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OP-ED CONTRIBUTOR

The Age of Concrete

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COME April, the first tenants may finally be able to move into Dubai's Burj Khalifa, now the tallest building in the world. Despite a series of setbacks since its ostensible opening two months ago, including the closing of the observation deck, the tower has already prompted an exuberant proliferation of record-breaking statistics: it soars more than half a mile high, stands twice the height of the Empire State Building, boasts views that reach 60 miles, etc. But all the hoopla misses two other symbolic milestones that should enliven the history books. Namely, the [Burj Khalifa](#) is primarily residential and its structural frame is reinforced concrete.

Why are these two facts so important? The pursuit of maximum altitude is a major technological undertaking, requiring extraordinary economic investment, significant innovations in materials and a high tolerance for risk; as we survey the monuments of architectural history, tall structures provide remarkable insights about the aspirations of the societies that created them.

Think back to the Middle Ages. The soaring cathedrals of Notre-Dame de Paris and Chartres were awe-inspiring landmarks in stone. Gothic churches maximized the structural capacity of available materials, transforming heavy rock into delicate, lofted skeletons enclosing voluminous spaces. Pilgrims to these edifices would no doubt have been awed by their apparent defiance of gravity, and moved by the breathtaking spiritual power conveyed by the churches' vast, light-pierced interiors.

Under construction from 1192 to 1311, [Lincoln Cathedral](#) in England was considered the first building to exceed the height of the Great Pyramid at Giza. After the partial destruction of the previous cathedral by an earthquake in 1185, the bishop of Lincoln, St. Hugh, had ordered a colossal rebuilding of the structure in local oolitic limestone, making full use of recent engineering innovations like flying buttresses and pointed arches.

The cathedral's master builder also experimented heavily with ribbed vaulting; so-called crazy vaults were extended upward like delicate palm fronds at a dizzying height. This architecture was perfectly matched to its use, with stone transfigured into filigree that enclosed a sublime

sanctuary. It was the world's tallest building for two and a half centuries, until its central spire collapsed in 1549.

Now jump to the threshold of the 20th century. With the complementary technological developments of the steel frame and elevator, the ability to stack floor plates at heights inconceivable in stone constituted an explosive return on land investment.

For the first time, the tallest buildings in town were no longer churches. The skyscrapers that shot up in Chicago and New York were "cathedrals of commerce," abounding in office space and brimming with enterprising workers.

The Empire State Building was constructed at a breakneck pace — 410 days — in order to beat the Chrysler Building and 40 Wall Street for the title of tallest building in the world. When the skyscraper opened in 1931, it was a sensational and unprecedented marriage of steel and commerce, and it would retain its title as tallest for four decades. Its two million square feet of office space still accommodate about 21,000 employees working for 1,000 companies; the tower has its own ZIP code.

So what of the marvel recently constructed in the Middle East?

From a technological standpoint, it's profoundly impressive that a reinforced concrete frame has outperformed the steel of Taipei 101 — the previous record holder for height — by 1,050 feet. This achievement suggests a new era in structural engineering: the compressive strength of concrete has tripled in the last four decades, allowing concrete structures to be thinner, lighter and far, far taller.

Also notable is the fact that the world's tallest building is dedicated entirely to opulent residences and various retail, entertainment and commercial functions. The Burj Khalifa amounts to a kind of vertical city for the affluent.

Because the Burj Khalifa has arrived as the global economy lies smoldering in ruins, it's tempting to view it as an exceptional antique, the product of a culture that's already disappeared. But new highs in architecture don't always coincide with the health of the market — the Empire State Building was, of course, built during the Depression. And great innovations in materials and structures have the power to endure, regardless of the circumstances under which they were born.

If one society worshiped God in stone, and another venerated enterprise in steel, it must say something that we have now been able to reach so high with our most common building material: concrete.

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