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“The Cornerstone and Abode of Our National Progress”:

New York City’s Skyscrapers as an American Story of Innovation and Teamwork

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Imagine this: it is July 8th, 1900, 5:03 pm; and a man named Grant just finished his day working at the New York Stock Exchange. He walks down the stairs from the top floor, and emerges from the building where the warm sun hits his face. He looks back at the Stock Exchange Building and admires its Victorian architecture but has heard rumors that a bigger and better Stock Exchange Building was soon to replace the current building. Imagining this new building makes him excited for what is to come, for the building is to symbolize America's strength in the global financial market. To begin his commute home, he walks through the somewhat crowded streets to the Brooklyn Bridge, where he rides the elevated railway across the bridge and to his house.

Now picture this same day, but in 1931. The Stock Exchange Building is much taller. Grant needs to take an elevator down to the ground floor when he leaves work. He emerges between the tall Corinthian columns where no sun hits his face. The sun is instead blocked by several office buildings that tower hundreds of feet into the sky. As he walks to the nearest subway to take him across the East River and to his home in Brooklyn, he listens to the echoing sounds of rush hour and focuses on not bumping someone. In the past fourteen years, he endured a war, but came home to an economy that brought him, his wife, and their newborn daughter economic security. But today, he questions the security of his family's finances. As he walks to the nearest subway station, he looks to the east and sees New York City's newest treasure, the Empire State Building. He is reminded of America's prestige and continual advancement and smiles to himself because he feels America will recover from this economic slump and continue to rise to unprecedented heights.

This paper seeks to answer what contributed to the rise of New York City's skyscrapers to unprecedented heights. Prior research has looked at the history of skyscrapers, but often only a singular characteristic or issue is considered. After Chicago's Home Insurance Building became the first skyscraper in 1885, other American cities adopted the idea of expanding vertically. New York City was one of those cities that embraced this revolutionary concept. Skyscrapers are generally defined as being over ten stories tall and having a steel structural frame. New York City would build more and taller skyscrapers than any other city in the world between 1889, when the city's first skyscraper was built, and 1931, when the Empire State Building was finished. What unfolded between these years is a story an uniquely American story.

The story begins with how the environment and conditions of America were improving in the late 19th century. An area of focus for historians has been the technology used to build skyscrapers. This technology includes building materials and mechanical equipment with an emphasis on the development of steel.¹ The consequences of bigger and more advanced construction projects forced builders to rethink how they organized themselves. However, builders would have nowhere to build these tall, steel-structure buildings if the economy did not demand a need for more office space. Historians of New York City have explored how the rise of big business in the late 19th century impacted the city.² The growing businesses needed a place to locate their headquarters, and skyscrapers in New York City became their best economic option.

¹ For more information see Thomas Misa, *A Nation of Steel: The Making of Modern America 1865-1925*, (Baltimore: The Johns Hopkins University Press 1995), and Thomas Leslie, "Built Like Bridges: Iron, Steel, and Rivets in the Nineteenth-century Skyscraper," *Journal of the Society of Architectural Historians* 69, no. 2 (June 2010): 234-261.

² For more information see Robert Fogelson, *Downtown: Its Rise and Fall, 1880-1950* (New Haven: Yale University Press), 2001. And Jason Barr, *Building the Skyline: The Birth and Growth of Manhattan's Skyscrapers* (New York: Oxford University Press): 2016.

The story continues with the public telling the narrative of the impact skyscrapers had on New York City. New York City had the perfect environment for skyscrapers, and as a result, skyscraper construction became a common sight for New Yorkers. The initial lack of a strict building code allowed for skyscrapers to be built with no height restrictions or design requirements. Newspaper articles and builder magazines reveal a public debate over whether the skyscraper benefits America and its people or if they are a “menace” to America’s greater well-being. The public praised it for how it stimulated the business industry and for its symbolism. They also expressed concerns over public health and safety, as well as building aesthetics and economics as Robert Fogelson describes in *Downtown*.³ The concerning consequences of skyscrapers would lead New York City to pass the 1916 Zone Ordinance. The public conversation continued, but the voices that attacked the skyscraper became whispers, and praise and excitement for the future of skyscrapers and America became shouts.

The story concludes with the Empire State Building as America’s exclamation mark. Researchers are most impressed with how the Empire State Building was built so tall and in such a short period.⁴ Evidence strongly points to builder collaboration as the answer to this question, but I further explore how the building of, and the finished Empire State Building itself, became symbols of America. **The rise of skyscrapers in New York City is a story about how the construction industry’s innovation led them to create something that no other nation had done. Technological inventions, such as steel and elevators, and a growing economy forced builders to create a new system of construction, one dependent on teamwork. In finding a**

³ Robert Fogelson, *Downtown: Its Rise and Fall, 1880-1950* (New Haven: Yale University Press 2001), 175.

⁴ For more information see Donald Friedman, “A Story A Day’: Engineering in the Work,” In *Building the Empire State*, edited by Carol Willis, 33-46, (New York: W.W. Norton & Company), 1998.

way to build to unprecedented heights, the men of the construction industry worked through health, economic, and aesthetic concerns and a zoning ordinance to create an American style. In the end, Americans built an achievement that symbolizes the nation's power and prestige and it stands as an example of how it is possible to reach even the tallest of challenges with teamwork.

An Evolving America

The developments that came because of the Industrial Revolution led America to evolve into an innovative nation beginning in the second half of the 19th century. Technological inventions and big business together inspired unprecedented skyscrapers that transformed city life for Americans. Charles Glaab and Theodore Brown in their chapter on “Urban Technology” in *A History of Urban America*, credit technological changes for American cities’ drastic increase in population between 1869 and 1910. They write, “technological changes...altered the social and physical environment and the way people were conditioned by that environment.”⁵ Technological developments incentivized buildings to be taller, safer, and more frequently built, changing how Americans were living in cities by the early 20th century. The increase in office space that skyscrapers provided made the landscape of cities an optimal location for businesses.

The most important technological development that allowed for taller buildings is steel. Buildings were originally built with bricks or cast iron, but their heavy weight limited their height. When the Bessemer Process transformed steel into a light, flexible, and durable material that could be mass produced at a low cost, the question was raised of how tall buildings could be

⁵ Charles Glaab and Theodore Brown, “Transformation and Complexity: An Urban Technology,” 134, in *A History of Urban America*, 3rd ed., (New York: Macmillan Publishing Co.) 1983.

built.⁶ Well-known skyscraper builder, William Starrett, wrote *Skyscrapers and the Men Who Built Them* in 1928. A chapter of his book describes how the Bessemer Process was “the final victory to steel” which “permitted an upward revision.”⁷ Steel was a catalyst for skyscraper construction that triggered ambitious engineers to develop something new. Starrett states, “Construction and steel production are inseparably linked; neither would have been possible without the other, for the demands of the one furnished the incentive for the colossal scale upon which the other has been developed.”⁸ Steel presented Americans with a new opportunity to build something unprecedented since Europe had not begun to build buildings above ten floors. A 1921 advertisement from a steel production company states, “The crowning achievement of past endeavor is the mighty industry that has made steel, not a weapon of destruction, but a product of constructive force enabling our nation to rise to a conspicuous place among the world’s power.”⁹

As steel allowed buildings to grow taller, engineers were challenged to develop a piece of machinery that would transport people to these new heights safely, comfortably, and efficiently, all while keeping cost low and not occupying too much floor space. Elisha Otis invented the first elevator in 1853, but this was not the final design, and the elevator would continue to develop and improve into the 20th century. Starrett states, “elevator manufacturers were keeping one jump ahead of the rising sky-line.”¹⁰ The materials and equipment needed to design and

⁶ For more information on the development of steel see Misa, Thomas Misa, *A Nation of Steel: The Making of Modern America 1865-1925*, (Baltimore: The Johns Hopkins University Press), 1995.

⁷ William Starrett, *Skyscrapers and the Men Who Built Them* (New York: Charles Scribner’s Son, 1928), 41.

⁸ William Starrett, *Skyscrapers and the Men Who Built Them* (New York: Charles Scribner’s Son, 1928), 161-162.

⁹ American Sheet and Tin Plate Company, *The Architectural Forum*, July 1921.

¹⁰ William Starrett, *Skyscrapers and the Men Who Built Them* (New York: Charles Scribner’s Son, 1928), 42.

manufacture the elevator all became possible with the developments of the Industrial Revolution. Before the outbreak of skyscrapers in the 20th century, Americans were already taking note of the impact elevators were having. The author of an article in *The Real Estate Record Association* magazine writes, “The effect of this development of the passenger elevator upon modern construction has been revolutionary.”¹¹ The elevator was an innovative machinery that evolved as building heights got taller because elevator engineers were challenged to improve the speed, space, and safety of elevators. Two elevator advertisements show how improvements were made over time. The first advertisement was published in 1890, and the author’s objective was to prove that the electric elevator ensures “safety, simplicity, efficiency the absence of noise, smell, smoke, ashes, and heat and freedom from liability to damage by frost or by careless manipulation.”¹² In 1921, an advertisement for the “New Micro Leveling Elevators” stated that these elevators were, “the most important developments in the history of vertical transit.”¹³ The Micro Leveling Elevator design made elevators cheaper and made the ride more comfortable and safer for passengers. The author concludes that purchasing a Micro Leveling Elevator would, “give the owner the advantages of new economies in operation and a new security of building investment.”¹⁴ The first elevators raised public concerns of safety, but by the 1920s, elevators were being promoted as a necessary apparatus that would only bring benefit for the public. Elevators represent the American characteristic of not letting anything stop them from accomplishing their goals. Builders wanted to build higher, and thus, engineers designed a safe and efficient means to transport individuals to buildings’ unprecedented heights.

¹¹ “Passenger Elevator,” *The Real Estate Record Association*, 1898.

¹² “The Otis Electric Elevator,” *The Engineering and Building Records*, July 5, 1890.

¹³ Otis Elevator Company, “Otis Micro Leveling Elevators.” *The Architectural Forum*, July 1921.

¹⁴ *Ibid.*

New technological developments allowed for construction projects to be bigger and more complicated than ever before. This forced builders to rethink how they went about designing and constructing, leading to a systemization within the construction industry. Jane Bonshek's article, "The Skyscraper: a catalyst of change in the Chicago construction industries," argues how the first ever skyscraper built in Chicago influenced builders and building-suppliers.¹⁵ Building skyscrapers requires the work of thousands of people to correctly and efficiently maneuver the equipment and materials into place. The 1908 *New York Times* article, "The Men Who Must Not Make Mistakes," stresses how a minor mistake architects, builders, or engineers make can result in an unsafe building that threatens the lives of the public.¹⁶ To prevent a catastrophic event, Starrett describes an innovative system developed by the men of the construction industry. This system developed when the modern contractor position was created. Before the contracting position existed, in addition to designing the building, the architect was responsible for supervising and managing the work of all the sub-contractors. Skyscrapers' logistics heightened the complexity of construction. This overwhelmed architects, thus increasing the likelihood of mistakes being made. The contracting position changed how construction was conducted in order to meet the new challenges. Starrett states contracting became, "an industry and a profession, visualizing the building problem in its entirety- promotion, finance, engineering, labor, and materials."¹⁷ The contractor transformed into a position of leadership with a wide range of responsibilities, from the oversight of construction to the administration work.

¹⁵ Jane Bonshek, "The Skyscraper: a catalyst of change in the Chicago construction industries, 1882-1892," *Construction History* 4, (1988): 53-74.

¹⁶ Allan Benson, "The Men Who Must Not Make Mistakes." *New York Times*, December 17, 1908.

¹⁷ William Starrett, *Skyscrapers and the Men Who Built Them* (New York: Charles Scribner's Son, 1928),33.

The complexity of the skyscrapers required the contractor to carefully plan and organize before construction could begin. The contractor creates a plan that details a range of information, from materials to logistics. Starrett believes, “The essence of the building of these great skyscrapers is organized forethought.”¹⁸ When a thorough plan is put together the chances of an unsafe, prolonged, and expensive project are minimized. Perhaps, the most significant organizational development for the construction industry was a system of collaboration between all the men contributing to building the skyscraper. This system is what Starrett calls the “general contract” which divides work into divisions.¹⁹ The architect and the contractor must work together to communicate what will be built and how it will be done efficiently. According to an 1898 article in *The Real Estate Record Association*,

It is the task of the architect to lay out his work so that all these workmen can labor together or in their proper order in harmony; and of the Captain of Industry [the contractor] to mass these sub-contractors into one, and so direct the work of each that all shall at last result in the finished structure, the materialization of the architects’ plans.²⁰

The skyscraper is truly a team-build. The architect works with the developer to understand what and how they envision their building. Then the architect must design an aesthetically pleasing building, while working with engineers to ensure the building’s structure will be durable. The design is handed off to the contractor, or the “Captain of Industry,” who has the responsibility to take the architect’s and developer’s vision and make it a reality. The contractor directs and assembles each trade strategically so that they efficiently work together to build the skyscraper. Once each worker has done their role, a distinctly American icon is left. The author in “The Men Who Must Not Make Mistakes” concludes with an acknowledgment of the beauty behind the

¹⁸ Ibid., 80.

¹⁹ For more information see Starrett, Chapter 7.

²⁰ “The Builder,” *The Real Estate Record Association*, 1898.

buildings of the ancient Greeks.²¹ The ancient Greeks are known for their influential architectural style as well as the durability of their buildings. When Americans work together they can build a masterpiece that will give them a legacy comparable to the ancient Greeks.

The second development that the Industrial Revolution created was big businesses. As the American economy grew, the business industry grew. The establishment of the New York Stock Exchange on Wall Street grew Downtown New York City into a place of business as suggested by Robert Fogelson in *Downtown*.²² He also credits the growth of New York City's downtown district to an increase in demand for office space and to the specialization of business, which required businessmen to be closer to one another to maximize productivity and thus, profits.²³ Heading into the 20th century, the number of office workers more than tripled between 1870 and 1890.²⁴ With a continual demand for office space, New York City and skyscrapers were the innovative combination Americans were searching for. Skyscrapers allowed building owners to maximize office space while minimizing cost, and business would be made more efficient by centralizing where business was conducted.

Technological developments from the Industrial Revolution and the rise big businesses together triggered an urbanization trend in American cities. People were leaving the countryside to live and work in cities, and the Industrial Revolution provide the infrastructure needed to expand cities. The years following the Industrial Revolution saw more cities being built than the

²¹ Allan Benson. "The Men Who Must Not Make Mistakes," *New York Times*, December 17, 1908.

²² Robert Fogelson, *Downtown: Its Rise and Fall, 1880-1950* (New Haven: Yale University Press 2001), 11.

²³ For more on the growth of downtown district in New York City see Fogelson, *Downtown*, 21-26.

²⁴ Jane Bonshek, "The Skyscraper: a catalyst of change in the Chicago construction industries, 1882-1892," *Construction History* 4, (1988), 54, table II.

century before.²⁵ This rapid business and city growth created jobs in America. New York City had the highest population in America, largely credited to the influx of immigrants going through Ellis Island; while the Brooklyn Bridge, Grand Central Station, and the subway system made transportation into and around the city feasible.²⁶ The progress America had made at end of the 19th century set New York City as the perfect location for the rise of skyscrapers and the creation of America's crown achievement.

Early Skyscrapers: 1900-1915

The earliest skyscrapers were far from the iconic skyscrapers we think of today. The design of today's skyscrapers took years of experience for architects and contractors. New York City's construction industry exploited the advancements made in elevators and steel and built its' first skyscrapers in 1902. However, as Leopold Arnold states in "The Tall Building in New York in the Twentieth Century," "experience brings change."²⁷ Between the years of 1902 and 1915, the architects of New York City's skyscraper toyed with the aesthetics of skyscrapers bringing the public both excitement and concern.

Architects' needed to design a building that would provide the building owner with the most office space to maximize profits. To achieve this, the earliest skyscrapers had a block-like structure that shot straight up into the sky with minimal artistic features. The Singer Building, completed in 1908, was not the first skyscraper built in New York City; however, it gained public attention for its unprecedented height at 607 feet tall. Architect, Ernest Flagg, designed its

²⁵ For more information on urbanization in the early 1900s see "Transformation and Complexity: An Urban Technology."

²⁶ U.S. Bureau of the Census, *Population of the 100 Largest Urban Places: 1900*, June 15, 1998, <https://www.census.gov/population/www/documentation/twps0027/tab13.txt>.

²⁷ Arnaud, Leopold, "The Tall Building in New York in the Twentieth Century," *Journal of the Society of Architectural Historians* 11, no. 2 (May 1952): 16.

Neoclassical architecture and structure. The base of the building was a block, but the upper half was a narrower tower that set-in from the lower half, allowing the building to rise to be the tallest building in the world. A *New York Times* article published in 1907 suggests the public's excitement for the skyscraper was because of its height. The author states, "when completed its gigantic steel tower will dwarf [the] city's famous skyscrapers to insignificance." Skyscrapers of one hundred feet or less no longer seem impressive. The Singer Tower's unforeseen height suggests a coming evolution for New York City's skyline. At the top of the Singer Building's steel structure sat an American flag, crediting America for this revolutionary achievement.²⁸ A magazine article published by the Otis Elevator Company states, "the tower of the Singer Building...has become as distinctive as a feature of the skyline of New York as the Egyptian pyramids are of the Valley of the River Nile."²⁹ Already, the public has taken pride in the impact, and legacy skyscrapers can have on the world.

The Woolworth Building designed by Cass Gilbert in 1913, indicates how skyscrapers continued to evolve in design and height, now reaching 750 feet. Like the Singer Building, its' structural design has a block-like base while the upper half is a tower. However, the Woolworth Building base is in the shape of a "U" rather than a four-sided block. The U-shape was an innovative design intended to allow more natural light and air into the building. It also evolved away from the basic block structure, that was receiving criticism. The tower rises straight up where the top narrows in to a point, like a pyramid. This pyramid-like crown resembles the 1909 Metropolitan Life Insurance Company Tower, which is said to be inspired after St. Mark's Campanile in Venice. The public acknowledges the similarities to St. Mark's Campanile.

²⁸ "Already Highest Structure in the World," *New York Times*, August 25, 1907.

²⁹ "The Singer Building," *The Indicator*, December 1908.

However, they boast about the Metropolitan Life Tower being over double the height of the campanile in Venice and for being the tallest building in the world.³⁰ Americans celebrated the Woolworth Building for both its height and its appearance. Its' novel Neo-Gothic aesthetics received praise. A magazine article published by the Otis Elevator Company on the Woolworth Building states, "Architects and owners now realize that in erecting these tall buildings it is essential to consider more than the commercial utility of this building, and that beyond this each building must be a monument."³¹ Knowing that skyscrapers would leave a global legacy inspired architects and builders to build skyscrapers as masterpieces. The Woolworth Building's unforeseen speed of construction even impressed builders. The same magazine article highlights how America's construction speed was significantly faster than other countries, celebrating another American achievement.³² When the Woolworth Building opened in 1913, a dinner was held on the symbolic top floor to celebrate America's new accomplishment. From Washington, President Wilson turned on the building's lights to signal its opening. Later in the evening, the National Anthem was played.³³ The completion of the Woolworth Building was so significant that the celebration called for the presence of the man who represents America, the president. At its completion, the Woolworth Building symbolized how America had become a global leader in innovation.

With any push towards progress and change, there is resistance. The most aggressive and unyielding barrier to the rise of skyscrapers was public opinion. The completion of New York City's first skyscraper prompted criticism immediately. A *New York Times* article written in

³⁰ "The Singer Tower Soon To Be In Second Place," *New York Times*, December 29, 1907.

³¹ "The Woolworth Building," *The Indicator*, December 1912.

³² "The Woolworth Building," *The Indicator*, December 1912.

³³ "55-Story Building Opens On A Flash," *New York Times*, August 25, 1922.

1902, suggests the concerns the public will have for skyscrapers. These concerns pertained to the appearance of skyscrapers as well as the possible health and economic consequences building more skyscrapers could have on the city and its inhabitants.³⁴ Ironically, a critic of skyscrapers was Ernest Flagg, who says “it was a great mistake to ever have allowed them [skyscrapers] to be built.” A *New York Times* article published in 1911, titled, “Are American Cities Going Mad Architecturally?” features Flagg’s criticism. Addressing the appearance of skyscrapers, Flagg states, “we are veritable barbarians in matter of taste” and calls architects “amateurs.” He believes skyscraper designs are “underdeveloped” and suggests they are a poor imitation of European architecture. This led Flagg to claim,

Foreigners scoff at the appearance of our cities, and justly too. They see our darkened streets and darkened buildings. Having the clear atmospheres with which any city is highest, they see us busily engage in depriving ourselves of its benefits, and they thank God that the height buildings craze has not reached the shores of Our World.³⁵

Flagg’s disapproval for skyscrapers is mainly because of their design. Not only do they “disfigure the city,” but they prevent light from reaching the street which he blames on the careless designing done by architects. Flagg is convinced that skyscrapers were not making Europeans envious; instead they are strengthening their belief that they are the wiser nations. Flagg is not alone in his criticism against skyscrapers. A *New York Times Article* written following the Triangle Shirtwaist Factory fire titled “Skyscrapers are a Growing Menace” addresses safety and health concerns. The author calls for a height limit placed on buildings because skyscrapers encourage the building of other skyscrapers to the same or even taller height. More skyscrapers will create a “concentration of population” which would crowd

³⁴ “Give Greater New York A Plan,” *New York Times*, December 24, 1902.

³⁵ “Are American Cities Going Mad Architecturally,” *New York Times*, April 6, 1911.

sidewalks and streets. Inside the buildings, a “concentration of population” would create poor working conditions because of “a lack of sufficient light and ventilation.”³⁶

Flagg also addresses the potential economic problem of skyscrapers which he says there is an innate “financial limit.” He explains, “It costs more to build a tall building than one of equal bulk spread over the ground. The higher one goes the greater the cost all the way down.” The law of diminishing returns implies at one point the cost to keep building vertically will outweigh the investment the building owner would make. The second economic problem Flagg identifies is the effect on property values. Empty lots adjacent to or near skyscrapers value will increase, forcing developers to build more skyscrapers since tall buildings bring in the most revenue. The vicious cycle of skyscraper construction to compensate for the rising property values and congestion led Flagg to call skyscrapers an “ill-advised experiment.”³⁷

Despite the justifiable aesthetic, economic, and health concerns, Americans excitement for the future of skyscrapers and New York City outweighed the campaign to place a height limit on skyscrapers. The circumstances of the day were too ideal to halt the creation of an icon that highlighted America’s power. Architect Cass Gilbert, in the 1908 *New York Times* article, “Skyscrapers and the Skyline of the Future” argues the expansion of New York City’s skyline is inevitable. He reasons, “nearly every important business organization finds it must have an office here [New York City].”³⁸ New York City’s economy in the early 1900s is strong and so is steel. A *New York Times* article features an experienced builder that disproves the public’s concern that skyscrapers’ steel frame will rust and weaken the building’s ability to stand over time.³⁹ But the

³⁶ “Skyscrapers are a Growing Menace,” *New York Times*, May 1911.

³⁷ “Are American Cities Going Mad Architecturally,” *New York Times*, April 6, 1911.

³⁸ “Skyscrapers and The Skyline of The Future,” *New York Times*, May 10, 1908.

³⁹ George Huss, “Durability of Steel Frames,” *New York Times*, April 6, 1902.

relentless concerns from the public did convince New Yorkers that skyscrapers needed restrictions and guidelines.

1916 Zone Ordinance

In response to the public's convincing criticism of skyscrapers, New York City passed the 1916 Zone Ordinance as a way to better regulate skyscrapers. In "The New York Zoning Resolution and Its Influence Upon Design," John Taylor Boyd explains what the 1916 Zone Ordinance entailed. For height, the ordinance created districts that determined the buildings' cornice height which refers to the maximum height a building may go before it has to set-in. The maximum height is based upon the width of the street, which is multiplied by the fraction the buildings district allowed for. Once the building reached its cornice height, it can continue to rise, but it is required to "set-back" one and a half feet for every foot the building expands up. As the set-backs continue, a line placed on an angle from the center of the street can trace the building as it rises. The set-back requirement revolutionized skyscrapers' design and made them more artistic. The ordinance also allowed for buildings to have a tower as long as its footprint covered no more than 25% of the lot. Boyd implies that the inclusion of a tower was to add beauty to New York City's skyline.⁴⁰ However, Boyd states that the intentions of the ordinance was "to bring order, coherence, and coordination into city life."⁴¹ Multiple architects and builders point to the 1916 Zone Ordinance being less about beauty and more about the well-being of the city and its people. Boyd states the ordinance, "merely offers the architect an opportunity to prove his ability."⁴²

⁴⁰ John Boyd, "The New York Zoning Resolution and Its Influence Upon Design," *Architectural Record*, July, 1920, 198-201.

⁴¹ *Ibid.*, 217.

⁴² *Ibid.*, 209.

The years following the 1916 Zone Ordinance saw few skyscrapers, but those that were built were not impressive. The skyscrapers built between 1920 and 1922 suggest that architects struggled to design a skyscraper that also had beauty. Boyd states, “it is fair to say that most of the tall buildings of New York antedating the Zoning Resolution are failures architecturally.”⁴³ The architects of the 1921 Fisk Building attempted to use the set-back requirement to create a building that had beauty. However, their design still reflected a bulky structure with a block base. The architects included two set-backs, but it gave the building a disproportionate figure. From this aesthetic point of view, it was fortunate that America’s entry into World War I prevented more bulky skyscrapers from being built. The weapons and machinery needed for the war were manufactured with steel, shifting the focus of factories to manufacturing war equipment and not steel beams. At the same time, the men who were working on the construction of skyscrapers were drafted into the military. As a result, between 1916 and 1925 there was a significant decrease in the amount of skyscrapers being built.⁴⁴ This slow down in skyscraper growth gave architects time to develop what would become a distinctly American style.

The Skyscraper Boom

The logical assumption is that the 1916 Zone Ordinance would permanently hinder New York City’s skyscraper growth. However, the ending of the war in 1918 sent new shifts in America's environment, again making the context of the day perfect for skyscraper growth. No longer was steel needed to build war equipment, the men were back and wanting to design and build more skyscrapers, and more Americans were moving to cities from the countryside. New York City saw a 20% increase in population between 1920 and 1930, triggering a period of

⁴³ Ibid., 206.

⁴⁴ For more information see Jason Barr, “The Economic Context,” in *Building the Skyline*: (New York: Oxford University Press, 2016), 294.

urbanization in America.⁴⁵ The strong economy following the war increased the demand for employment in the trade, finance, and other business fields. A demand for office workers and the increase of New York's population beginning in 1920, again set New York City as the perfect location for more skyscrapers. This time, the number of skyscrapers built between 1925 and 1931 nearly tripled the amount built between 1900 and 1915.⁴⁶ A *New York Times* article from 1927 describes how drawings of New York City's skyline quickly become outdated.⁴⁷ A new problem for New Yorkers was if they left the city for too long, they may not recognize it when they returned.

The purpose of the 1916 Zone Ordinance was to solve the problems the public blamed skyscrapers for causing. The set-back style did allow for more light to shine through and onto the streets, while air could flow more openly through the set-backs. But in 1930, New York City had over 200 buildings twenty floors or higher and most of the tallest buildings in the world; making it questionable how much light and air were readily hitting the streets.⁴⁸ The increase in New York City's population and the number of tall buildings built in the 1920s suggest that the city's congestion problem was getting worse. The 1926 *New York Times* article, "Now the Skyscraper is Sharply Attacked," is wary of the long term effects the concentration of skyscrapers and people will have on the city claiming that, "concentration spells congestion"⁴⁹ A different *New York Times* article written in 1923 acknowledges the city's traffic problem; however, they are not concerned because they believe the subway will solve this problem.⁵⁰ "Now the Skyscraper is

⁴⁵ Ibid., 276.

⁴⁶ Ibid. 294.

⁴⁷ H. Brock, "Manhattan's Canyons, Seen From Above," *New York Times*, February 20, 1927.

⁴⁸ Robert Fogelson, *Downtown: Its Rise and Fall, 1880-1950*, (New Haven: Yale University Press. 2001), 179.

⁴⁹ Rose Field, "Now the Skyscraper is Sharply Attacked," *New York Times*, July 4, 1926.

⁵⁰ "Coming City of Set-back Skyscrapers," *New York Times*, April 29, 1923.

Sharply Attacked” also addresses the economic concerns of skyscrapers. The author sees the rising property values and building of more skyscrapers as a continuous cycle where it is unknown which is the cause and which is the effect.⁵¹ One *New York Times* article from 1928 adds to the discussion of the economic height of skyscrapers. They state how the development of steel and elevators have offered the opportunity for skyscrapers to “shoot upwards to new dizzy heights,” but property values hold back the height of skyscrapers.⁵² After 1916, architects needed to be more cautious of the owner's return on investment than before. As a skyscraper got taller and began to set-in, the amount of profitable space is reduced. Despite the 1916 Zone Ordinance not solving the congestion problem and only slightly improving light and air quality, skyscrapers in New York City rose to unprecedented heights, while creating a innovative style on its way up.

The issue the 1916 Zone Ordinance did solve, and perhaps unintentionally, was the lack of beauty in skyscrapers and the city’s dull skyline. The set-back requirement gave architects a structure and guidelines they used as inspiration. Popular New York City architect of the 1930s, Aymar Embury II, wrote “New York’s New Architecture: The Effect of the Zoning Law on High Buildings” in 1921. Here, Embury contends that the 1916 Zone Ordinance is not a hindrance to architects. He describes the set-back requirement created unity in New York City’s skyline while offering architects an opportunity to be creative with the building’s design:

The first, and thus far most obvious result, has been to increase greatly the possibilities of interesting treatment in the upper stories of high buildings; the second, which is as yet a tendency rather than an accomplishment, is to produce a certain unity in out street facades through the limitation of heights.⁵³

⁵¹ Rose Field, “Now the Skyscraper is Sharply Attacked,” *New York Times*, July 4, 1926.

⁵² “Economic Height of Tall Buildings,” *New York Times*, December 9, 1928.

⁵³ Aymar Embury, “New York’s New Architecture,” *The Architectural Forum*, October, 1921, 119.

The lack of regulations before 1916, led architects to freely design without much prior experience, thus creating a skyline that Embury calls a “bore.”⁵⁴ The best architects used setbacks to design the upper half of skyscrapers to express beauty. With most skyscrapers setting-back, New York City’s skyline has order and harmony. Another well-known architect, Irving Pond’s article, “Zoning and the Architecture of High Buildings,” from 1921, expresses similar feelings about the ordinance as Embury does. He beautifully expresses how,

some beneficent power, embodied at present in a zoning law, has given architects a chance to create beautiful and appropriate buildings, not Greek temples nor medieval cathedrals, but something modern, born of a new spirit which is neither Greek or Gothic nor Roman or classic renaissance, but which is intensely of today.⁵⁵

The ordinance presented architects with the opportunity to be the masterminds behind a new and uniquely American architectural style, known today as Art Deco. This uniquely American style will leave a legacy just as how the Greek temples, the medieval cathedrals, and the architecture of the Renaissance Period has. New York City’s skyscrapers are foreseen to be replicated all around the world.

What skyscrapers came to represent for America inspired architects, builders, and businessmen to keep building them. The public was proud and excited for the future of America. An article from 1923 states, “the reign of skyscrapers is just setting in,” suggesting bigger and better things are coming because of skyscrapers. For New York City, the skyscraper will, “grow [the city] to be the business centre of the world.”⁵⁶ The height of office buildings distinguishes New York City as the best place to do business. Skyscrapers placed corporations closer together

⁵⁴ Ibid.

⁵⁵ Irving Pond. “Zoning and the Architecture of High Buildings,” *The Architectural Forum*, July-December, 1921, 133.

⁵⁶ “Coming City of Set-back Skyscrapers,” *New York Times*, April 29, 1923.

allowing for business to be conducted efficiently. The success of America's business industry has made them a global leader with the reputation of ambition and achievement.

No one understands the revolutionary impact skyscrapers had better than one of the contractors of the Empire State Building, William Starrett. His 1928 book, *Skyscrapers and the Men Who Built Them*, takes the reader through skyscrapers origin, and how they are built. Starrett understands the innovation in skyscraper construction writing, "As compared with its masonry predecessor, the skyscraper was light, airy, sanitary, quieter. Its sore and sweep stirred the imagination; there was prestige in being officed in such a monument."⁵⁷ Starrett studied buildings from their initial brick structures to their transformation into the iconic skyscrapers we think of today. He finds pride in its evolution and recognizes that skyscrapers great legacy is a result of America's teamwork. Starrett writes,

How it all started, and who the men were brought it all about, is a fascinating tale and one full of frantic interest. Nations and civilizations may rise and fall and historians of the far distant future...will of a surety say that we were a nation of builders...the greatest that the world had ever seen up to the era of our sudden greatness in construction.⁵⁸

What brought Starrett the most pride is the height of the skyscraper. He describes how the skeleton frame is, "essential to the towering heights upon which we gaze with such admiration and awe and pride, our everlasting pride in our completely American creation."⁵⁹ Looking up at the skyscrapers reminds Starrett of the collaborative effort needed to build skyscrapers to the height that no other men- and importantly, no other nation- had accomplished before. As a builder, Starrett is proud not only of the finished building but how the building was built. He sees the process of building a skyscraper an exciting "drama":

⁵⁷ William Starrett, *Skyscrapers and the Men Who Built Them*, (New York: Charles Scribner's Son, 1928), 35.

⁵⁸ *Ibid.*, 2.

⁵⁹ *Ibid.*, 1.

those of us who part in the creation and production of the drama have a pride and joy that is just what would be imagined by the enthusiastic spectator who gazes with admiration at some feat of skill and daring performed before his very eyes as he looks on from a vantage point, and perhaps sees nature used against its very self in the accomplishment of a spectacular bit of work.⁶⁰

The concept of constructing a building that is hundreds of feet tall is new and revolutionary. It took years of experimenting with designs and materials to understand how it was scientifically possible to build such an ambitious dream. The construction, Starrett suggests, is so complex that it required the “hustle and bustle” Americans had become known for.⁶¹ Starrett compares the men of the construction industry to that of a “combatant army” because of the collaboration and disciplined work skyscrapers require.⁶² To make a mistake while building a skyscraper can result in the loss of money and the loss of lives. Starrett finds beauty in the teamwork required to build a skyscraper and sees it as an art form. He marvels at the process of multiple minds and hands working together to build a masterpiece. Along this journey of constructing the world’s tallest buildings, Americans perfected the art of teamwork.

As a result, a finished skyscraper is something “completely American.”⁶³ Starrett explains that its “vastness, swiftness, utility, and economy...epitomizes American life and American civilization, and, indeed has become the cornerstone and abode of our national progress.”⁶⁴ For Starrett, skyscrapers represent what America had become. He acknowledges how skyscrapers are large, and so is America’s landscape; they are mainly office buildings, and America is a global leader in business; and as skyscrapers continue to improve, America continues to innovate. Despite skyscrapers already giving America a global reputation of the most advanced builders,

⁶⁰ Ibid., 2.

⁶¹ Ibid., 74.

⁶² Ibid., 63-73.

⁶³ Ibid., 74.

⁶⁴ Ibid., 2.

Starrett was not yet satisfied. He had the American attitude of progress and a desire to build something bigger and better while faster. Starrett states in the concluding chapter of his book, “destiny beckons us to a future that we feel is to be ever brighter.”⁶⁵ Skyscrapers’ steel-frames had not proven to engineers that it has a limit, and elevators incentivized builders to keep building higher. Two years after Starrett finished writing his book, his team would build a skyscraper that defied expectations. They constructed an American icon taller than what the world had seen before. It crowns New York City’s skyline and remains an American symbol of global power and prestige.

Empire State Building

It only took the builders of the Empire State Building thirteen months to build what would be the tallest building in the world- a position that would hold from 1931 to 1970. From the base of the building to the top of its tower, it measures 1,454 feet tall, has 102 floors and 2.158 million square feet of rentable office space. The masterminds behind the design of the Empire State Building were the architectural firm, Shreve, Lamb, and Harmon, and the contractors were the Starrett Brothers and Eken Corporation. Three thousand five hundred men contributed to the construction of the Empire State Building, installing 57,000 tons of steel and 73 elevators. The Empire State Building’s height is a wonder of the modern world, not just for its completed form but for how fast it went up. In Paul Starrett’s 1938 autobiography he writes, “The story of the Empire State Building is truly an epitome of all that has preceded.”⁶⁶ Before the Industrial Revolution, it was not possible to build a building 1,454 feet tall. The development of

⁶⁵ Ibid., 335.

⁶⁶ Paul Starrett, *Changing the Skyline: An Autobiography*, (New York: Whittlesey House, 1938). 284.

steel and elevators triggered the changes in the construction industry which made building the Empire State Building possible, while the 1916 Zone Ordinance inspired its iconic design.

The meticulous notetaking of the builders reflect how building the Empire State Building was a collaborative effort. They created a seventy-seven page long manuscript that includes details such as a flowchart of how the job was organized; a “daily job activity” log; information about deliveries, steel and elevators details, as well as cost reports; and plans for how to feed and transport the workers up and down the building.⁶⁷ The *New York Times* article, “Greatest Skyscraper Rises On A Clockwork Schedule,” expresses the impressive effort of the 3,000 plus workers to build the Empire State Building like “clockwork.” The author quotes architect Richmond Shreve,

The construction of the Empire State Building within the time set for its completion has been, like every other great task, dependent on the successful execution of many detail operations, failure in respect to any one of which would render impossible the carrying out of the full program in the allotted time.⁶⁸

By 1929, construction had evolved into an industry that required careful planning and clear communication between the different trades. As the builders of the Empire State Building have proved, with strategic and meticulous planning and organizing, the most complex projects are easily attainable.⁶⁹ Donald Friedman, in “A Story a Day’: Engineers the Work,” writes,

Spectacularly tall and architecturally distinguished, the Empire State represents the culmination of the skyscraper boom of the 1920s, but the most remarkable aspect of the building- one that has not been surpassed by a younger, taller, or bigger building- is the speed of construction.⁷⁰

⁶⁷ [John Carmody?], “Notes on the Construction of Empire State Building,” 1930-1931, in *Building the Empire State*, edited by Carol Willis, 33-46, (New York: W.W. Norton & Company, 1998).

⁶⁸ C.G. Poore, “Greatest Skyscraper on a Clockwork Schedule,” *New York Times*, July 27, 1930.

⁶⁹ For more information on “Notes on Construction of Empire State Building,” see “*Building the Empire State*.”

⁷⁰ Donald Friedman, “A Story A Day’: Engineering in the Work,” in *Building the Empire State*, edited by Carol Willis, 33-46, (New York: W.W. Norton & Company, 1998).

The Empire State Building rose to an unprecedented height with remarkable speed because of the organization and collaboration between the developer, architects, engineers, and the workers. Architects designed its iconic aesthetics and innovative structure. Engineers determined how much steel and how many elevators were needed to ensure the building was safe and the owner's investment was returned. The contractors masterfully instructed when and how the building was to rise to a new height. Together they made the perfect team to create not only an iconic building but a legendary story.

The Empire State's renowned Art Deco architecture is unlike the bulky, block-like skyscrapers of the early 1900s. The *New York Times* article, "Smith Skyscraper has a Novel Design," describes how the Empire State Building's new and innovative features will solve the early concerns of skyscrapers.⁷¹ Influenced by the 1916 Zone Ordinance, the building begins using set-backs after the sixth floor which allows for more light and air to flow through, as described by the article. To avoid a block-like structure while adding beauty, the architects were both innovative and creative in using six set-backs that are all at different heights and lengths. Its Art Deco style contradicts the Neoclassical and Neo-Gothic style of the early skyscrapers adopted from Europe. The Empire State Building's aesthetics symbolize America's power and global leadership in innovation. At the top of its signature tower sits a mooring mast. Airships, or blimps, offered a new way to travel. Since, the Empire State Building was also innovative and revolutionary, the builders believed the world's tallest building should be crowned with society's newest advancement.

⁷¹ "Smith Skyscraper has a Novel Design," *New York Times*, Jan. 8, 1930.

The timing of when the Empire State Building was built contribute to its significance. In 1929, four miles from the construction site, the stock market crashed and sent America into the worst economic depression in history. Despite the warnings signs of a declining business industry, the Empire State Building's construction showed no signs of slowing. The Empire State Building was determined to be built. Once construction finished, it became a symbol of America's great power and innovation. In the "conclusion" of the Starrett brothers' notes, the author writes, "This massive building now stands as a majestic symbol of the enterprise and efficiency of our age."⁷² In the 1930s, the Empire State Building represented a hope that the business industry would accelerate the economy, filling all 2.15 million square feet of rentable office space inside the building. A *New York Times* article, written in 1930, interviews a man who believes the Empire State Building will not have a problem finding tenants because of New York City's reputation as the leading business center. The man says,

Empire State reflects the structural readjustment of the greatest city in the world. All the lines of trade and all professions of the universe pay tribute to New York. The stature of Empire State is testimony to the fact that New York never hides its light under a bushel. This building is not a result of whim nor impulse, but of close observation of the trend of growth in the area between the two greatest railway terminals in the world.⁷³

Before construction finished, the symbolism of the tallest office building in the world being in New York City battled the signs that America's economy was declining and the nation had stopped advancing. The 1931 newspaper article, "Big Growth Ahead in New York City" calls the real estate market only a "temporary lull." The author believes that because of the skyscraper boom and the increasing height of skyscrapers, a growth trend will continue into the 1930s.⁷⁴

⁷² [John Carmody?]. "Notes on the Construction of Empire State Building," 1930-1931, 77 in *Building the Empire State*.

⁷³ "Operator Optimistic Regarding Renting," *New York Times*, December 7, 1930.

⁷⁴ "Big Growth Ahead In New York City," *New York Times*, January 4, 1931.

When the Empire State Building opened in 1931, a celebration for America took place, echoing the opening of the Woolworth Building years before. The *New York Times* article, “Empire State Tower, Tallest in World is Opened by Hoover,” reports on this symbolic event. At the ceremony, they played the National Anthem, and read a telegram from Hoover that thanked all the men who contributed to its construction and celebrated the legacy it will leave.⁷⁵

Similarly, the author of the article expresses:

I am very happy as a citizen of New York to congratulate all of you, the owners, the managers the architects, the engineers, the builders, and the workmen, who made it possible, on completing a task in record time, in doing it truly and well, and in once more setting a mark of vision and faith that will hold good for many years to come.⁷⁶

The Starrett Brothers & Eken’s team cemented America’s reputation of power and prestige over other nations with the Empire State Building. The atmosphere at its grand opening was filled with pride and hope for the future. The author quotes the building owner, Alfred Smith, who at the ceremony says, “It [Empire State Building] is intended to stimulate trade, commerce and continue to make New York the imperial city of the world.” The men apart of the construction of the Empire State Building hoped its completion would reverse the declining economy, but those not at the celebration saw things differently.

Three years after the stock market crashed reality for some Americans that their great nation was no longer advancing was setting in. On the day the Empire State Building opened, the *New York Times* article, “Rivalry for Height is Seen as Ended,” express a different sentiment than the excitement expressed in “Empire State Tower Tallest in World is Opened by Hoover.” The author believes the Empire State Building marks the end of the era where builders

⁷⁵ “Empire State Tower Tallest In World Is Opened By Hoover,” *New York Times*, May 2, 1931.

⁷⁶ Ibid.

questioned building heights.⁷⁷ Rather than questioning what is the next tallest building will be, the public was questioning if construction would even continue. No longer was there a demand for clerical workers and thus, no demand for office space. The public can no longer downplay the signs that the period of great innovation and progress for America has concluded. New York City's skyscraper construction would come to a drastic halt. Left in New York City's skyline was an American icon that left an exclamation mark in the history books.

Conclusion

Standing on the observation deck of "The Top of the Rock" is Grant's granddaughter. She has a perfect view of the Empire State Building from the 70th floor, where the sun is fully visible, and the breeze hits her face. Directly to the south, is the iconic Empire State Building. The building lights, illuminate the sky as the orange and yellow sky fade to darkness. Those walking on the busy street below hardly notice the coming darkness since shadows normally cover the streets. The only breeze that hits their face is the hot, polluted air that shoots up from the vents of the subway. As she stands on the open deck of the 70th floor, she scans the skyline and can't help but admire the view of America's most iconic city, but wonders how was all this possible?

The Industrial Revolution led Americans to build something taller than what any other nation had accomplished. The development of steel and big businesses gave America both the strength and the justification for rising hundreds of feet into the sky. Additionally, the construction industry developed into a system of collaboration that allowed construction workers to efficiently work together to build something unprecedented. The public fought the rise of

⁷⁷ "Rivalry For Height Is Seen As Ended," *New York Times*, May 2, 1931.

skyscrapers. They expressed their concerns for the health and economic consequences, such as congestion and high property values, could have on the people and the city. The 1916 Zone Ordinance attempted to solve these problems. It inspired the innovative set-back style, which added beauty to the skyline, but it did little to address the consequences of over-congestion.⁷⁸ The ideal economy following the war led a drastic increase in skyscraper construction in New York City where builders continued to test the height limit. The boom of skyscrapers in the 1920s transformed New York City as a global leader in construction and business. However, things changed in the 1930s. America's declining economy halted the skyscraper boom, ending the era of innovation and achievement. New York City's skyscrapers began in 1902, at 285 feet with the Flatiron Building and finished in 1931, at 1,450 feet with the Empire State Building. Rising high above anything else, the Empire State Building symbolizes how America's innovation gave them power and prestige over all other nations, and serves as a reminder that with teamwork, "only the sky is the limit."

⁷⁸ For how New York City is handling over-congestion today, see, Winnie Hu, "Congestion Pricing: N.Y. Embraced It. Will Other Clogged Cities Follow?," *New York Times*, April 1, 2019.

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