

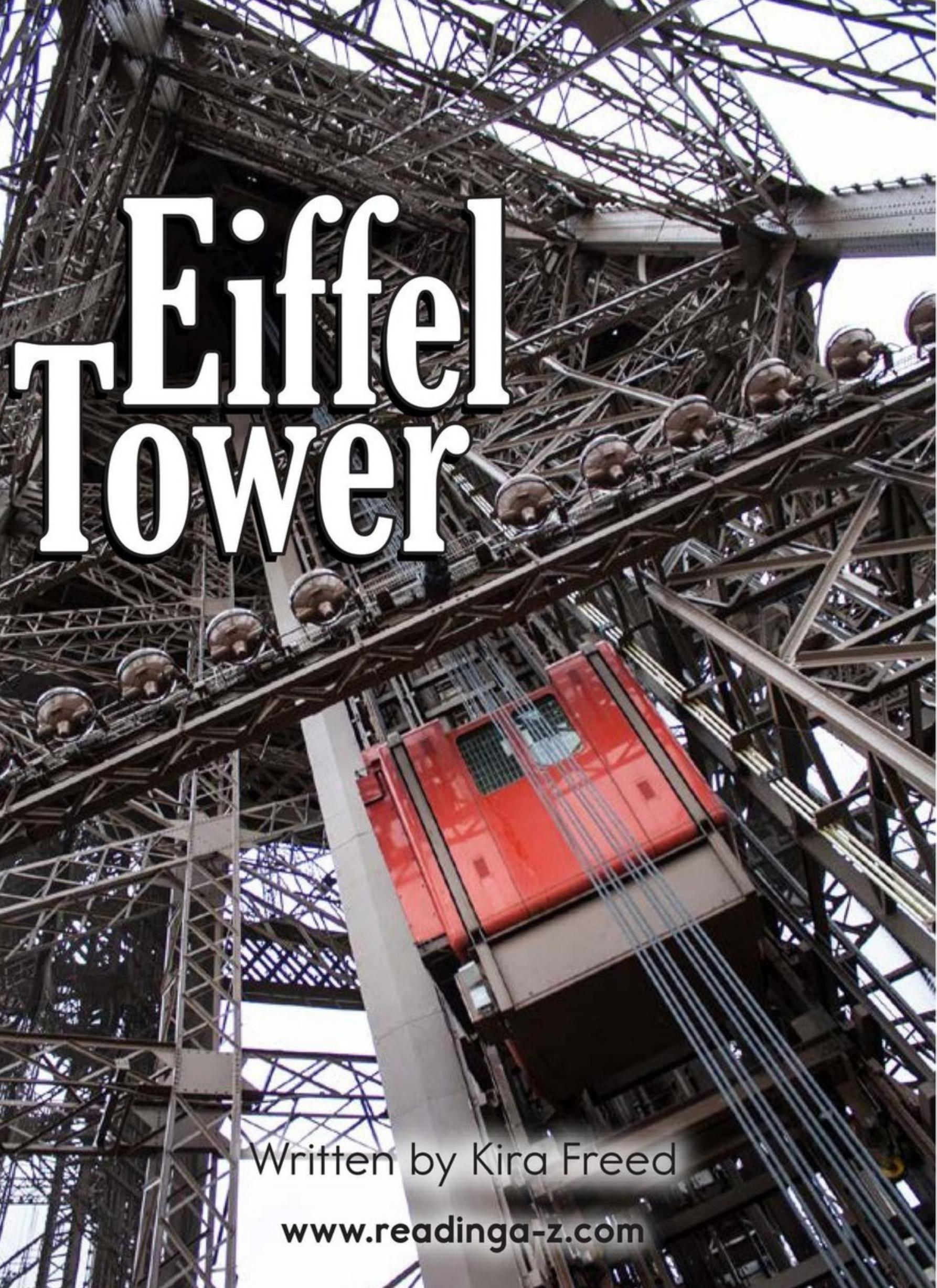
LEVELED BOOK • Z¹

Eiffel Tower



Written by Kira Freed

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Focus Question

How did the Eiffel Tower surpass expectations and become a well-known landmark?

Words to Know

assembled
engineer
eyesore
feat
girders
hydraulic

landmark
latticework
plunging
precision
replicas
transmissions

Front and back cover: The Eiffel Tower is located on the Seine River in Paris, France.

Title page: Elevators carry nearly seven million visitors a year to the top of the Eiffel Tower.

Page 3: On a clear day, visitors enjoy spectacular views from an observation deck on the tower.

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World Landmarks
Level Z1 Leveled Book
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Correlation

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Reading Recovery	N/A
DRA	60



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The Eiffel Tower is by far the tallest structure in Paris.



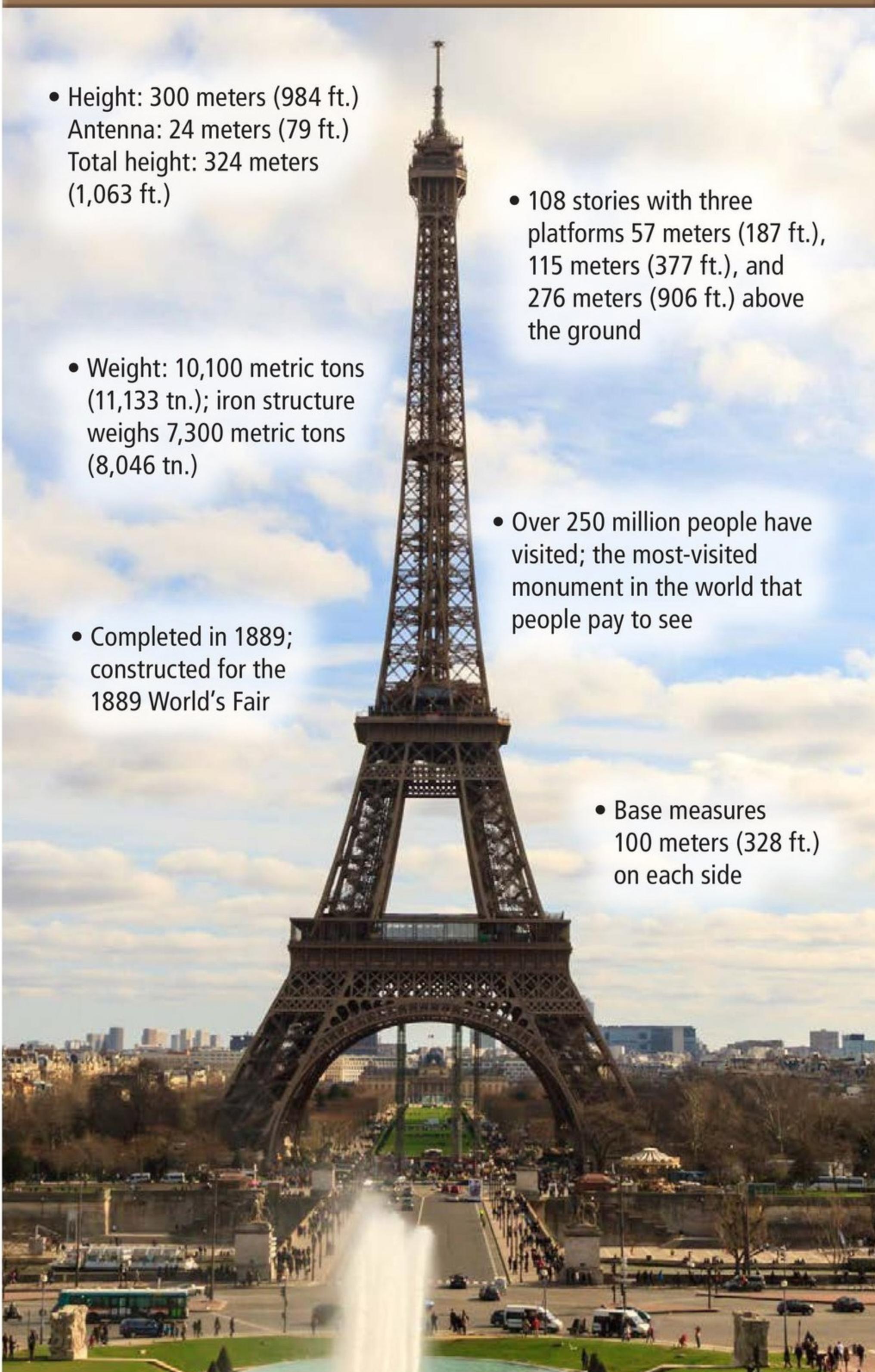
Paris Icon

If you ever travel to the European country of France and visit Paris, its capital, you can't miss seeing the Eiffel Tower. Even if you don't actually take a tour of this world-famous **landmark**, you'll see it from practically every part of the city. The wrought-iron structure, which towers over the "City of Light," has been fascinating people from around the world ever since it first opened to the public in 1889. Since that year, more than 250 million people have visited the Eiffel Tower, and they frequently use one word to describe it: *breathtaking*.

The Eiffel Tower

- Height: 300 meters (984 ft.)
Antenna: 24 meters (79 ft.)
Total height: 324 meters
(1,063 ft.)
- Weight: 10,100 metric tons
(11,133 tn.); iron structure
weighs 7,300 metric tons
(8,046 tn.)
- Completed in 1889;
constructed for the
1889 World's Fair
- 108 stories with three
platforms 57 meters (187 ft.),
115 meters (377 ft.), and
276 meters (906 ft.) above
the ground
- Over 250 million people have
visited; the most-visited
monument in the world that
people pay to see

- Base measures
100 meters (328 ft.)
on each side



Tower of Power

The Eiffel Tower is a huge bronze-colored iron structure made of four slightly curved **girders**. Enormous decorative arches beneath the lowest of three platforms contribute an appealing balance to the gentle curve of the rising girders.

The original height of this unmistakable landmark was 312 meters (1,024 ft.) from the ground to the top of the tower's flagpole. For its first forty-one years, the Eiffel Tower was the tallest structure ever constructed—until New York's Chrysler Building was built in 1930. The antenna at the top of the Eiffel Tower, which was installed in 1957, brings the tower's total height to 324 meters (1,063 ft.).



The iron tower's light and airy-looking design was considered a major architectural achievement of its time.

The Eiffel Tower



City of Light

The Eiffel Tower was constructed for the 1889 World's Fair, which marked the hundredth anniversary of the French Revolution. The tower celebrates the power that citizens have when they band together. The structure is situated along the south bank of the Seine (SEN) River on the Champ de Mars (shawm duh MARS), a large public greenspace. People gather there day and night to marvel at the famous landmark.

Paris's French nickname, *La Ville-Lumière*, is often translated as "City of Light." It actually means "City of Enlightenment," referring to the value that the people of the city place on culture and knowledge. The area where the Eiffel Tower is located has many attractions, including museums, gardens, fountains, ornamental ponds, and cultural centers.

A Daring Dream

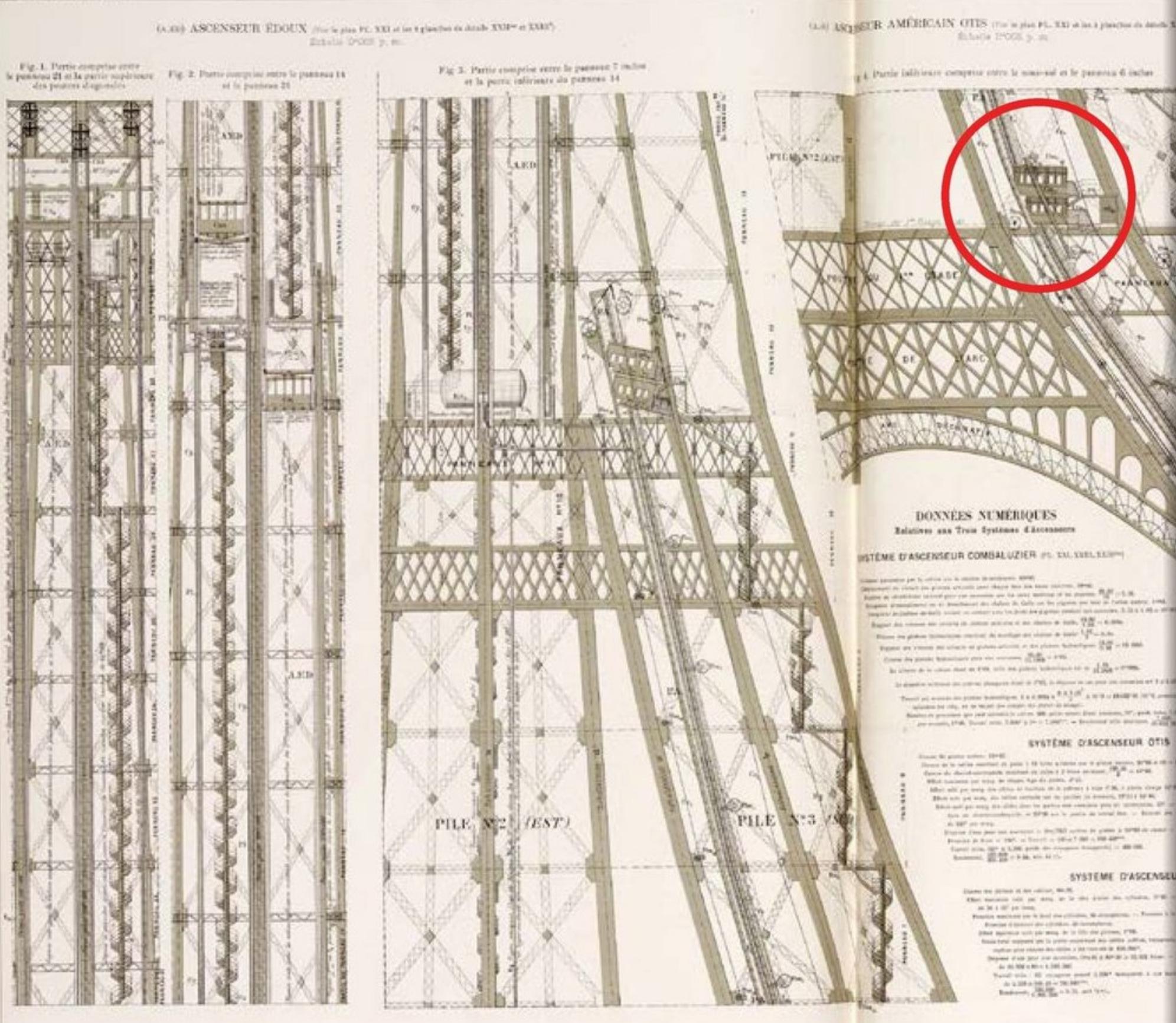
Credit for the design of the Eiffel Tower usually goes to French civil **engineer** Gustave Eiffel (eh-FEL in French), who had helped design the Statue of Liberty. However, the original drawings were the work of Maurice Koechlin (mor-EES kay-KLAHN) and Emile Nouguier (ay-MEEL NOO-gee-ay), who were the chief engineers for Eiffel's company. In 1884, they developed the tower's design with the intention of entering it in a contest. The contest's organizers were looking for designs for the centerpiece of the 1889 World's Fair. Koechlin and Nouguier came up with a design for a tall tower made of a **latticework** of iron beams. The beams would serve as four legs at the base and would curve inward as they rose higher until they came together at the top. Horizontal metal beams would join the four main beams at regular intervals along the four sides of the structure.

Before building the Eiffel Tower, Gustave Eiffel (1832–1923) designed hundreds of metal structures, including a railway station, an observatory, and many bridges.



ASCENSEURS. — RÉSERVOIRS. — CANALISATION. — COUPE VERTICALE SUIVANT LA DIAGONALE DE

TOUR DE 300 MÈTRES



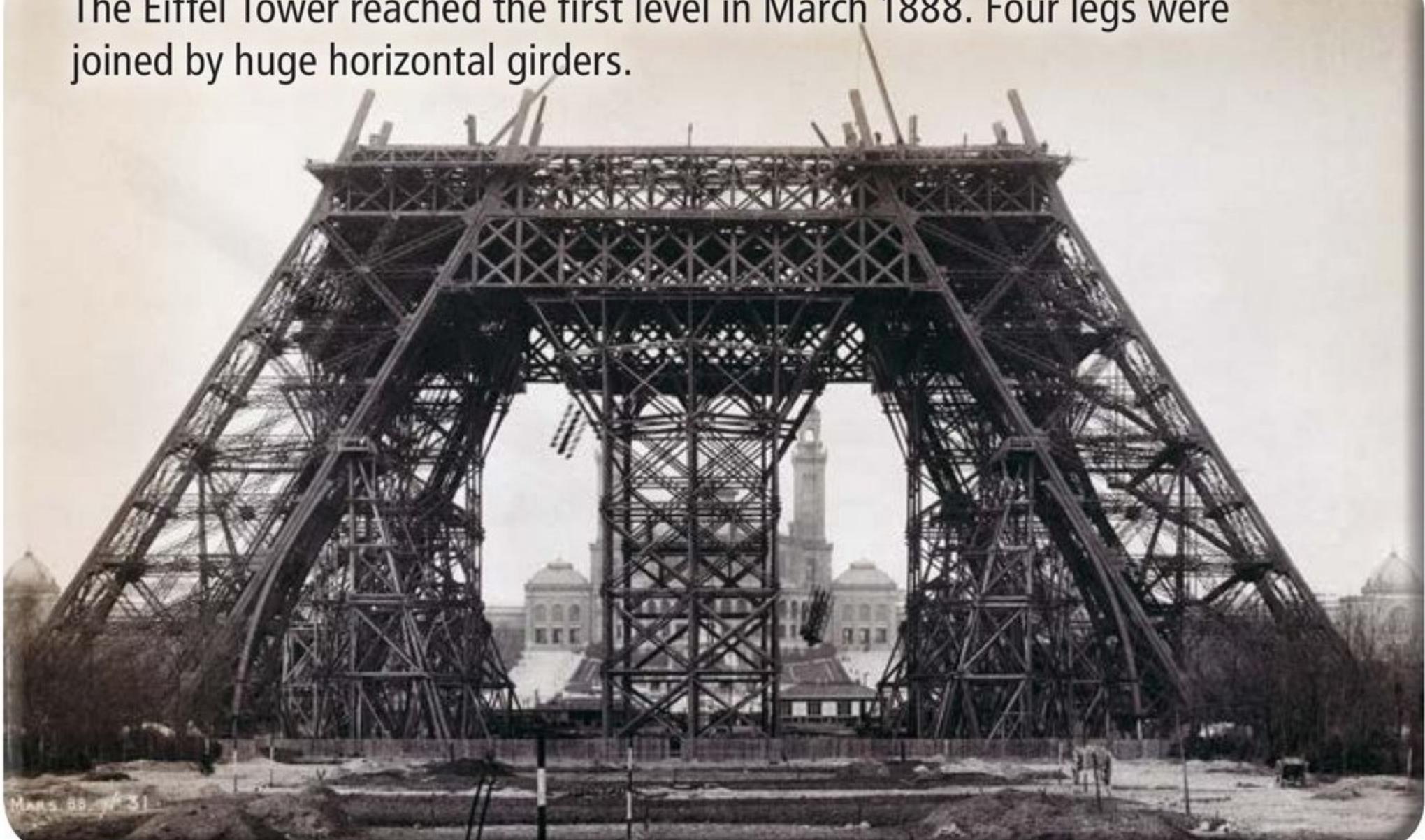
Elevators (upper right) were included in this diagram showing some of the detailed construction plans for the tower.

Eiffel's engineering firm already knew how to build supports for bridges. However, applying their mastery to a structure 300 meters (984 ft.) tall was a daring idea. They brought in a French architect named Stephen Sauvestre to ensure that the finished tower would be beautiful as well as structurally sound. Sauvestre recommended adding enormous curved arches to connect the tower's columns and large halls on each level with walls made of glass.

A total of 107 projects were proposed for the contest. After their design was declared the winner, Eiffel's team began construction. Ground was broken on January 26, 1887, and the supports began to be **assembled** on July 1 of the same year. The entire project was completed just over two years later, on March 31, 1889.

The tower is constructed of 18,038 pieces weighing 7,300 metric tons (8,046 tn.). Eiffel used latticework wrought iron. He wanted to demonstrate that metal was as strong as stone without weighing as much. The pieces of the tower were first prepared at Eiffel's factory, located on the outskirts of Paris. A total of 150 workers assembled individual pieces to form sections that each measured about 5 meters (16 ft.) in length.

The Eiffel Tower reached the first level in March 1888. Four legs were joined by huge horizontal girders.





In July 1888, the second horizontal section of the tower was in place (left). By late November, the tower was nearing completion (right).

The individual pieces forming the sections were joined with bolts at the factory. At the site, the bolts were replaced with rivets, which were heated up before being installed. The rivets shrunk after cooling, which caused the shaft of each rivet to become shorter and pulled the two “heads” together, guaranteeing an extremely tight fit. A total of 2.5 million rivets were used, each one installed by a team of four workers.

The foundation, which is made of stone and cement resting on a layer of gravel, was positioned to resist wind. During construction, the four legs sat on sandboxes and **hydraulic** jacks so the first platform would be level. This was required in order to ensure that the remainder of the tower above it would be properly balanced.

Up to three hundred workers assembled the tower using wooden scaffolds and small steam cranes. The tower was considered an engineering marvel. The speed of completion—two years, two months, and five days—combined with the degree of **precision** at every stage were remarkable at the time. Also remarkable were the elevators, which were considered an important technical **feat**. No one had ever used elevators in such a tall structure.

After the tower's construction was complete, workers coated it with 60 metric tons (66 tn.) of paint to protect it from rust. Since 1899, workers have repainted it every seven years. The tower's color has changed over the years from dark red to dark yellow to brown and most recently to bronze.

wowser!

- The Eiffel Tower sways a little due to wind, but it moves more because of heat. On hot days, the part of the tower in sunlight expands, which causes the tower to lean up to 18 centimeters (7 in.).
- A single elevator in the Eiffel Tower travels about 103,000 kilometers (64,000 mi.) each year—the equivalent of two and a half trips around Earth's circumference.



Doubters and Dissenters

When Gustave Eiffel and his team were drawing up their plans, not everyone was in favor of the ambitious project. Eiffel already had a good record of designing challenging structures. Some people, however, doubted that he could build a tall tower capable of withstanding the wind. One math professor predicted that a tower even three-fourths the height of the one being designed would collapse.

In addition, not everyone was thrilled about how the tower was going to change Paris. After construction began, a group of three hundred artists, writers, and architects asked the Paris Exposition to halt the project. The petition called the tower “ridiculous” and claimed that it would be an **eyesore** as offensive as a “gigantic black smokestack.”

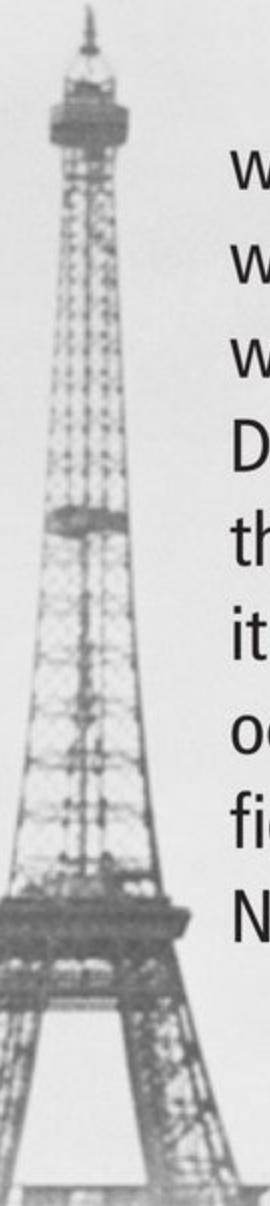
Construction proceeded despite objections, and the tower was eventually completed just over a month before the World’s Fair began. People were awed by the architectural sensation during the six months or so when the World’s Fair was open as well as afterward. However, the tower was constructed as a temporary exhibit and was scheduled to be torn down after twenty years.

Eiffel didn't want the tower dismantled, so he worked to give it lasting value to the scientific community. He described his vision by saying, "It will be an observatory and a laboratory such as science has never had at its disposal." The day after the tower was first open to the public at the fair, Eiffel equipped the third floor with a meteorology laboratory. The lab contained barometers, lightning conductors, wind gauges, and other instruments. Eiffel opened the lab for use by scientists studying a wide range of topics and also conducted thousands of experiments of his own.

The Paris Exposition, a celebration of French achievements, was held from May 6 to October 31, 1889. Over eighty structures on the Champ de Mars had exhibits from Europe as well as North and South America.



The Eiffel Tower During WWI and WWII



During World War I, the tower was used by the French military for wireless communication with ships as well as to intercept enemy messages. During World War II, Hitler ordered the Eiffel Tower to be demolished, but it never took place. When Germany occupied Paris, French resistance fighters cut the elevator cables so the Nazis would have to use the stairs.



Adolf Hitler and a group of German Nazis on a tour of Paris in July 1941

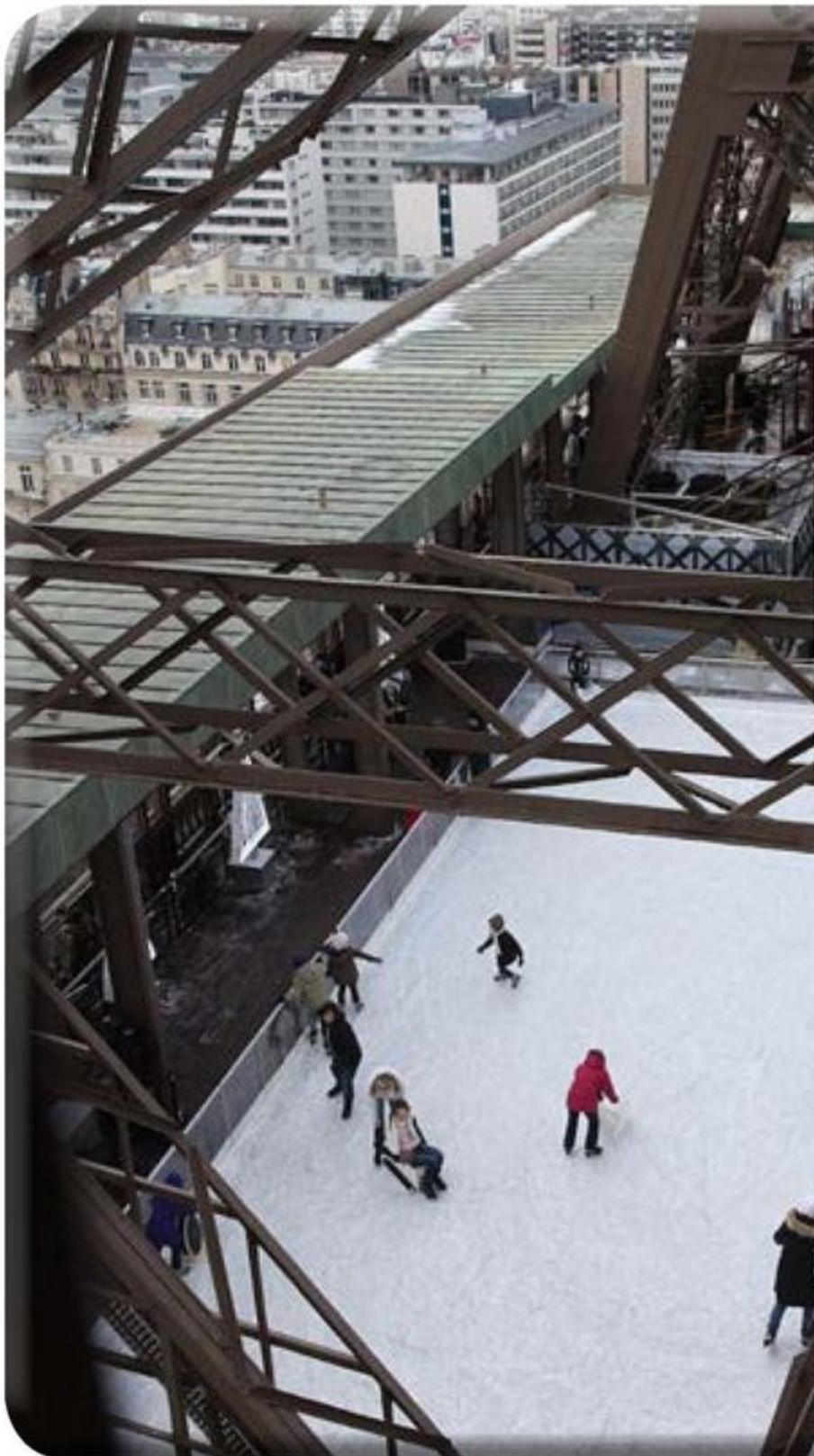
The tower's great height eventually became its saving grace. In 1909, it began to be used for the first radio **transmissions** and later, in 1925, was used for the first public radio program. Also in that year, it began to be used for experiments in television, and 1935 marked the beginning of the first regular broadcasts. Today, the Eiffel Tower has 120 radio and television antennas.

Exploring the Tower

A thrilling way visitors experience the Eiffel Tower is by taking one of the glass elevators to the top. On the way up are views of the landmark's architecture at a range of heights. At the top, visitors are treated to an exquisite view of Paris and its many places of interest. The top of the tower includes two levels, one covered and the other in open air so visitors can enjoy the view day or night in any weather. The top floor also includes Gustave Eiffel's restored office as well as maps with directions and distances to various other major cities.



At the top of the Eiffel Tower, visitors enjoy a grand view of Paris. They can also see Eiffel's restored office with wax figures of Gustave Eiffel (right) in conversation with Thomas Edison (left).



The first and second floors offer many attractions, including souvenir shopping, dining, and an ice-skating rink 57 meters (187 ft.) above Paris.

The second floor has souvenir shops, restaurants, and displays about the tower's construction. It also has a glass window with a **plunging** view down to ground level. The first floor's main attraction is a transparent floor that creates the illusion that you're walking on air as you look down 57 meters (187 ft.) to the ground below. Also on the first floor are interactive displays about the tower, a video show, restaurants, and shops. There is also a piece of the original spiral staircase to Eiffel's office. Since 2004, the first floor also has an ice-skating rink every winter. Behind-the-scenes tours offer extras such as a visit to the original engine room, which still controls the elevators.

If you're lucky enough to be in Paris during a special event, you'll enjoy an additional treat at the Eiffel Tower—a light or fireworks show! To celebrate the Chinese New Year in January 2004, the magnificent structure was bathed in red lighting. In May 2006, the tower was decked out in blue on Europe Day, a celebration of peace and unity in Europe. When France hosted the Rugby World Cup in 2007, the tower was adorned with an enormous rugby ball, green lighting for the playing field, and beams of light to represent the goal. A spectacular light and fireworks show took place at the Eiffel Tower to usher in the year 2000.



To celebrate the year 2000, over a million people gathered on the streets to see a spectacular New Year's Eve LED light and fireworks display at the Eiffel Tower.

At night, the tower's sensors automatically turn on 336 projectors furnished with yellow-orange lamps.



A Must-See Landmark

The Eiffel Tower is one of the most easily recognized tourist attractions on the planet. It's been an important part of the plot in dozens of novels and movies, including many in which it is destroyed. It has inspired over thirty **replicas**, including ones in Guatemala, Japan, Pakistan, Romania, Belgium, Mexico, China, Russia, and Las Vegas, Nevada. Not surprisingly, there are also replicas in Paris, Texas, and Paris, Tennessee!

The tower has also inspired many people to sketch it or write about their impressions of it. To some people, the tower is a symbol of history; to others, it is a symbol of love and romance. Whatever the attraction, people know of this iconic structure and dream of visiting it. If you ever go to Paris, you must visit the Eiffel Tower.

Glossary

assembled (<i>v.</i>)	put together from parts; gathered together (p. 10)
engineer (<i>n.</i>)	a person who designs, builds, or repairs machines, buildings, bridges, or other structures (p. 8)
eyesore (<i>n.</i>)	something that is especially unattractive (p. 13)
feat (<i>n.</i>)	an amazing action or accomplishment (p. 12)
girders (<i>n.</i>)	large beams made of steel or iron (p. 6)
hydraulic (<i>adj.</i>)	operated by the pressure or movement of a liquid, such as water (p. 11)
landmark (<i>n.</i>)	an important historical building or site; an object on land that marks a place (p. 4)
latticework (<i>n.</i>)	a framework formed from overlapping wooden or metal strips (p. 8)
plunging (<i>adj.</i>)	relating to a rapid fall or a steep slope (p. 17)
precision (<i>n.</i>)	the quality of being exact or accurate (p. 12)
replicas (<i>n.</i>)	copies or reproductions of something (p. 19)
transmissions (<i>n.</i>)	things, such as messages, that are sent from one person or place to another (p. 15)

Eiffel Tower

A Reading A-Z Level Z1 Leveled Book

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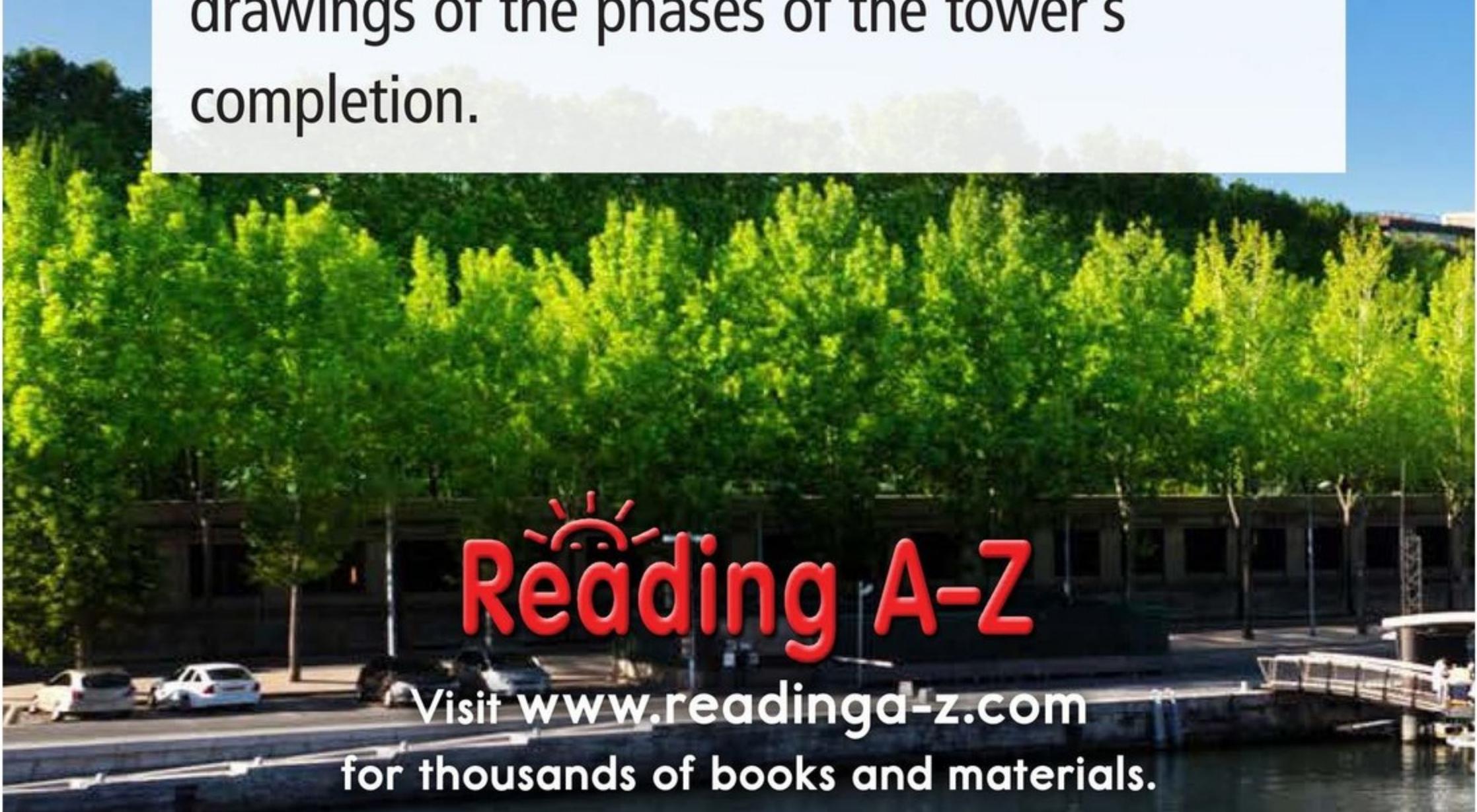
Connections

Writing

Write an informational report about the Eiffel Tower, including its history, construction, and impact on the world. Use facts from the book as well as additional resources for your report.

Social Studies

Make a timeline of the construction of the Eiffel Tower. Include at least seven dates on your timeline, and include pictures or drawings of the phases of the tower's completion.



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