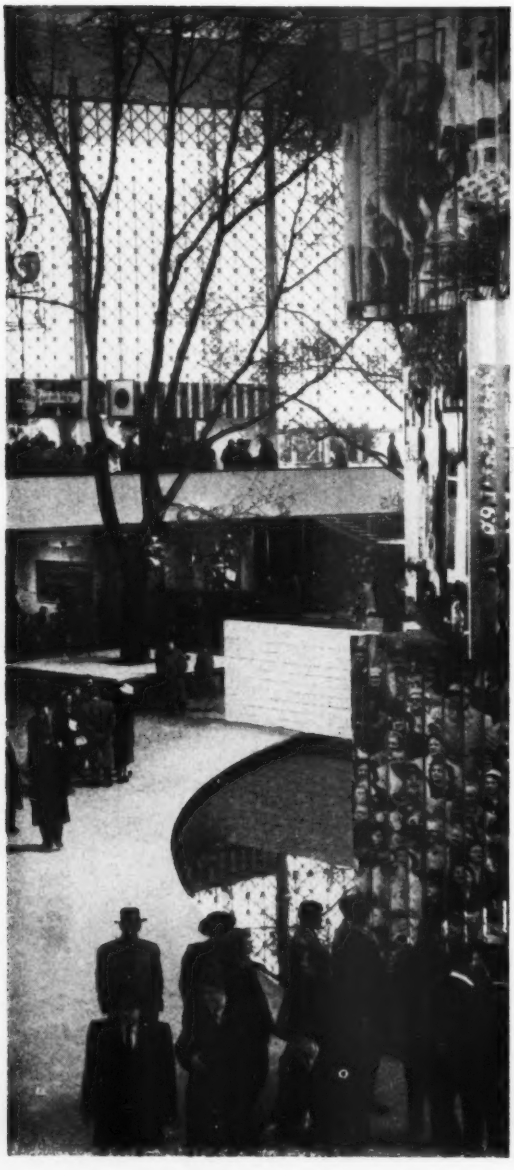
United States

The United States Pavilion at dusk is one of the most striking sights at the exhibition. Through the transparent walls of the pavilion the lights can be seen picking out the open steel and aluminium ring suspended 60 ft. above the central pool. The fountains and pool in front of the pavilion, though part of the US exhibit, are in effect a valuable addition to the public open space at the centre of the foreign section.

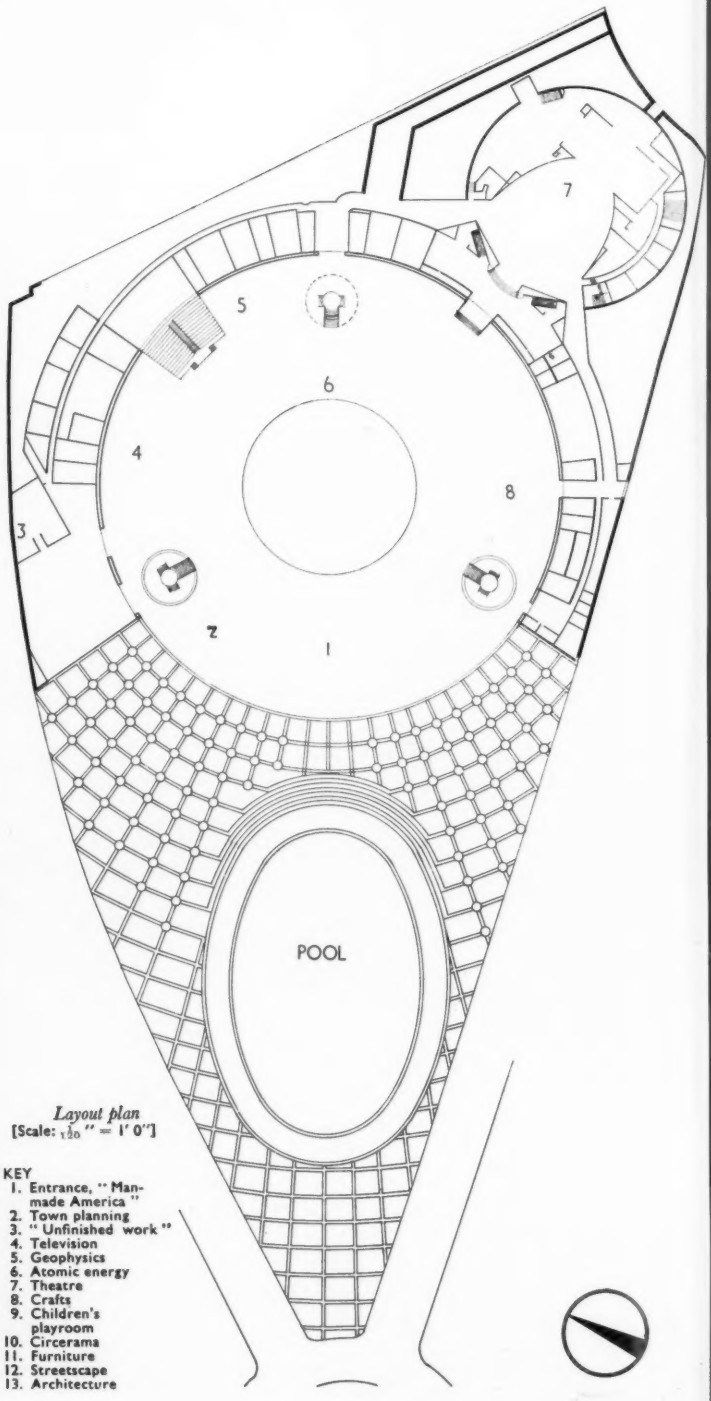
United States : continued



Above, view of the US pavilion from the Porte des Nations showing, right, part of ceramic screen surrounding theatre. Below, looking towards the crafts section

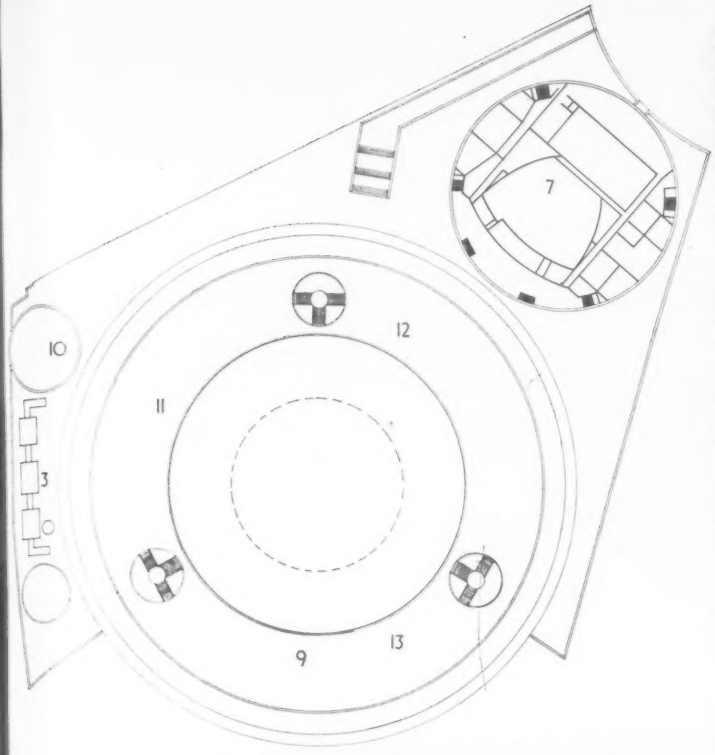


Turning back into the *Avenue des Nations* you come to the UNITED STATES Pavilion (architect Edward Stone), passing first the small rotunda of the Theatre (completely enclosed within a ceramic screen) and reaching then the vast rotunda of the main pavilion. From the structural point of view there are two points of interest about this vast and, in the main, very successful structure. The first concerns the roof. This is technically a "hanging roof"; but in contrast, say, to the hanging roof of the Brazilian pavilion, the fact of it being such has not influenced the form of the building. Which is as much to say that the hanging roof



Layout plan
[Scale: $\frac{1}{120}$" = 1' 0"]

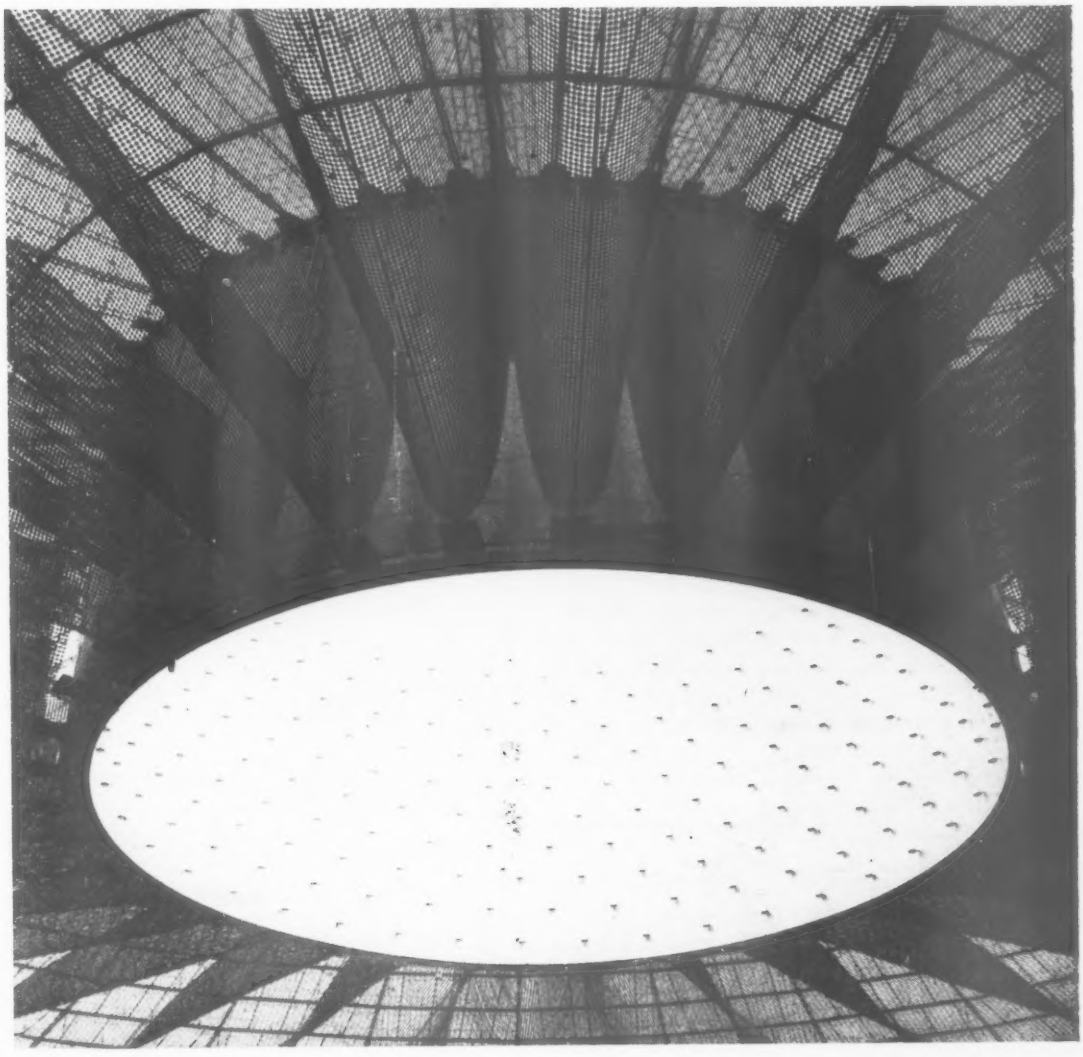
KEY
1. Entrance, "Man-made America"
2. Town planning
3. "Unfinished work"
4. Television
5. Geophysics
6. Atomic energy
7. Theatre
8. Crafts
9. Children's playroom
10. Circerama
11. Furniture
12. Streetscape
13. Architecture



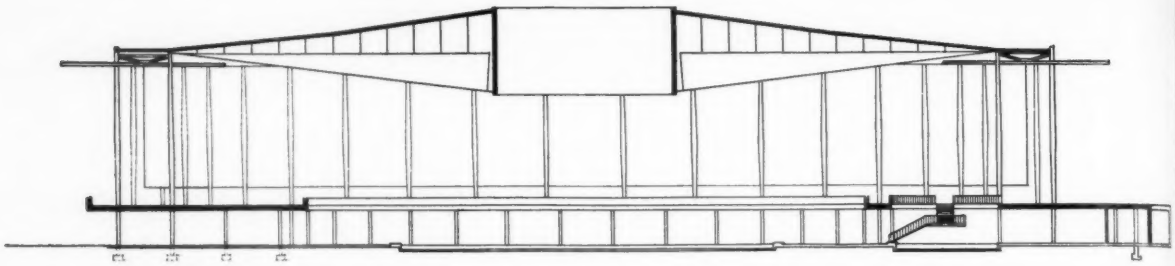
Balcony plan. For key, see opposite page.
[Scale: $\frac{1}{16}$" = 1' 0"]

Above, interior of the US Pavilion, with one of the mannequins who perform a continuous fashion parade standing on the pier in the central pool.

Below, close-up view of the 330-ft. diameter roof to the main pavilion, showing the aluminium-clad steel "hub" and steel mesh drape.



United States : continued



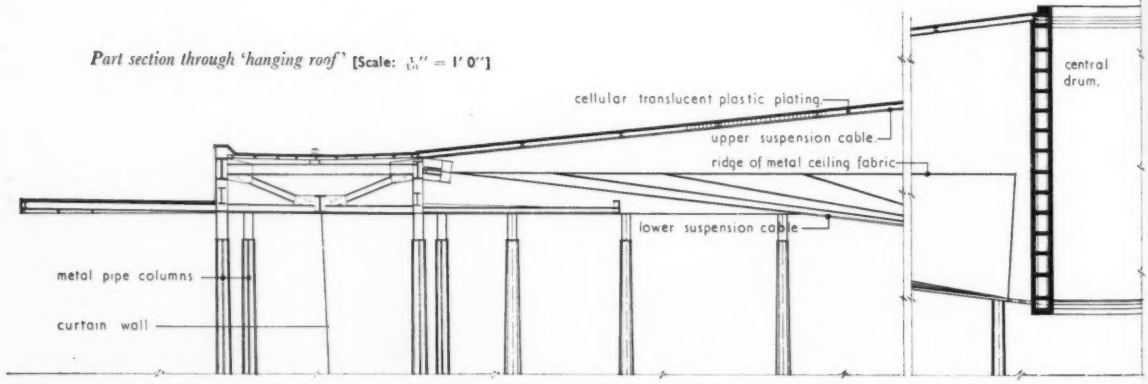
Section [Scale: $\frac{1}{64}$" = 1' 0"]

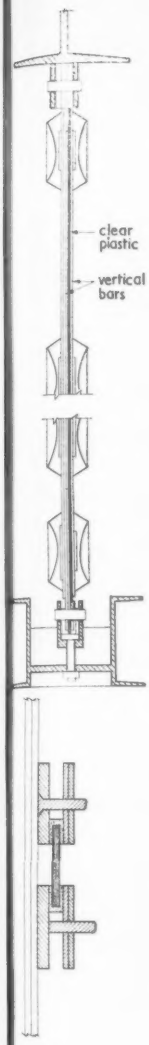
structure has been used (very convincingly as it happens) to cover a preconceived geometrical form. The total diameter of the rotunda (*i.e.*, between the outer ring of columns) is about 330 ft. The height of the steel ring from which the roof is hung is about 60 ft. above ground level. It is interesting to notice that this steel ring was originally conceived in reinforced concrete (like the balcony ring below) but was later changed to steel for ease of site handling: the expression, however, remains that of concrete. The roof construction has been described as being similar to a bicycle wheel laid on its side. It comprises a central "hub" in the form of a double skinned steel drum (faced both sides with aluminium) 25 ft. high and 62 ft. in diameter. This was assembled on the ground and then lifted slightly above its final position. Steel cables were then run from the top and bottom of the "hub" to the surrounding "wheel" (which thus became a "compression ring") and these were then allowed to take the weight. The lower cables were then draped in steel mesh, suspended from metal hangers run from the top cables; steel purlins were secured to the top cables and on these were laid a surface of honeycombed translucent plastic panels.

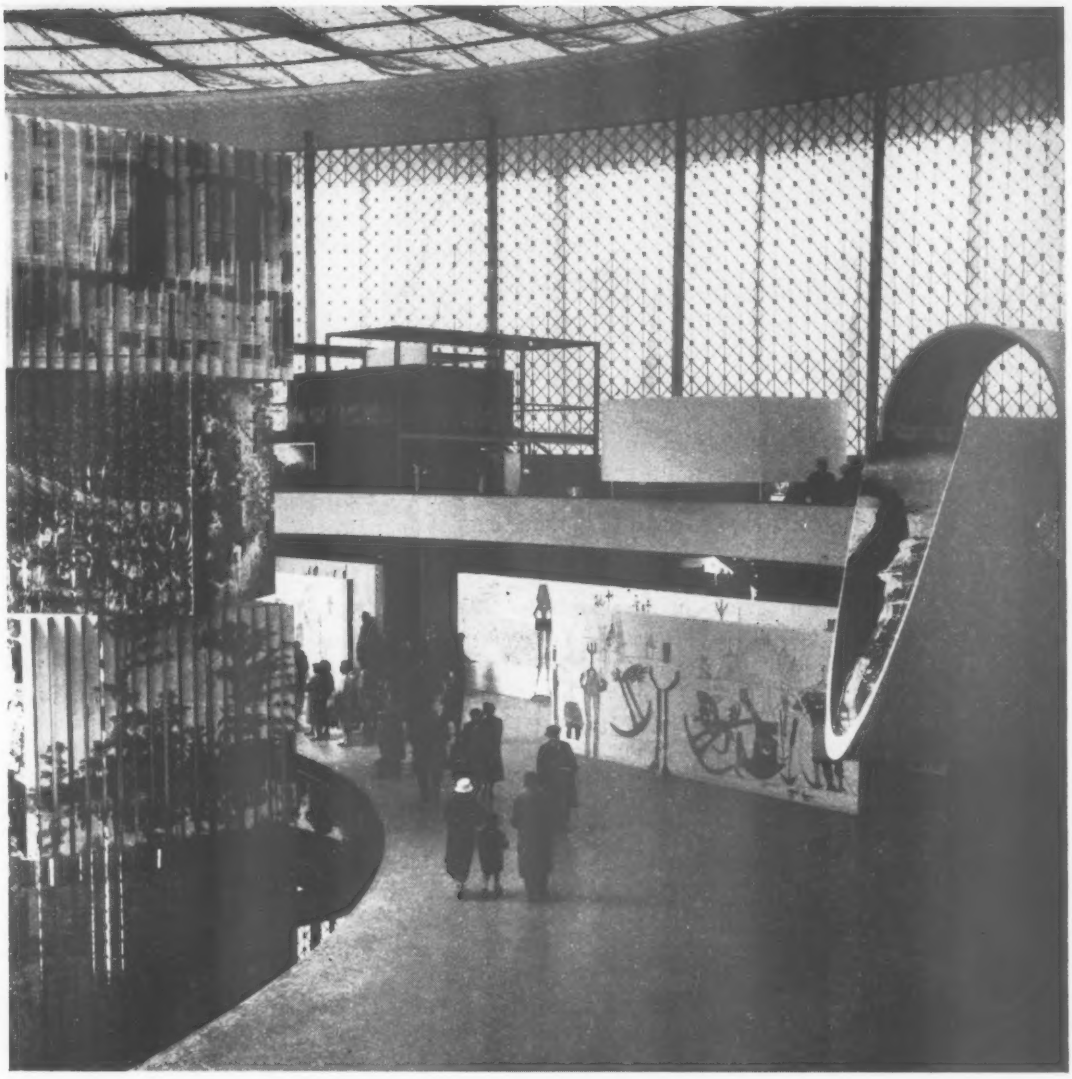
The second point of technical interest in this pavilion is the design of the glazed wall. This is in fact clad not with glass but with vinyl chloride sheeting, a material which permits movement but tends to lose some of its transparency with time. But the real interest of the construction lies in the supporting bars. These are in the form of mild steel flats and run in three directions: the bars which actually hold the sheeting run vertically and two other sets of bars run diagonally in both directions. These diagonal bars were first fixed and were adjusted so that the profile of the criss-cross surface which they formed sagged inwards at mid-height. The vertical bars were then fixed behind the trellis of the diagonal bars and were stressed until they had forced the diagonals to a position midway between their original position and the vertical, stressing them in the process. By this means the two systems of bars were stressed against each other and their lateral rigidity assured. The two systems of bars were then loosely joined together by means of a pair of bolts passing from the vertical bars through the angles formed by the diagonals and these junctions were then concealed by a gilded plate (see drawing). From the aesthetic point of view these plates are the one jarring note in an exceedingly fine conception, giving to the rotunda a "Roman" quality which belies the tone of the interior and of the exhibits. These are both completely charming. The rotunda is truly grand without being in any sense oppressive.

The layout of the exhibits, and the exhibits themselves, are informal and add to the feeling of exaltation and liberty generated by the great space itself. The visitor carries away with him an extraordinary impression that he has actually "been to America." To help him in this illusion there is *another* rotunda (this time a very small one) outside the exhibition hall and next

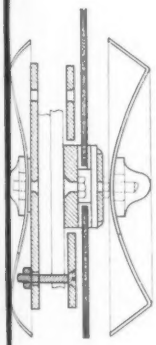
Part section through 'hanging roof' [Scale: $\frac{1}{64}$" = 1' 0"]

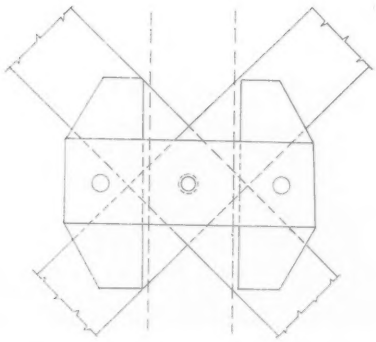






Above, view within the pavilion, showing Saul Steinberg's murals. Left and below, details of wall: top, part section [Scale: ½" = 1' 0"] *centre, plan section through vertical bars showing fixing of plastic* [Scale: ½ full size.] *below, left, section through junction of vertical and diagonal bars and gilded cover plate* [Scale: ½ full size.] *and below, right, elevational diagram showing disposition of bars.*





the theatre, where he can see the Circarama—a Disney colour film projected simultaneously all round the walls. The mannequin parade, which takes place continuously every day from 2 p.m. onwards, cannot be overlooked, as the girls parade up and down a ramp which leads from a raft in the central pool to the balcony. Directly below them, on the ground floor, there is a closed circuit colour TV transmission. Town planning is covered by a not very useful exhibit on Philadelphia: but architecture and streetscape (in the balcony) are treated much more seriously. This is one of the few pavilions where the works of modern architecture are exhibited in models and photographs all clearly labelled with the names of the designers. The exhibition, on the ground floor, of contemporary and folk art is excellently displayed. Steinberg's murals caricaturing American life, which face the main entrance, are one of the best things in the exhibition. One other thing which should not be missed is "Unfinished Work," an outdoor exhibition which becomingly describes America's social problems. And, above all, one should visit the American Pavilion at night.

The Hungarian Pavilion.

Hungary

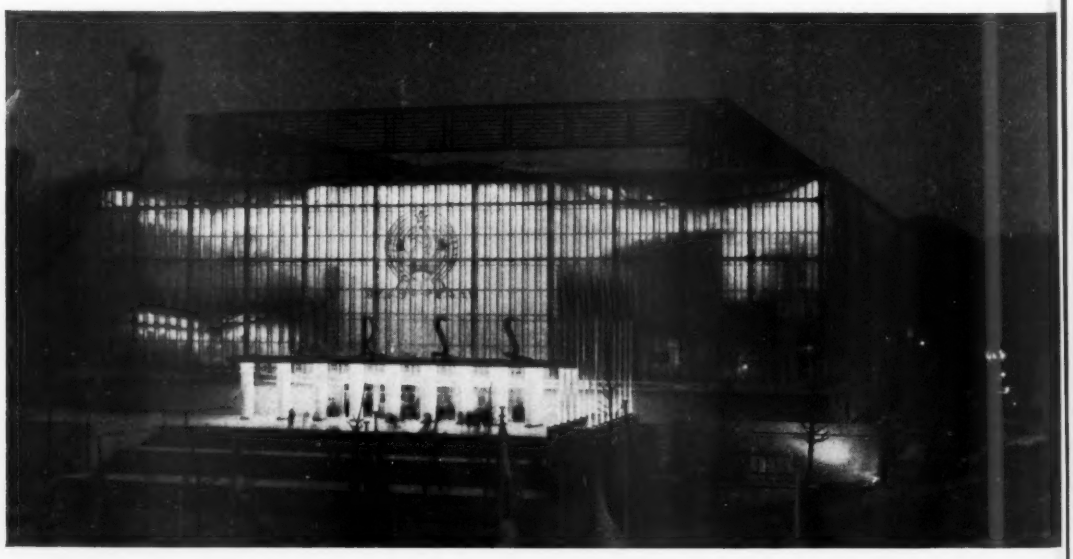
In the triangle formed by the American and Russian Pavilions is a group of three pavilions, those of the ARABS (described officially as the joint effort of Saudi-Arabia, the Arab Federation and the United Arab Republic), of the SUDAN and of HUNGARY. Architecturally none of these quite come up to the mark and the one-day visitor ought to give them a miss. Of the three, the most important is that of Hungary (architect, Lajos Gadoros) which is "modern" in intent, though in a rather coarse idiom, and has a good industrial exhibit and an excellent restaurant with a most formidable Gipsy band.

Soviet Union

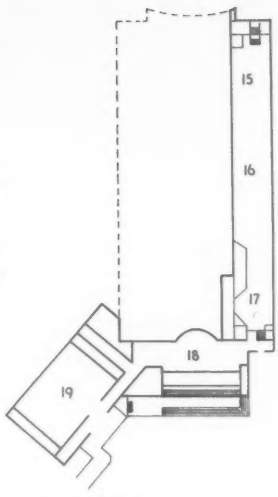
The SOVIET Pavilion (architects, Boretski, Abramov, Doubov and Polanski) is a very large rectangular hall-type building 470 ft. long by 234 ft. by 72 ft. high. It is fully glazed, round all four sides, by an aluminium framed curtain wall which is serrated on plan. The construction is of steel and was designed on the assumption that the building would be re-erected in Russia as a permanent Building Exhibition Hall. Structurally the pavilion depends on two lines of lattice stanchions which run at 60-ft. centres 37 ft. inside each long wall. These rise some 30 ft. above the roof and support two hinged trusses which run out like the booms of a crane, one outwards to take the curtain wall, the other inwards to take a giant lantern. These trussed "booms" are both held in position by cables slung from the apex of the stanchion. The lantern itself is a remarkable construction, being 320 ft. long and 74 ft. wide, and made up of a series of cambered lattice trusses which are inclined to one another and glazed to form a ridge-and-furrow pattern down the length of the pavilion. Continuous horizontal bars for the fixing of neon lights are secured to the tops of the main stanchions above roof level. The pavilion as a whole is very impressive when seen from the outside, particularly at night. The detailing, however, is very coarse, and there is a manifest descrepancy between those parts of it which are evidently the work of the architects (*i.e.*, the cornice, the decorated aluminium band at the foot of the curtain wall, the casing of the columns which flank the entrance and, of course, the monumental steps) and those which are the work of the engineers. The engineering detail itself seems to have been conceived with little regard for the visual effect, though the majestic scale of the building tends to conceal this from the casual onlooker. We in this country deplore rightly the lack of understanding between architect and engineer. A building like this—which is, after all, typical of what was being done in England in the 'twenties—makes one realize what a long way we have in fact travelled in the direction of inter-professional understanding.

Outside the main pavilion there is a cinema, a formidable exhibition of agricultural and contracting

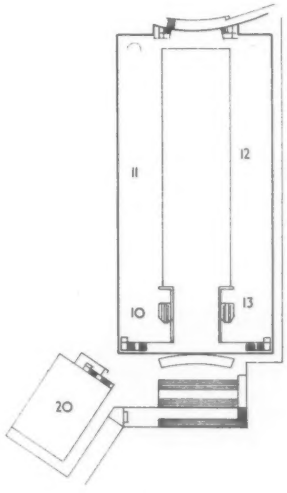
A general view of the Soviet Pavilion at night.



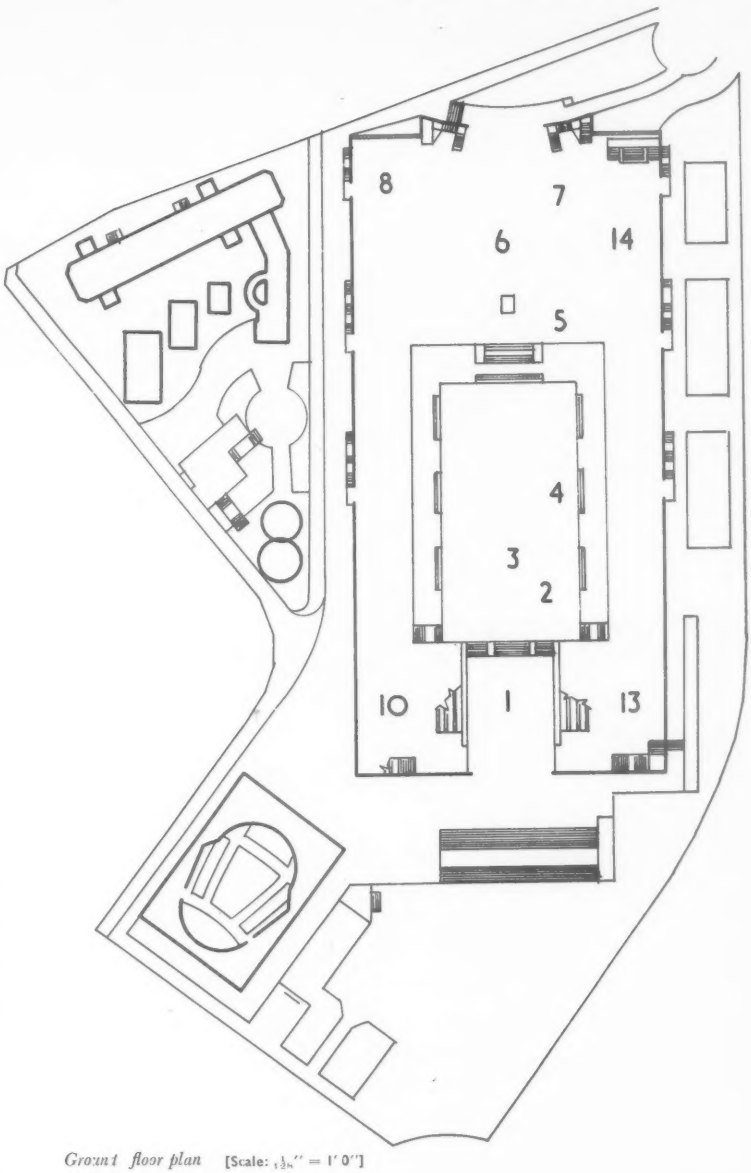
KEY :
1. Entrance hall
2. Industry
3. Sputniks, rockets
4. Agriculture
5. Transport
6. Trade unions
7. Sport, leisure
8. Children
9. Education
10. Science
11. Art
12. Food, light industry
13. Moscow reconstruction
14. Soviet woman
15. Health
16. Radio, photography
17. Atomic energy
18. Tourist information
19. Cinema
20. Cafe



Lower ground floor [Scale: $\frac{1}{250}$" = 1' 0"]

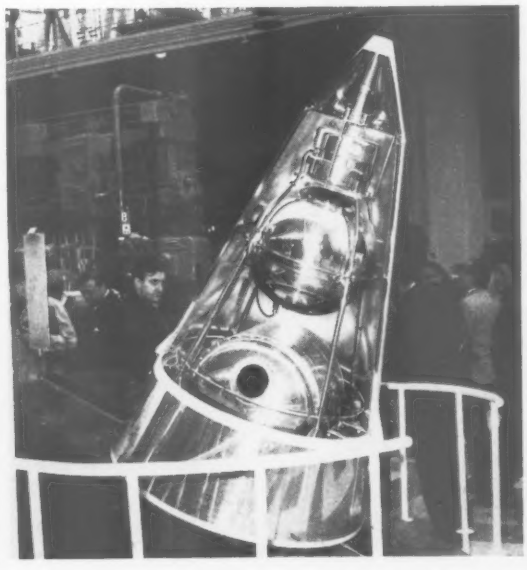


First floor plan [Scale: $\frac{1}{250}$" = 1' 0"]

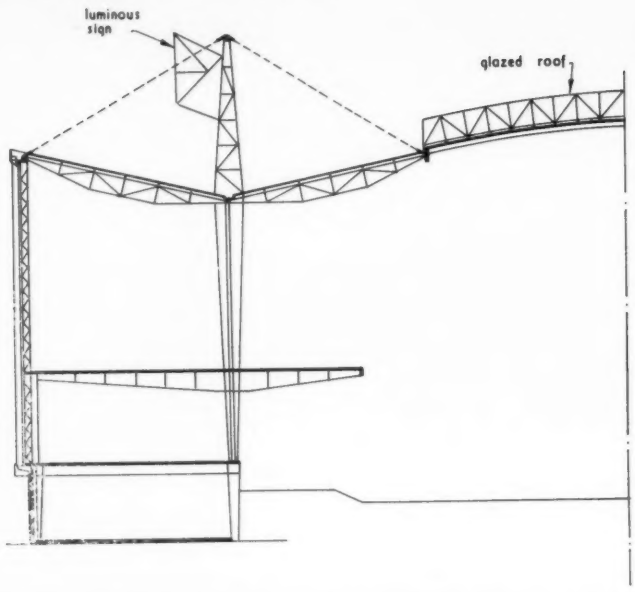


Ground floor plan [Scale: $\frac{1}{150}$" = 1' 0"]

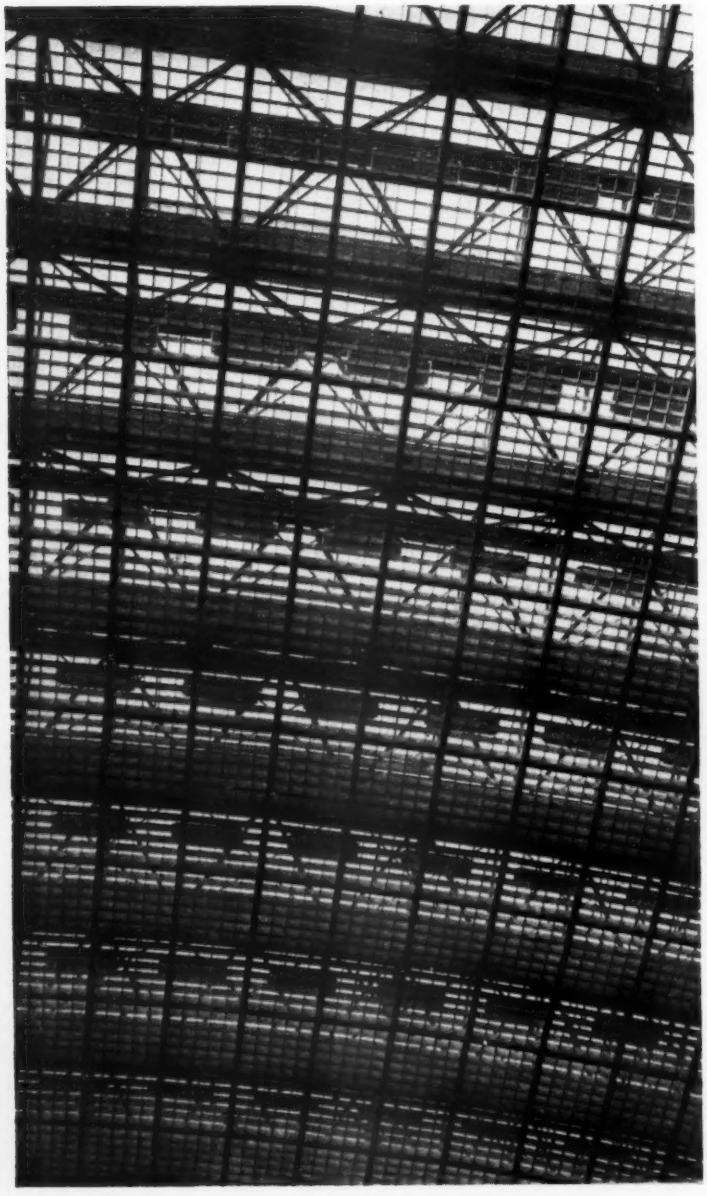
Below, left, a general view of the interior, and right, the nose of the Sputnik.



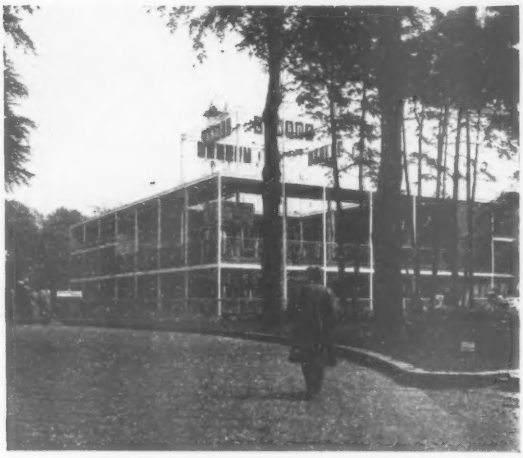
Soviet Union: continued



machinery, an oil well, and a coal mine with a complete assembly of coal cutters, power loaders, and conveyors. The interior décor and display are, æsthetically speaking, appalling, but the pavilion leaves a powerful impression of Soviet progress. If you have very little time, and only want to see the Sputnik, it is almost the first thing one comes to in the main hall, where other industrial exhibits, including Soviet motor cars (with Detroit styling) are to be found. Apart from some good photographs of historical architecture, the cultural sections can well be missed. But, if you have time, and want to acquaint yourself with Soviet design and the standard of living, pass along the balcony on the right, where there is an impressive display of food and drink and other consumer goods and some enormous, but depressing, photographs of the reconstruction of Moscow. In the ground floor gallery, under "radio and photography," there are television and radio sets of distinctly German appearance.



Above left, transverse section [Scale: $\frac{1}{32}$" = 1' 0"] *Left, the lantern of the Soviet Pavilion, and below, a detail of the serrated curtain wall.*



Czechoslovakia

Beyond the Russian Pavilion is that of CZECHOSLOVAKIA (architects Cubr, Hruby and Pokorny). This is a large multi-storied pavilion housing a particularly comprehensive show of exhibits. Architecturally it falls short of the best, being executed in a rather coarse idiom (which is, incidentally, very similar to that of Hungary) so the hurried visitor may be excused if he gives it a miss. This would be a pity, however, for the architectural arrangement is well thought out and there is a lot worth seeing, including some impressive machinery and the glassware. The plan comprises three exhibition halls—all more or less square on plan and two-storied—connected by galleries. The square halls have solid walls (steel framing, rendered outside and plastered inside) and receive natural light from a strip of window which runs round the edge of the roof; and the connecting galleries are glazed to their full height, the upper floor gallery and exhibition space being set back an average of 6 ft. from the window. The loadbearing structure is of steel throughout with tapering lattice beams in the roof, fully enclosed by a suspended ceiling. The restaurant is a separate building.

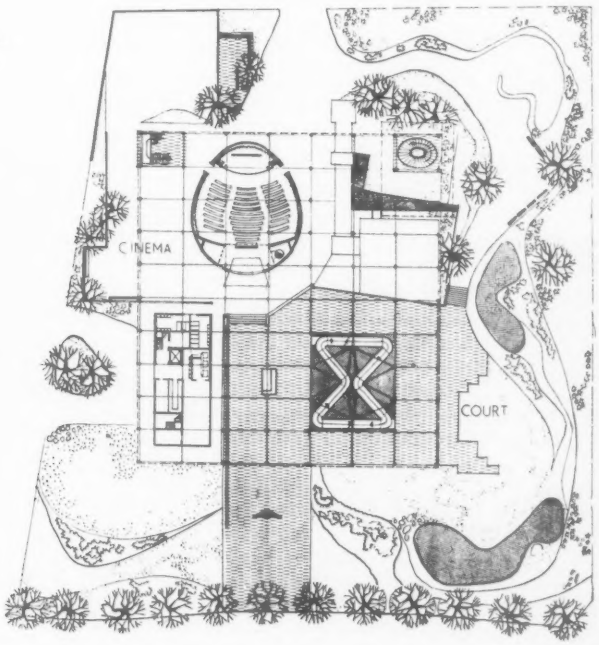
Below, detail of Czech Pavilion, showing balcony edge of one of the connecting galleries.

Canada

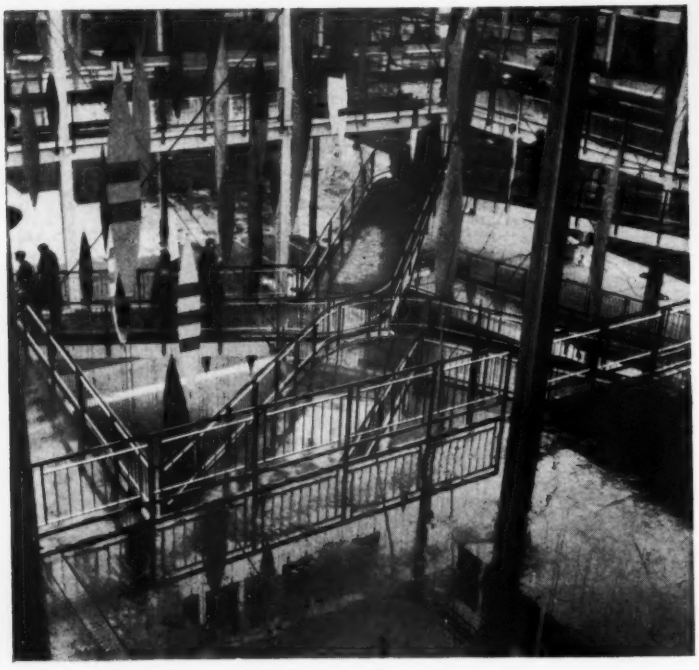
Turning back down the avenue which leads towards the Benelux Gate, you pass on your right three small pavilions which are of no particular account: NICARAGUA, INTERNATIONAL ROTARY and the INTERNATIONAL RED CROSS. On the left is the Pavilion of CANADA (architect G. B. Greenberg). This is an orthodox steel-framed building part open, and part clad with aluminium curtain walling. One part which calls for comment (though it is not visible) is the structural floor detail. All upper floors are constructed of 2½-in. laminated wood decking which is bolted direct to the supporting steel. This timber decking is laid (on the main exhibition floors) with ½-in. asphalt and ⅝-in. granolithic, elsewhere with linoleum.

The main technical interest of the pavilion, however, is to be found in a pair of suspended ramps which are

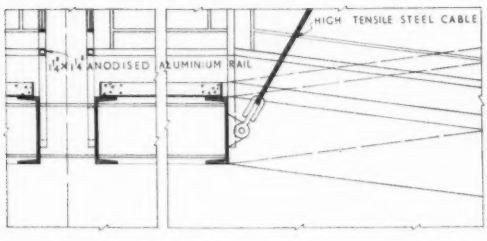
Ground floor plan of the Canadian Pavilion [Scale: 1/16" = 1' 0"]



Canada: continued



Above, the two suspended ramps in the Canadian Pavilion. Below, detail of the construction of the ramps [Scale: ¾" = 1' 0"]



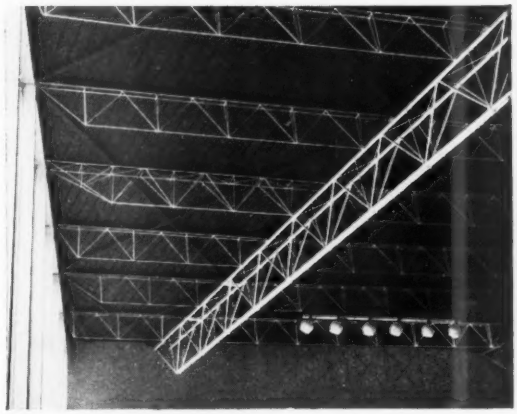
on plan the shape of a capital M (reversed for the second flight) and which climb the 15 ft. between ground and first floors. The carriage of each ramp is formed by a pair of m.s. channels and the bearing surface of 2 in. of concrete (coloured and polished) cast in a continuous metal tray. There are three landings on each ascent and both ramps are supported at each of these by a pair of high-tensile steel cables, hung from the stanchions which surround the ramp case.

Of substantially the same construction is an elliptical stair which, sited in one corner of the pavilion, runs up the full height. Here, however, the carriage is by two m.s. stringers to the inside of each of which is welded an m.s. channel to support the treads. These are likewise formed of coloured concrete cast in a metal tray. The suspension cables run vertically from flight to flight and are secured to the string by welded brackets and adjustable screw fixings.

The exhibits are conventional, although impressive. The restaurant and terrace on the second floor provide one of the best views in the exhibition, looking over the fountains towards the American pavilion.

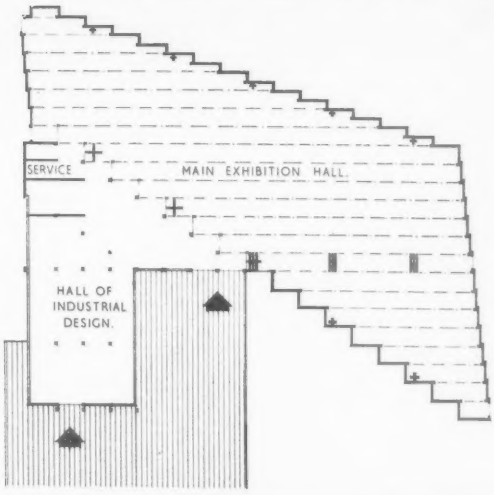
Israel

On leaving Canada, you continue on down only as far as the Pavilion of ISRAEL (architects El Hanani, Idelson and Sharon). There are, in fact, two more pavilions on this avenue, those of LIECHTENSTEIN and of the SOVEREIGN ORDER OF THE KNIGHTS OF MALTA; but unless you happen to have a special interest in either of these for its own sake it is not worth going on down the avenue and it is best to turn down the little path which leads under the viaduct and enables you to see the remaining pavilions on the *Avenue des Nations*. The pavilion of Israel, however, though small and of no particular structural interest, is very elegant and contains a well-presented and moving exhibition. It is a long narrow building, set across the contours on a sloping site, one-storied at the entrance end and two-storied at the rear. It has a low-pitch butterfly roof with white-painted light steel trusses supporting a dark painted boarded roof.

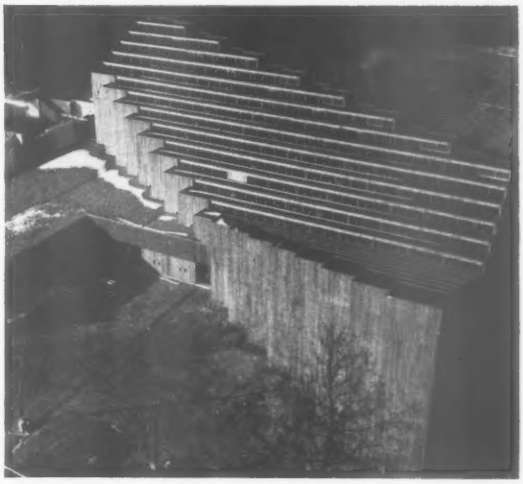


Close-up of the roof of the Israeli Pavilion.

Rejoining the *Avenue de l'Europe* at the point where it passes underneath the viaduct, you reach, first, the Pavilion of ARGENTINA (architects Roberto Quiroz and Francisco Sabate). This, though finished on time, is on the whole the least satisfactory of the pavilions of the larger South American republics. A welded steel structure rises within a glazed "showcase" with a sharply curving roof. There is a small circular pavilion at the back reached by a glazed passage-way from a high level (for the ground slopes steeply behind) and there is a pool below. The reason for the (comparative) failure of this pavilion seems to be the arbitrary and unpleasing form of the roof and the use of too many conflicting shapes on a small building.

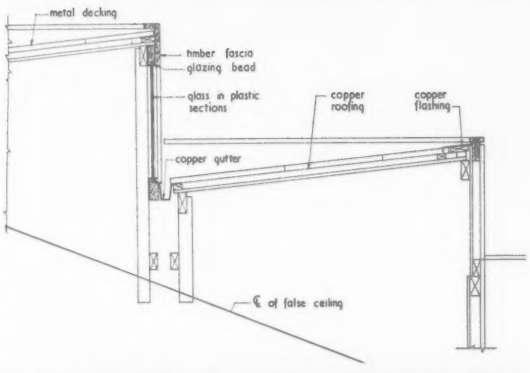


The Finnish Pavilion, seen above from the Avenue des Nations, is built almost wholly of timber. Above right, plan [Scale: $\frac{1}{16}$" = 1' 0"] *The air view, right, shows the continuous clerestories and the stepped roof. Centre right, detail of the roof construction* [Scale: $\frac{1}{2}$" = 1' 0"] *and, below right, the Hall of Industrial Design*



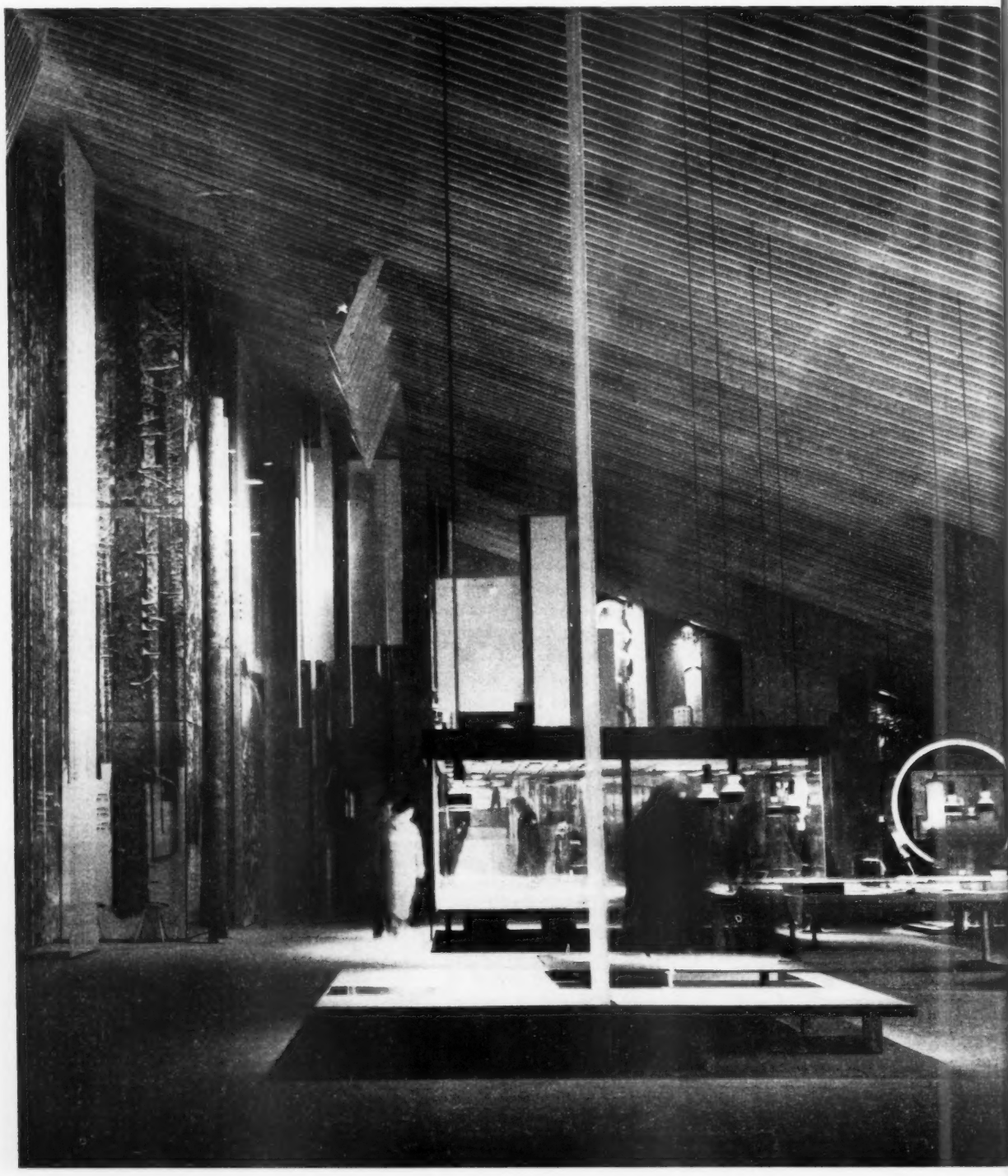
Finland

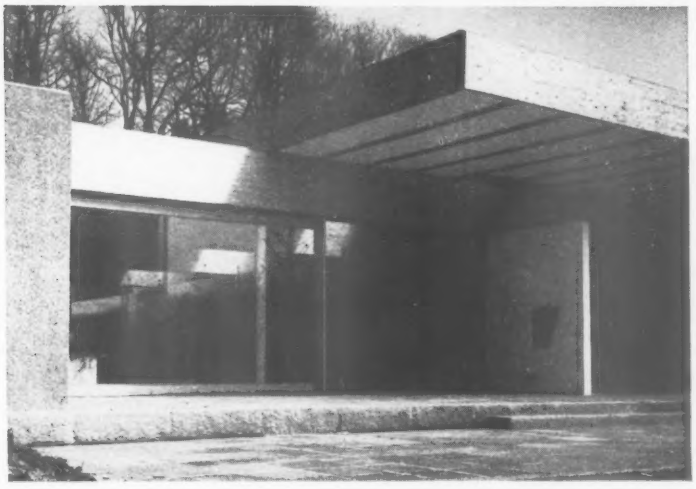
Its neighbour, the Pavilion of FINLAND (architect Reima Pietila—a young Finnish architect who won the job in competition) is much more successful, though the external view from the *Avenue de l'Europe* is not its strongest point. The Finnish Pavilion is almost wholly of timber (that's why it's much the best-smelling pavilion) and, except for one long projecting wing, is substantially artificially lit. That is to say, so far as the public spaces are concerned. The walls of the pavilion are serrated on plan on all four sides. The roof is also serrated in profile, rising by a series of steps from a low valley which divides the roof into two unequal parts, towards two peaks in the opposite corners. The roof itself is lit by continuous clerestories which are invisible from the front and the back of the pavilion as they face inwards; and are invisible also from the inside as they are concealed by a sloping timber ceiling. The interior rises to a height of about 25 ft. in one corner and of about 30 ft. in the other. The effect of height is much enhanced by the plain timber piers and by clusters of long spars which hang from the ceiling. The roof structure is completely invisible from inside, but comprises a series of five trusses which run at right angles to the valley and are thus shaped to the serrated profile of the roof. The roof is covered with copper, the clerestory glazing is interrupted (on plan) only by vertical "leading" made of plastic, and the whole construction (as can be judged from the detail) is of an engaging simplicity. The interior is by Tapio Wirkala, best known for his glass designs and plywood veneers. Architecture is treated seriously in a representative exhibit.



Finland : continued

The sloping timber ceiling of the Finnish Pavilion provides the height for the exceptionally large and impressive photographs mounted on the back wall, left. The exhibits include, on the right, a model of a timber processing plant.



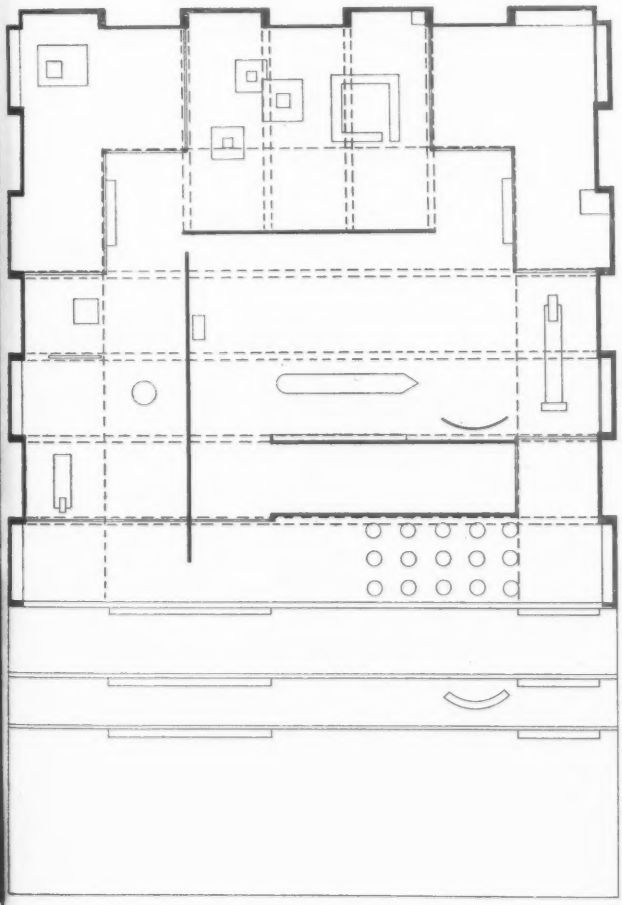


Right, the entrance to the Norwegian Pavilon. Above, one of the transparent plastic columns supporting. a roof beam

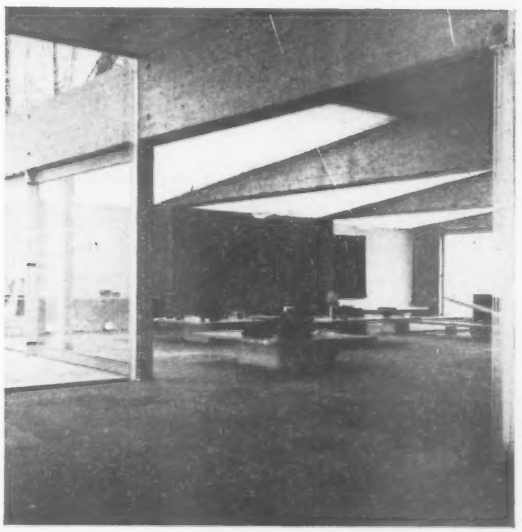
Norway

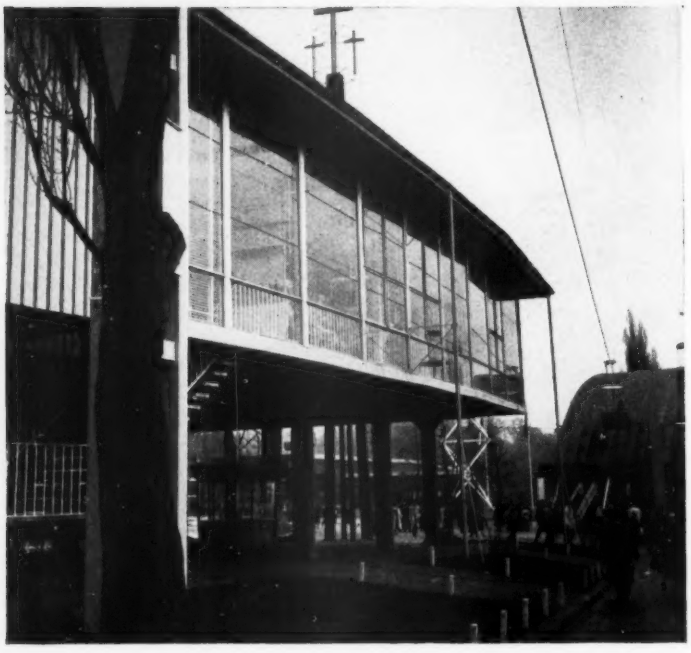
Next to the Pavilion of Finland is that of NORWAY, also by a young architect (by name Sverre Fehn). Norway is not a country which we associate with accomplished architecture, but this pavilion is excellent and compensates for the absence from the Exhibition of Norway's more sophisticated neighbours, Denmark and Sweden. The pavilion is single-storied and occupies a rectangular court which is walled in at back and sides. The roofing structure comprises huge beams of laminated pine, supported on the surrounding walls and, in the middle of the site, on columns made of plexiglas (*i.e.*, transparent plastic). The main beams are 3 ft. deep and run in pairs with a cavity between each pair. The plexiglas columns (which are a cross on plan) terminate in a plate on which the columns rest: the member which is in the same plane as the beams then continues up through the cavity and the two beam thicknesses are bolted through it. Four pairs of beams run the full width of the pavilion (about 110 ft.) in two lengths, with an interesting expansion joint between formed of a mild steel plate between the bearing surfaces. The walls are (where opaque) of vertical boarding, where transparent or plate glass (bonded direct to the plexiglas columns) and the wide openings are closed by wide storey height sliding glass doors. The roof is sealed with cocooning (which is, of course, translucent) and artificial lighting is generally by lights poised above and shining through the roof structure.

Ground floor plan [Scale: $\frac{1}{32}$" = 1' 0"]



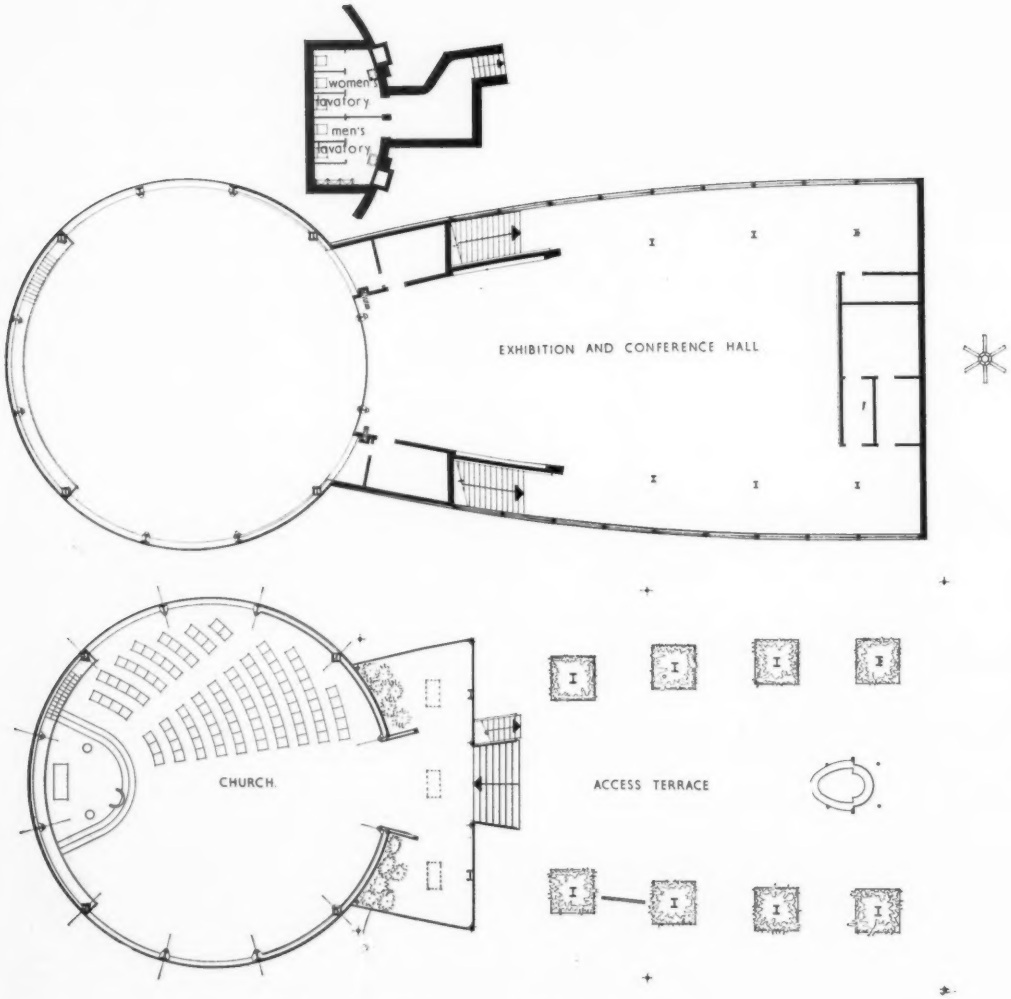
Interior of the Norwegian Pavilion.





Council of Protestant Churches

The Norwegian Pavilion is the last which the hurried visitor *must* see, since the last pavilion in this row, that of SAN MARINO, is a "funny." There is, however, one more respectable little pavilion which technically comes into this section, that of the OECUMENICAL COUNCIL OF PROTESTANT CHURCHES, which is to be found round the corner, at the foot of the *Avenue du Congo*. This is by the Swiss architects Calame-Rosset and Wastelain. It comprises a wedge-shaped exhibition space at first-floor level which serves at one end as a balcony to a small circular church. The supporting structure is steel, with aluminium cladding.

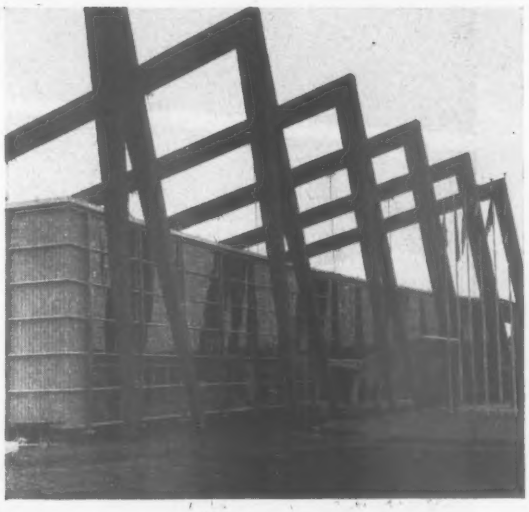


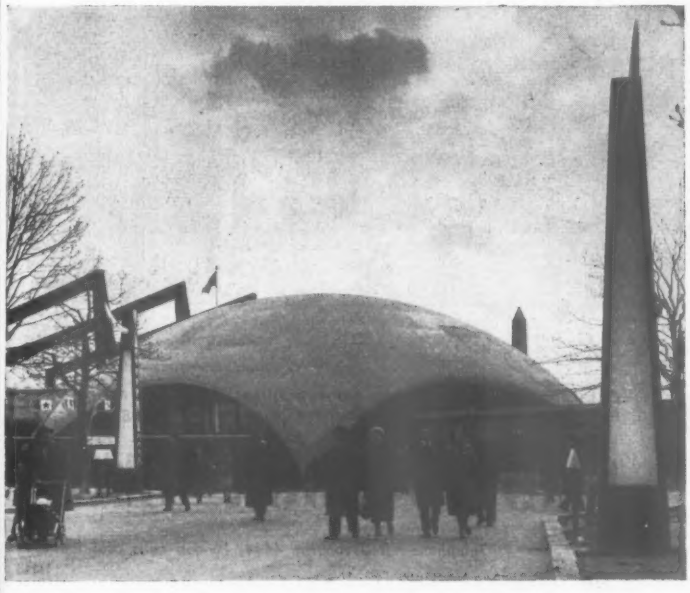
Ground and first floor plans of the protestant church [Scale: $\frac{1}{16}$" = 1' 0"

Having finished our tour of the Foreign Section, we now deal more briefly with the small International Section, the Atomium and the Belgian Section; we do not attempt to recommend any route, but only draw attention to the buildings of greatest interest.

The International Section

Above, looking down the Avenue de L'Urundi towards the International Section, comprising the pavilions of the European Coal and Steel Community, (CECA), the United Nations, below, and other organizations of international co-operation.





The International section (which is not to be confused with the " foreign section ") is so-called because it is devoted to pavilions of international organizations. It lies in the south-western corner of the site, next to the Congo section, and is approached by either the Ruanda or the Urundi Avenues. The exhibits it houses are, as you would expect, exceptionally arid, and the section would not justify a visit were it not for one very interesting structure, that of the OEEC Pavilion (architect Karl Schwanzer). This is a ship-like glass-walled building covered by a hang-

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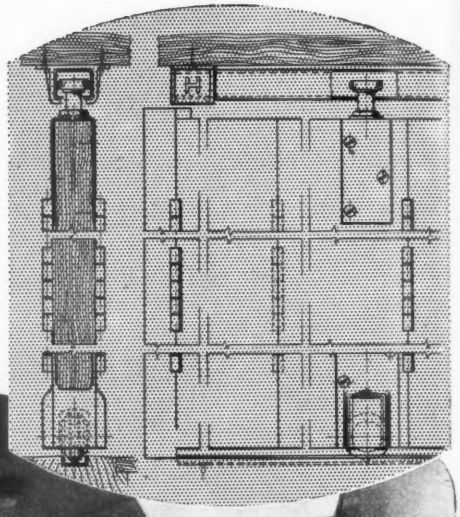

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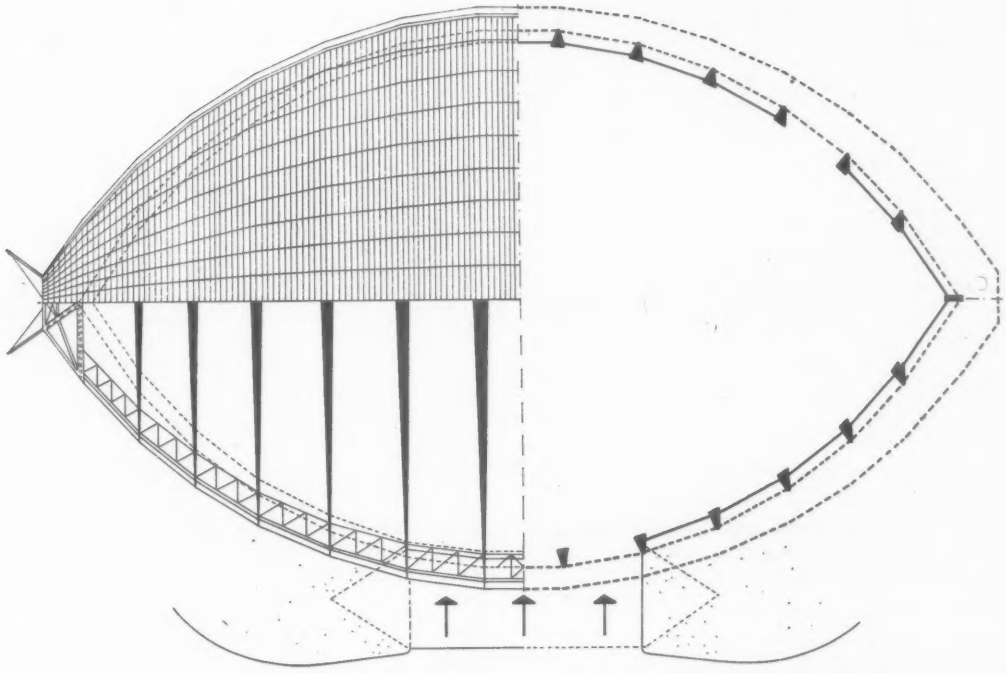
The International Section: continued

ing roof suspended from two steel towers, one fore and the other aft.

Another building in this section which calls for comment is that of the UNITED NATIONS (architect Hugo van Kuyck). This takes the form of a very flat concrete shell dome resting on six pendentives which rise directly from the ground. Single-storey timber structures, symmetrically arranged, project from beneath the dome and house offices, an exhibition space and a small cinema. The marriage between this timber structure and the dome is not happily contrived and the total effect is depressing. It is remarkable how this degree of axial planning so rarely pays off in a building which is modern in intention. The CECA Pavilion (*i.e.* European Coal and Steel Community) which flanks it on the opposite side from OEEC is hardly more successful, being roofed by a flat steel structure suspended by cables from a series of very whimsical steel portal trusses which rise high above it.

Above, one of the steel towers from which the hanging roof of the OEEC pavilion is suspended, and right, a general view of the OEEC pavilion, with the CECA pavilion in the foreground. Below, part plan of roof covering, roof trusses and walls of the OEEC Pavilion. [Scale: $\frac{1}{16}$" = 1' 0"]



The Atomium

Left, interior of a tube; escalators are fitted in the two tubes used for ascending. Below, looking up one of the supporting bipods one can see clearly the aluminium strips (into which lights are recessed) defining the nine great circles which divide the surface of the sphere into 48 spherical triangles. These are sub-divided into 15 spherical triangles each covered with an aluminium panel.

Successful as it is as a visual symbol, the Atomium is more the work of the engineer (A. Waterkeyn) than of the architects (A. and J. Polak); and though it is well worth going up it for the sake of the view, the perceptive visitor will be shocked by the coarseness of the architectural detailing and by the general failure of the interior trim to live up to the promise of the outside.

The Atomium is an enlargement (to 165 million times) of a molecule of iron. In order to get a structure which would stand up, it was decided to stand the "atom" on one of its nine spheres in such a way that the diagonals connecting this sphere to the central "atom" and the latter to the opposing "atom" would be vertical. With this arrangement you have a base sphere, a central sphere and a top sphere, a lower circle of three spheres and an upper circle of three spheres. Only the three spinal spheres and the three lower spheres of the Atomium are open to the public.

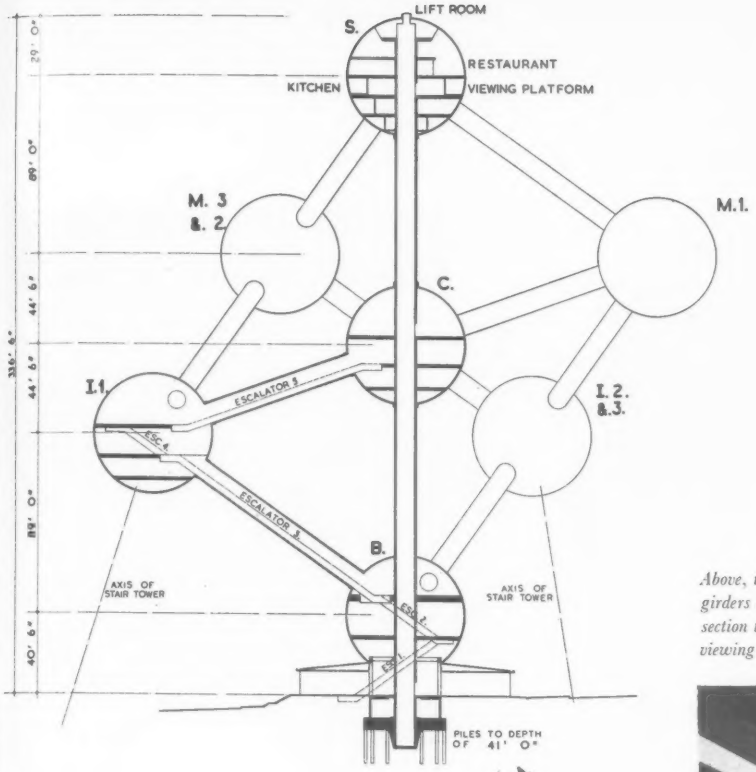
Below the bottom sphere there is an entrance hall from which one can go by the lift to the central and top spheres, and by escalators to the central sphere by way of the bottom sphere and sphere 1_1 in the lower circle. (See section on p. 840.) The Atomium serves two distinct purposes: it provides a unique overall view of the exhibition, and it contains exhibits on nuclear energy. Our advice, unless one is keenly interested in nuclear energy, is to give the exhibitions a miss, but not to miss the view from the top.

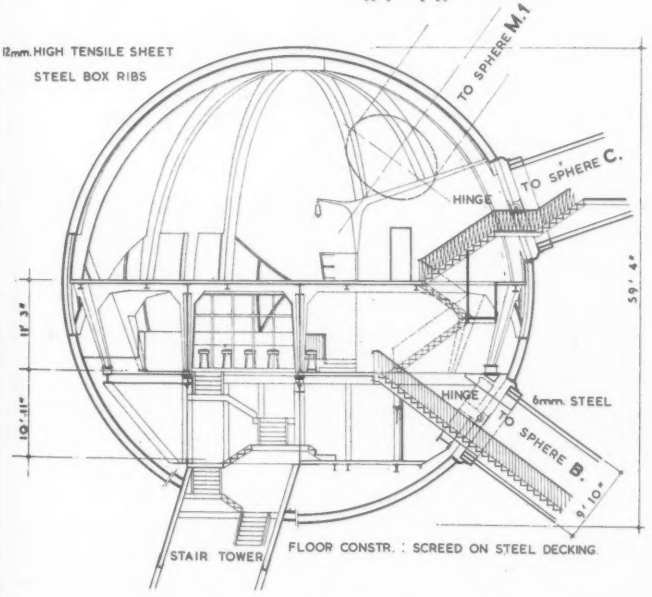
The top sphere, like all the "inhabited" spheres, has two public floors, each of which has windows all round. The lower floor is simply a public viewing platform, with, in the centre, the kitchen for the expensive Savoy Restaurant on the upper floor. To see the exhibits one starts with a Belgian exhibit in the bottom sphere, ascends by escalator to the exhibits in 1_1, then by escalator to the exhibits in the central sphere, from which one descends by the staircase to the exhibits in 1_2, and then by the stairs in the bipod to the ground. Alternatively, one can walk down from the central sphere to 1_3 which, rather like the top sphere, contains a viewing platform on its lower floor, and a bar on its upper floor.

It was originally intended that the nine spheres should rest wholly on the base, but this was considered to be too daring and in the event each of the spheres in the lower circle is buttressed by a pair of steel "legs" (or "bipods") which also serve to house the descent stairs. These "bipods" are of welded steel, and though they weigh over 100 tons each were lifted into place in one piece.

The actual construction of the Atomium posed a number of difficult problems. Experiments made with a model in a wind tunnel showed, surprisingly enough, that wind pressure was not a very serious factor, since the spheres tended to shield each other. In fact the whole structure rests on 123 piles, each sunk to a depth of about 50 ft.: 59 of these are under the central sphere and the remainder under the bipods. The heads of the piles under the central sphere are bound together by a 6-ft. deep r.c. foundation, 36 ft. in diameter, which has a sinking in the middle to house the lift machinery. The construction of the

The Atomium: continued





Above, the central sphere, showing the steel skeleton of arched box girders and the lift shaft, during construction. Left, diagrammatic section through the Atomium and, below left, sphere 1₃. Below, the viewing platform on the lower floor of the top tube.

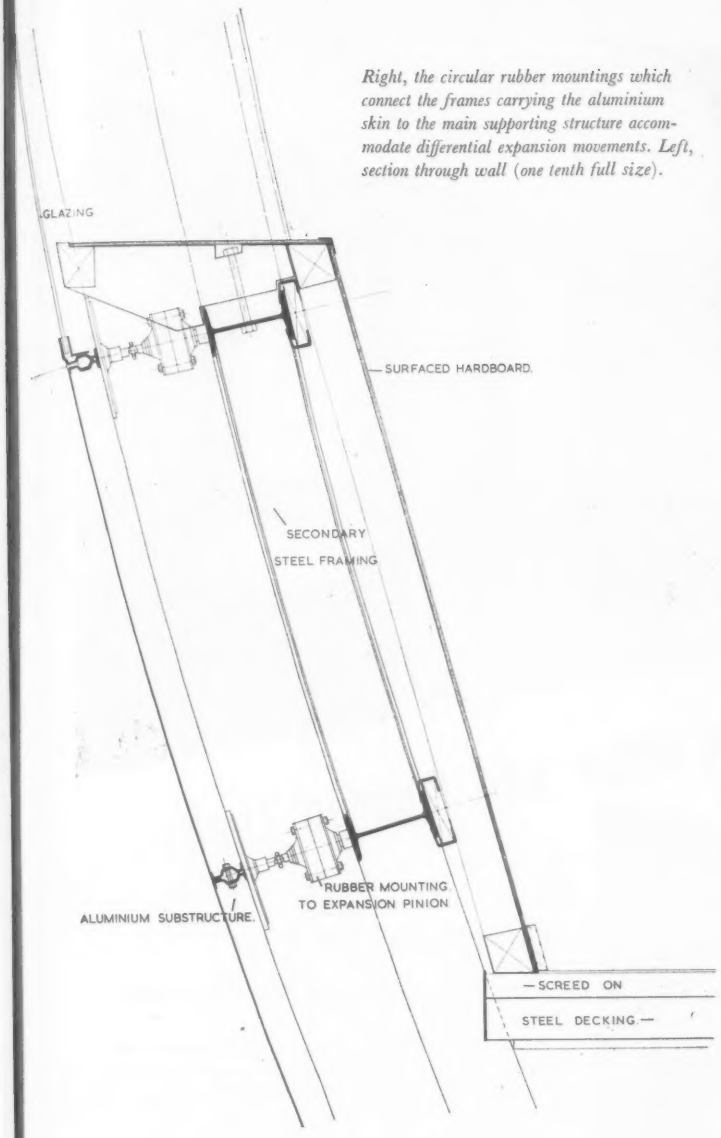
spheres varies according to their position. The spheres on the spine and in the outer ring are constructed of 12 arched box girders formed of 12 mm. sheets of high-tensile steel and welded (see photograph). The spheres on the lower ring are constructed differently: the lower parts are formed of an orthodox steel cage and the pattern of arched girders applies only to the upper half (see drawing).

The central tube of the Atomium is in fact a lift shaft with a diameter of about 10 ft. 6 in. The structure of the shafts is hexagonal on plan with a framework of 8-in. by 8-in. ribs supporting the tube itself, which in the lower 120 ft. is 12-mm. thick and above 6-mm. thick. The central tube was prefabricated in sections which varied between 9 and 36 ft. in length. The weight of the mast in the lower parts is about 2 tons per yard run. Generally speaking, the structure becomes lighter as you go upwards and outwards. Thus the tubes connecting the outer spheres weigh only about 1 ton per yard run. The tube diameter also varies to give headroom in the escalators. As the diagonal tubes (*i.e.*, those connecting the central to the outside spheres) have a relatively steep incline, they can be accommodated in 9-ft. diameter, but the tubes joining the outer spheres, as they have a steeper incline, require a 10-ft. 6-in. diameter.

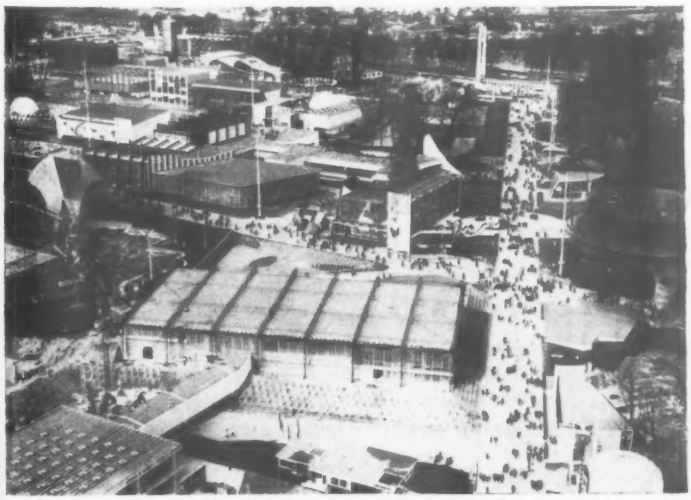
Technically the most interesting aspect of the Atomium is the cladding of the spheres. The trouble arises from differential expansion, both in the external plates themselves (due to the sun striking different sectors of the sphere) and as between the cladding, which is aluminium, and the supporting structure, which is steel. The only precedent which the designers could find was the Dome of Discovery at the Festival of Britain and much of their data was taken from that experience. The sur-

The Atomium: continued

Right, the circular rubber mountings which connect the frames carrying the aluminium skin to the main supporting structure accommodate differential expansion movements. Left, section through wall (one tenth full size).



face of each sphere was divided into 48 large spherical triangles formed by circumscribing nine "great circles." Each of these 48 spherical triangles was then subdivided into a further 15 spherical triangles, the great circles themselves being defined by bands 1 ft. 4 in. wide. These bands and the smaller spherical triangle were then made the basis of the covering. This is an aluminium alloy named "peraluman 15" to which is bonded an outer leaf of aluminium foil which has a high reflectance. The aluminium sheeting is 12/10 mm. thick and the edges of each sheet are turned over a light aluminium welded frame. The panels thus formed are bolted together through the frames and the joints are sealed with two joints, one of plastic and one of rubber. The connection with the steel structure is made by means of circular rubber mountings which occur at the points where the great circles intersect. These mountings (see drawing and photograph) are in the form of a wheel on a screw and are able to accommodate two different types of movement: rotatory, caused by differential expansion in the cladding, and compressive due to differential expansion between cladding and structure. The windows are formed of sheets of "plexiglas" (also spherical triangles) and electric lights are fixed at about 4-ft. 6-in. centres round the great circles.

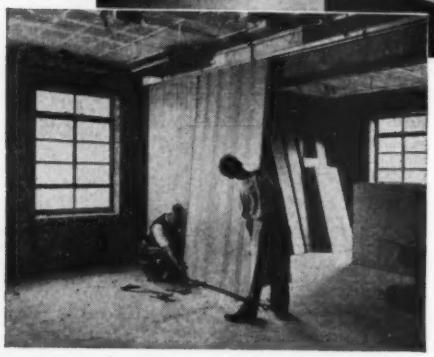


A view from the Atomium of the commercial part of the Belgian section. The broad way on the right is the Avenue de Belgique.

The Belgian Sections

The Belgian sections fall geographically into three main parts, which correspond more or less (there are maddening exceptions) to three categories of exhibit. First, there are the official exhibits which line the *Avenue de Belgique* and the *Place de Belgique, i.e.* the main thoroughfare which connects the Atomium to the Main Entrance. This section also extends along the north side of the Esplanade. Next, to the west of these, are three clear-cut sections (four, if you include the International section): the Amusement Park,

Wall Panels in Figured M'ninga and Figured Limbo . . .



Offices at the new Locomotive House

Individual rooms in this 5-floor block of offices were formed by a special partitioning system devised to the Architects' specification in conjunction with Compactom Ltd., the partitioning specialists. 3¾" thick wall partitions comprising compressed cork slab faced on either side with veneered resin-bonded plywood were prefabricated to exact detail and dry fitted on site to form flush veneered panelling. Each room was provided with its own selected wood, some 18 different stocks being used and in addition to easy and rapid erection a sound reduction of about 35 decibels at average frequencies was achieved.

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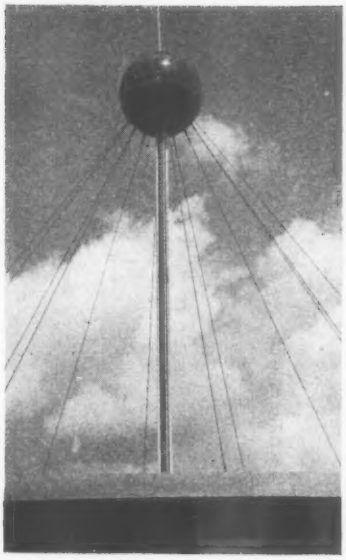
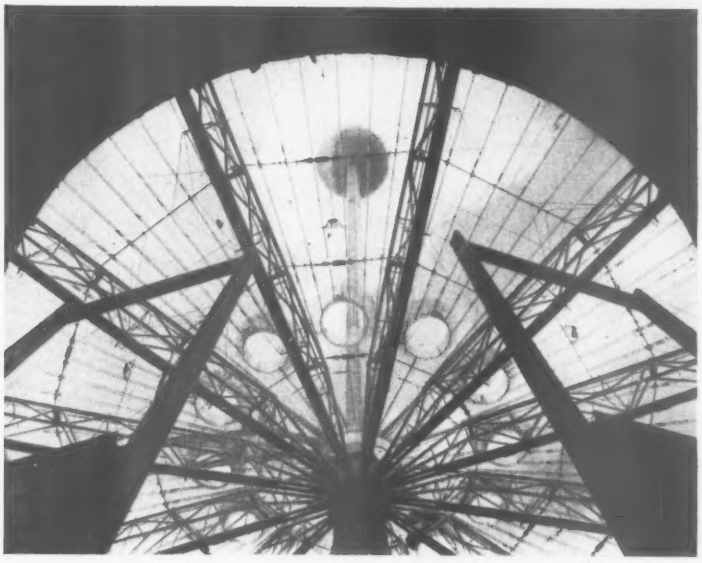


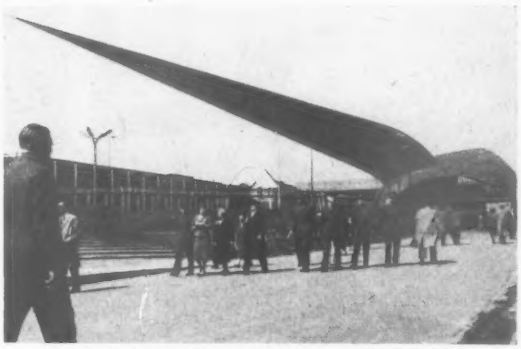


Above, looking through the plastic roof of the Postal and Telecommunications Centre one can see the green fluorescent plastic globe (see also left) mounted on a 180-ft. high steel mast incorporating a lift.

" Belgium 1900 " and the Congo. Lastly, to the east of the *Avenue de Belgique* there is a large area which is approximately square on plan and which is given over to commerce. Immediately to the east of this section, dividing it from the Foreign section, is a wooded valley with a lake at the foot.

The " Official" Pavilions

The official group of pavilions divides, architecturally, into two main categories. There is first of all the big group of permanent buildings arranged in a formal layout round the north side of the *Place de Belgique*. These are of heavy construction (brick with stone facings), date from 1935, and have been manfully dolled-up or, rather, masked for the occasion, but inevitably have little of strict architectural interest. Then there are the new pavilions. We have called these " official " but we include among them some pavilions of industries (such as oil and insurance) which are so organized that they have an " official " character. These pavilions are all conceived firmly in the modern idiom. At least two of them (the Transport pavilion and its neighbour the Post Office pavilion, both on the Esplanade) have interesting roof structures of a very temporary kind. In the techniques employed and in the finishes obtained, the pavilions of this group are the equal of those in the Foreign section. What makes them of lesser interest is that (and this is true of *all* Belgian pavilions) they lack the visual refinement of the best pavilions in the Foreign section. They give the impression that their designers are not accustomed to the idiom and have not learnt how to design their detailing so as to convey the effects they desire. This gives to their buildings a lack of maturity and (what amounts to almost the same thing) of a spirit of contemplation. You feel that it is all good fun—but not quite architecture. If this is very noticeable in the buildings, it is less noticeable in the display, and for this reason the best



Above, Civil Engineering's ugly but impressive concrete arrow, 260-ft. long, serves a purpose; suspended from it is a bridge that carries spectators over an immense relief map of Belgium on which model cars run along the new motor roads. The shaft is counterbalanced by a concrete shell enclosing a conference hall. Below, the Tobacco Industry pavilion.

Room for more

When the directors of Brooke Bond commissioned Heal's Contracts to create their dining room, they asked that the dining room should be able to seat up to twenty people in comfort and without any undue formality. They also pointed out that the room on occasions would be used for luncheons of a more intimate nature, and that it should be possible to adapt it accordingly.

In designing and constructing this room, Heal's Contracts extended the length slightly by bowing the far wall containing the doors.

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Panelling in teak and beech. All other woodwork in teak. Chairs covered in light and dark blue fabric; yellow curtains; blueberry carpet.

These photographs show the various uses to which this one room can be put. The work was commissioned by Brooke Bond Ltd. and the original Heal design was carried out by Heal's Contracts Ltd. Write for booklet "Interiors".

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The Belgian Sections: continued

pavilions to go inside are those which are completely blacked out. The best value is certainly the Electricity Pavilion which is a vast hall completely blacked out, traversed by a system of ramps leading past a sequence of illuminated exhibits. Of the same kind, and almost as successful, is the Insurance and Banking Pavilion opposite, on the other side of the *Avenue de Belgique*. The last pavilion which seems to call for special mention in this group is the Tobacco Pavilion down near the Atomium. This is perhaps the most successful of the Belgian glass-fronted pavilions, and though slightly out of scale provides a good box for what it has to show.

Belgium 1900

The amusements section is a super fairground of the much more ambitious Continental kind. "Belgium 1900" (which has an alternative title "*Belgique Joyeuse*," englished as "Frolicksome Belgium") is a little enclave built up of stage sets of Belgian historical architecture and contains an enormous number of bars, cafés, cabarets and shops.

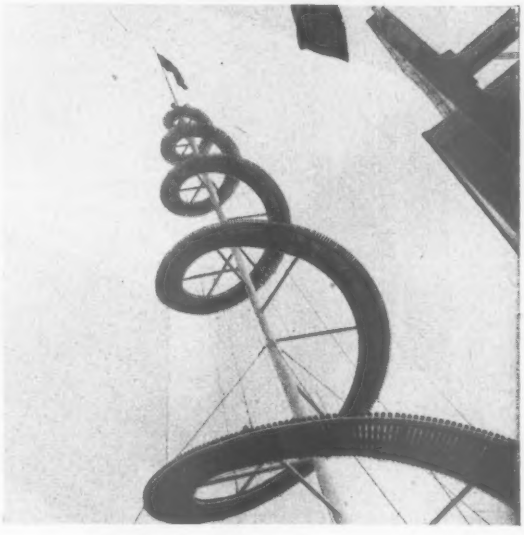
Belgian Congo

The last section on this side, sandwiched between the International section and the Benelux Gate, is devoted to the Belgian Congo. Architecturally it differs from the other Belgian sections only in that African motifs are worked into the décor. The most restrained, and much the most successful, is the Wild Animals (Fauna) Pavilion (architect C. L. Brodski), which lies opposite the Netherlands Pavilion. This takes the form of a flat, low timber dome, sheathed in copper and without windows. The animals are stuffed. Behind them are large screens carrying photo-montage. They peer at you through screens of dried grasses and jungle plants and are sufficiently realistic to be exciting and sufficiently artificial to be charming.

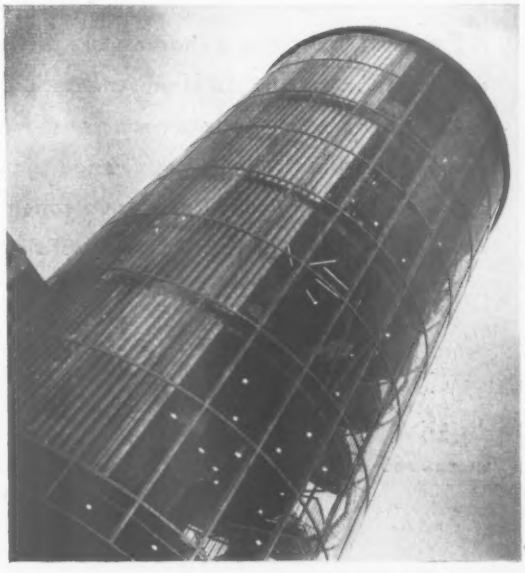
The Commercial Sector

We have called the large sector of the site which lies eastwards of the *Avenue de Belgique* "commercial" because that is its general character, but it is not labelled as such and there are exceptions (*e.g.* a rather poor Town Planning Exhibition on the *Avenue de la Construction*). In general, it may be said that the stands are no worse in character (and most are better) than you would expect at an equivalent exhibition in this country. The most interesting stand is the glass-walled round tower built for the Belgian Lamp Manufacturers (architects J. Thiran and J. Wybauw) and which has some remarkable sunblinds. These run on circular tracks at ceiling level on each floor and can be moved round with the sun. Another stand worth a look on account of its eccentric details is that designed for Hachette by an English architect, Neil Hutchison.

Interior of the Congo Agriculture pavilion.



The Eternit pavilion provides this whimsical vertical feature. Below the Belgian Lamp Manufacturers' tower is fitted with revolving shutters, seen here on the left, which can be moved to any desired position.



Summing up: consolidating modern architecture

What does all this add up to? Critics seem agreed that the Exhibition marks the beginning of a period of consolidation for modern architecture and it is difficult, though tempting, to contest this. On the whole, those nations which have come off best are those which already had a stake in the movement before the war, countries like Germany, Holland and Finland; but it is pleasant to see other countries joining their company who had no such tradition, countries like Spain, Yugoslavia and Austria. On the debit side are France, who still finds herself uneasy in the idiom, and Italy, who appears, momentarily we trust, to have contracted out. But these are the exceptions: the great movement is all the other way.

If this is becoming a more universal language, is it at the same time (and it is this which interests us most) becoming a *richer* language? On the whole, yes. The Exhibition has emphatically given the lie to the old jibe that Modern Architecture is a language in which you can only say one thing. This is, in a sense, the natural consequence of universalization, for any language (whether architectural or otherwise) tends to be enriched when more people use it and for more diverse purposes. As examples of this kind of enrichment one could quote the two phrasebooks, one agricultural and the other marine, compiled by the Dutch Architects, or Karl Schwanzer's urbane drawing-room idiom in the Austrian pavilion, or Vasquez-Molezun's use of Mohammedan three-dimensional patterns in the roof of the Spanish Pavilion. All of these are authentic transpositions of experience in terms of modern architecture, yet how varied are the results. On this point of enrichment it is a pity that neither of the two churches quite came off. It is a pity because a successful church architecture would provide the most irrefutable proof of the scope of the idiom. Yet, as those who have anything to do with this kind of patronage will realize, these two churches are in themselves evidence of a change in the views of those who commission churches, and show that from now on, the new architecture can be seriously applied to this building type—which is more than we could say even five years ago.

At the technical level the Exhibition is slightly disappointing. There are, of course, some interesting gimmicks to be found (we have noted as many as we could see); but we cannot really say that the Exhibition demonstrates the rapid assimilation by the building industry of new scientific knowledge. Even in the structural field—which is, after all, the field in which exhibitions are expected to contribute—there is little that is at once new and of real promise. The development which comes nearest to getting a mention here is the hanging roof, of which there are five major examples. This is not quite new, but, being potentially cheap and effective, is useful. Another field which shows some advance is that of daylighting, though this is modest enough and only amounts to a general realization that if you are going to have transparent walls you must do something about glare. If a fitting symbol of the architecture at Paris '35 would be a glass box, a corresponding symbol for Brussels '58 would be a glass box with a *brise soleil*. Rather a meagre advance for a quarter of a century of feverish technical renewal, but to be expected when you recall the meagre diet of research on which architecture has had to live. The lesson of Brussels seems to be that Modern Architecture has at last triumphed at the social level. The party which stands for fundamental reform has at last "got in." Now must follow a period of intensive research and development. For if it doesn't the movement will be unable to fulfil its electoral promises.

Information

How to get there

If you take our advice, and make a tour of the exhibition, concentrating on the foreign pavilions, the most convenient gate at which to arrive is the Benelux Gate. But if you are driving your own car make for the parking places to the north or the east of the exhibition. Parking Nord is by the main entrance (Porte des Grands Palais), and is rather more convenient. By taxi (about 10s. from the centre of the city) one can of course, go direct to the Benelux Gate. You can, if you don't mind paying 21s. for a six-minute flight, arrive at the heliport, also near the main entrance. There is a continuous shuttle service from Melsbrook Airport. Finally, you can go by tram. Every tram stop in Brussels which has a direct service to the exhibition carries the exhibition sign and the numbers of the trams going there. The services to the Benelux Gate are 6, 16 or 18, but be sure to get off at the Benelux Gate as the trams continue on to the main tramway station inside the exhibition. This is more convenient for the Belgian section, but farther from the foreign pavilions. Tram rides to the exhibition are free, if you buy a 30 franc ticket which includes admission to the exhibition. The admission ticket when you get there is 30 francs, and there are cheaper admission rates for children, parties and season tickets.

Getting round the Exhibition

This is a very big exhibition. There are 500 acres, 20 miles of roads, innumerable corridors and umpteen stairs to wear out one's feet. Unfortunately, the exhibition is badly supplied with mechanical transport and what there is of it is not of much use to the man who is systematically going from pavilion to pavilion. But it can be of great value if you want to get a quick bird's eye view, or have to go from one end of the exhibition to the other.

Chairlift (telesiege)

For a sight-seeing jaunt, but not for serious transport because it is expensive, there are three lines of aerial railway, which carry passengers in gay, coloured, two-seater tubs from which one gets a splendid view. From the Benelux Gate there is a line to the Place Belgique (near the main entrance), or vice

Information *continued*

versa. If you walk a couple of hundred yards from the Benelux Gate towards the Atomium you will come to another station (telesiege) from which you have a choice of two lines. One of them, like the first, takes you to the Place de la Belgique. The other takes you along the Avenue des Nations, through the foreign section to the United States Pavilion. The fare is 20 francs (3s.) a time. But for sightseeing the trip along the Avenue des Nations is a "must."

Bus "trains"

There are 25 trains, each consisting of a light bus with a plastic roof and open sides, towing two cars behind it, and carrying altogether 75 people. These trains do a circular route of rather more than 4 miles in about 40 minutes for a fare of 15 francs (2s. 3d.). The official guide (30 francs) contains a map showing the route and the stopping places which advertise themselves by the presence of queue barriers. One can get on or off at any stop; unlike the chairlift, this does take one directly to the area containing the British and German pavilions. If you arrive at the Benelux Gate you can pick up the train between the Austrian and Netherlands pavilions. (But it's not worth taking it just to go from there to the UK pavilion, unless your legs are in bad shape.)

Motorized rickshaws

These are rather like the old-fashioned hansom cab, as the boy who drives sits behind, and the two passengers in front. For a fare of 60 francs (8s. 6d.) two people can go wherever they like for half an hour. These vehicles, like taxis, can be picked up wherever they can be found.

Where to eat

In one sense this is not a problem at all, as there are restaurants and snack bars in nearly every pavilion. The real problem is the high and often exorbitant prices charged. Don't make a date for lunch at the British pavilion: not because the food's bad, but because there isn't a restaurant there. If you want to eat near the British pavilion try the German restaurant, which is efficiently run, reasonably quick, and (by comparison with most of the foreign restaurants) moderate in price. That is to say, one can get a meal for 13s., excluding tip, wine or coffee. Among most extensive restaurants we can recommend the Swiss, the Portuguese and the Hungarian. You are unlikely to get one cheaper than the Czechs, who serve a good meal for 70 francs (10s.). The Dutch have a good, but small restaurant (menu 90 frs.). The Vatican has a large self-service restaurant and bar (Civitas Dei), right in the centre of the Foreign Section, which offers more popular prices. The most pleasantly situated foreign restaurant is probably the Yugoslav, which is built over a woodland stream. If you have to be careful about expenditure on meals, our advice is not to eat at the slap-up foreign restaurants without checking the price of the menu. In the Belgian section there are many restaurants and cafés, which cover a wide range of quality and price, catering on the whole for a more popular clientele. Belgium 1900, the Folklore section, has 50 restaurants and cafés, and there is a Bavarian restaurant for 4,000 people in the Funfair. The highest meal in the exhibition is in the Savoy restaurant at the top of the Atomium, it is reputed to be the most expensive in the exhibition.

Miscellaneous services

Public lavatories provided by the exhibition itself are almost non-existent, though you will find one beside the Britannia, with a stout lady charging 1 fr. for one service, 2 frs. for another, and 3 frs. for a towel; don't try to cheat, as she can see what you're up to. Nearly all the toilets are inside the pavilions; that's where you have to look. Charging for the use of the toilet is general, and a tip is expected, too.

Almost every kind of service that a visitor can want is to be had in the Hall of Welcome, at the Grands Palais or main entrance. There are left-luggage offices, a Logexpo office (where you can get accommodation), booking offices, banks, a post office, telephones, bathrooms and showers, cleaners, self-service stores, and hairdressers.

Where to stay

Accommodation can be booked through Logexpo, which has offices at the exhibition (in the Hall of Welcome) and at the Nord and Midi stations.

Attractions

If you are planning a stay in Brussels, it is worth finding out the dates when various famous orchestras, dance companies, theatre companies, and other artists are performing. These include the best orchestras and dance companies in the world. The Bolshoi Ballet and the Royal Ballet, for example, are both performing in June, the Bolshoi Ballet, the Pekin Circus, the Scots Guards and an International Violin Festival are in July. The full list is, unfortunately, far too long to publish. Seats can be booked through Cooks or Keith Prowse Ltd.

Diversions

(For Those Who Get Bored By Exhibitions: or, for mother and child when father is studying curtain walls, hanging roofs or hyperbolic paraboloids.)

The Atomium

A full description of the Atomium is on page 839. But we mention it here because the view from the top (50 francs) should not be missed. For 60 francs one can visit both the top sphere and the nuclear energy exhibits in four of the spheres, passing from sphere to sphere by moving staircases. The exhibits are interesting to the technically-minded, but not to anybody else.

The electronic poem (by Corb)

Le Corbusier's Philips pavilion is also fully described elsewhere (page 799). But for a few minutes' diversion, to see and hear what a famous firm of electronic experts can do with a script by Le Corbusier, a pavilion by the same hand, and sound effects by Edgar Varese, it is well worth visiting—whatever one's architectural interests.

Circarama

No, this is not Cinerama (which can be seen at the Fun Fair) but an exciting development that can be seen in a small cinema in the U.S. Pavilion. Co-ordinated cameras project a Disney film on the walls of a circular cinema, giving the illusion of seeing all round one (and the anxiety that one may be missing something very exciting at one's back).

Science films

The International Hall of Science (by the main entrance) has an international exhibition on The Atom, The Molecule, The Crystal and The Living Cell. A film showing the connection between different fields of science will be shown continuously, and there are other scientific films in smaller theatres.

Other films

Many of the foreign pavilions are showing films. These include Britain and the Soviet Union, which has one of the largest cinemas.

The mannequin show

The Americans are presenting a continuous mannequin show throughout the afternoon and early evening.

The funfair

Here is the real centre for exhibition escapists, though not one for those with very light pockets. Apart from a switchback railway and all the other normal attractions of a funfair, there is "Sam Snyder's Water Follies," variety shows, and a 2½-minute journey in an interplanetary rocket which, it is claimed, produces the sensations of

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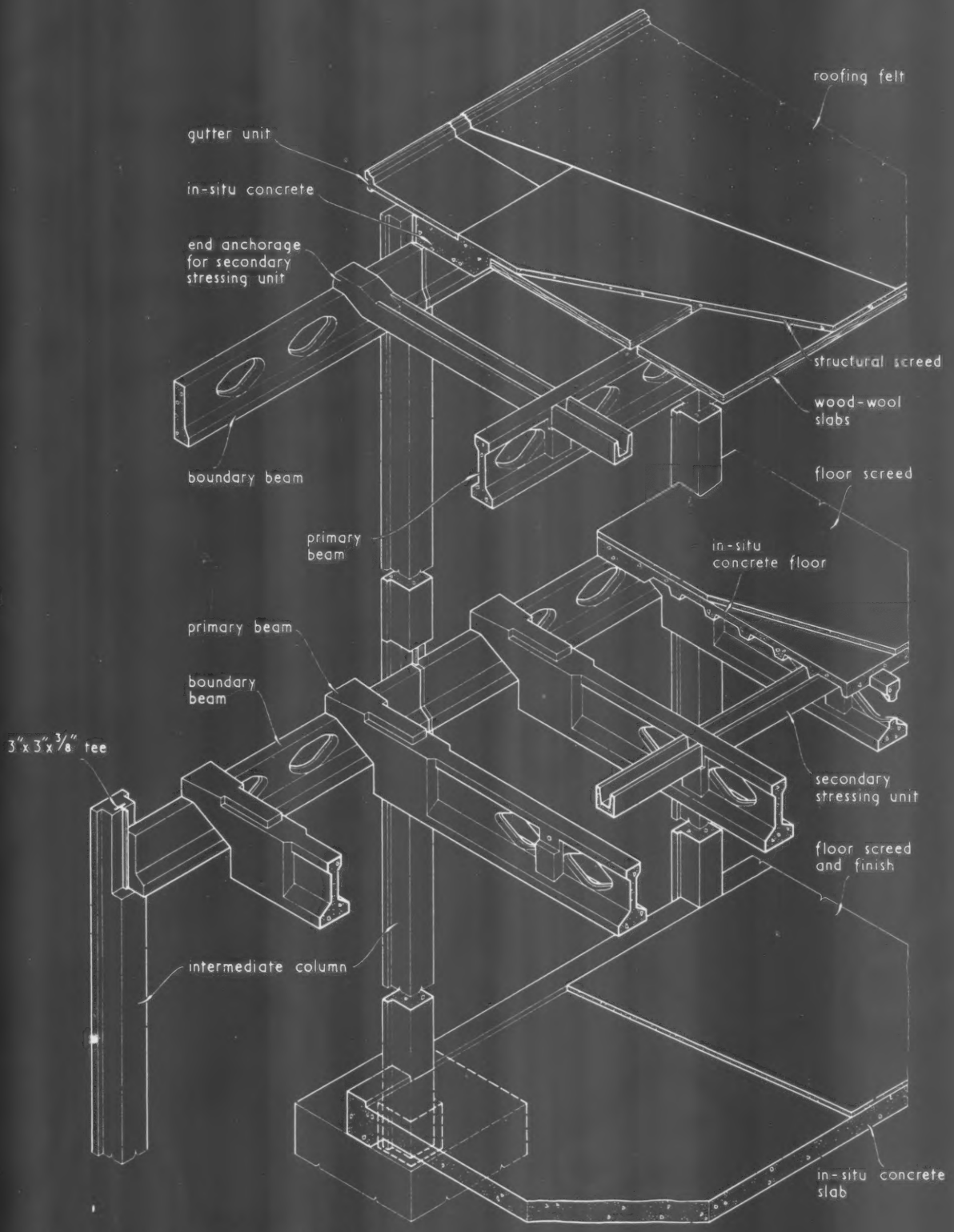

GENERAL ASSEMBLY OF COMPONENT PARTS.

INTERGRID MARK 3 PRECAST CONCRETE SYSTEM OF CONSTRUCTION: 1.

Proprietor: Gilbert-Ash Ltd.

25.B1 ·INTERGRID MARK 3· PRECAST CONCRETE SYSTEM OF CONSTRUCTION: 1

This Sheet, together with Sheet 25.B2, describes the Intergrid Mark 3 system of construction: the two Sheets should be read in conjunction. The system consists of prestressed and reinforced concrete components which may be assembled to form a complete structure with no reasonable limit to the number of storeys. The floors and roofs are supported on columns and boundary beams. Floor and roof slabs may be precast or cast in situ. The system has been designed to conform with the Model Byelaws and relevant British Standard Codes of Practice.

Design

The plan is based on a 3 ft. 4 in. module and is divided into independent structural bays, each of which has boundary beams round the perimeter. Columns on opposite sides of the bays need not be on the same module lines, the primary beams being supported on boundary beams which span between the columns.

The bases of ground floor columns are set in pockets in the foundations. The top of the column foundation should be 10 in. minimum below the finished floor level. Boundary beams are contained within the floor depth.

A vertical module of 10 in. controls all heights. Changes of level between floors or roofs are possible from a minimum of 1 ft. 8 in. in 10-in. increments. Ceiling heights may be from 7 ft. 6 in. upwards in 10 in. increments.

Primary beams in floors and roofs have cut-away ends and holes in the web for service pipes, cables, etc., and between beams there is ample accommodation for all services. Vertical services may pass through floor or roof slabs at almost any point.

Columns are provided with ⅜-in. diameter sockets at 10-in. centres on their internal faces, for fixing partitions, fittings and finishes.

Structural wind bracing is required and should be included at the planning stage. It may be between internal columns, or between external columns inside the cladding.

Vertical weather seal is provided between cladding units and columns and must be continued around frames of openings.

For staircases, allowance must be made for a stairwell of 3 by 6 modules (10 ft. 0 in. by 20 ft. 0 in.). Rooflights can be incorporated as required.

Expansion joints should occur at intervals of approximately 100 ft. 0 in. These are provided by using double rows of columns and packing the gap between each external pair with impregnated fibreboard, weathered with a vertical sealer.

Components

Columns: These are prestressed with pretensioned steel in three standard sizes, 6½ in., 9 in. and 12 in. square. Special sizes, e.g. 15 in. or 18 in. square, can be made to order if required. Four different types are available in each size: for external use, intermediate columns and external and internal corner columns, and for internal use, one standard type. Columns can be cast in heights of more than one storey.

Boundary beams: All boundary beams are reinforced concrete: the normal spans are 6 ft. 8 in., 10 ft. 0 in. and 13 ft. 4 in., but larger spans are possible.

Primary beams: Primary beams are of prestressed concrete using pre- or post-tensioned steel.

Secondary stressing units: Secondary beams are reinforced concrete or concrete prestressed with post-tensioned steel.

Floor and roof slabs: Slabs are reinforced concrete cast in situ or precast in sizes depending upon the requirements of site economy.

Cladding slabs: Two types of precast cladding are available, one for infilling, leaving the columns exposed, and one which covers the columns. The slabs are 3 in. thick by 10 in. or 1 ft. 8 in. high, in lengths to suit column spacings. The system does not preclude the use of any other form of cladding if desired.

Eaves gutters: Eaves gutters are of three types, according to their projection and in lengths of 3 ft. 4 in. They provide for 3-in. rainwater pipes to be taken down on the outside of the columns.

Eaves fascia units: These may be used as an alternative to the eaves gutters. They are similar to the cladding slabs but are 1 ft. 10¾ in. high, in lengths to form a continuous band over the face of the columns and they are used with internal drainage.

Staircases: Standard staircases are available for floor-to-floor dimensions of 9 ft. 2 in. to 13 ft. 4 in. They comprise precast concrete landing beams (which are the standard boundary beam section), strings and treads with open or closed risers.

Finish

There are six standard finishes in which the precast cladding is obtainable: exposed shingle, Derbyshire spar in white cement, pink granite in white cement, black granite in black cement, calcined flint in white cement and plain concrete. Other finishes can be supplied to special orders.

Further Information

The information on these Sheets refers to the standard type of Intergrid Mark 3, using beams with service holes. Other components are available to meet particular design considerations. For example, shallow beams, without service holes, may be used where the floor constructional depth is critical.

Architects may contact the Intergrid Division of Gilbert-Ash Ltd. in order to discuss with them and their consulting engineers, The Prestressed Concrete Co. Ltd., the application of the Intergrid system to a particular scheme. To obtain full advantage from this advisory service, consultation in the early design stage is essential. Gilbert-Ash Ltd. supply the structural drawings and, as building and civil engineering contractors, are prepared to submit a price for the whole of the work or, alternatively, to quote for the Intergrid framework only.

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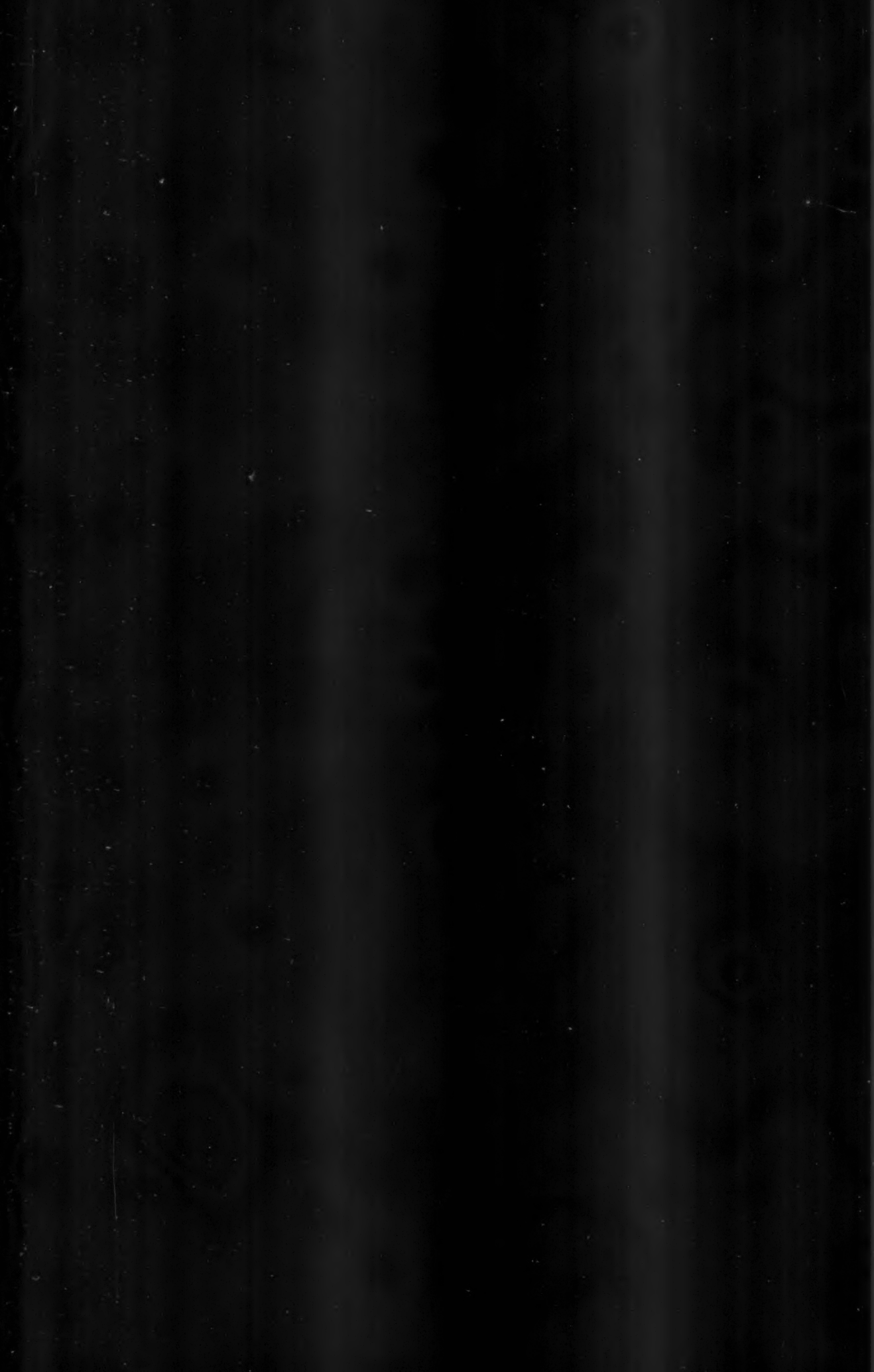

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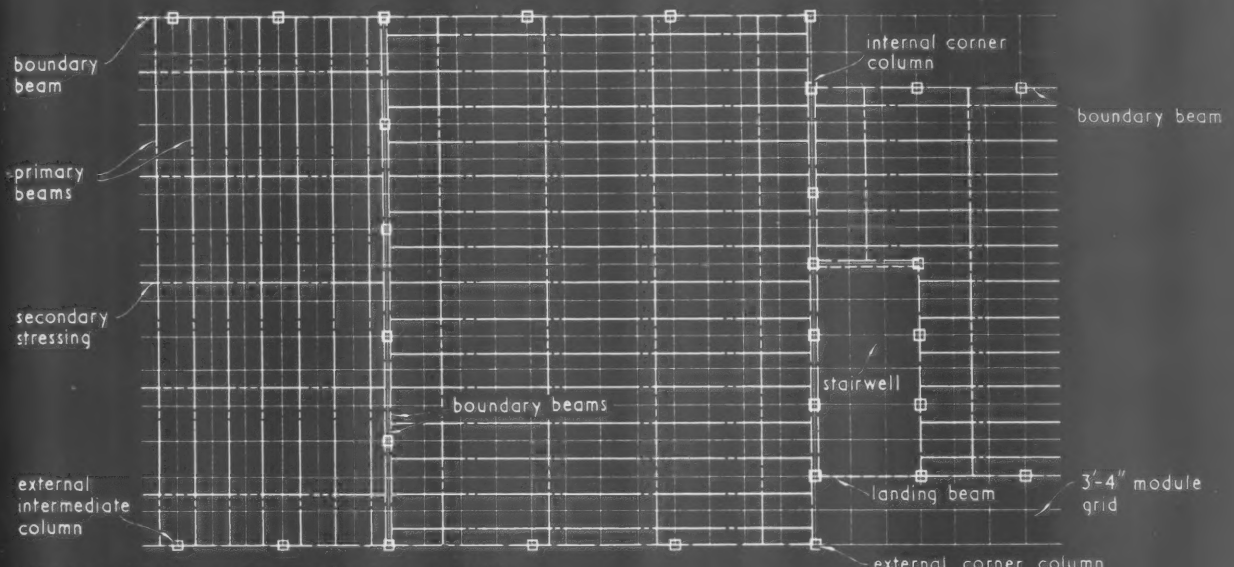
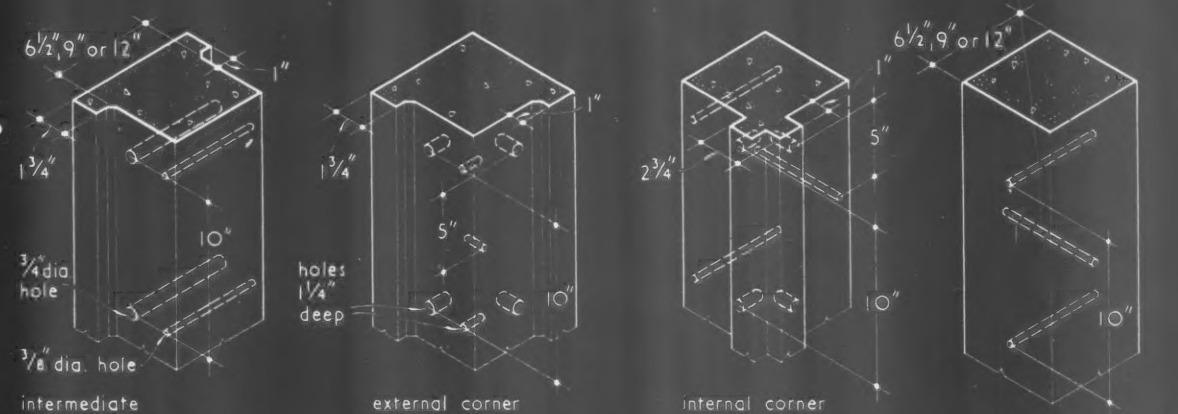
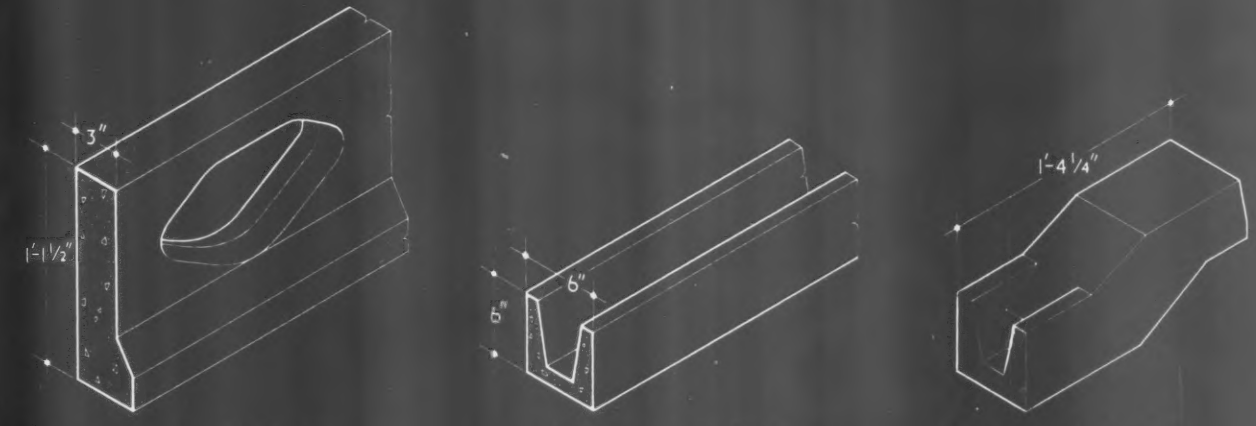


DIAGRAMMATIC PLAN OF TYPICAL LAYOUT.



EXTERNAL COLUMNS.



TYPICAL BOUNDARY BEAM. SECONDARY STRESSING UNIT. END ANCHORAGE.

INTERGRID MARK 3. PRECAST CONCRETE SYSTEM OF CONSTRUCTION: 2.

Proprietor: Gilbert-Ash Ltd.

·INTERGRID MARK 3· PRECAST CONCRETE SYSTEM OF CONSTRUCTION: 2

This Sheet, together with Sheet 25.B1, describes the Intergrid Mark 3 system of construction : the two Sheets should be read in conjunction. The face of this Sheet gives details of the columns, boundary beams and secondary stressing units described on Sheet 25.B1 together with a diagrammatic plan showing the general layout of components. The tables below are an indication of the size of beam for a given span and load requirement for roofs and floors where the beams with service holes are to be spaced at 3 ft. 4 in. or 6 ft. 8 in. in each case.

ROOFS

For beams at 3 ft. 4 in. centres

Load lb./ sq. ft.	Span (modules)																
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
25				1	1	1	1	1	1	1	1	2	2-4	3-4	3-4	4	4
30				1	1	1	1	1	1	1	2	2	2-4	3-4	3-4	4	4
35				1	1	1	1	1	1	1	2	2	2-4	3-4	4	4	4
40				1	1	1	1	1	1	1	2	2	3-4	3-4	4	4	4
45				1	1	1	1	1	1	2	2	2	3-4	4	4	4	4
50				1	1	1	1	1	1	2	2	3-4	3-4	4	4	4	4
55				1	1	1	1	1	1	2	2	3-4	3-4	4	4	4	4
	6′ 8″	10′ 0″	13′ 4″	16′ 8″	20′ 0″	23′ 4″	26′ 8″	30′ 0″	33′ 4″	36′ 8″	40′ 0″	43′ 4″	46′ 8″	50′ 0″	53′ 4″	56′ 8″	60′ 0″
	Span (ft. and in.)																

For beams at 6 ft. 8 in. centres

Load lb./ sq. ft.	Span (modules)																
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
25		1	1	1	1	1	1	1	2	2	3-4	3-4	4	4			
30		1	1	1	1	1	1	1	2	2	3-4	4	4	4			
35		1	1	1	1	1	1	2	2	3-4	3-4	4	4				
40		1	1	1	1	1	1	2	2	3-4	4	4	4				
45		1	1	1	1	1	1	2	3-4	3-4	4	4					
50		1	1	1	1	1	2	2	3-4	4	4	4					
55		1	1	1	1	1	2	2	3-4	4	4	4					
	6′ 8″	10′ 0″	13′ 4″	16′ 8″	20′ 0″	23′ 4″	26′ 8″	30′ 0″	33′ 4″	36′ 8″	40′ 0″	43′ 4″	46′ 8″	50′ 0″	53′ 4″	56′ 8″	60′ 0″
	Span (ft. and in.)																

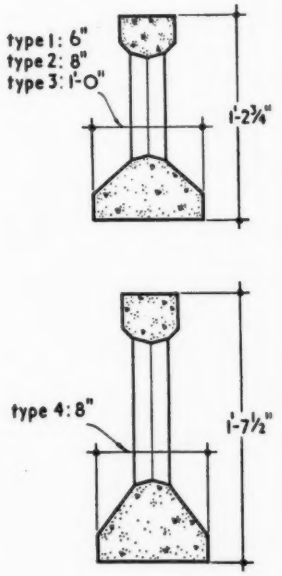
FLOORS

For beams at 3 ft. 4 in. centres

Load, lb./sq. ft.	Span (modules)										
	2	3	4	5	6	7	8	9	10	11	12
60				1	1	1	1	1	2	2-4	3-4
65				1	1	1	1	1	2	2-4	3-4
70				1	1	1	1	2	2	3-4	3-4
75				1	1	1	1	2	2	3-4	3-4
80				1	1	1	1	2	2	3-4	3-4
85				1	1	1	1	2	2	3-4	3-4
90				1	1	1	1	2	2	3-4	4
95				1	1	1	1	2	2	3-4	4
100				1	1	1	1	2	3-4	3-4	4
105				1	1	1	1	2	3-4	3-4	4
110				1	1	1	2	2	3-4	3-4	4
	6′ 8″	10′ 0″	13′ 4″	16′ 8″	20′ 0″	23′ 4″	26′ 8″	30′ 0″	33′ 4″	36′ 8″	40′ 0″
	Span (ft. and in.)										

For beams at 6 ft. 8 in. centres

Load, lb./sq. ft.	Span (modules)										
	2	3	4	5	6	7	8	9	10	11	12
60		1	1	1	1	1	2	3-4	3-4	4	4
65		1	1	1	1	2	2	3-4	4	4	4
70		1	1	1	1	2	2	3-4	4	4	4
75		1	1	1	1	2	2	3-4	4	4	
80		1	1	1	1	2	3-4	3-4	4	4	
85		1	1	1	1	2	3-4	3-4	4	4	
90		1	1	1	1	2	3-4	4	4	4	
95		1	1	1	2	2	3-4	4	4		
100		1	1	1	2	2	3-4	4	4		
105		1	1	1	2	2	3-4	4	4		
110		1	1	1	2	2	3-4	4	4		
	6′ 8″	10′ 0″	13′ 4″	16′ 8″	20′ 0″	23′ 4″	26′ 8″	30′ 0″	33′ 4″	36′ 8″	40′ 0″
	Span (ft. and in.)										



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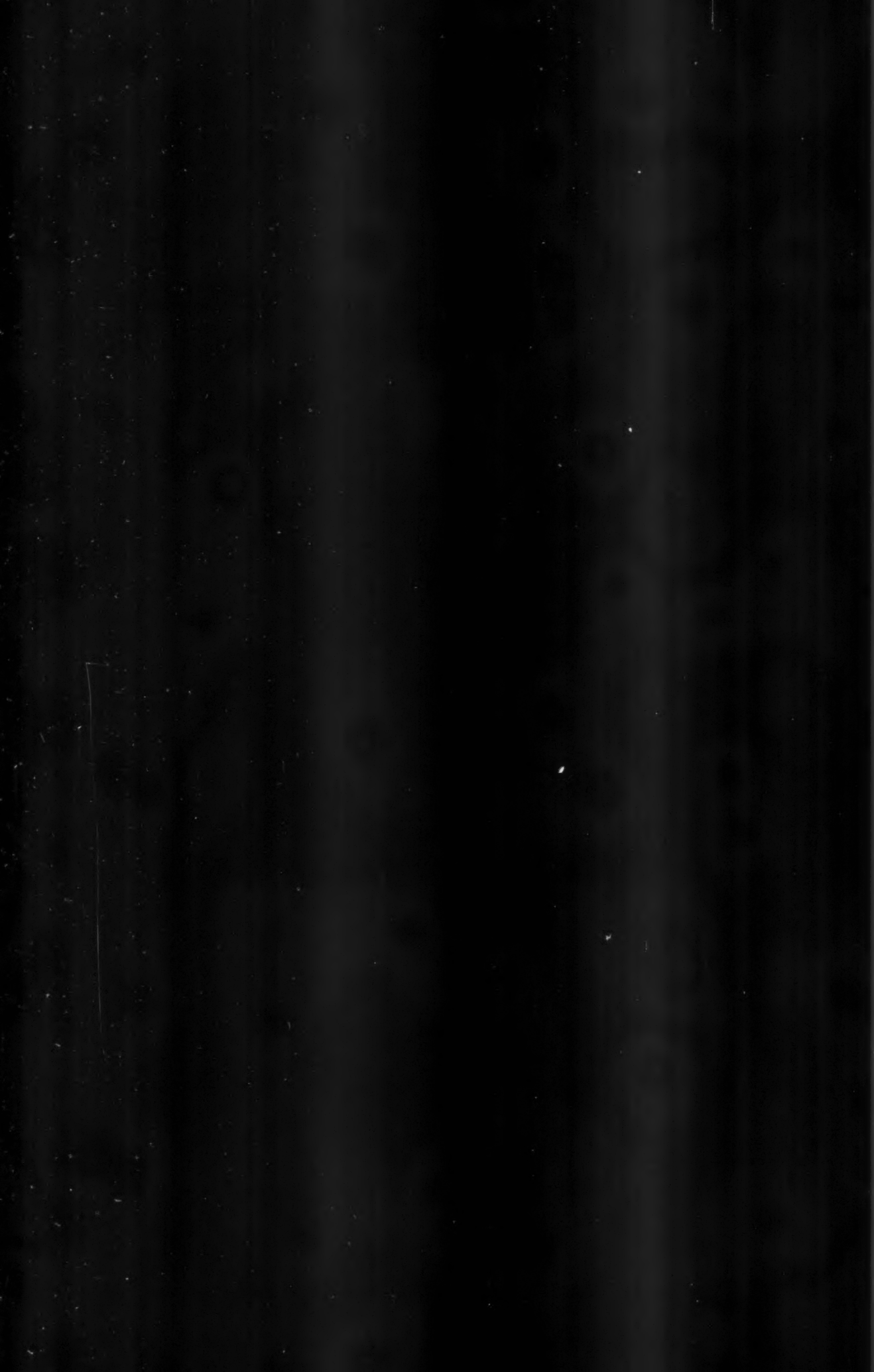


working detail

GLAZED WALL: OFFICE BLOCK IN STOCKHOLM

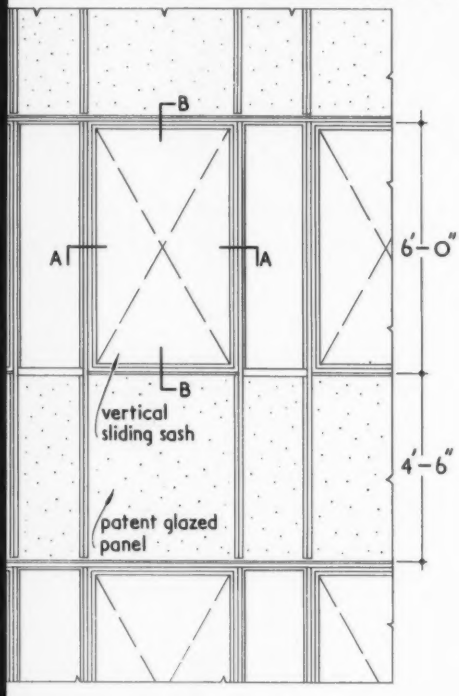
Sven Markelius, architect (material supplied by John Whalley)

This curtain wall shows an unusual solution to the problem of cleaning. Vertical sashes (aluminium outside with teak frame within) are hung proud of the line of the fixed glazing. These sashes are double-framed so that when they are in the "closed" position they can be opened inwards. It is then a relatively easy matter to clean not only the windows themselves but the narrow fixed lights at the sides and the opaque panels below.

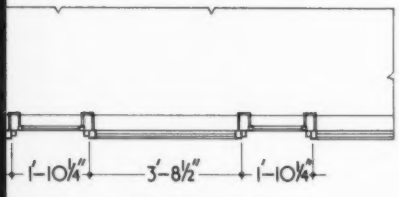
working detail

GLAZED WALL: OFFICE BLOCK IN STOCKHOLM

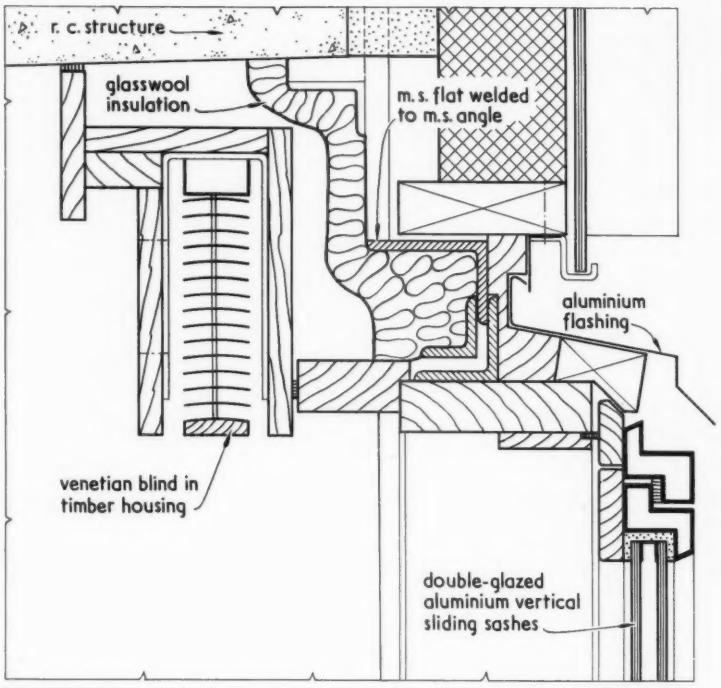
Sven Markelius, architect (material supplied by John Whalley)

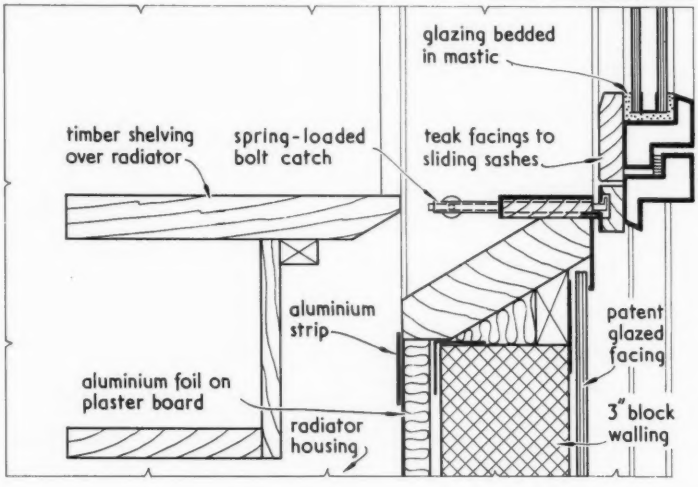


ELEVATION. scale 1/4" = 1'-0"

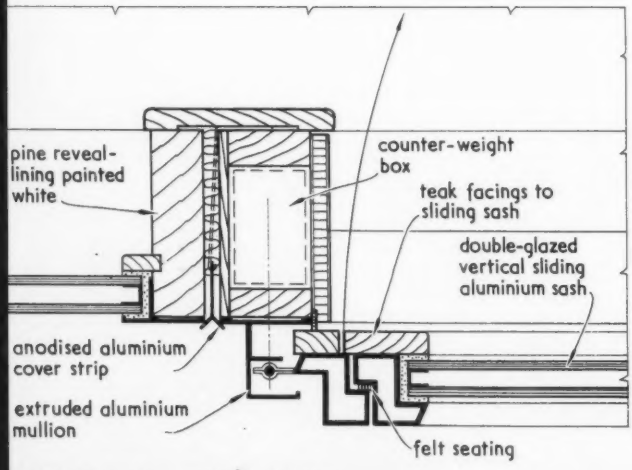


PLAN. scale 1/4" = 1'-0"

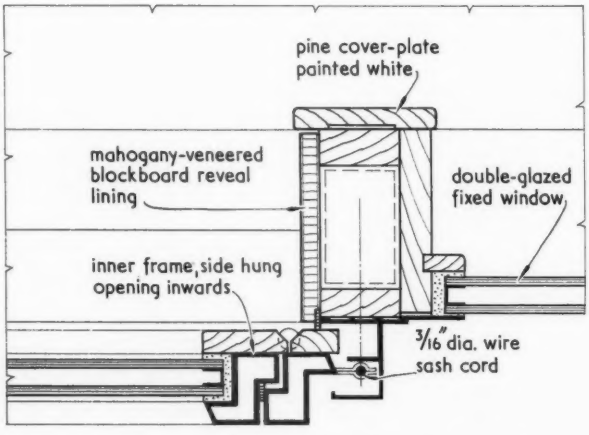




SECTION B—B. scale 1/4 full size



PLAN AT A—A. scale 1/4 full size



note: figured dimensions in feet and inches are approximate

Don't worry... Carrier have thought of everything

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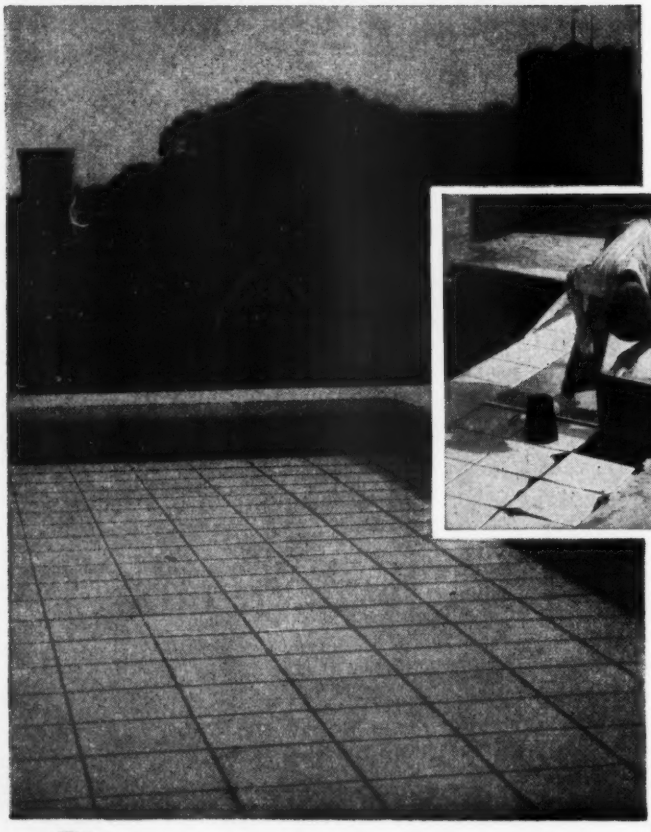

Above: GRAND STAND, CHELTENHAM RACE COURSE.
Architect: Rainger, Rogers & Smithson. FF/AA/R.I.B.A.

Below: THE GEORGE HOTEL, CRAWLEY, SUSSEX.
Architect: J. Hopwood, A.R.I.B.A.

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Diversions
continued

Jolly Belgium, Frolicksome Belgium, Belgium 1900, *Belgium Folklorique: the organisers seem to have been unable to decide on a title: but here it is, right, with its* 50 *bars,* 6 *restaurants,* 10 *snack-bars,* 3 *dancings and* 25 *souvenir shops (including quite a good bookshop).* *See below.*

travel to an artificial satellite moving round the planet Mars.

The planetarium
Although not strictly part of the exhibition, it is so close as not to matter. Those who have never seen a planetarium should not miss this one.

The children's kingdom
This is really another amusement park, for children from 3 to 15. Children can be "parked" in a nursery and play-room. The amusements include a "motor-racing track," another interplanetary rocket to take the children to the moon, and pony rides.

The illuminations
As at most exhibitions, it is worth coming after dusk to see the illuminations, which are on a most elaborate scale, and make the most of the water features, such as the "water staircase" that runs down the slope from the Hall of Welcome to the Benelux Gate, and the fountains outside the U.S. Pavilion.

Art exhibitions
Untill July 21 there is a most interesting and representative exhibition, "Fifty Years of Modern Art" (which actually ranges from Van Gogh to the present day). This is to be followed from August 8 to October 19 by "Man and Art," described as "a panorama of masterpieces from pre-historic times to our own day." Both of these are to be seen in the International Fine Arts Hall. The American pavilion also includes an exhibition, both of American Traditional Art from Indian times, and of modern art, for which an excellent catalogue is available.

Belgium in 1900
Although we do not recommend a visit to this section (which also goes by the names of Jolly Belgium, and Folklore) for its architecture, a great many people will get a lot of fun out of it. It contains innumerable bars, cafes, and restaurants, and remains open until the small hours. A programme of festivities includes music-hall, cabarets, and outdoor entertainments. The population, which consists almost entirely of waiters, waitresses, barmaids and assistants in souvenir shops, are dressed in 1900 costumes. Admission is 25 francs.

NEWS

MOHLG

Report for 1957

This report offers few excitements. It begins with a description of the 1957 Rent Act and ends with paragraphs about National Parks and Historic Buildings; with a thick tailpiece of statistical tables about local authority finance.

The following notes are taken from the housing and town planning sections: 301,090 houses were built in 1957 making that the fifth year in which the famous "300,000 houses a year" target has been reached. 146,000 of these were built by public authorities but capital restrictions will reduce this number for 1958 to about 100,000. Government finance for housing has declined sharply—£50 million was spent in 1957 which is only £2 million more than in the previous year, whereas increases between previous years had averaged £6 million. Money lent or given to private developers under the Housing and Small Dwellings Acquisition Acts has also declined, but the report mentions that some local authorities are working out new schemes of lending money in which the interest rate will be variable—this puts them on a similar basis to the building societies. The sum spent for Improvement Grants was £6·5 million which implies that the total cost of this work was about £13 million. The amount of land bought under Compulsory Purchase Orders has declined.

With regard to the dwellings themselves, the report reveals that for the last three or four years the proportion of 1-bedroom dwellings has increased, the proportion of 2- and 4-bedroom has remained about the same and the proportion of 3-bedroom has declined. Likewise with flats. In 1956 27 per cent of all dwellings were in flats; in 1957 it was 31 per cent and this year there will be even more. House areas too have been decreasing—from just over 1,000 sq. ft. in 1951 to just over 900 last year. In the same period costs of houses have risen from about 27s. per sq. ft. of floor area to just over 32s. It took less time to build a house in 1957—partly because of the good building weather in the first quarter of the year and partly because the number of contracts being let has decreased more sharply than the number of men employed on housing.

In the Town Planning section of the report we note that there were last year, nearly 7,000 appeals against planning decisions, the majority of them concerning single private houses in rural areas. 32 per cent of these appeals were allowed.

In the eight London New Towns the population has reached 260,500. In other new towns it is 69,250.

The report costs 9s. 6d. and can be obtained from HMSO.

YORK INSTITUTE

A Correction

We regret that the reports (AJ, May 15) on the courses at the York Institute on the care of Historic Buildings and of Churches were incorrectly attributed. B. M. Fielden wrote the former, the report on the course on the care of Churches having been written by J. Fletcher Watson.

TPI

Silver Medal

Gerald Walker, of Rothwell, has been awarded the Silver Medal and Certificate by the Town Planning Institute for his Thesis "The Swedish Contribution to Town Planning." This medal is awarded annually for the best Thesis submitted for the Degree or Diploma Examination at schools recognized by the Town Planning Institute. Mr. Walker was a full-time student in the Department of Town and Country Planning at the Nottingham College of Arts and Crafts.

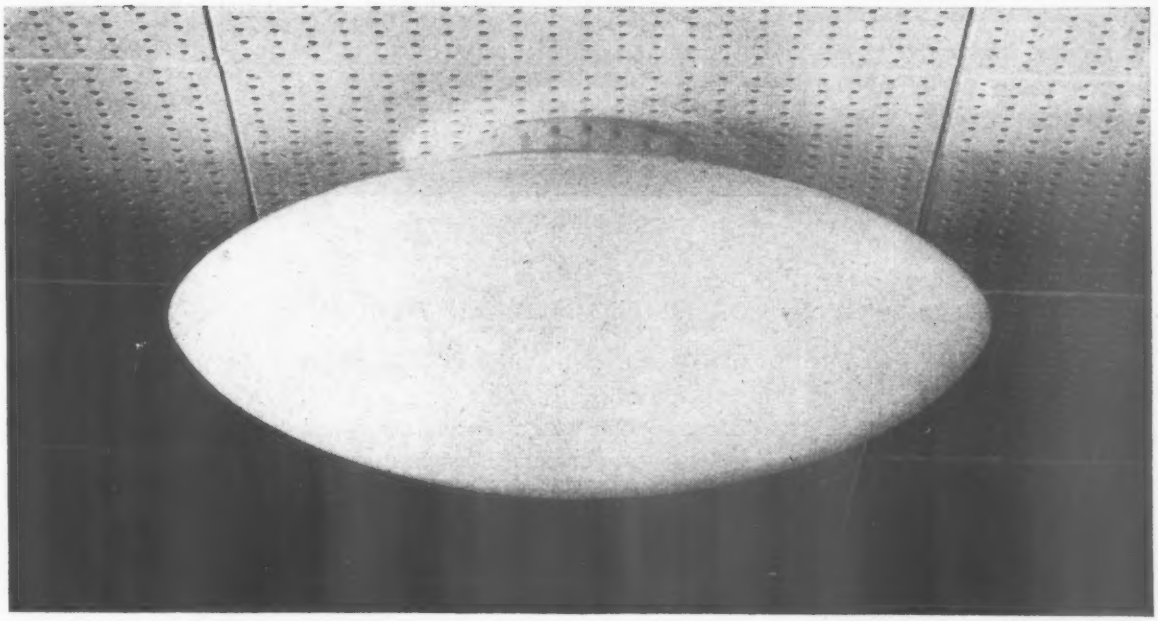
DIARY

Form and Pattern in the Biological World. Talk by Professor C. H. Waddington. At the AA, 34, Bedford Square, W.C.1. 8 p.m. MAY 29.

Nicholas Hawksmoor and the Baroque Town Plan. Talk by K. Downes. At the Courtauld Institute, 20, Portman Square, W.1. 5.30 p.m. JUNE 3.

In Planning a new Factory the Plant Engineer and not the Architect should have the Final Authority. Debate between E. C. Stephens for the Plant Engineers and Geoffrey Monro for the Architects, with W. J. Dickie in the Chair. At the RSA. 7 p.m. JUNE 3

Looking at the Town. Talk by R. Fureaux Jordan at the Annual Meeting of the CVE. The Earl of Euston will preside. At the HC, 13, Suffolk Street, S.W.1. 3 p.m. JUNE 4



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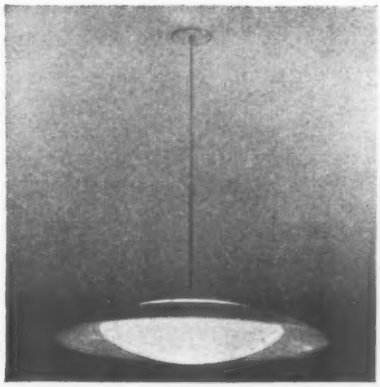

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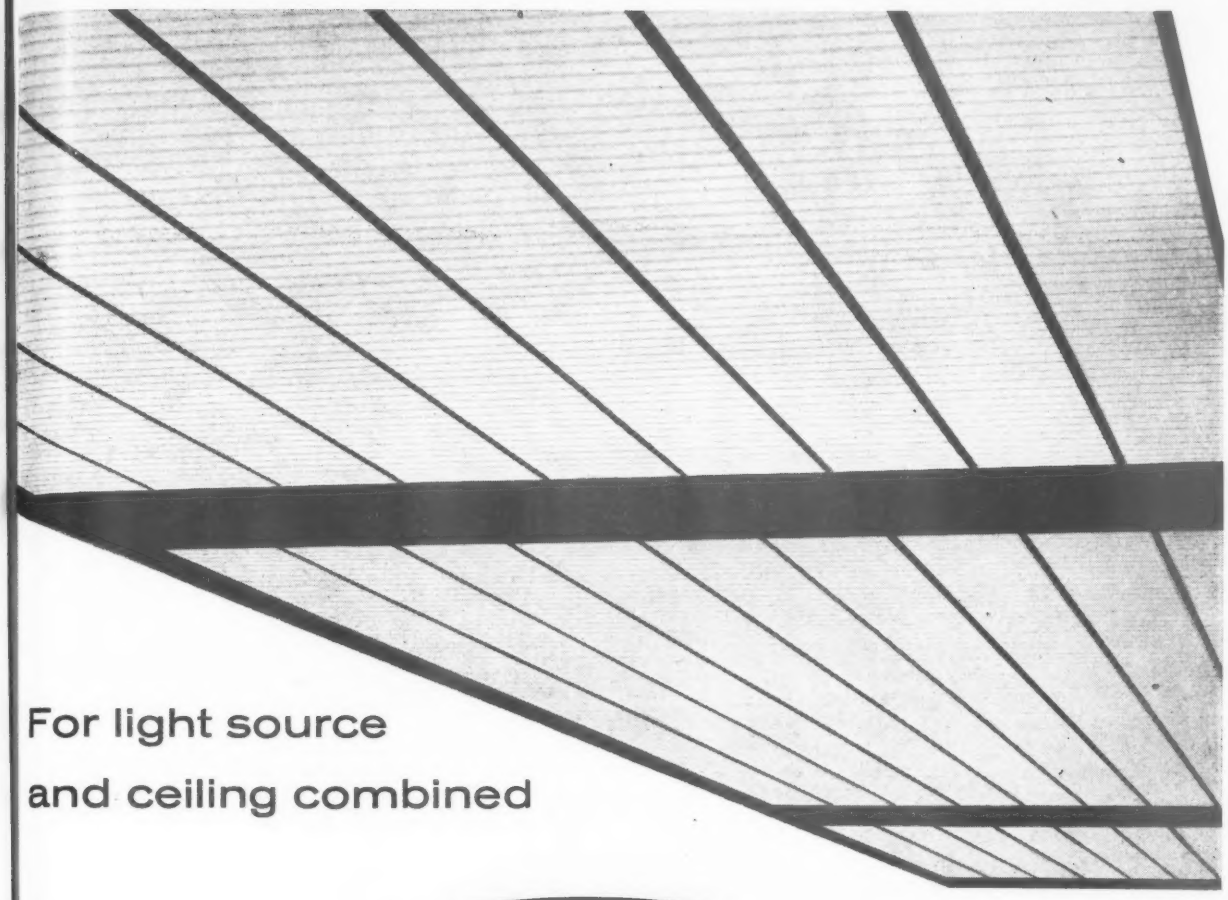

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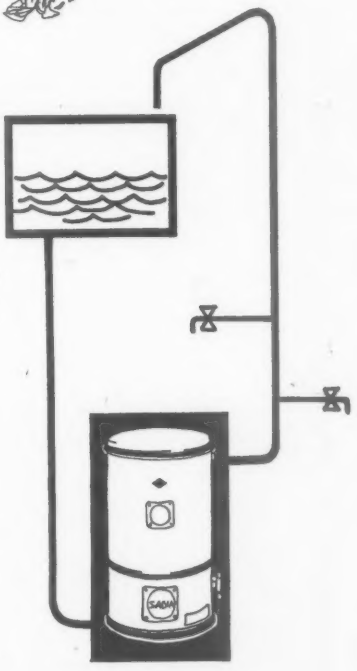

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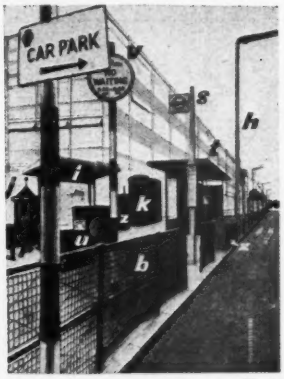
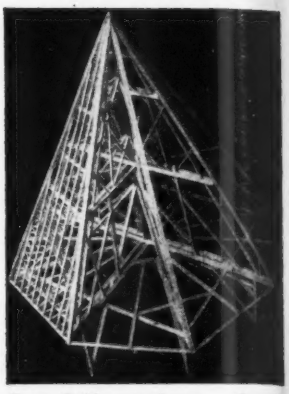
MAY

Ove Arup's house in Highgate, by the Danish architect Erhard Lorenz.



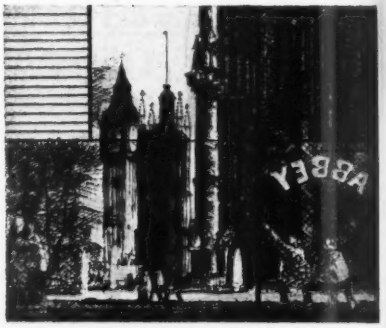
Street side clutter, such as will be imposed on any architect's ideal vision if it is built in a town; from Kenneth Browne's article *Streetscape with Furniture*, the street in this case being replanned Notting Hill Gate.



Great Gothic space-frame; Quentin Hughes' magnificent model to illustrate his article on roof of York Chapter House.

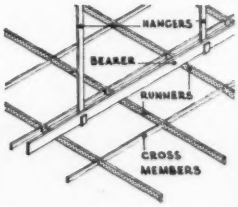
JUNE

Town centre of Vallingby, above, and the market place of Harlow New Town, right; contrasts in animation from *Hubs Without Wheels*, a survey of two important new town centres.

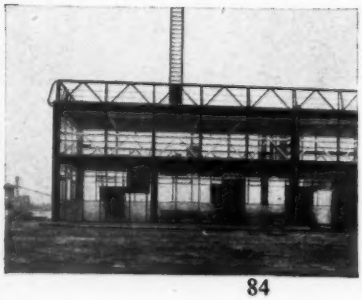


Building development in Victoria Street near the Abbey, touch off again the future of Westminster Precinct. This enfilade of the spires of Westminster highlights Gordon Cullen's proposals in *Westminster Revisited*.

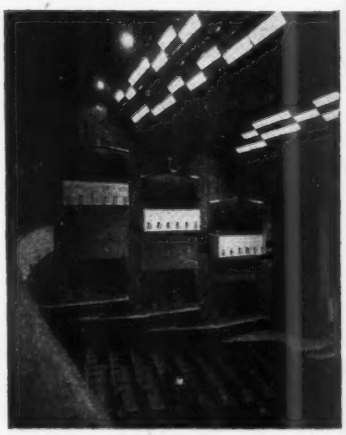
JULY



Right: overhead nomenclature; the designations of the parts of suspended ceilings, from the first of a number of articles on this new entrant in the field of prefabricated building elements. *Below:* Glass Cages at Gatwick; some of the new buildings at Gatwick airport are almost brutalistically solid, others are transparent glass and steel structures, all will be fully described in a special feature.



Below: Theatre in Coventry; a view across the auditorium of the newly-opened Belgrade Theatre. The interior of the National Film Theatre will also be given the full treatment in this issue.



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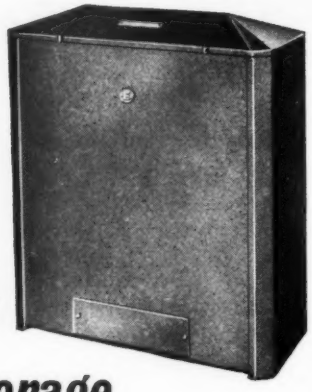

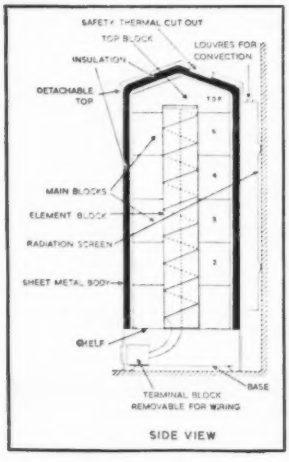

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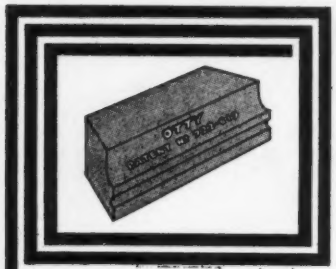

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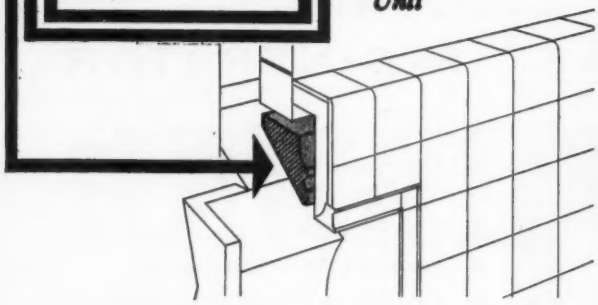

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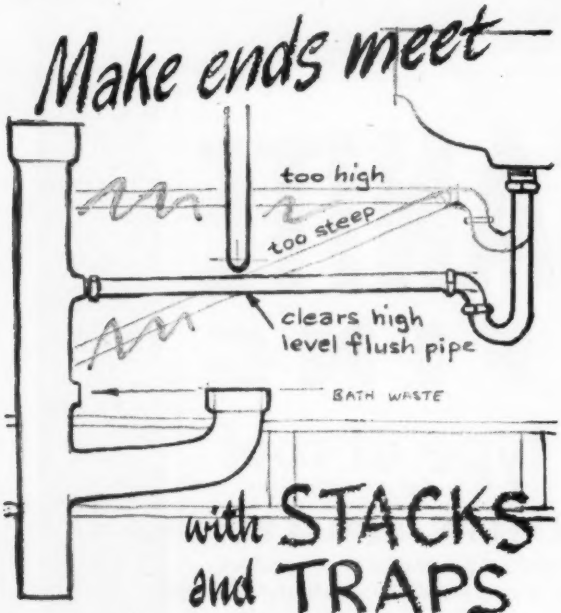

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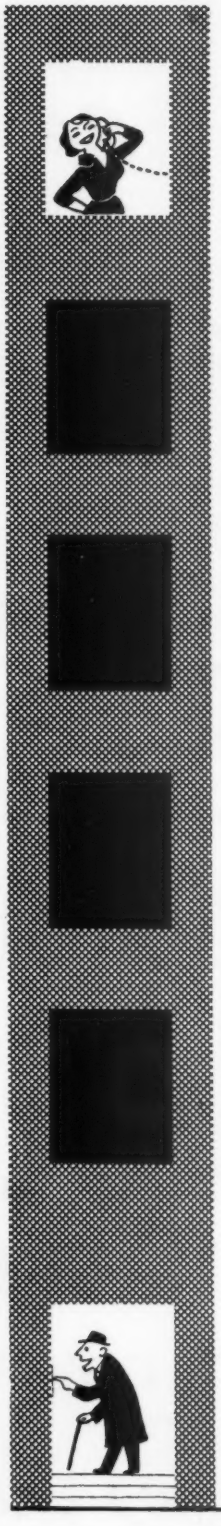

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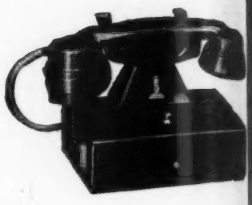

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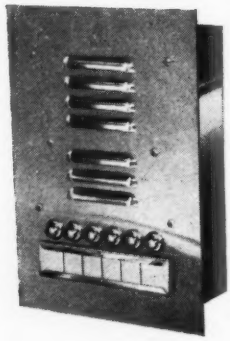

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ARCHITECTURAL ASSISTANT. Salary £525 (at age 21 and over) to £730 p.a.

Applicants must hold Intermediate R.I.B.A.

Starting salaries dependent on age and/or experience.

All posts are subject to the N.H.S. (Superannuation) Regulations.

Further details from the Regional Architect, T. Noel Mitchell, B.Arch., F.R.I.B.A., Pearl Assurance House, 55, Castle Street, Liverpool, 2 (Tel. No. Central 8464). Applications stating age, experience, qualifications, present and previous appointments and salary and names and addresses of three referees (two technical) to me by 9th June, 1958.

VINCENT COLLINGE,
Secretary to the Board.
53, James Street, Liverpool, 2. 9555

CITY AND COUNTY OF THE CITY OF EXETER

Applications are invited for the appointment of STRUCTURAL ENGINEERING ASSISTANT on the establishment of the City Architect's Department, at a salary within the Special Grade, *i.e.*, £750 to £1,030 per annum.

Applicants must be Associate Members of the Institution of Structural Engineers, or hold equivalent qualifications, and must have had considerable experience in the design of reinforced concrete and steelwork structures, such as for Schools, Public Buildings, etc.

The appointment will be subject to one month's notice on either side and to the provisions of the Local Government Superannuation Acts, 1937-53. The successful applicant will be required to pass a medical examination. Canvassing will disqualify, and applicants must disclose whether to their knowledge they are related to any member of the Council or to the holder of any senior office under the Council.

Applications, stating age, qualifications, previous and present appointments and salaries, full details of experience, and the earliest possible date when available, should be sent to H. B. Rowe, F.R.I.B.A., A.M.I.Struct.E., City Architect, Municipal Offices, Exeter, not later than 7th June, 1958.

C. J. NEWMAN,
Town Clerk.
Exeter.
May, 1958. 9497

LINDSEY COUNTY COUNCIL

(*a*) ONE SENIOR ASSISTANT ARCHITECT, Special Grade (£750—£1,030). Applicants should be A.R.I.B.A.

(*b*) ONE ASSISTANT QUANTITY SURVEYOR, Special Grade (£750—£1,030). Applicants should be A.R.I.C.S.

(*c*) ENGINEERING ASSISTANT (HEATING), Grade A.P.T. II (£725—£845). Applicants should hold Higher National Certificate.

In special circumstances consideration will be given to starting salary above minimum of the grade. N.J.C. Conditions of Service. Canvassing will disqualify. Candidates must disclose in writing whether to their knowledge they are related to any Member or Senior Officer of the Council.

Applications, giving age, qualifications, experience, present post and salary, and the names of at least two persons to whom reference can be made, to be sent not later than 29th May, 1958, to the County Architect, County Offices, Lincoln. 9475

BOROUGH OF BEDFORD
APPOINTMENT OF ASSISTANT QUANTITY SURVEYOR

Applications are invited for the post of ASSISTANT QUANTITY SURVEYOR, Grade A.P.T. II (£725—£845), in the Architectural Section of the Borough Engineer and Surveyor's Office.

Applicants should be experienced in the preparation of Bills of Quantities, Interim Valuations and Final Accounts for all types of housing work, and should have passed the Intermediate Examination of the Royal Institution of Chartered Surveyors or Final Examination of the Institute of Quantity Surveyors. The office is in the charge of a qualified Quantity Surveyor.

The Council are prepared to assist in the provision of housing and pay removal expenses.

Forms of application and particulars of the appointment may be obtained from the undersigned and returned not later than Monday, 9th June.

F. W. DAWKES,
Borough Engineer and Surveyor.
Newnham House, Horne Lane, Bedford. 9520

AIR MINISTRY WORKS Design Branch requires in LONDON and PROVINCES ARCHITECTURAL ASSISTANTS experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries in LONDON up to £1,015 p.a. for men and £925 p.a. for women. Somewhat lower in PROVINCES. Starting pay dependent on age, qualifications and experience. Long-term possibilities with promotion and pensionable prospects. Five-day week, three weeks three days leave a year. Liability for overseas service. Normally natural born British subjects. Write stating age, qualifications, employment details including type of work done to any Employment Exchange quoting Order No. BOROUGH 100. 9535

HARLOW DEVELOPMENT CORPORATION

Architect Planner: FREDERICK GIBBERD, C.B.E., F.R.I.B.A., M.T.P.I.

Executive Architect: VICTOR HAMNETT, B.Sc., A.R.I.B.A., Dip.T.P., A.R.I.C.S., A.M.T.P.I.

Applications invited from suitably qualified candidates for the following posts for work on varied interesting programme of housing, commercial and industrial buildings which offers exceptional opportunities for candidates with good design ability.

Post A. ASSISTANT ARCHITECT, £753—£939 per annum.

Post B. ASSISTANT ARCHITECT, £844—£1,029 per annum.

Post C. ASSISTANT ARCHITECT, £934—£1,146 per annum.

Salary dependent upon qualifications and experience.

Dwelling accommodation available in approved cases. Applications giving full details and stating post applied for to be sent with the names of two referees to the General Manager, "Terlings," Harlow, Essex, within 10 days. 9532

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD
ARCHITECT'S DEPARTMENT

Applications are invited for the following appointments on the permanent staff of the Board's Regional Architect generally in accordance with the Whitley Council conditions of service. A number of large development schemes are now in active preparation on which the new staff will be engaged.

London weighting is payable in addition to the scales quoted.

SENIOR ASSISTANT ARCHITECT

The commencing salary will be at the minimum of the scale, £1,010 × £30 (5) × £35 (1)—£1,195. Applicants must be qualified architects with an interest in hospital work and experience in contemporary construction and design.

ASSISTANT ARCHITECTS

The commencing salary will be within the scale £700 × £25 (3) × £30 (1) × £35 (6)—£1,015. Applicants must be Associate members of the Royal Institute of British Architects and capable of preparing working and detailed drawings and specifications and supervising work on individual projects. Experience of hospital planning and construction an advantage.

SENIOR ASSISTANT QUANTITY SURVEYOR

The commencing salary will be at the minimum of the scale—£1,010 × £30 (5) × £35 (1)—£1,195. Applicants must be Corporate members of the Royal Institution of Chartered Surveyors (Quantity Surveying Branch) and have had sound practical experience in the estimating and analysis of prices, working up and taking off of quantities for contracts and also of checking contractors' accounts.

ASSISTANT LAND SURVEYOR

The commencing salary will be within the scale, £700 × £25 (3) × £30 (1) × £35 (6)—£1,015. Applicants must be Corporate members of the Royal Institution of Chartered Surveyors and have had sound practical experience of the surveying of land and buildings and be familiar with matters relating to the Town and Country Planning and Building Bye-Laws.

ASSISTANT QUANTITY SURVEYOR

The commencing salary will be within the scale £700 × £25 (3) × £30 (1) × £35 (6)—£1,015. Applicants must be Corporate members of the Royal Institution of Chartered Surveyors (Quantity Surveying Branch) and have had sound practical experience in working up and taking off of quantities for contracts, checking contractors' accounts, estimating and analysis of prices.

SURVEYORS' CLERK

The commencing salary will be at the minimum of the scale £440 at age 24 or over × £15 (3) × £20 (4) × £25 (2)—£615. Applicants must have had suitable training including three years technical experience in a Surveyor's office, including experience in working up.

Applications for the senior appointments should state age, experience, qualifications, present appointment and salary together with names of three referees and be sent to the undersigned at 11a, Portland Place, from whom application forms for the other appointments may be obtained. Completed applications must be received by not later than 9th June, 1958.

E. G. BRAITHWAITE, *Secretary.* 9556

CITY AND COUNTY OF LICHFIELD
CITY ENGINEER & SURVEYOR'S DEPARTMENT
APPOINTMENT OF ARCHITECTURAL ASSISTANT, A.P.T. GRADE II (£725—£845 p.a.)

Applications are invited for the above Appointment in the City Engineer & Surveyor's Department. The appointment which is permanent offers an opportunity to participate in interesting architectural work in connection with Overspill and Redevelopment Schemes.

Applicants should have had suitable training and be appropriately qualified.

Housing accommodation will be offered to the successful applicant. Car Allowance.

The appointment will be subject to the Scheme of Conditions of Service and the provision of the Local Government Superannuation Acts.

Further particulars may be obtained from Mr. D. Oglesby, M.I.Mun.E., City Engineer & Surveyor, Meredith House, 62, Wade Street, Lichfield.

Applications stating previous appointments, qualifications and details of experience together with the names and addresses of two referees must be received by the undersigned in a plain sealed envelope endorsed "Architectural Assistant" not later than noon on Wednesday, 11th June, 1958.

HENRY J. CALLENDER.
Town Clerk.
Guildhall.
Lichfield.
20th May, 1958. 9561

COUNTY BOROUGH OF CROYDON
ARCHITECTURAL ASSISTANT

Applications are invited for this appointment under a team leader on general architectural schemes. Candidates should have reached about the standard of the R.I.B.A. Intermediate examinations.

Commencing salary between £605 and £875 p.a. according to qualifications and experience. Scale rises to £1,060 p.a., subject to passing R.I.B.A. Final examination.

Further particulars and application form from Borough Engineer, Town Hall, Croydon.

Closing date 10th June, 1958.

E. TABERNER.
Town Clerk. 9539

DUNGANNON RURAL DISTRICT COUNCIL
WHOLE-TIME QUALIFIED ARCHITECT

Applications are invited for the above appointment in the Council's Engineering Department in the salary scale of £1,050—£40—£1,210.

Applicants must be Associate Members of the Royal Institute of British Architects and if not possessing a Town Planning qualification should have had experience in a Town Planning Office.

Some of the duties on which the Officer will be mainly engaged consist of New Housing, Slum Clearance, Re-development, Conversion and Improvement, and work of a Planning nature.

The appointment will be subject to the Local Government Superannuation Acts and a medical examination.

Applications stating age, past and present appointments, qualifications, and experience, together with copies of three recent testimonials should be delivered to the undersigned not later than Wednesday, 11th June, 1958.

Canvassing in any form will disqualify.

C. A. IRWIN,
Clerk of the Council.

Rural District Council Offices,
Dungannon,
County Tyrone,
N. Ireland. 9537

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Vacancies for (1) ARCHITECTS, Grade III, starting salary up to £1,090 a year. (2) ARCHITECTURAL ASSISTANTS, starting salary up to £860.

Full and interesting programme of Houses, Flats, Schools and General Buildings.

Application form and full particulars from Hubert Bennett, F.R.I.B.A., Architect to the Council, The County Hall, S.E.1, quoting Ref. AR/EK/21/58. (799) 9375

CITY OF BRADFORD
ARCHITECTURAL ASSISTANT

Applications are invited for the appointment of an Architectural Assistant (Post No. 204) at a salary in accordance with Special Grade (£750—£1,030); commencing salary in accordance with experience and qualifications.

Candidates should have had experience in the design of houses, flats and shops and the layout of housing estates, have sound design ability and be experienced in the preparation of working and detail drawings.

Applications on forms to be obtained from the City Engineer and Surveyor, Town Hall, Bradford, 1, together with three testimonials, must be received by the undersigned by 16th June, 1958.

W. H. LEATHEM,
Town Clerk.

Town Hall, Bradford, 1. 9536

HERTFORDSHIRE COUNTY COUNCIL
COUNTY ARCHITECT

Applications invited for the post of County Architect, which will become vacant on 15th December, 1958, on the salary scale £2,855 × £105—£3,170 plus travelling and subsistence expenses. Applicants must be members of the Royal Institute of British Architects.

No application forms will be issued but letters of applications should give the names of three referees and be sent to reach the Clerk of the County Council, County Hall, Hertford, on or before the 14th June, 1958. 9538

GOVERNMENT OF NORTHERN IRELAND
ASSISTANT ARCHITECT CLASS II

Applications are invited for pensionable posts in the Chief Architect's Branch, Ministry of Finance. Candidates must be Registered Architects by examination, with at least two years' experience in an Architect's Office in the preparation of working drawings. Salary scale £780 (at age 25)—£1,055 (age 34 and over)—£1,215. Transfer of existing Pension rights may, in certain circumstances, be approved. Preference will be given to ex-Servicemen. Application forms may be obtained from the Secretary, Civil Service Commission, Stormont, Belfast. 9540

MIDDLESEX COUNTY COUNCIL

ASSISTANT ARCHITECTS required in County Architect's Department. N.J.C. Special Grade: £750—£1,030 p.a., plus London weighting (£30 if 26 years or over, £20 21-25 years). Commencing salary according to qualifications and experience. Should have Parts 1 and 2 of R.I.B.A. Final Examination. Prescribed conditions. Application forms (stamped addressed foolscap envelope) from County Architect. 1, Queen Anne's Gate Buildings, Dartmouth Street, S.W.1, returnable by 11th June. (Quote X.500 A.J.) Canvassing disqualifies. 9503

METROPOLITAN BOROUGH OF WANDSWORTH
ARCHITECTURAL ASSISTANT

Applications invited for post of Architectural Assistant, A.P.T. III (£875 rising to £1,055). Applicants must have passed Parts I and II of the R.I.B.A. Final or Special Final examination, and have had at least five years' experience, including training.

Application forms, obtainable from the Borough Engineer, must reach me by 11th June.

R. H. JERMAN,
Town Clerk.

Municipal Buildings,
Wandsworth, S.W.18. 9534

DENBIGHSHIRE COUNTY COUNCIL
COUNTY PLANNING DEPARTMENT

The above Council invite applications from suitably qualified persons for the following appointments, *viz*:—

(*a*) CHIEF COUNTY PLANNING ASSISTANT, A.P.T. Grade IV (salary £1,025—£1,175 per annum).

(*b*) SENIOR COUNTY PLANNING ASSISTANT, A.P.T. Grade IV (salary £1,025—£1,175 per annum).

(*c*) DEPUTY AREA PLANNING OFFICER (Wrexham), special scale (salary £750—£1,030 per annum).

Appointments (*a*) and (*b*) are to the Headquarters Staff of the County Planning Department at Ruthin and appointment (*c*) is to the Area Planning Office Staff at Wrexham.

Application forms and further particulars can be obtained from the under-signed. Completed applications, giving the names of two referees, must be returned not later than 20th June, 1958.

W. E. BUFTON,
Clerk of the County Council.

County Offices,
Ruthin,
Denbighshire. 9533

Architectural Appointments Vacant

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

ASSISTANT ARCHITECT required by private firm in Nigeria. Single man preferred. Eighteen-month tour in first instance. Passages, living accommodation, and car provided. Salary according to age and experience.—Box 9472.

YOUNG qualified ASSISTANT ARCHITECT required. Must be neat and expeditious draughtsman. Capable of preparing designs and working drawings for new buildings and shop-fitting. Apply, giving age, experience and salary required, to Staff Architect, Prices Tailors Ltd., Cardigan Crescent, Leeds, 4. 9489

MAJOR PETROLEUM DISTRIBUTION COMPANY require for their London office a fully qualified and experienced SENIOR ARCHITECTURAL ASSISTANT for work on varied commercial projects, including Service Stations. Salary according to experience. Position will be permanent and pensionable. Excellent working conditions, staff restaurant, sports club, etc.—Apply in writing, giving full details of age, qualifications and experience, to Box 9420. Replies can only be sent to those selected for interview.

ASSISTANT, passed Intermediate, required for interesting and varied work with fair measure responsibility. London practice. Box 9510.

ARCHITECTURAL ASSISTANTS required for Hospital and other work, some office experience necessary, Intermediate or Final standard, five-day week. Apply to Adams, Holden & Pearson, 38, Gordon Square, W.C.1. 9525

SENIOR ARCHITECTURAL ASSISTANT, capable of making site surveys, preparing sketch plans and working drawings and supervising work in progress. Knowledge of shop fitting an advantage.—Applications, stating age, experience, qualifications and salary required, to R. E. Akerman, F.R.I.B.A., Chief Architect, United Dairies, Ltd., 31, St. Petersburgh Place, W.2. 9421

NORFOLK Architect has vacancy for PUPIL/IMPROVER, with small salary to commence.—Reply with details to Box 9469.

LOUIS DE SOISSONS, PEACOCK, HODGES & ROBERTSON have a vacancy for an ASSISTANT, preferably with experience in design and presentation of sketch schemes, etc. Write stating age, salary and experience to the above at 3, Park Square Mews, Upper Harley Street, London, N.W.1. 9501

COMPETENT and experienced ASSISTANT required for small busy practice in the West End. Shaw & Lloyd, 74, Great Russell Street, W.C.1. Museum 9693. 9514

VINCENT BURR AND PARTNERS urgently require another ARCHITECTURAL ASSISTANT of not less than Intermediate standard. Great scope for future promotion. Large and varied practice. Salary according to experience. Apply by letter only to 85, Gower Street, London, W.C.1. 9513

QUALIFIED ASSISTANT required. London private practice, varied work, prospects. Box 9509.

WANTED immediately: qualified experienced ARCHITECTS. Good salaries, excellent prospects for right men according to experience. Appointments vacant for Senior and Intermediate grades. Apply, stating qualifications, experience, etc., to J. G. L. Poulson, L./F.R.I.B.A., 29, Ropergate, Pontefract, Yorks. Closing date for applications: 12th June, 1958. 9531

ARCHITECTURAL ASSISTANTS of varying grades required for industrial and commercial architects in London. Three to ten years' office experience. Salary according to qualifications and experience. Reply giving details of age, experience and salary required to Box 9526.

LONDON firm of Architects seek qualified ASSISTANT, with some experience in design and constructional detailing for laboratories. Salary according to qualifications and experience. —Box 9547.

ARCHITECTURAL ASSISTANT required immediately for work on a new Church, Shops and Offices, Factory and Farm Buildings. Qualifications should include preferably R.I.B.A. Intermediate examination.—Apply to Graham & Roy, 6, Paternoster Row, Carlisle, stating age, qualifications, experience, and salary required. 9552

ARCHITECT'S ASSISTANT, with office experience, a sound knowledge of straightforward construction, and ability to produce clear working drawings, required in busy Birmingham office. Pension Scheme. Salary £750.—Box 9551.

TREHEARNE & NORMAN, PRESTON & PARTNERS have vacancies for ASSISTANTS. Salary according to experience and qualifications.—Apply: 83, Kingsway, W.C.2 (HOL. 4071). 9550

ASSISTANT, with several years' experience, required by Architect with varied practice in small office in S.W.3.—Telephone KEN. 2187 for appointment, or write, giving particulars and salary required, to Box 9549.

GEORGE WIMPEY & CO., LIMITED

THE ARCHITECTS' DEPARTMENT seek SENIOR and INTERMEDIATE ASSISTANTS, with experience in, and ability to apply their knowledge to, new construction techniques covering Multi-Storey Flats, Houses, Offices and Industrial Buildings for contracts in the U.K. and overseas.

Permanent appointments at Head Office, Hammersmith. 5-day week.

Salaries will be commensurate with qualifications and experience and, subject to satisfactory service, there is a Pension Scheme available.

IMMEDIATE SHORT-TERM APPOINTMENTS, FOR PERIODS UP TO 12 MONTHS, ARE ALSO AVAILABLE FOR ASSISTANTS ON WORKING DRAWINGS AND DETAIL WORK.

WRITTEN APPLICATIONS, giving full particulars, to:—

E. V. COLLINS, A.R.I.B.A.,
Chief Architect,
27, Hammersmith Grove, London, W.6.
Ref. 503.A. 9553

A VACANCY exists on the staff of the Chief Civil Engineer, British Railways, York, for a QUANTITY SURVEYOR, experienced in Building and Civil Engineering Quantity Surveying. Applicants should be Corporate Members of R.I.C.S. (Quantities Division). Commencing salary £916 per annum, within range £916—£956—Applications in writing, giving age, qualifications, etc., to Chief Civil Engineer, British Railways, North Eastern Region, York. 9541

ARCHITECTURAL Department of development company group requires capable ASSISTANT (Inter standard) for varied work in North London office.—Write, stating age, experience, and salary required, to Box E544, Whites, Ltd., 72/78, Fleet Street, London, E.C.4. 9554

ASSISTANT required. Passed Inter. standard, with office experience of at least 5 years. Good draughtsman, capable of detailing and general routine, required for small busy office in W.C.2 district dealing mainly with Houses and Flats. Prospect of advancement for a keen, capable Assistant.—Full particulars, stating education, training, and past experience, present salary and salary required, Box 9546.

ARCHITECTURAL ASSISTANT (A.R.I.B.A.), seeking long term employment and capable of handling large and small projects, is required on the Architectural Staff of Guest, Keen & Nettlefolds (Midlands), Ltd.—Applications, stating age, previous experience, and approx. salary required, to Men's Employment Officer, Box 24, Heath Street, Birmingham, 18. 9545

PART-TIME fully qualified and experienced assistance required in expanding new practice mid-Herts. up to 20 hrs. weekly in this office or away. Immaculate, enthusiastic service. Adequate remuneration.—Box 9544.

THREE experienced ASSISTANTS wanted:—

(1) To work for one year in London office on Hospital Project, and then for about two years as Resident Architect on its construction in West Africa. Salary in West Africa, £1,750, plus accommodation.

(2) To work for about 9 months in London office on Training College, and then for about 18 months on its construction in West Africa. Salary in West Africa, £1,600, plus accommodation.

(3) To work in office in West Africa after a couple of months in London office. Salary in West Africa, £1,400, plus accommodation.

Reply, stating for which post application is made to Box 9543.

ARCHITECTS Jackson & Edmonds, have vacancies for ASSISTANTS between the salary grades £350—£750 per annum in London and Birmingham offices. Pension scheme in operation.—Write, giving details of age, experience and qualifications, to 116, Colmore Row, Birmingham, 3. 9563

COVELL & MATTHEWS require SENIOR ARCHITECTURAL ASSISTANTS of Final standard. Salary by arrangement. Work is varied and interesting. 5-day week.—Apply in writing to: 34, Sackville Street, Piccadilly, W.1. 9542

BRIGHTON office of London practice requires sound ARCHITECTURAL ASSISTANT, at £650 to £700 range. Applicants to have had at least two years' office experience since completion of training, and be capable of working on their own initiative. Congenial working conditions; 5-day week; staff pension scheme.—Apply Box 9562.

OPPORTUNITY for advancement occurs for single young man of Intermediate or better standard as SECOND ASSISTANT in Country Practice.—Reply to Box 9568.

JUNIOR ARCHITECTURAL DRAUGHTSMAN (male or female) wanted for busy country practice.—Apply, stating age, experience, and salary required, to Earp, Badger & Harrison, A./A.R.I.B.A., 4, High Street, Evesham, Worcs. 9566

ARCHITECTURAL ASSISTANT required, of Inter. or Final standard, with some experience, for work on Department Stores, Shops, Exhibitions and Housing.—Box 9565.

NEWMAN, LEVINSON AND PARTNERS require a SENIOR ARCHITECTURAL ASSISTANT, with knowledge of commercial and industrial work, and London experience. Candidates should be capable of taking control of jobs.—Write, stating experience and commencing salary required, to 9, Mansfield Street, London, W.1, or telephone LANgham 9253/4. 9564

Architectural Appointments Wanted

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

ASSOCIATE (35), B.Arch., 10 years' varied experience, requires part-time work, Birmingham area. 4 days a week maximum. Car owner.—Box 9559.

ENTHUSIASTIC ASSISTANT, with 10 years' experience, including timber engineering, architectural practice, etc., is anxious to obtain situation with firm of prefabricated timber manufacturers. Capable of truss design, and detailing schemes, etc. Present position will terminate in six weeks owing to retrenchment.—Box 9560.

Other Appointments Vacant

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

LEADING Flooring Contractors with live connection among Architects wish to engage a MANAGER with experience of organisation and laying of linoleum, plastic and rubber tiles, etc. Salary commensurate with experience and qualifications. All replies will be treated in strict confidence. Apply to Box 9487.

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MORTON SUNDOUR FABRICS, LTD., are seeking a Contract Manager with good education, preferably architectural or furnishing contract experience, and certainly ability to promote sales in a wide range of furnishing products.

The Manager will be based on London. Interviews, however, can be arranged either at Carlisle or our London Showrooms.

Replies must include full details of education, business experience, present remuneration, age, married or single, and should be addressed, marked "Confidential," to The General Manager, Morton Sundour Fabrics, Ltd., Dentonhill Works, Carlisle. 9558.

DRAUGHTSMAN. Male assistant of Intermediate standard to prepare structural schemes and finished projects under supervision required for Drawing Office in large Multiple Firm. Knowledge of shopfitting would be an advantage. Pension Scheme and Staff Restaurant. Reply stating age, experience and salary required to Box 9522.

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FOR SALE.—Approximately 1,200 pairs, hand-made, green glazed "over" and "under," Spanish Tiles. Reasonable price.—Apply A. Harris & Sons, Farnham Potteries, Wrecclesham, Farnham, Surrey. 9557

MOTOR CAR TURN-TABLE. Avoids reversing, indispensable in limited spaces. Write for terms.—Oscar Chess, Limited, Port Talbot, Glam. 9567

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4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra.

A. J. BINNS, LTD., Specialists in the supply and fixing of all types of Fencing, Gates and Cloakroom Equipment.—Harvest Works, 96/107, St. Paul's Road, N.1. Canonbury 2061.

CANTEEN and Restaurant Kitchens expertly planned and fitted. Reconditioned or new equipment available. Rental facilities if required. Designer will call. Commercial Catering Equipment Co., Ltd., 29, Abingdon Road, Kensington, W.8. Tel. WEStern 0936. 9042

ARCHITECTURAL METALWORK of all types supplied and fitted. Gates, doors, balustrades, staircases, steel structures. Design staff available.—Clayton & Bamber, Ltd., Cartersfield Road, Waltham Abbey, Essex. 5823

ACCOMMODATION offered Architect's contemporary house, Dorking. Use office facilities, etc. Would suit married couple, or single man.—Write Box 9334.

CROGGON & CO., LTD.—Chain Link Fencing and all types of Wrought Iron Fencing supplied and erected.—230, Upper Thames Street, London, E.C.4. CENtral 4382. 9429

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4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

R.I.B.A. and T.P.I. EXAMS.—Stuart Stanley (Ex. Tutor Sch. of Arch., Lon. Univ.), and G. A. Crockett, M.A./B.A., F./F.R.I.B.A., M./A.M.T.P.I., prepare Students by correspondence. 10, Adelaide Street, Strand, W.C.2. TEM. 1603/4.

R.I.B.A. Inter. and Final EXAMS. TUITION, BY POST.—C. W. BOX, F.R.I.B.A., 115, Gower Street, W.C.1. Tel.: EUS. 3906. 1942

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