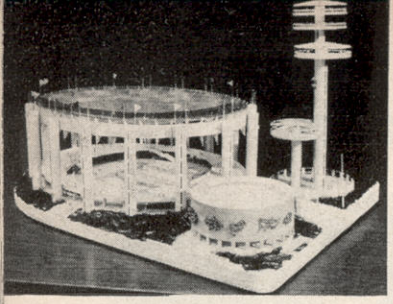
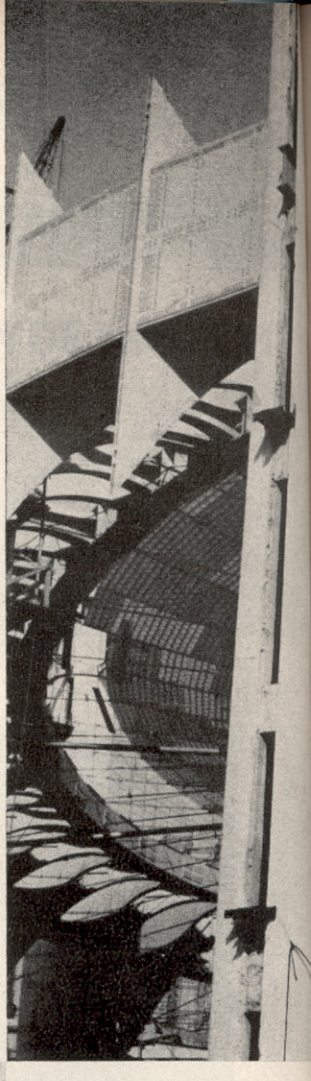


They Built the Roof on the Ground

New York State's Fair pavilion is a mighty wheel, supported by slim towers

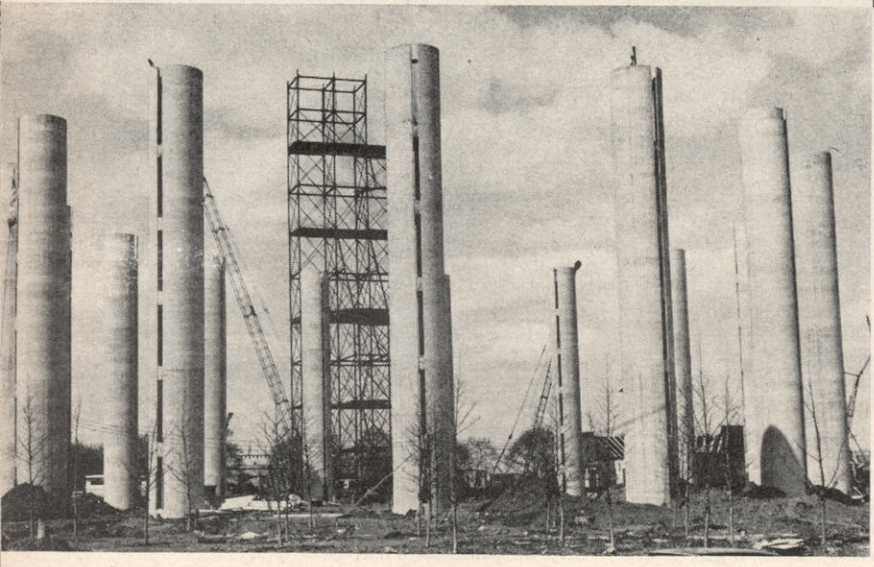
By Henry B. Comstock



BUILD a lopsided bicycle wheel so big its 2,000-ton rim would almost girdle a football field. Assemble it horizontally on the ground. Then snug up its 96 spokes—each a 2½-inch cable.

Next, lift the wheel 100 feet and support its rim on brackets projecting from 16 concrete columns. Finally, cover it with multicolored plastic panels.

That's how they've constructed the Tent of Tomorrow for the New York State pavilion at the coming World's Fair. Architecturally, cable-suspension roofs like this may be the biggest breakthrough since elevators spawned the skyscraper. They need no interior supports, weigh only nine pounds per square foot, vs. 80 for a conventional roof.



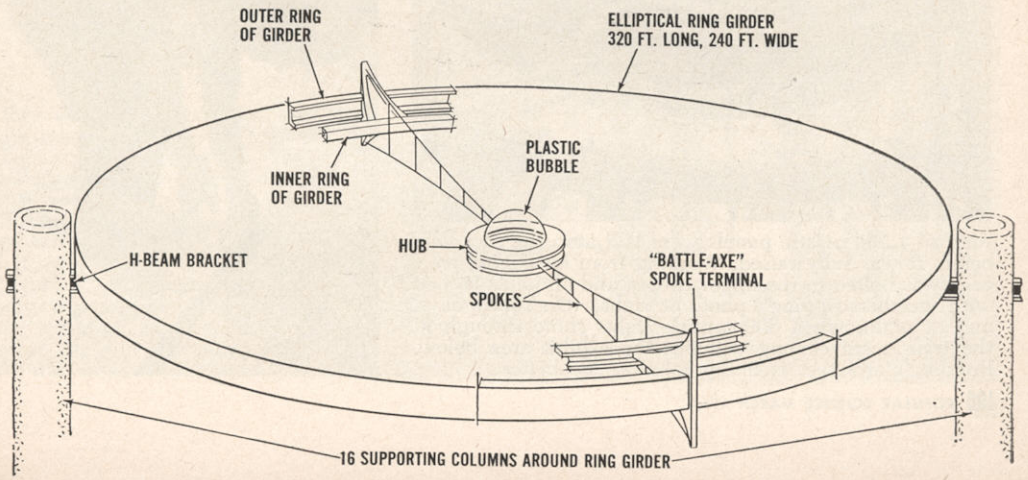
How they raised

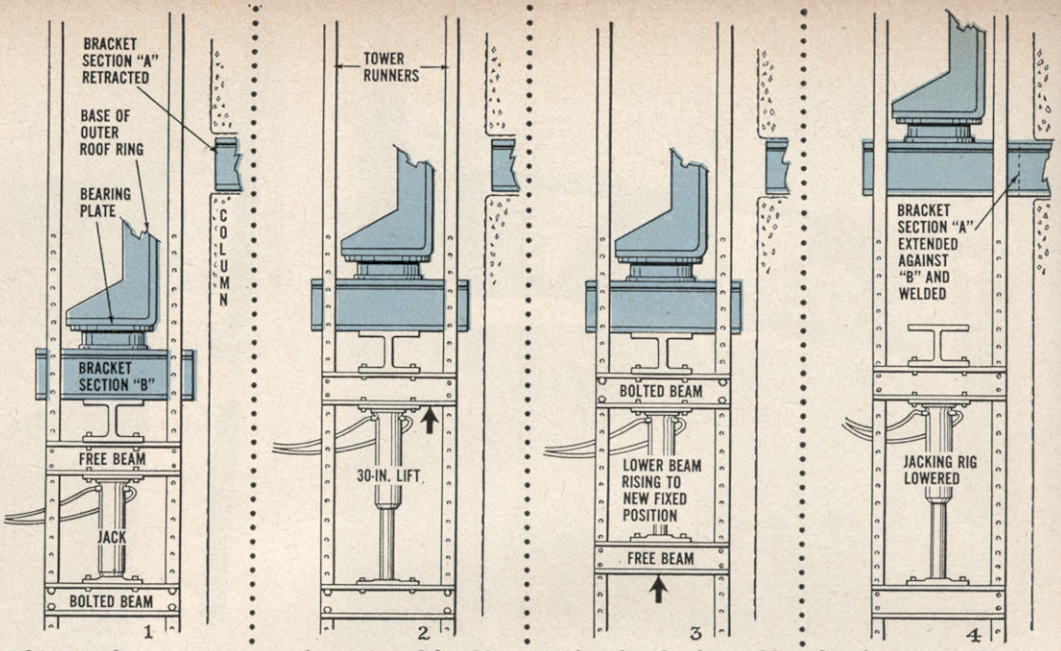
Before prestressed cable roof of Tent of Tomorrow was built, 16 concrete columns were formed by the slip-mold method. Standing more than 100 feet high, they encompass a 240-by-320-foot oval area. These are the sole supports for the huge steel-and-plastic canopy. Scaffolding behind them is for adjacent observation towers.

CONTINUED

the roof for the Tent of Tomorrow

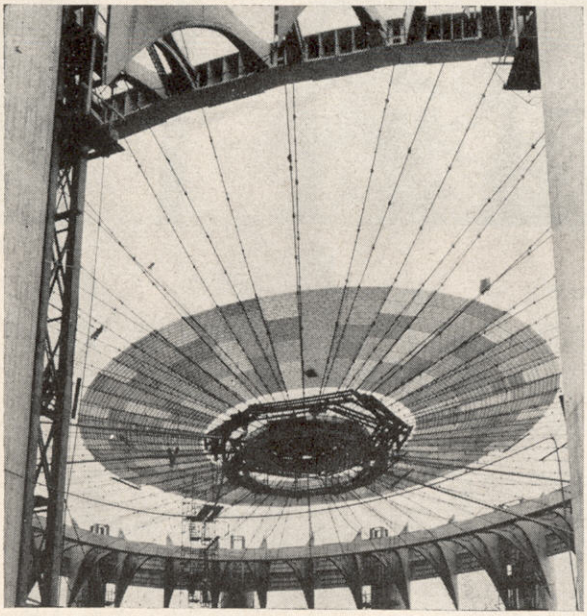
"Bicycle-wheel" roof consists of girder in shape of 240-by-320-foot ellipse, with "battle-axe" braces, to which cables radiate like spokes from hub at center. It looked like this before plastic panels, laid over the 2½-inch cables, completed the roof and made it weather-tight.

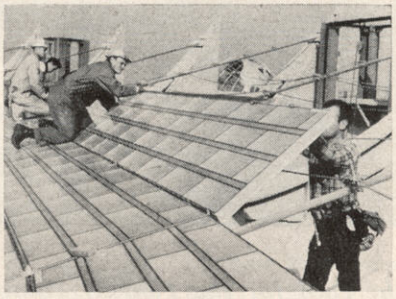




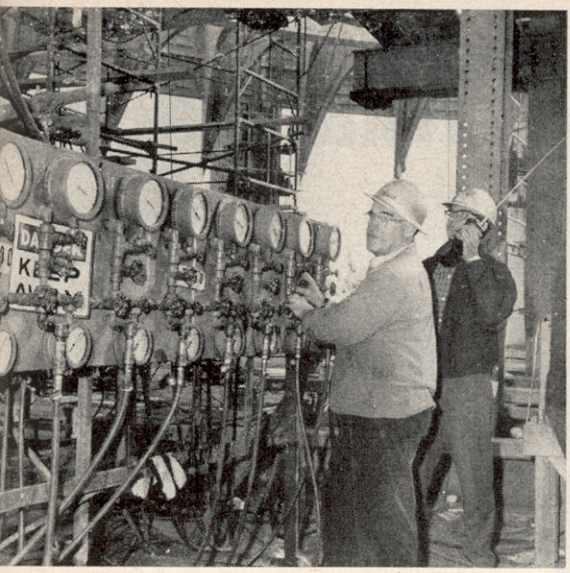
Thirty inches at a time, roof was raised by 32 hydraulic jacks in temporary four-sided towers, alongside permanent concrete columns. In last drawing, roof has been fastened at planned 100-foot height, by welding bracket section beneath it to similar section extended from column. Jacking rig, its work done, is lowered, and temporary tower can now be removed.

Giving the cable-suspension roof a coat of many colors

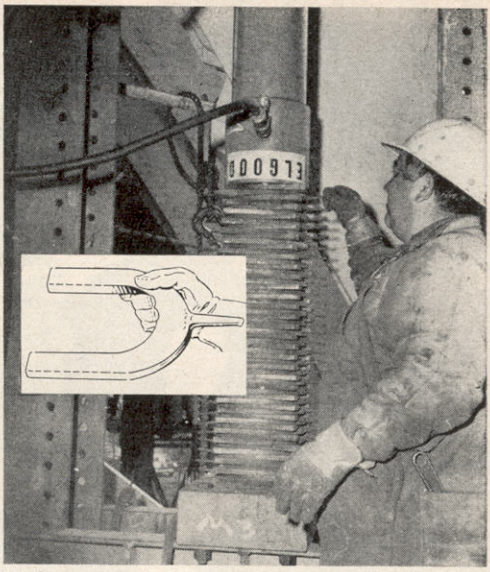




First of 1,500 plastic panels were laid atop the roof long before it was fully raised. Working from tensioning ring, each was bolted to the upper cables, and all joints lapped with weatherstripping (photo at right). On sunny days, and at night, when 800 topside lights shine through it, the translucent canopy will tint the exhibit area below. Building's architect is Philip Johnson Associates.

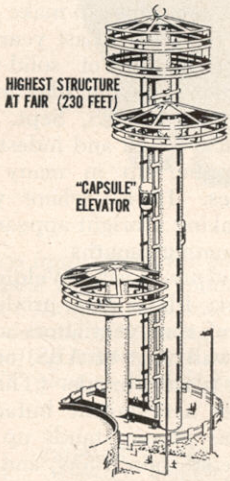


Touchy job of keeping roof constantly horizontal was controlled from this hydraulic nerve center. Walkie-talkies kept the operators in continuous contact with tower-crew foremen.



Had any part of hydraulic system failed, jacks could not have dropped roof as much as an inch. Horseshoe-shaped stops (sketch), slipped around pistons, provided a safeguard.

New York State lookouts will be the highest at the Fair



Two of three observation towers, taking shape beside Tent of Tomorrow, rise above it. Their radial roof beams will double as supports for ring-shaped decks suspended below. Concrete crossarms flanking tower at left in photo hold guides for "capsule" elevators. Lapping observation decks will let one car serve all three towers. Another car will run express only to the highest platform.