

TITLE: SCRAPING THE SKY

SUBJECTS/TOPICS: AMERICAN HISTORY, ARCHITECTURE

GRADE LEVEL: HIGH SCHOOL, 9-12

AUTHOR: KEVIN HOFMANN, M.S.ED.



ABSTRACT

In 2017, 144 skyscrapers (towers at least 660 feet tall) joined the skylines of 69 cities across the globe—a record that will likely be broken again before the end of 2018. This lesson combines individual investigations of primary resources and visual media with group analysis to investigate the following inquiry: **How is the evolution of the American skyscraper related to broader themes of modern U.S. history, economics, and culture?** Students will construct original arguments regarding the relationship between the evolution of the skyscraper and the modern American city.

STANDARDS

KEY IDEAS & DETAILS:

CCSS.ELA-LITERACY.RH.11-12.1

CCSS.ELA-LITERACY.RH.11-12.2

CCSS.ELA-LITERACY.RH.11-12.3

INTEGRATIONS OF KNOWLEDGE & IDEAS:

CCSS.ELA-LITERACY.RH.11-12.7

CCSS.ELA-LITERACY.RH.11-12.8

CCSS.ELA-LITERACY.RH.11-12.9

LEARNING OBJECTIVES

SWBAT:

- A. Identify and record evidence from six case studies covering the evolution of the American skyscraper;
- B. Summarize its evolution by offering strong connections to important themes of industrialization, socioeconomics and globalization;
- C. Predict its future by innovating to solve a pressing social, economic, or scientific issue.

BACKGROUND

For most of human history, tall buildings have endured as aspirational markers of a great societies. For the Egyptians, monumental pyramids symbolized the ascension to the heavens; delicately layered Japanese pagodas served as spaces for contemplation; and Gothic cathedrals impressed upon the masses the awe-inspiring might of God. Despite the geographical, formal, and stylistic differences among these various types of vertically oriented architecture, they remain unified by their ambition to inspire and impose.

In the West, the Enlightenment, in addition to ushering in a new era of experimental free thinking, marked a shift in funding for the arts from church patronage to free-market development. By the second half of the nineteenth century, Europe and most of the Americas were in the throes of Industrial Revolution. In particular, the secular, free-market capitalism of the United States coupled with rapidly densifying cities encouraged entrepreneurs to innovate. The parallel expansion of the American city also encouraged vertical exploration. Stacked floor plans provided the density needed to support urban life while also maximizing the return on investment for developers. New terminology—the “skyscraper”—evoked notions of human technological achievement. By the middle of the twentieth century, slender towers of glass and steel could be found around the world, the hallmark of any successful, modern city.

ESSENTIAL/GUIDING QUESTIONS

What economic, social, and technological forces led to the invention of the modern skyscraper, and how have skyscrapers changed the city?

What long-term impact have steel and concrete skyscrapers had on the environment?

How can material innovations (primarily wood) continue to change the role skyscrapers play in urban life?

BACKGROUND, CONTINUED

The invention of the electrically powered passenger elevator, refinement of steel and concrete construction, increasing value of urban land, and gradual cultural adoption of modern aesthetics help explain the presence of skyscrapers in many American cities. Early iron-framed towers, often covered in brick or stone, like the Rookery Building in Chicago, point to the emergence of impressive, well-lit, ground-floor lobbies symbolizing growing influence of American commerce. Nearly a century later, Mies van der Rohe used classical symmetry and gothic articulation to perfect the modern tower of glass and steel. Today, skyscrapers like Chicago's Aqua by Studio Gang use expressive, curved architectural form to address contemporary challenges of energy consumption, thoughtful real estate development, and context.



Flatiron Building, New York City, 1903
Photochrome postcard by Detroit Photographic Company

PREPARATION

In 2017, cities around the globe saw the completion of 144 new skyscrapers, a term used to describe tall, vertically arranged buildings most often constructed of glass and steel. **Today, modern towers of glass and steel dominate the skylines of many American cities, but how did this come to be?** Although these buildings can trace their architectural ancestors back to late-nineteenth-century Chicago, less than 6% of all new skyscraper construction occurs in the United States. By tracing the origins of the American skyscraper back to the Industrial Revolution, one unfolds a narrative in which modern building technology, the architectural character of modern cities, cultural aspirations, and real estate practices collide to dictate the shapes and skylines of many modern cities.

Using primary and secondary resources for six case studies, examine how the construction techniques and physical characteristics of the skyscraper have evolved and/or changed over time. Situate each study within its appropriate historical context and examine how each study is connected to significant twentieth-century events. By the end of this lesson, you will be able to create a timeline charting this evolution and further analyze how the skyscraper developed architecturally, culturally, and formally over the course of the twentieth and twenty-first centuries. Identify an additional document (not provided below) that you can use to justify your argument and be prepared to explain how it supports your analysis. Finally, you will use your analysis to predict the global future of skyscrapers.

QUESTIONS FOR INITIAL INQUIRY

Questions for initial inquiry:

1. What forces led to the invention of the skyscraper?
2. What does the skyscraper symbolize, for whom, and has this changed over time?
3. How is the evolution of the skyscraper related to globalization?

ACTIVITIES

PART I: Video Introduction “Skyscrapers of the Future Will Be Engineered to Copy Nature”

(Seeker, 2018; <https://www.youtube.com/watch?v=-OPGQ9EhDZM>)

In the video above, the narrator discusses the future of the skyscraper as it relates to technology, the environment, and society. Designers in many of the world’s densest cities are exploring wooden construction as a viable alternative to energy-intensive steel and concrete. As you will examine, improvements in steel and concrete technology led to the invention of the skyscraper, so consider how the introduction of new structural material like wood might change how we understand and interact with these structures.

PART II: Case Studies

For our first activity, you will examine six skyscraper case studies. Each case has a variety of visual, digital, and text sources offering a brief summary of each case; your task is to carefully record all important information. Remember to always read with a critical eye: facts like names, dates, places, and styles are important, but pay careful attention to the author’s tone and voice. How does each case relate to the cases chronologically before and after? How does each case relate to developments in technology and society?

PART III: Formation of Narrative

Using your notes from above, construct a document-based written response that responds to the following prompt:

Using the following documents, analyze how the skyscraper developed evolved over the course of the 19th, 20th, and 21st centuries. Identify an additional document (not provided below) and explain how it would help you analyze this evolution and predict one aspect of the skyscraper’s future.

Consider: What is your relevant thesis? How can you support it using the evidence you have? How can you explain the relevance of the additional document and how does it aid your prediction of the skyscraper’s future?

ACTIVITIES, CONTINUED

CONCLUSION: Peer Review

Now that you have each attempted a first pass, we will now trade our essays with a classmate for peer review. You will assess your peer's work using the provided template. Think like a reader: Is there a clear thesis? Is it adequately persuasive and supported by evidence? Is the additional document relevant and skillfully incorporated?

Instructors may wish to conclude with a brief discussion of the following:

1. What does the continued popularity of the skyscraper (especially in Asia) say about the future of many cities and the lives of those who live in them?
2. Will the term "skyscraper" eventually need to be redefined as buildings get taller and technology progresses? Will the skyscrapers of today still be considered skyscrapers in 100+ years?

EXTENSION

Drawing on your experiences as both a writer and reader, revise your essays according to your peer's feedback.

ASSESSMENT

At the end of class, you will trade your essay with a peer and be given a Peer Review Rubric. Using this rubric, grade your peer according to each category; be sure to justify your assessment of their work using clear, constructive, and concise feedback.

(Note: If students are working digitally, instructors may wish to have students submit their pre-edited work for comparison.)

DESCRIPTION

With a deft combination of loadbearing masonry and steel framing, The Rookery provides both a window into the past and a portent of things to come. Its iconic granite and brick presence on LaSalle Street in the heart of Chicago's financial district displays the exceptional quality of masonry construction during the 1880s. But the south and east elevations and the interior light well look toward the skyscraper's future, displaying the lightness and openness of iron framing.

The Rookery plays an enormous role in the story of Chicago architecture; not only was it a brilliant design and engineering solution from one of the city's most important architecture firms, but it also has survived the twentieth-century transformation of LaSalle Street into a canyon of much larger, and, on the whole, far less interesting office buildings.

Successful Boston businessmen Peter and Shepard Brooks commissioned Burnham and Root to design The Rookery in 1885, having already worked with the firm on the Montauk Block of 1882. The Brooks brothers (founders of the eponymous clothing store) wanted to erect a building that would be successful primarily from a financial standpoint—it should be economical to build and create retail and office spaces that would command high rents. They knew that an elevator, excellent mechanical systems, natural lighting, and a grand lobby were essential components for the success of the building.

The Rookery rises eleven stories and presents bold, highly decorated facades on both LaSalle and Adams streets. The color of the rich red granite on the lower, commercial floors is continued in the hard brick of the upper floors. Deep Romanesque arches at the entryways are contained within central bays that display John Root's love of surface ornamentation and his familiarity with an array of architectural styles. Within lies a two-story skylit lobby with a grand double staircase. A large light well to the west has walls finished in a highly reflective, cream-glazed brick.

Market pressures shaped the building in the twentieth century. In response to shifting tastes of the early 1900s, including a preference for the lighter colors and more delicate ornamentation found in newer office buildings, the Rookery's owners hired Frank Lloyd Wright to redesign the lobby in 1905. Root's Victorian cast-iron columns and light fixtures were replaced or covered over by intricately carved white marble panels and Wright's signature Prairie Style planters and electric light fixtures.

The Rookery underwent a sensitive rehabilitation in 1992, reopening the light court and restoring the best of both Burnham and Root's and Wright's work. This grand dame of LaSalle Street continues to function as a successful mixed-use building whose rich ornamentation and beautiful interiors remain a commercial amenity and aesthetic delight.

Rookery Building

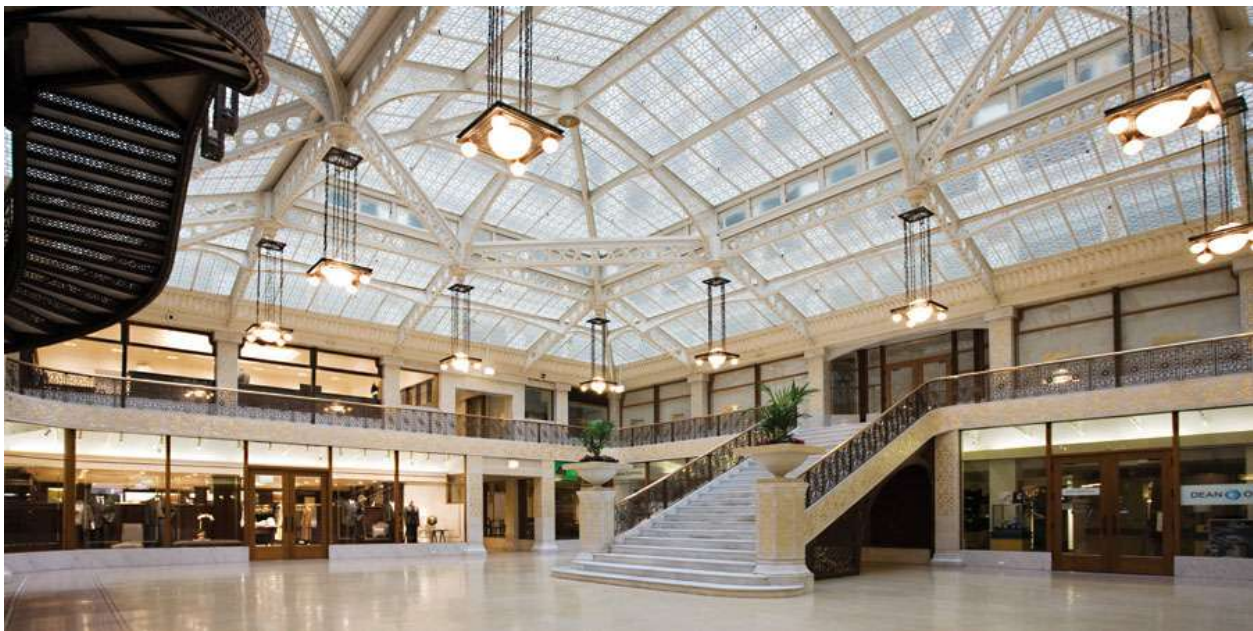
209 S. LaSalle Street
Chicago, Illinois



LaSalle Street Entrance; photo by Jean Follett



ABOVE: LaSalle and Quincy Street Detail; photo by Jean Follett
BELOW: Alley Detail off Adams Street; photo by Jean Follett



Interior Lobby; <http://therookerybuilding.com/>

DESCRIPTION

Louis Sullivan considered the Wainwright Building to be his first mature work. It was commissioned as a speculative office building by brewer Ellis Wainwright who, in 1891, hired the same firm to design a tomb for his recently deceased young wife in Bellefontaine Cemetery. Since completion the Wainwright Building has been considered one of the key works of skyscraper design, and is often linked with Sullivan's best-remembered principle, form follows function. By the early 1970s, the building was dirty, shabby, and underutilized. After prodding by the National Trust and the Landmarks Association of St. Louis, the State of Missouri purchased it in 1974. Renovated and reopened as the Wainwright State Office Building in 1981, the landmark once again displays its stunning deep red Missouri granite base, brick and terra-cotta mid-section, and terra-cotta attic and cornice.

Louis Sullivan and engineer Dankmar Adler formed a partnership in Chicago in 1881 that lasted until 1896. By 1890, the tall office building had become the new challenge for architects. The invention of the skeleton steel frame and the safe passenger elevator provided the technology to grow buildings ever taller, a necessity in the face of growing urban populations and high urban land values. For Sullivan, the ten-story Wainwright marked the beginning of a highly productive decade that produced several impressive yet disparate tall commercial buildings, including Adler and Sullivan's Union Trust Building on Olive Street nearby. A key to understanding the Wainwright is revealed in Sullivan's article "The Tall Office Building Artistically Considered" published in *Lippincott's Magazine* in March 1896, in which he provided a listing of different floors—a basement for mechanical equipment, a ground floor for retail shopping, a second floor that is an extension of the first, tier upon tier of identical office cells, an attic story for other parts of the mechanical equipment, and a common entrance on the ground floor—all evident in the Wainwright. He also wrote about the "imperative voice of emotion" and identified the chief characteristic of the tall office building as "loftiness": "It must be tall, every inch of it tall." The function of the tall building was poetic and visual. There are twice as many verticals in the brick piers of the midsection than there are in its steel skeleton, but they are necessary for the building to look tall.

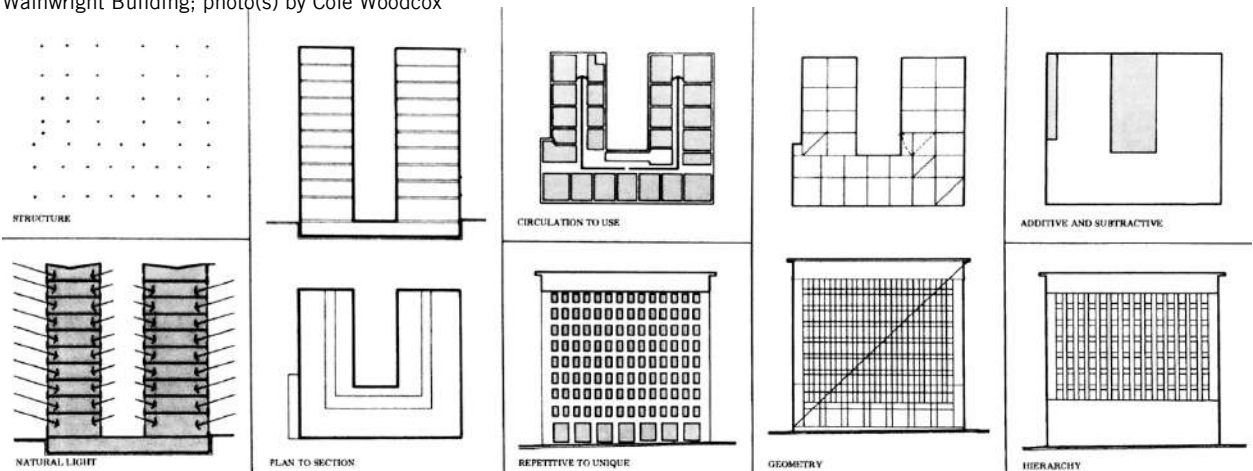
Originally, the Wainwright was surrounded by other tall office buildings from roughly the same period. They were sacrificed in a full-block program issued for the state office complex, of which the Wainwright was one element. Mitchell/Giurgola of Philadelphia with Hastings and Chivetta of St. Louis designed the new sections, and the Wainwright Building was completely renovated, with the lightwell of its U-shaped plan covered by a skylight and converted to an atrium lobby.

Wainwright Building

101 N. 7th Street
St. Louis City, Missouri



Wainwright Building; photo(s) by Cole Woodcox



Diagrams taken from *Precedents in Architecture* by Michael Pause and Roger H. Clark (1984)

DESCRIPTION

In 1901, a syndicate including Chicago's George A. Fuller Construction Company filed plans for a 20-story building on the triangular plot bounded by 22nd and 23rd Streets, Broadway and Fifth Avenue. The building was never the city's tallest, but its location in what was then the main shopping district made it one of the most famous.

The facade itself is handsome but not exceptional for its time: horizontal rusticated courses of limestone, brick and terra cotta of intricate design, with occasional classically styled medallions of female faces and other elements. It was designed by the firm of Daniel H. Burnham, the Chicago architect who was a key figure in the development of skyscraper design.

But what was most dramatic about the building had less to do with art than commerce: making full use of the small, oddly shaped lot, it rose straight up, directly and bluntly, from its wedge-shaped site without the setbacks, turrets, towers or domes that characterized the tall buildings then being designed by New York architects.

Indeed *Architectural Record* in 1902 sounded disappointed. The site "clamored for an original and unconventional solution," it said, whereas Burnham "has simply drawn three elevations of its three fronts," approaching the design as merely three connected facades rather than as a sculpted space.

But what was to a professional journal simply a "conventional skyscraper" attracted crowds, "sometimes 100 or more," said *The New York Tribune* in 1902. They looked up "with their heads bent back until a general breakage of necks seems imminent."

One apocryphal story that has attached itself to the Flatiron Building is that its name was resisted by the Fuller Company, which tried to attach its own to the building it occupied. In fact, specifications drawn up by Burnham and Fuller in 1902 had called it the Flatiron Building.

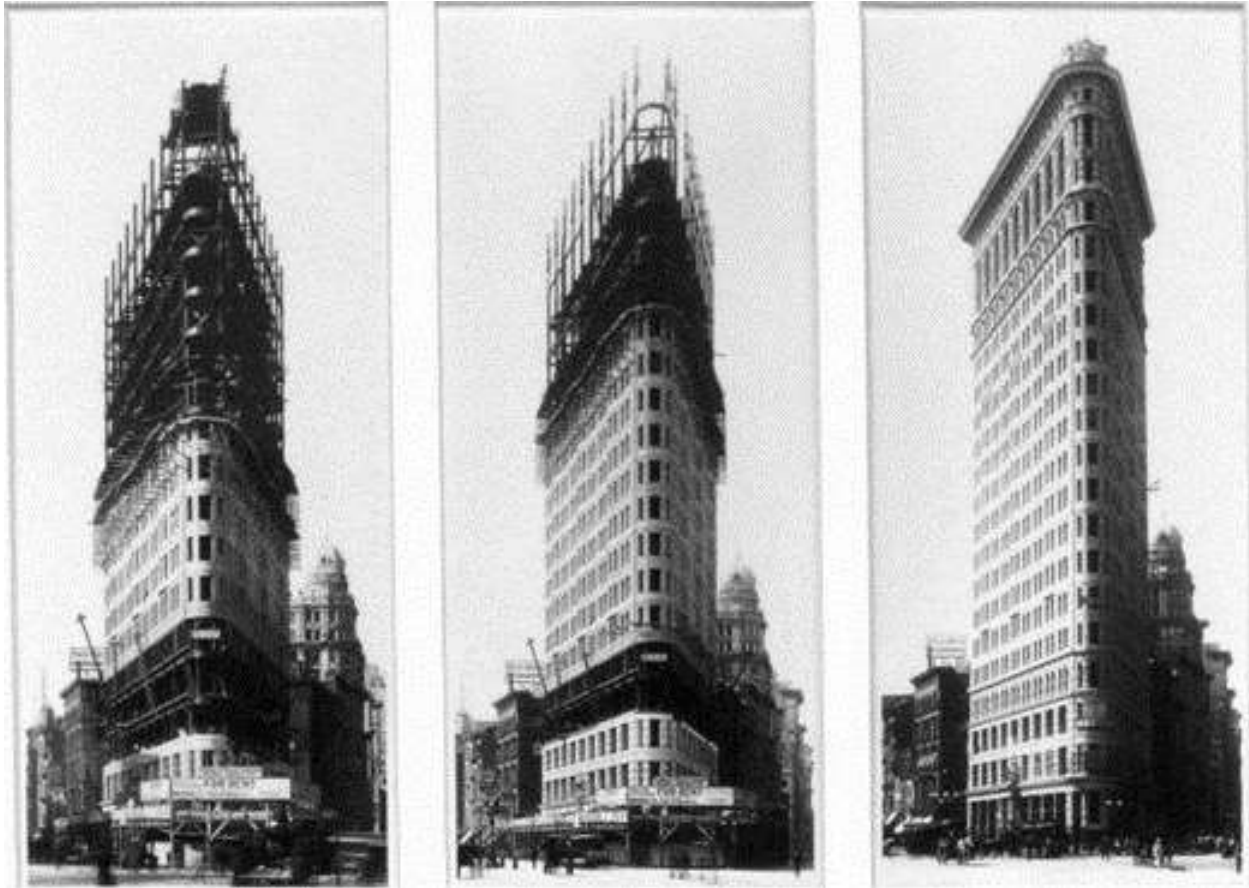
But stories of the wind effects of the building are apparently true. In February of 1903, a gust magnified by the great triangle blew John McTaggart, a 14-year-old messenger, out into Fifth Avenue where he was killed by a passing automobile.

NEWSPAPERS ran many articles on the wind problem, among them a 1903 story in *The New York Herald* headlined "Whirling Winds Play Havoc with Women at the Flatiron." And in the same year Gibson N. Vincent, a store owner across Broadway, sued for \$5,000 to cover the replacement cost of plate glass broken, he said, by gusts caused by the new building.

Excerpts from Christopher Grey, "Streetscapes: The Flatiron Building; Suddenly, a Landmark Startles Again," *New York Times*, July 21, 1991.

Flatiron Building

175 5th Avenue
New York, New York



Library of Congress

DESCRIPTION

No other city bears as strong an imprint of Mies van der Rohe as Chicago. Other major cities, like New York with its Seagram Building, may have only one Miesian gem mixed in with diluted forms of what came to be called the International style. But Chicago is the place to see the broadest sampling of his work from 1938, when he moved there, until his death in 1969.

Miesian perfection was realized at 860-880 North Lake Shore Drive, the twin apartment buildings Mies designed for Greenwald in 1951. These were among the first glass-and-steel high-rises in the world. Set perpendicular to each other and oblique to the lakefront, the structural steel frames supporting the buildings that were so revolutionary are expressed on the exterior by the I-beams that became the mullions for the ceiling-to-floor windows and that appear delicate for all their strength.

If one is lucky enough to visit an apartment there, the experience is like walking into a glass house suspended in air or on a promontory over the lake. Tenants wake early just to see the sun rise over Lake Michigan, and many are devoted to maintaining Miesian interiors. Also, one observes how all of the glass-walled lobbies of his high-rise structures are like glass pavilions set within classical colonnades, and to see 860-880 at night is like seeing the floors above floating over rectangles of light. The doorman sits in a Brno chair.

VIDEO CLIP

Students should also be given time to watch a 2:49 minute long clip about 860-880 Lakeshore Drive available through this link: <https://interactive.wttw.com/tenbuildings/seagram-building>



Excerpts from Paula Dietz, “A Two-Day Tour of Mies’s Legacy,” *New York Times*, June 8, 1986.

DESCRIPTION

For much of the past thousand years, the pendulum of Western architectural taste has swung between two esthetic poles: Gothic and classical, they eventually came to be called. Because it fuses elements of both positions in a supremely elegant whole, the Seagram Building is my choice as the millennium's most important building.

The 38-story Manhattan office tower was designed in 1958 by Ludwig Mies van der Rohe in association with Philip Johnson and is the most refined version of the modern glass skyscraper. It faces Park Avenue across a broad plaza of pink Vermont granite, bordered on either side by reflecting pools and ledges of verd antique marble. The tower itself is a steel-framed structure wrapped in a curtain wall of pink-gray glass. Spandrels, mullions and I-beams, used to modulate the surface of the glass skin, are made of bronze. The walls and elevator banks are lined with travertine.

Mies began to experiment with designs for glass towers in the early 1920's. An admirer of the philosopher Oswald Spengler, Mies shared Spengler's pessimistic view that the 20th century would be a time of Western cultural breakdown. The architect's response was to cultivate an esthetic of refined austerity; the phrase "less is more" originated with Mies. He often realized his plain forms in sumptuous materials, however -- Italian marbles, bronze, chromium-plated steel, thick, tinted glass -- and he rendered them with an exquisite sense of proportion and detail.

Mies once defined architecture as the will of an epoch translated into space. For architects of his generation, this meant reckoning with the reality of the industrial age and the transforming power of machine technology. But it also meant overcoming the war of the styles, which had fragmented architecture into battling ideological camps.

In the Seagram Building, the classical elements are more obvious: the symmetry of its massing on the raised plaza; the tripartite division of the tower into base, shaft and capital; the rhythmic regularity of its columns and bays; the antique associations borne by bronze.

The building's Gothicism is subtler. It is evident in the tower's soaring 516 feet, the lightness and transparency of the curtain wall, the vertical emphasis conveyed by the I-beams attached to the glass skin and the cruciform plan of the tall shaft and the lower rear extension. Indeed, the Gothic cathedral was the prelude to the whole of modern glass architecture, a link that's especially clear in Mies's rendering of the (unbuilt) Friedrichstrasse office project of 1921. In this drawing, a precursor of the Seagram Building, Mies used exaggerated perspective to turn one corner of the tower into a sharply pointed triangle, creating the impression of a spire.

Today we recognize that Gothic and classical represent more than two architectural styles. They stand for two views of the world, neurologists have determined, that correspond to functions located in the left and right sides of the brain. The classical is rational, logical, analytic. The Gothic is intuitive, exploratory, synthetic. In hindsight, we recognize, too, that there's little to be gained by embracing one side at the other's expense. The business of civilization is to hold opposites together. That goal, often reached through conflict, has been rendered here by Mies with a serenity unsurpassed in modern times.

Herbert Muschamp, "Best Building; Opposites Attract," *New York Times*, April 18, 1999.

Seagram Building

175 5th Avenue
New York, New York



Seagram Building; photo by Steve Cadman

DESCRIPTION

Built on the western edge of the former Illinois Central Railroad yard, two blocks north of Millennium Park, Aqua is the most architecturally distinguished of more than a dozen high-rise mixed-use structures built in the Lakeshore East neighborhood since development of the 28-acre parcel began in 2001. The 82-story, mixed-use high-rise accommodates commercial and office space, a hotel, and luxury condominiums.

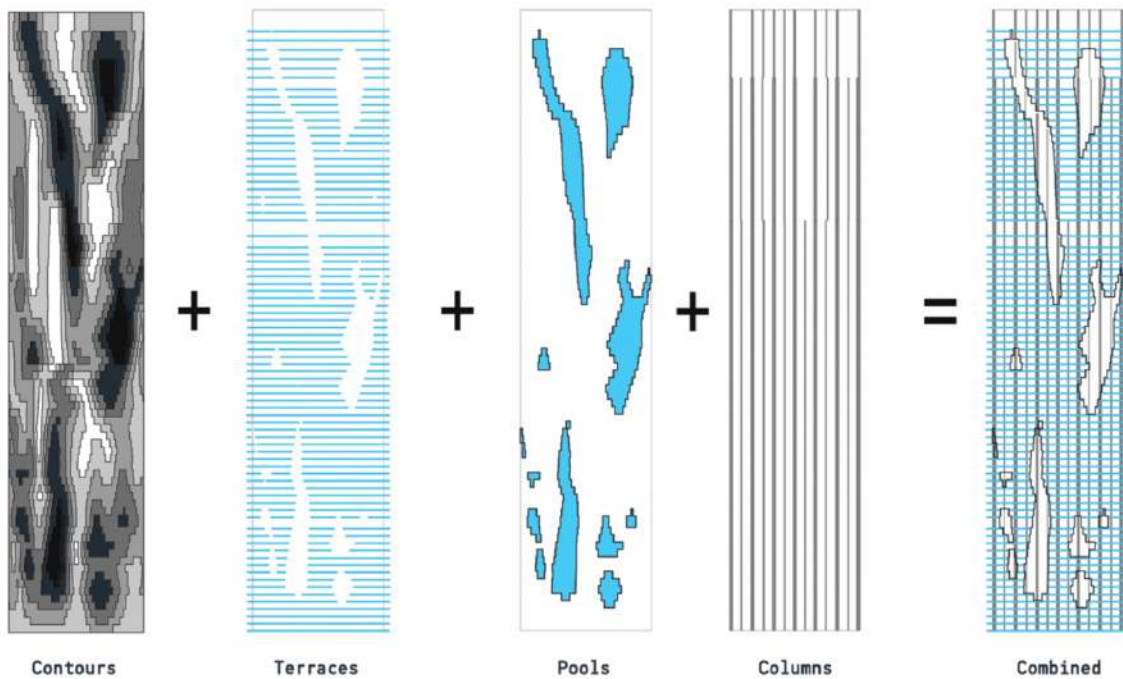
A conventional rectilinear, glass-enclosed structure with a wide base, Aqua is differentiated from its more conventional neighbors by undulating balconies that protrude from the taut envelope. Architect Jeanne Gang's balconies pierce that uninterrupted verticality with surging horizontal concrete planes. Serving as sun shades and wind blocks, the resulting balconies are supremely functional, while also providing the building with an unusual, innovative expressionism. These balconies were inspired by the weathered stone outcroppings that Gang observed along the shores of nearby Lake Michigan, providing Aqua with an abstracted marine character referencing both its location and Bertram Goldberg's nearby Marina City.

On the wide entry plinth, a thickened, curving porte-cochere covers the automobile drop off for the hotel on the north, while on the south, a landscaped garden covers a large hotel banquet room. The glazed tower rises from the center of the structure. Balconies on each level are unique to their specific floors, and extend out from the face of the building, curving out to a depth of twelve feet in some locations, and producing a tactile, rippling effect. The curving and varied balconies provide residents with particular views of Lake Michigan to the east, as well as the city rising to the north, south, and west. In areas without balconies, the blue-glazed envelope is revealed in irregular pond-shaped areas of glazing that is treated with reflective film to heighten the drama of the expression. Observed individually, the balconies are thin, apparently fragile structures, sinuously hovering out beyond the face of the building, while taken as a mass they become reef-like and powerful in their mass.

Aqua is perhaps the tallest building ever built by a woman-led firm, Studio Gang, which served as design architect for the building with Loewenberg and Associates as the architect of record working with the Magellan Development Company. With a large green roof, sun-shading balconies, UV-reflective glazing, and Chicago's first public electric-vehicle charging station, Aqua also reflects a contemporary concern with sustainability. An exciting rethinking of the possibilities of the glazed skyscraper and the value of good design in commercial development, Aqua is as important for its potential influence as for its observed impact. Marrying good design and profitable development, Aqua will hopefully inspire other real estate investors to erect thoughtful, innovative buildings.



Aqua; photo(s) by James Peters



05 | CRITERIA FOR ASSESSING STUDENT UNDERSTANDING

PART 1: Rubric for Grading Student Notes at Case Study Stations			
COMMON CORE STANDARDS: CCSS.ELA-LITERACY.RH.11-12.1, 11-12.2, 11-12.3			
KEY FACTS	YES student has recorded all “key facts” including: <input type="checkbox"/> name <input type="checkbox"/> date <input type="checkbox"/> use/program <input type="checkbox"/> height <input type="checkbox"/> location <input type="checkbox"/> style/movement architect <input type="checkbox"/> material(s) <input type="checkbox"/> structural systems	APPROACHING <input type="checkbox"/> student has not/mis-recorded 1 “key fact.”	NO <input type="checkbox"/> student has not/mis-recorded 2 or more of the aforementioned “key facts.”
INDIVIDUAL SUMMARIES Using outlines and/or annotations, student summarizes the argument(s) asserting architectural, historical, sociocultural, and/or technological significance put forth by primary/secondary texts.	YES <input type="checkbox"/> student extracts most, if not all, textual evidence to support arguments for architectural/historical significance <input type="checkbox"/> no significant recording/interpretive errors	APPROACHING <input type="checkbox"/> student extracts some textual evidence to support arguments for architectural/historical significance <input type="checkbox"/> minor recording/interpretive errors that do not change meaning of source	NO <input type="checkbox"/> student extracts little to no textual evidence to support arguments for architectural/historical significance <input type="checkbox"/> major recording/interpretive errors that change meaning of source

PART 2: INTEGRATION OF SOURCES			
COMMON CORE STANDARDS: CCSS.ELA-LITERACY.RH.11-12.8, 11-12.9			
COMPREHENSIVE SUMMARY Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources if any are present.	YES <input type="checkbox"/> student integrates most, if not all, relevant textual evidence into one comprehensive summary of skyscraper evolution in America <input type="checkbox"/> student notes, provides analysis of and offers explanation for discrepancies , if any are present	APPROACHING <input type="checkbox"/> student integrates some relevant textual evidence into one comprehensive summary of skyscraper evolution in America <input type="checkbox"/> student does not note, provides analysis of, nor offer explanation for discrepancies , if any are present	NO <input type="checkbox"/> student integrates little to no textual evidence into one comprehensive summary of skyscraper evolution in America <input type="checkbox"/> major recording/interpretive errors that change meaning of source

PART 3: USING DIVERSE SOURCES TO SOLVE A PROBLEM			
COMMON CORE STANDARDS: CCSS.ELA-LITERACY.RH.11-12.7			
<p>PROPOSED SOLUTION</p> <p>Based on their understanding of American skyscraper's evolution, students envision its future by proposing a hypothetical innovation to address a pressing social, economic, political or scientific problem.</p>	<p>YES</p> <ul style="list-style-type: none"> <input type="checkbox"/> based on at least 1 credible resource for which sourcing/citation is provided, student identifies pressing social, economic, political or scientific problem concerning the built environment <input type="checkbox"/> student asserts and defends a plausible future for the American skyscraper; that cogently addresses the identified problem 	<p>APPROACHING</p> <ul style="list-style-type: none"> <input type="checkbox"/> student merely alludes to a problem which may or may not be of pressing concern, especially in regard to the built environment <input type="checkbox"/> student offers a reasonably plausible solution which moderate relevance to the built environment 	<p>NO</p> <ul style="list-style-type: none"> <input type="checkbox"/> does not state a problem, or problem is of no concern to the matter at hand <input type="checkbox"/> inappropriate solution is suggested with little to no defense provided

06.1 | BIBLIOGRAPHIC RESOURCES

Skyscrapers of the Future Will Be Engineered to Copy Nature

<https://www.youtube.com/watch?v=-OPGQ9EhDZM>

Jean A. Follett, "Rookery Building" [Chicago, Illinois], SAH Archipedia, eds. Gabrielle Esperdy and Karen Kingsley, Charlottesville: UVaP, 2012—, <http://sah-archipedia.org/buildings/IL-01-031-0078>. Accessed 2018-07-28.

Osmund Overby and Carolyn Toft, "Wainwright Building" [St. Louis, Missouri], SAH Archipedia, eds. Gabrielle Esperdy and Karen Kingsley, Charlottesville: UVaP, 2012—, <http://sah-archipedia.org/buildings/MO-01-510-0003>. Accessed 2018-07-28.

Gray, Christopher, "Streetscapes: The Flatiron Building; Suddenly, a Landmark Startles Again," [New York, New York], *New York Times*, New York City, July 21, 1991. Accessed July 28, 2018. <https://www.nytimes.com/1991/07/21/realestate/streetscapes-the-flatiron-building-suddenly-a-landmark-startles-again.html>.

Dietz, Paula, "A Two-Day Tour of Mies's Legacy" [New York, New York], *New York Times*, New York City, June 8, 1986. Accessed July 28, 2018. <https://www.nytimes.com/1986/06/08/travel/a-two-day-tour-of-mies-s-legacy.html>.

Seagram Building

<https://interactive.wttw.com/tenbuildings/seagram-building>

Muschamp, Herbert, "Best Building; Opposites Attract," [New York, New York], *The New York Times*, New York City, April 18, 1999. Accessed July 28, 2018.

<https://www.nytimes.com/1999/04/18/magazine/best-building-opposites-attract.html>.

Elizabeth Milnarik, "Aqua" [Chicago, Illinois], *SAH Archipedia*, eds. Gabrielle Esperdy and Karen Kingsley, Charlottesville: UVaP, 2012—, <http://sah-archipedia.org/buildings/IL-01-031-0008>. Accessed 2018-07-28.

07 | METADATA SUBJECT TAGS

BUILDING	PEOPLE + FIRMS	STYLE + PERIODS	MATERIALS	BUILDING TYPES + COMPONENTS
Rookery	+ Burnham and Root + Frank Lloyd Wright + McClier Corporation	+ Richardsonian Romanesque	+ brick + Carrara marble + cast iron + glass + granite	+ commercial buildings
Wainwright	+ Adler and Sullivan + Charles K. Ramsey + Hastings and Chivetta	+ Chicago School	+ brick + red granite + steel + terracotta	+ high-rise buildings + office buildings
Flatiron Building	+ Daniel Burnham + Frederick P. Dinkelberg	+ Renaissance Revival + Beaux-Arts	+ steel + terracotta	+ office building + commercial buildings
Seagram/ 860-880 Lake Shore Drive	+ Harboe Architects + Krueck and Sexton + Ludwig Mies van der Rohe + Wiss Janney Elstner Associates + Philip Johnson	+ International Style + Modernist + Mid-century Modernist	+ plate glass + steel + travertine + bronze + curtain wall + glass	+ apartments + high-rise buildings + corporate headquarters + office buildings + plazas + restaurants + skyscrapers
Aqua	+ Loewenberg Architects + Studio Gang Architects	+ sustainability + LEED	+ architectural glass + reinforced concrete	+ apartment houses + condominiums + hotels + office buildings + retail stores + skyscrapers