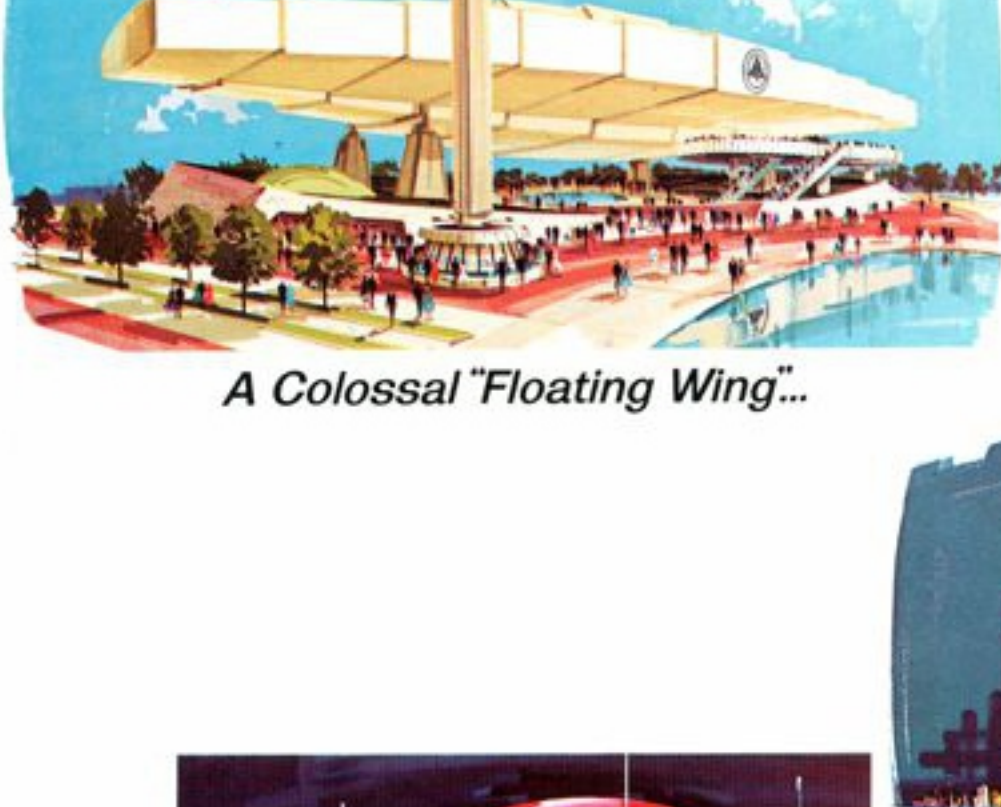


An Elegantly Domed Carousel...



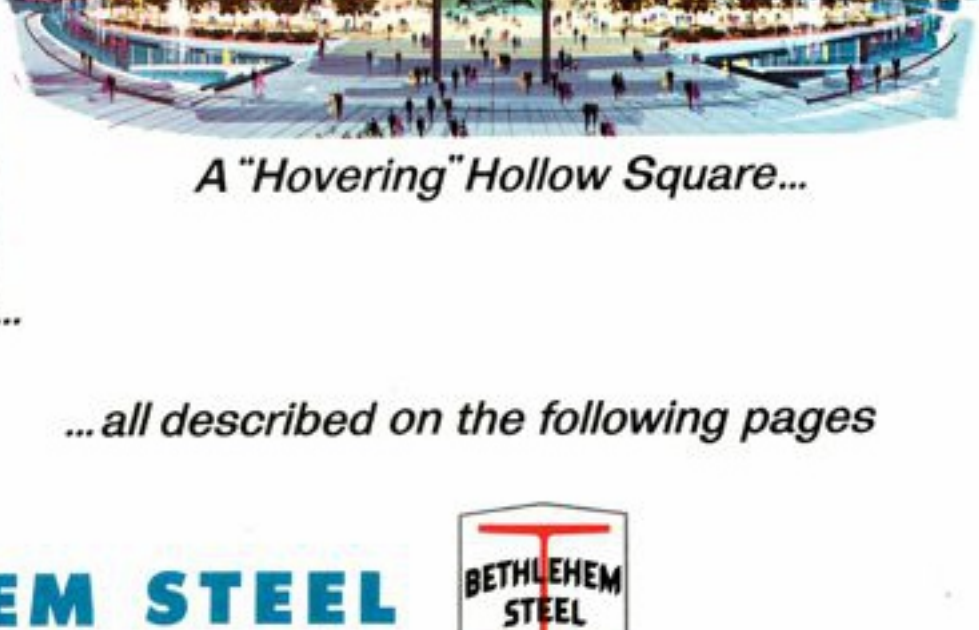
A Colossal "Floating Wing"...

World's Fair Preview

OCTOBER, 1963



A New Concept in Space Structures...



A "Hovering" Hollow Square...

...all described on the following pages

BETHLEHEM STEEL



Illustrations of World's Fair exhibits © 1962, 1963 New York World's Fair 1964-1965 Corporation



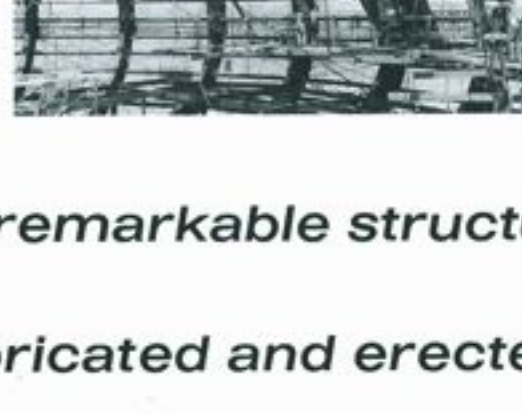
A lamella steel pipe dome crowns the General Electric Company Pavilion



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 UNITED STATES PAVILION

A "Hovering" Hollow Square

Functionally it's a building, but structurally it's a bridge. Or, more accurately, *four* bridges.

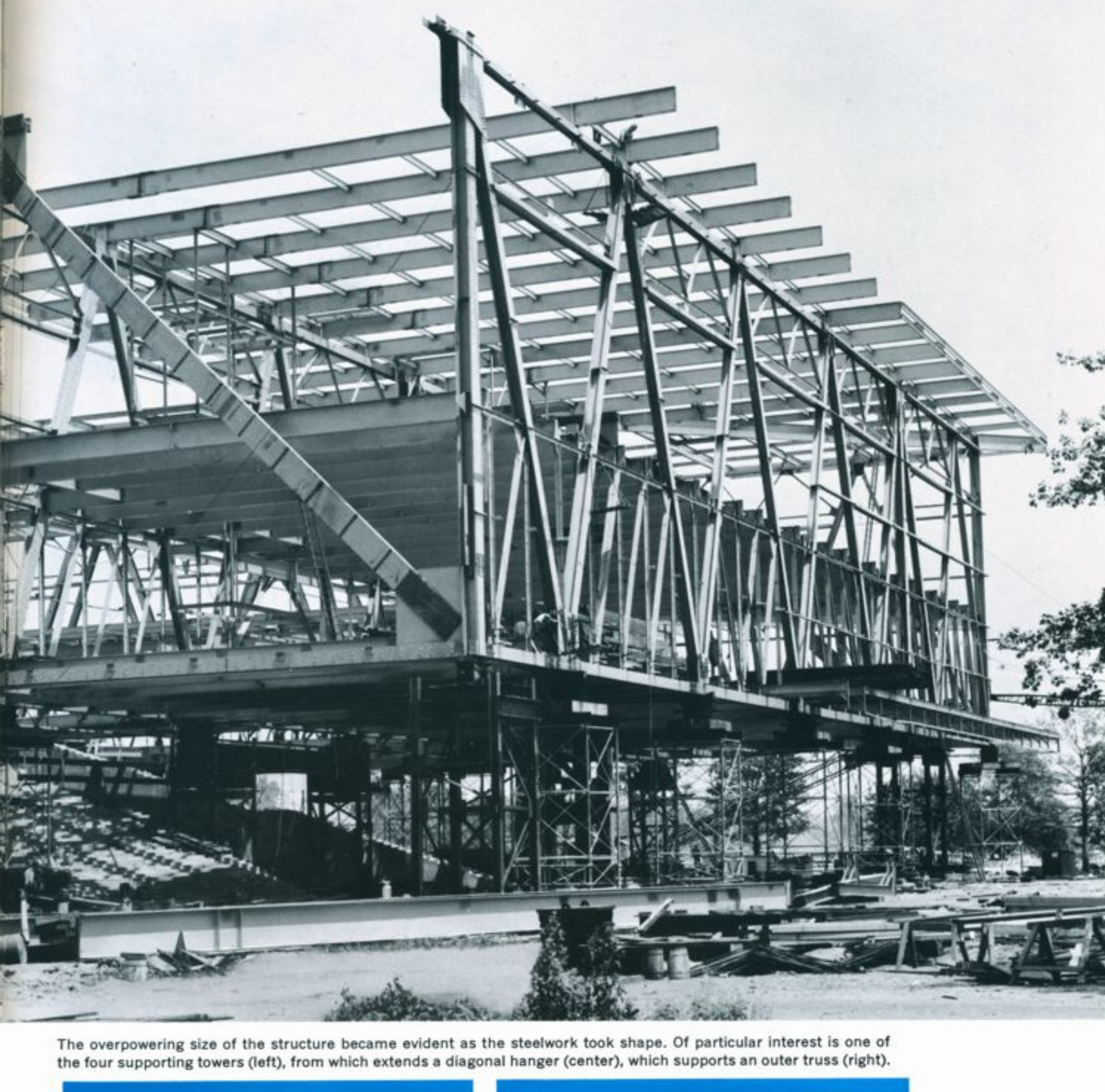
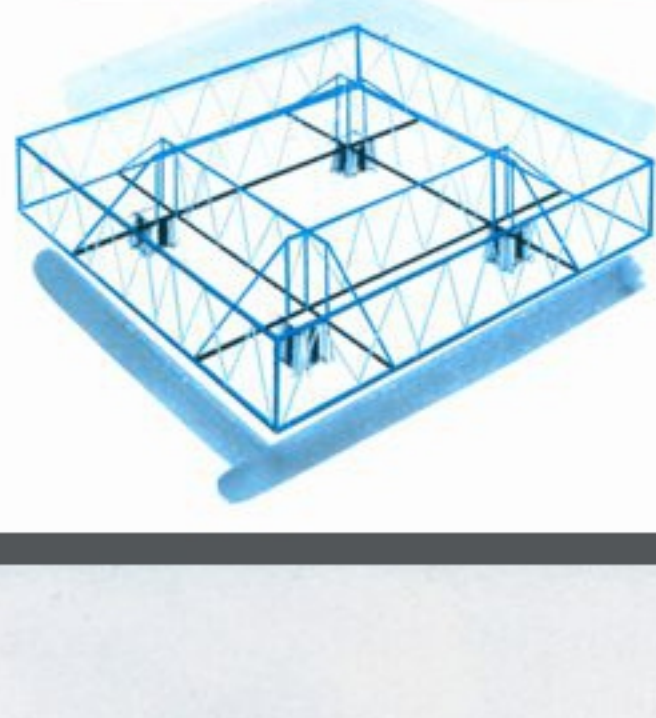
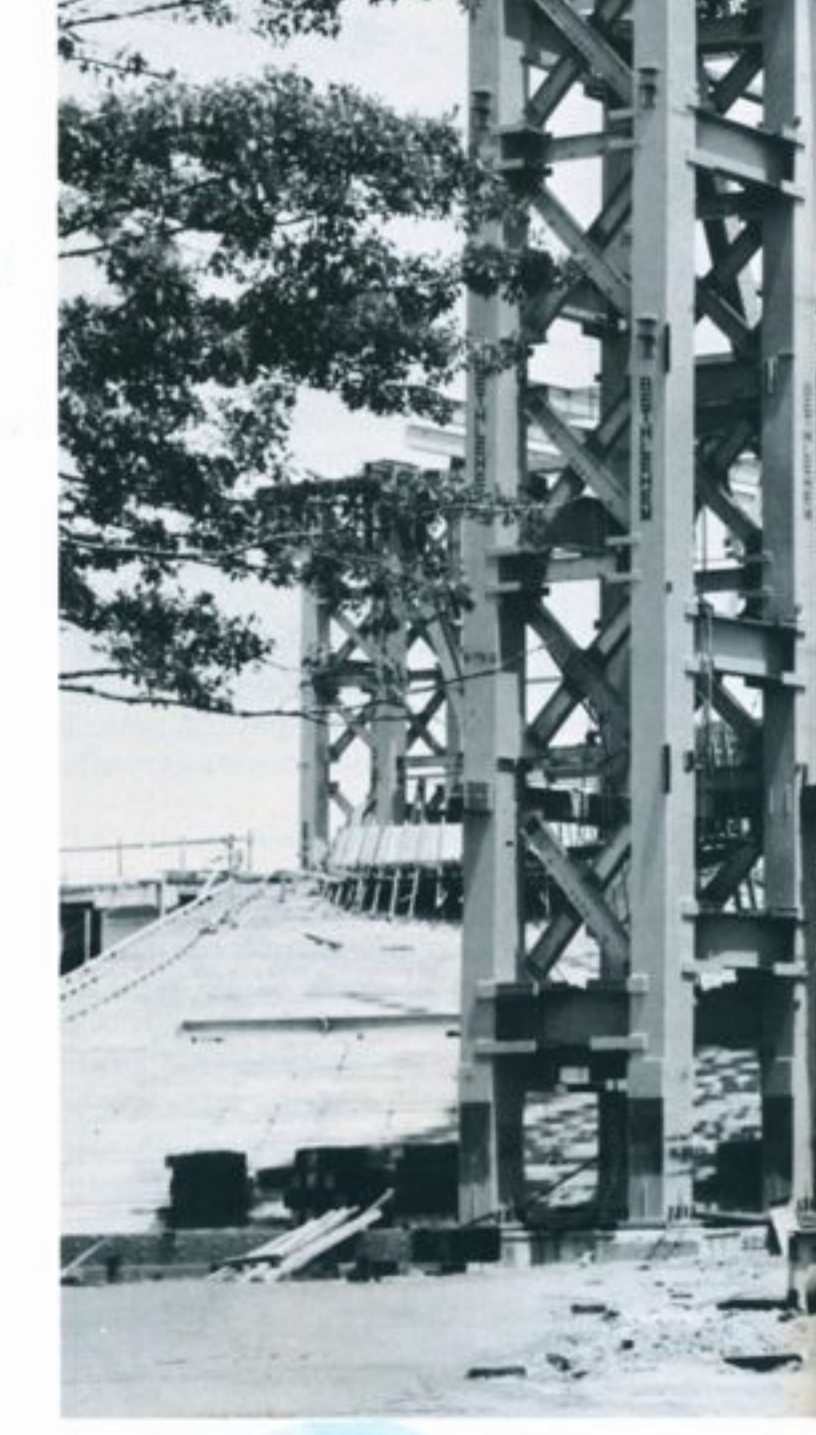
The sketch below illustrates the basic structural scheme. Essentially, it consists of four 310-ft-long inner trusses, spanning some 174 c-c of the supports, and extending out 68 ft to support the outer trusses. Both inner and outer trusses are 57 ft high, c-c of top and bottom chords.

Design of the outer trusses is evident in the photograph at right. The top and bottom chords, and the major vertical and diagonal members are 14 WF sections of various weights, while secondary horizontals, verticals, and diagonals are back-to-back angles up to 8 x 4 x 5/8 in. size.

The most unusual truss members are the hangers of the inner trusses (the massive diagonal shown at right), which are 81 ft long and are designed for a load of 3595 kips. They are made up of two 32-in.-wide by 2 1/2-in.-thick plates of A441 steel, with added reinforcement at each end, tying into massive (roughly 8-ft-sq x 2 1/4-in.-thick) A441 gusset plates top and bottom.

The United States Pavilion occupies a 4 1/2-acre site. It rises above a landscaped plaza, or podium, about 6 ft above grade. Visitors proceed under the structure, and up escalators to a court atop a truncated pyramid, from which point they cross to the lower level of the building by means of 39-ft-long steel bridges. Exhibits illustrating the exhibit theme, "Challenge to Greatness," are located on the first floor, along with an auditorium, VIP reception rooms, and staff offices, all of which occupy one entire segment of the first floor. A ride transports visitors through the second floor exhibition areas.

Simplified sketch of the basic structural scheme—eight giant trusses.



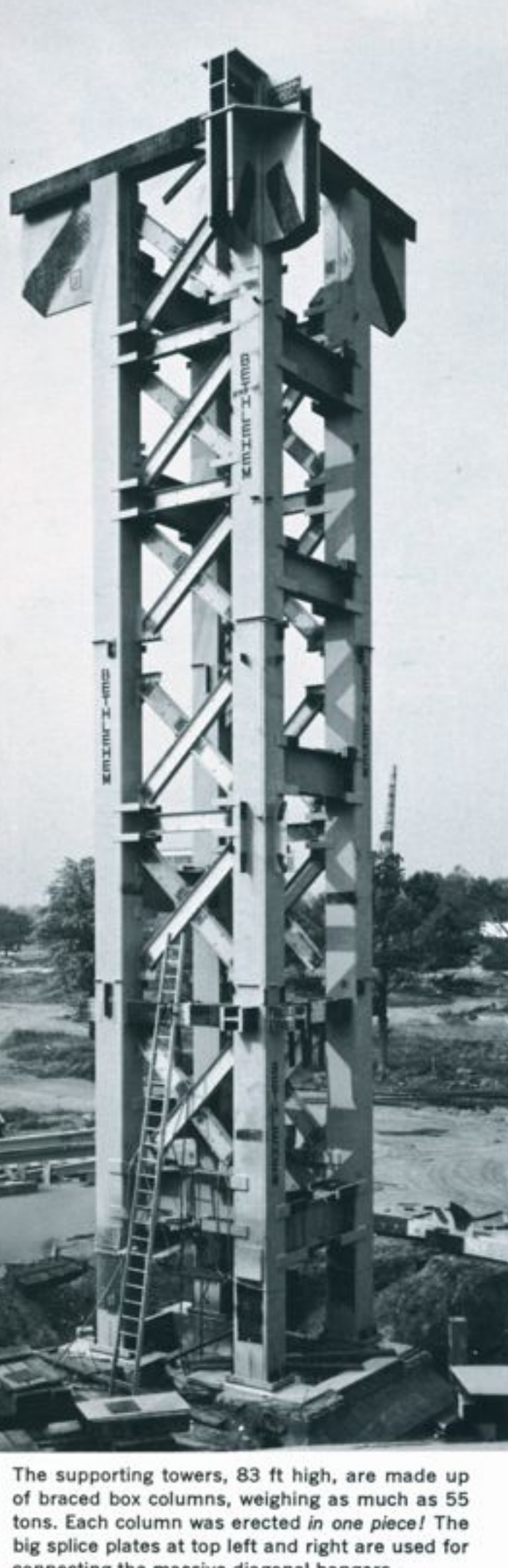
The overpowering size of the structure became evident as the steelwork took shape. Of particular interest is one of the four supporting towers (left), from which extends a diagonal hanger (center), which supports an outer truss (right).



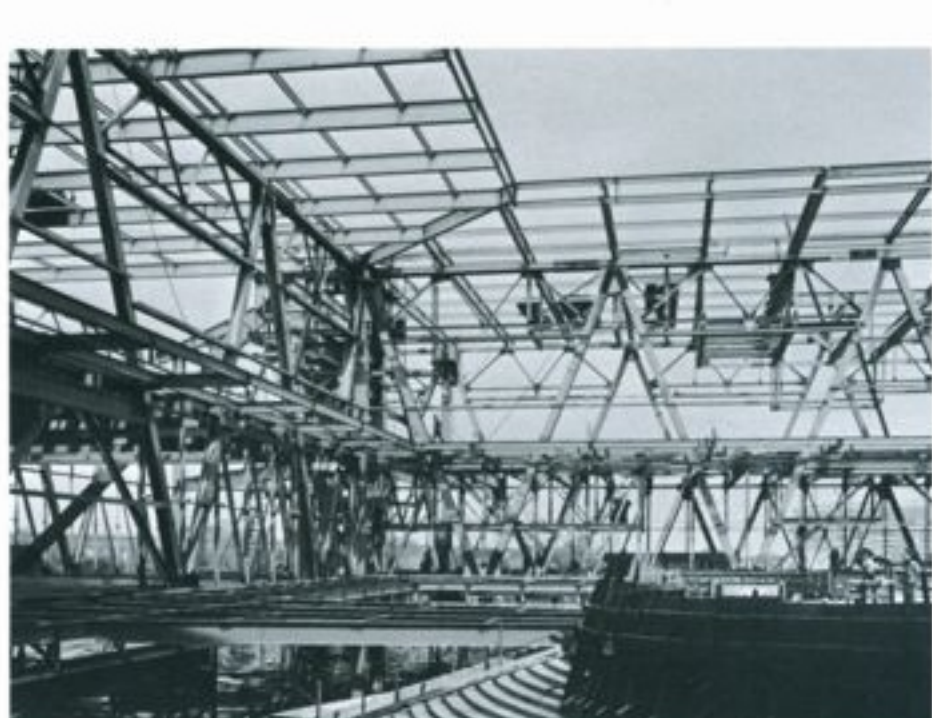
Outer truss



Inner truss



The supporting towers, 83 ft high, are made up of braced box columns, weighing as much as 55 tons. Each column was erected in one piece! The big splice plates at top left and right are used for connecting the massive diagonal hangers.



View from inner court during steel erection.

THE SUPPORTING TOWERS

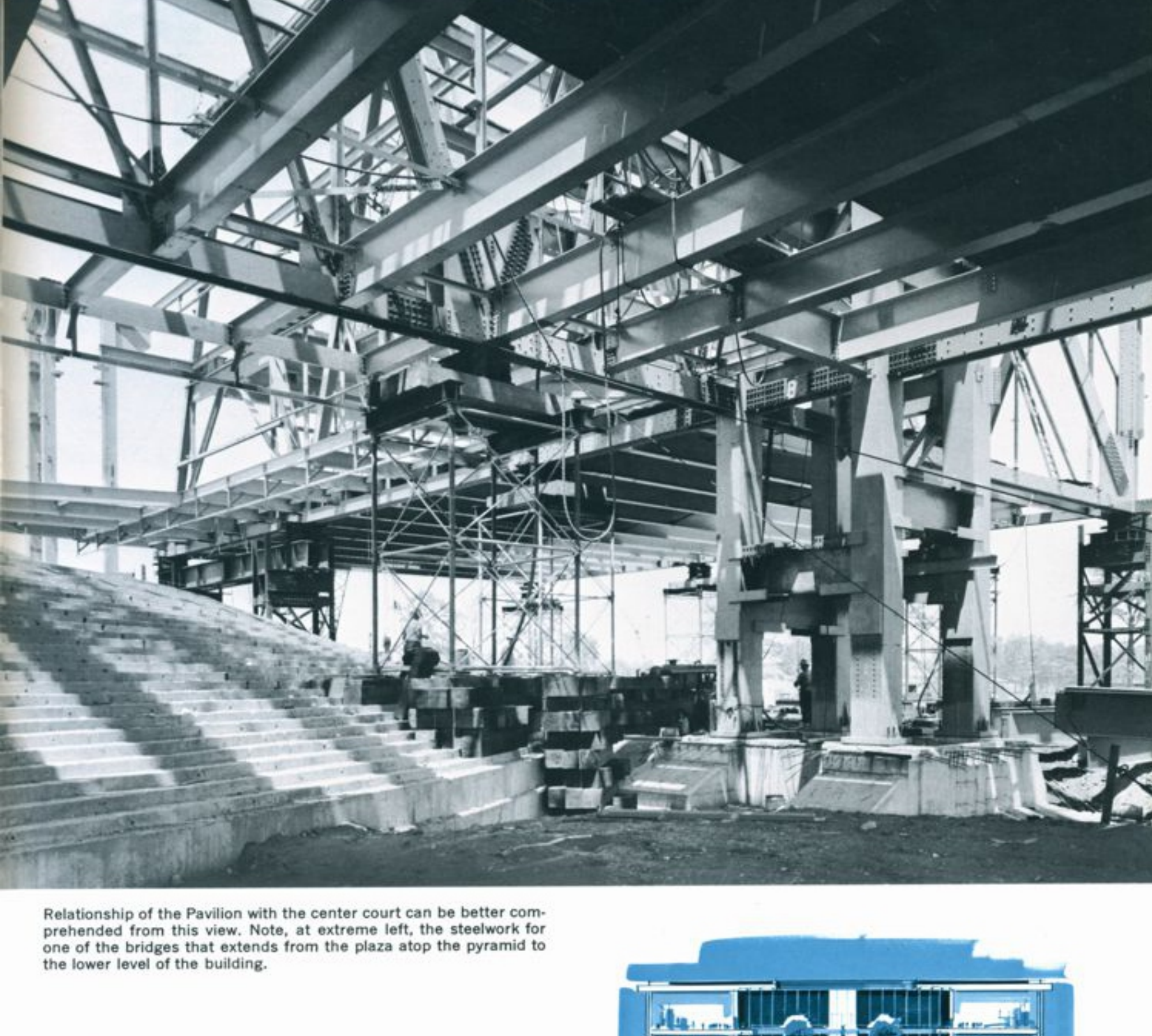
The structure's four supports, too, are of major interest. Each is a tower, comprising four individual box columns on 11-ft centers, tied together with heavy bracing. Three of these cores form stairwells, while the fourth contains an elevator shaft. The columns are of welded plate construction, about 26-in. square, using plates as thick as 2 3/8-in., and with additional reinforcing plates.

Steel supports saved 20 per cent of the total weight. Originally, the structural design specified that the column bearings would be located just below the first floor level, where they would stand on reinforced concrete piers some 25 ft high, and nearly 25 ft sq in plan. However, the poor substructure conditions made it necessary to lighten the total structure as much as possible. Re-examination disclosed that by simply extending the steel columns another twelve feet down, thus eliminating about one-half of the reinforced concrete, the total dead load was reduced by some 20 per cent!

To provide for leveling the gigantic structure, each tower is equipped to receive eighteen 300-ton-capacity hydraulic jacks.

THE FLOOR FRAMING

The framing spanning 66 ft between the inner and outer trusses is also of extremely heavy construction, especially at the deeply cantilevered corners. Wide-flange floor beams vary from 16 through 36 in., both at this level and at the second floor, while roof beams range from 14 in. through 36 in. Both floors and the roof are concrete slabs over 3-in.-deep formed galvanized steel decking. Floor-to-ceiling height of the lower level is 18 ft; second level is 23 ft.



Relationship of the Pavilion with the center court can be better comprehended from this view. Note, at extreme left, the steelwork for one of the bridges that extends from the plaza atop the pyramid to the lower level of the building.



The United States Pavilion is operated by the United States Commission, Department of Commerce, Norman K. Winston, Commissioner; Construction Supervision: General Services Administration; Architect: Charles Luckman Associates of New York and Los Angeles; Exhibit Design: Usher-Follis, Inc.; Cinema Camera Corporation; Structural Engineer: Severud-Elastad-Krueger Associates; Mechanical and Electrical Engineer: Slocum & Fuller; General Contractor: Del E. Webb Corp.; Steelwork: Bethlehem Steel Company