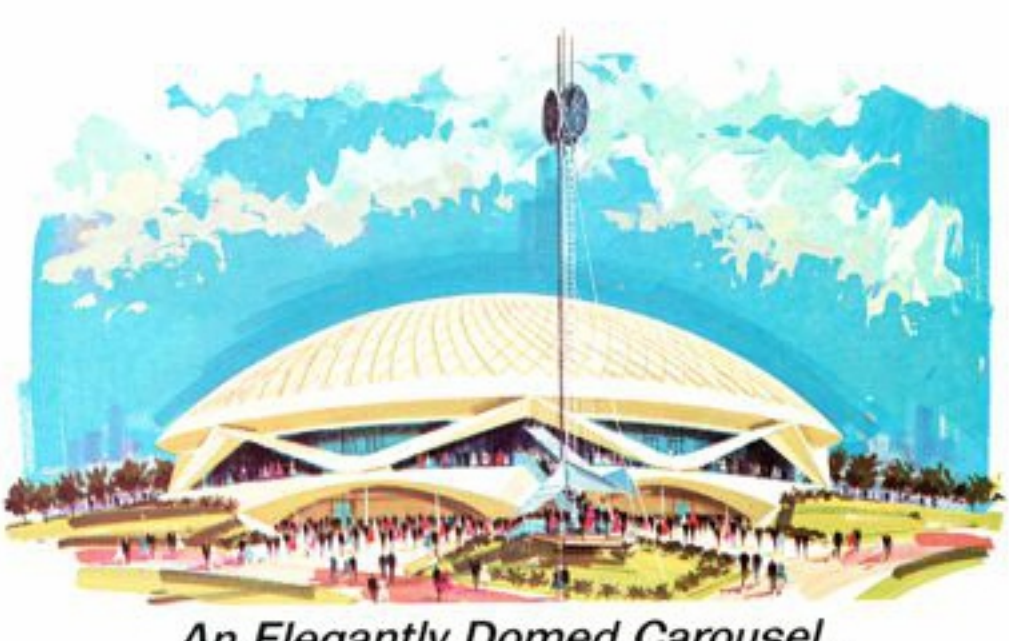


An Elegantly Domed Carousel...

A Colossal "Floating Wing"...

World's Fair Preview

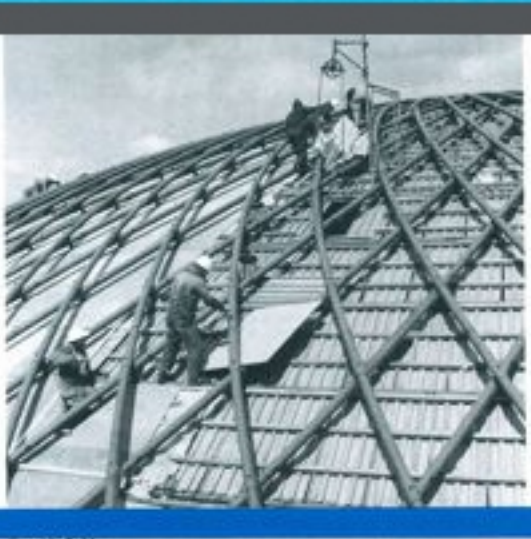
OCTOBER, 1963

A "Hovering" Hollow Square...

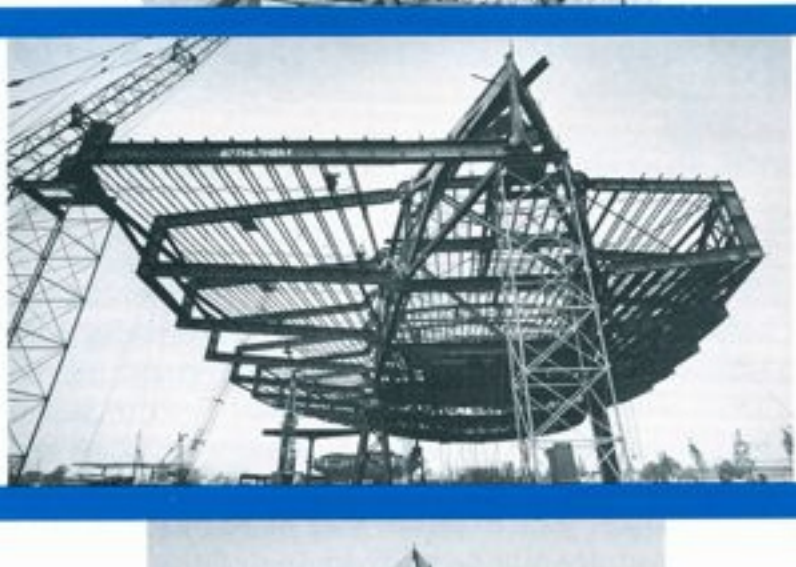
A New Concept in Space Structures...

...all described on the following pages

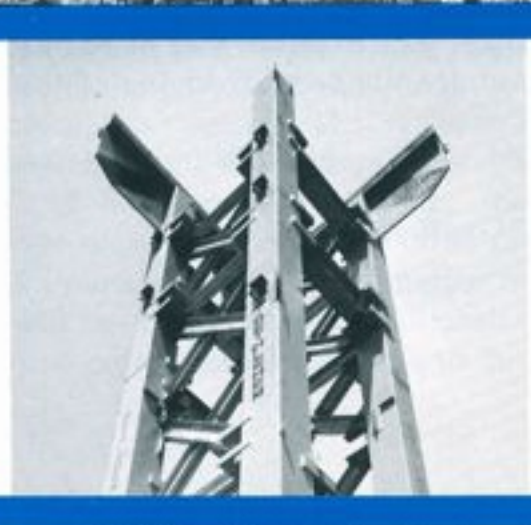
BETHLEHEM STEEL



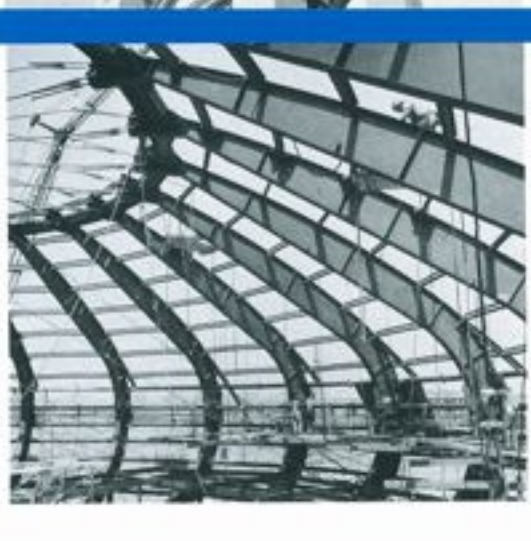
A lamella steel pipe dome crowns the General Electric Company Pavilion



Steel U-frames connected to curving trusses frame the ride for the Bell System Exhibit



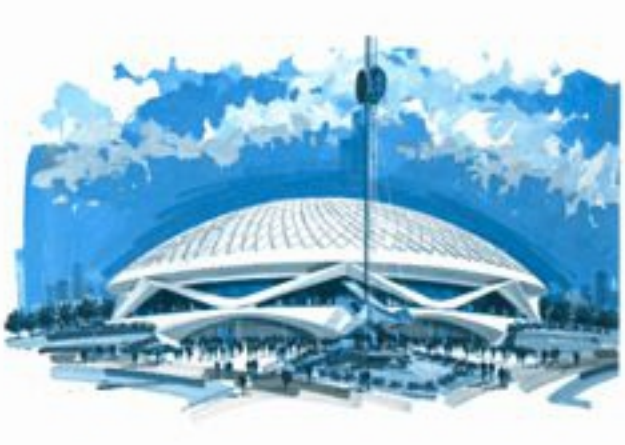
Lofty steel towers support eight giant trusses for the United States Pavilion



All-welded steel ribs, unique space structure, highlight The Travelers Insurance Pavilion

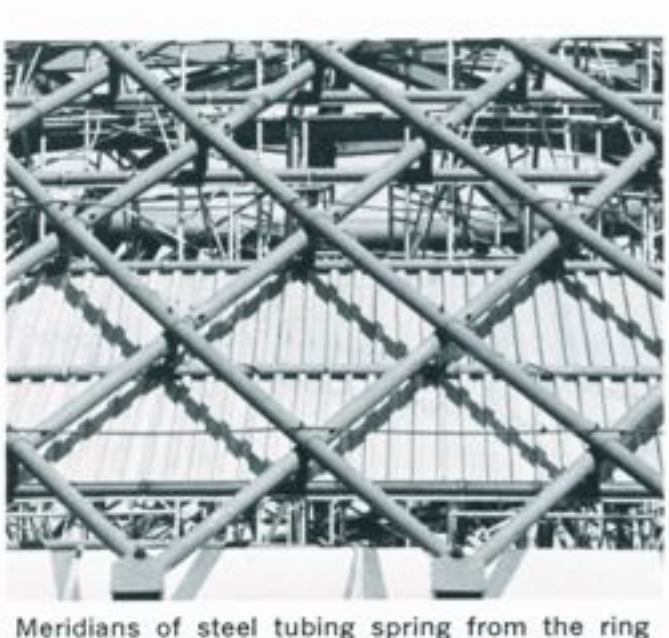
Four remarkable structures... all framed with steel...

fabricated and erected by **BETHLEHEM STEEL**



THE GENERAL ELECTRIC COMPANY PAVILION

An Elegantly Domed Carousel



Meridians of steel tubing spring from the ring girder (bottom), and support a lower course of horizontal hoops. Formed steel decking attached to the hoops was later covered with insulation, then plywood, then a continuous silicone rubber membrane.

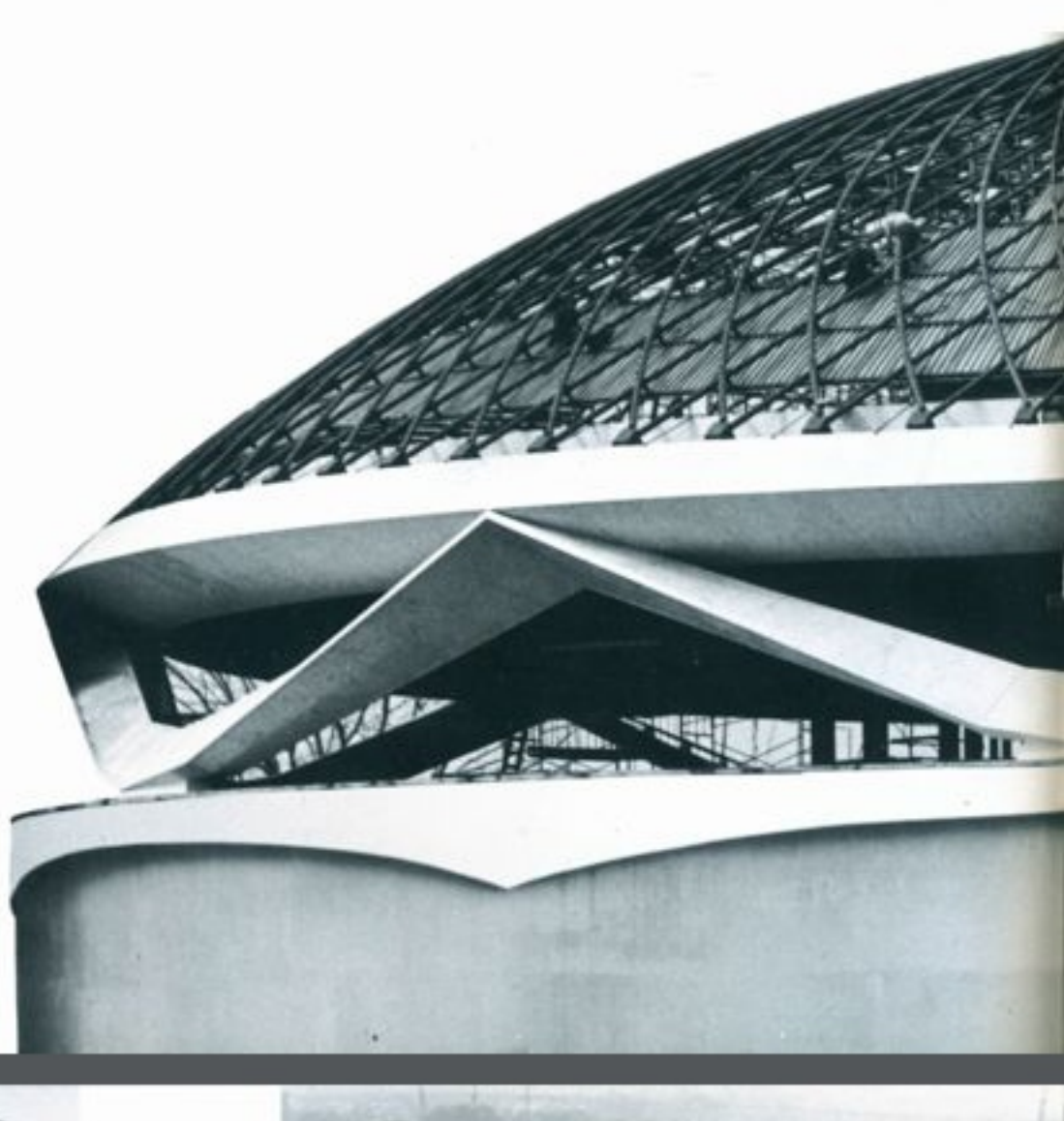
Here a decorative soffit is being applied to the all-welded ring girder, which is supported at eight points by sixteen sloping steel pipe columns, 18 in. in diameter, with 1-in. walls.

Photographs above and at right show how the pipe columns were encased in plywood forms to achieve the desired architectural effect.

This is basically a round structure with an open circular center well, topped with a unique lamella pipe dome springing from a compression ring girder at the third level. The most unusual functional feature is a circular, rotating section, mounted on the steelwork at the second level, permitting the six theaters to rotate to each of six fixed stages. The exterior wall of the theaters is exposed to view under the deep overhang of the dome roof. The over-all effect is that of a sparkling carousel, its motion simulated by the spiraling pipe members of the dome.

THE DOME

This "crowning glory" of the General Electric Pavilion can be described succinctly as a 194-ft-diameter (to outside of ring girder) lamella pipe dome with a rise of



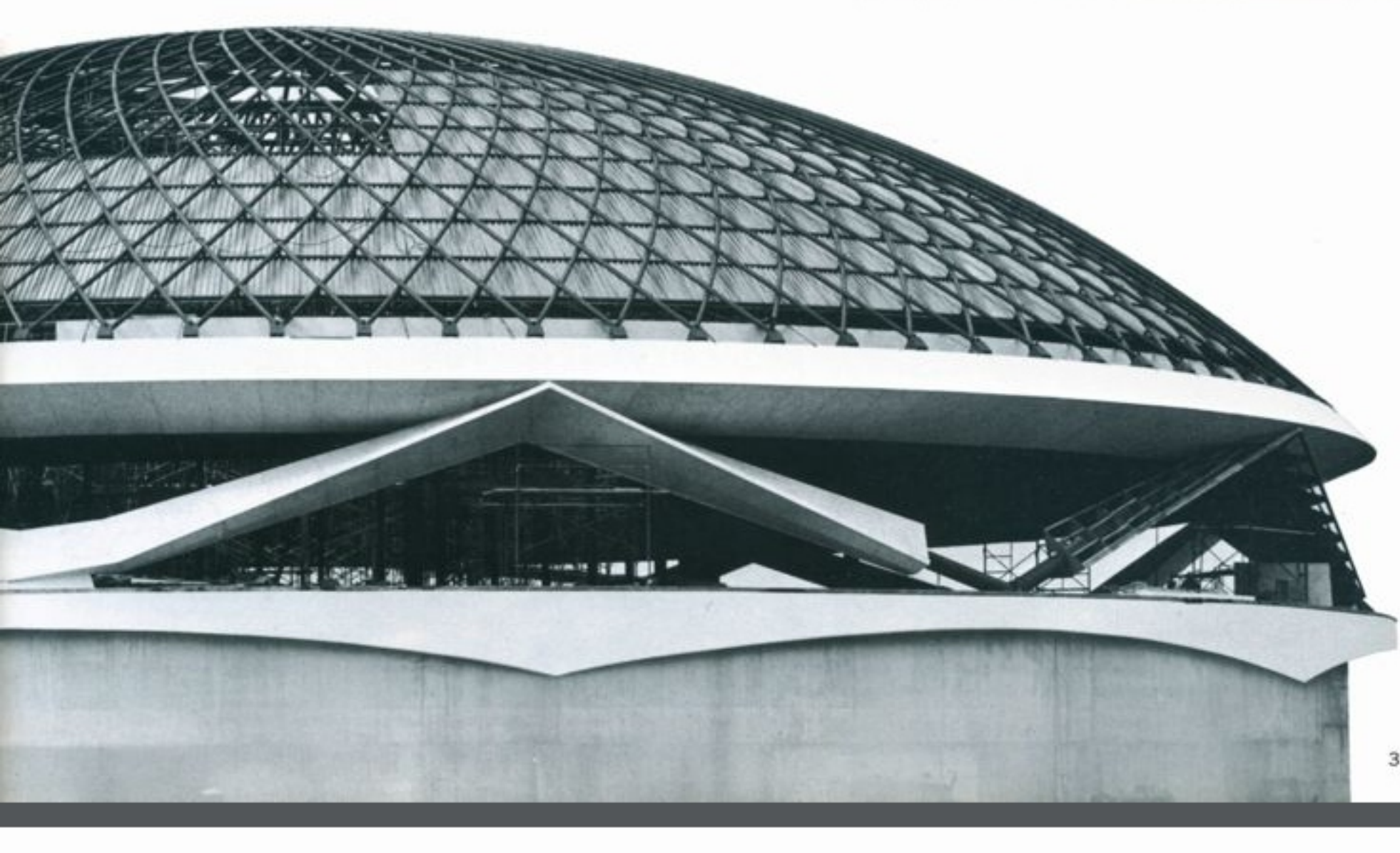
The pipe members of the lamella dome create an interesting visual effect. Each of the meridians follows a constant curve in a single plane.

In two levels, the meridians are pinned to the lantern ring (above) and to the ring girder (below), which take the thrust of the tubing.

40 ft. It has two courses of steel pipe from which are suspended pipe hoops which carry the roofing material. The lantern (compression) ring at the apex is 43 ft in diameter.

This framing system is extremely efficient. Weight of the lamella pipe and lantern ring is only 5.7 psf of roof area; 13.8 psf when the weight of the ring girder is added; and 16 psf if the hoops are included.

Of the structural steel in the building (about 750 tons), 120 tons are steel tubing. The 192 meridians required 16,000 lineal ft of 5-in. seamless tubing; the twelve concentrical hoops required another 6,000 ft of four-in. seamless tubing.



INTERIOR FRAMING

The first floor is enclosed in a 21-ft-high concrete foundation wall, much of which was later concealed from view by backfilling and landscaping. The wall is pierced by gracefully contoured entrance arches.

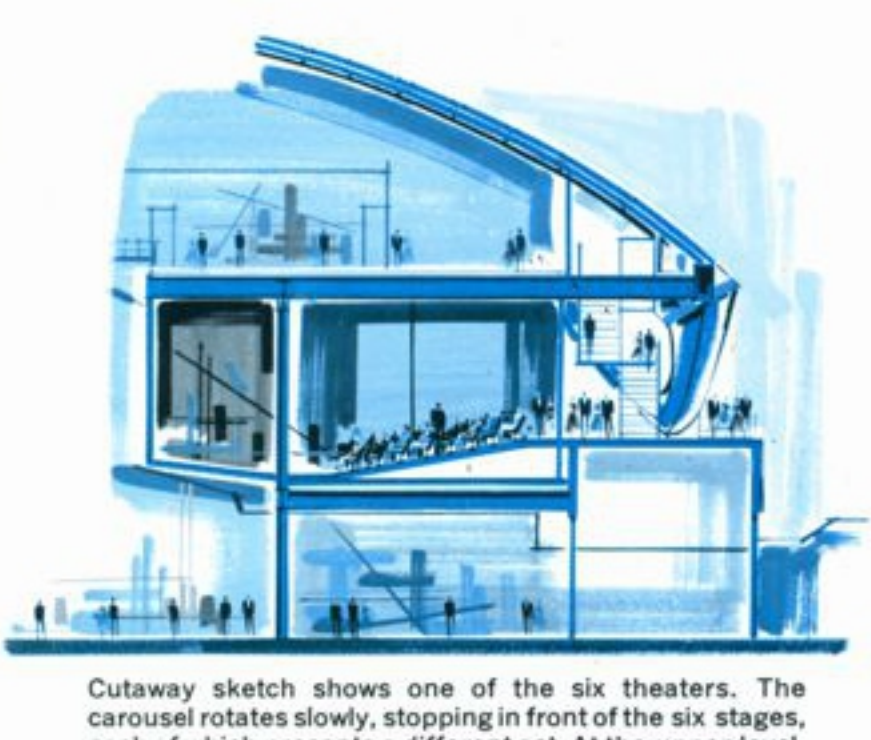
Eighteen-in. WF 45 radial girders are the main members supporting the theaters on the second floor. They are tied laterally with 8 WF beams, and are braced for additional rigidity with diagonal tie rods. At their "inside" ends, they tie into 24 WF 84 girders which form a twelve-sided polygon, supported on columns at each point, on an approximate radius of 54 ft from the vertical axis of the building. At their "outside" ends they are connected to the concrete floor system at the second floor level.

In plan, the lines of the radial girders are continued with 12 B 16.5 beams (typically) and extend inward with a slight upward slope. They support the floor of the exhibit area viewed from the theaters. Wide-flange hangers extending down from the third-level framing pick up the inner ends of these beams, and help support a steel-framed ramp which spirals down through the center well and is additionally supported by steel columns.

Also, an 11-ft-wide moving ramp, carried on steel beams, extends from a point on the second level some 80 ft across the diameter of the center well to an opposite point at the third level. It carries visitors leaving the theaters to additional exhibits above, after which they descend the spiral ramp.

At the third level, radial 27 WF 94 girders connect to the circumferential box girder and extend inward to support the top exhibit area. Inboard, these girders tie into a hexagon of 36 WF 300 girders, supported by six main columns. The radial lines are continued with 18 WF beams, from each of which are hung the 6 WF 15.5 hangers that extend to the second-level framing.

Interior steelwork, including the ring girder, was erected before the dome. The lower level of steelwork at left supports the moving theaters; the sloping beams at center support the stages; the upper level of steelwork comprises a large exhibit area.



Cutaway sketch shows one of the six theaters. The carousel rotates slowly, stopping in front of the six stages, each of which presents a different act. At the upper level, visitors view a show including films projected on the under surface of the dome (sprayed with asbestos for smoothness).

Note the braced supporting members for the carousel. Stage areas, at left, are elevated above this level and slope up toward the center well.

View from the second level. Steel decking for one of the stages is in the foreground. Framing for the circular ramp is cantilevered from vertical hangers. The ramp will bring visitors down to ground floor exhibits from which they proceed to the exits.

While it is true that all of the steelwork in the General Electric Pavilion can readily be disassembled at the Fair's end, and will have very substantial salvage value (the same, of course, is true of all structures described in these pages), the inherently specialized nature of the framing for exhibit areas makes it unlikely that the entire building would be re-erected elsewhere. However, the GE *dome* obviously could be re-used in any number of ways. Other than the welded box girder, all connections are pinned or bolted which, combined with the lightness of individual members, means that the dome can be taken down and re-erected at moderate cost.

Architect: Welton Becket and Associates; *Exhibit Design:* WED Enterprises, Inc.; *Structural Engineer:* Richard Bradshaw; *Mechanical and Electrical Engineer:* Syska & Hennessy, Inc.; *General Contractor:* Turner Construction Co.; *Steelwork:* Bethlehem Steel Company

Massive steel bents, all-welded except for the field-bolted knee braces, frame the entrance-exit arches.