



April 2016

zoom **in on america**

By the U.S. Missions of Austria and Poland

Volume VII. Issue 4.

THE GOLDEN GATE BRIDGE



Workmen wearing steel helmets lay the catwalks for the Golden Gate Bridge in San Francisco, September 19, 1935. (AP Photo)

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Zoom in on America

FROM AN IDEA TO... ONE OF THE MOST BEAUTIFUL BRIDGES

Design, but not just a design...

When it was designed and constructed, the Golden Gate Bridge was a one of a kind venture both in design and engineering. The first design proposed by Joseph B. Strauss was dismissed on the grounds of its unsightly architecture. And so the chief engineer changed his project and designed the bridge as a suspension span. When it opened in May 1927, it was the longest suspension span bridge in the world and held the record for 27 years. The scale of the project required thousands of calculations for the computation of stresses, which were made by a math genius Charles Ellis. Novel methods, such as the spinning of cables on location, were applied.

Work, but not just work...

It was the job for fearless men who did not shun heights. As the bridge towers rose, workers had to climb the high steel in fair weather or foul. Those who live in the Golden

Gate area or just visit it briefly know how quickly the local weather can change: the fog comes in unexpectedly, mar- rying visibility and making iron items icy and slippery. The high winds can be so powerful that they seem capable of literally blowing off those who work on the towers. But there was work to be done and no time to lose. And there were 600,000 rivets to put in each tower and 80,000 miles of steel wire to spin the cables.

Origins of the name

The Golden Gate Bridge took its name from the channel formed where the mouth of the San Francisco Bay meets the Pacific Ocean. Interestingly, the strait was named the Golden Gate even before the California Gold Rush began in 1848. Since it appeared in the memoirs of John Frémont, a military officer, politician, and an explorer, he is believed to be its author. As a matter of fact, Frémont be- came a millionaire when on his land near Mariposa rich ore veins were found.



The north end of the Golden Gate bridge model built by Venerando Indelicato, of San Francisco, showing the wealth of detail the hobbyist put into the bridge and the area around it, August 21, 1950. The bridge is made of vine-maple wood. Concrete was laid over shavings to simulate the land. (AP Photo/Ernest K. Bennett)

The idea

The idea of the bridge also came about long before such an undertaking was technically possible. In 1869 Joshua Abraham Norton, known as "Emperor Norton," called for a bridge to be built to connect San Francisco and Oakland. This picturesque San Francisco merchant who went bankrupt proclaimed himself "Norton I, Emperor of the United States and Protector of Mexico," and was inspiration for the character of the King in Mark Twain's *Huckleberry Finn*, as well as other literary fiction. Eccentric as he was, his dream was picked up after many years and once the bridge was actually built some wanted to name it *The Emperor Norton Bridge*.

Chief engineer

For a long time it was deemed impossible to construct a bridge, first because of the distance and second, due to turbulent currents in the Golden Gate strait. It was not until the first decades of the 20th century that with the advancements in the field of engineering the thought was seriously considered by the influential men of San

Francisco. They turned to Joseph B. Strauss, who had an engineering company in San Francisco. Strauss had previously worked as principal assistant of Ralph Modjeski, bridge engineer who was involved in construction of about 50 bridges across the United States and was chairman of the board of consulting engineers for the San Francisco–Oakland Bridge.

Waiting for approvals

But it was still a long way to go. The original design submitted by Strauss had to be changed and a bill had to be introduced in the California Legislature in order to enable financing and construction of the project. Finally, it had to be approved by the War Department, the owner of the land on both sides of the strait. The modified design was for a simple suspension bridge with a main span of 4,200 feet (1,280 m) and before the beginning of 1933 all paperwork and permits were finally obtained. Money needed for the construction was another big issue. The citizens made an unprecedented decision to put up their homes, farms and business properties as collateral for a \$35 million bond issue to finance the construction.



Workers complete the catwalks for the Golden Gate Bridge, spanning the Golden Gate Strait, prior to spinning the bridge cables during construction in San Francisco, October 25, 1935. (AP Photo)

The beginnings

Construction of the bridge began in January 1933. It is hard to imagine the magnitude of work that had to be done. First, two massive concrete blocks - anchorages - had to be built. This work was done by divers who set explosives to blast away rock in order to make space for the blocks. Strong tidal currents were a challenge and the workers could not stay long under water. Two towers 746-foot-tall top the anchors. For a suspension bridge the cables are of great importance as they support the whole structure of the bridge. They are strung horizontally on each side of the bridge between the anchorages. Additional vertical cables - suspender ropes - attach the main cable to the roadway. The cables were spun on the construction site by the same company - Roebling's Sons Co - which had made the cables for the Brooklyn Bridge.

A desirable job

During the Great Depression the construction of the Golden Gate Bridge was creating jobs and helped many families survive the hard times. As it was a requirement that the workers would be local inhabitants, many people who came to San Francisco looking for a job bought addresses from the city's residents.

Safety of work - a crucial issue

Strauss made the safety of workers a priority. All employees had to adhere to strict safety procedures; they had to wear a hard hats, glare-free goggles, use hand and face cream to protect their skin from the high winds. They were even required to be on special diets which were believed to fend off dizziness. Goofing off was forbidden and all who failed to comply were fired. In order to protect those who worked on heights Strauss had a net installed under the bridge. The net extended the length and the width of the bridge.

Halfway to Hell Club

While strict adherence to all safety precautions brought good results and saved many lives, there still was an unfortunate accident which killed 10 workers when a scaffolding suddenly collapsed. The net could not hold it and the scaffolding with the workers fell into the water. On other occasions the net saved the lives of workers who happened to fall off while working on heights. In all 19 lives were saved and the lucky survivors even called themselves "Halfway to Hell Club."



Workers install the first section of a huge safety net, at a cost of \$98,000, that extended from shore to shore beneath the Golden Gate Bridge span during construction of the bridge in San Francisco, September 2, 1935. (AP Photo)

GOLDEN GATE OPENING CELEBRATION

San Francisco's Golden Gate Bridge was completed and opened on May 27, 1937. The festivities lasted from May 27 to June 2, 1937. The official program of the celebration included proud greetings of the city Mayor Angelo J. Rossi:

"With eager expectation, San Franciscans and the citizens of the Redwood Empire have looked forward to this day when the mighty Golden Gate Bridge would be opened to the traffic of the world. / To you who have come from afar, we offer hospitality beyond measure. May the Bridge be a bond, uniting us ever in the bonds of brotherhood."

On the first day, May 27, the bridge opened simultaneously on the San Francisco and Marin sides exclusively for pedestrians.

The day included sports events: bowling and handball tournaments as well as hard-rock drilling championships.

There was a parade, advertised in the program as "All the color and romance of the West passing in thrilling review."

There were exhibitions such as Industrial and Manufacturers Exposition displaying California Products. Other events included Native Sons' and Daughters' Ceremonial, and the day wound up with a historical pageant of the history of California.

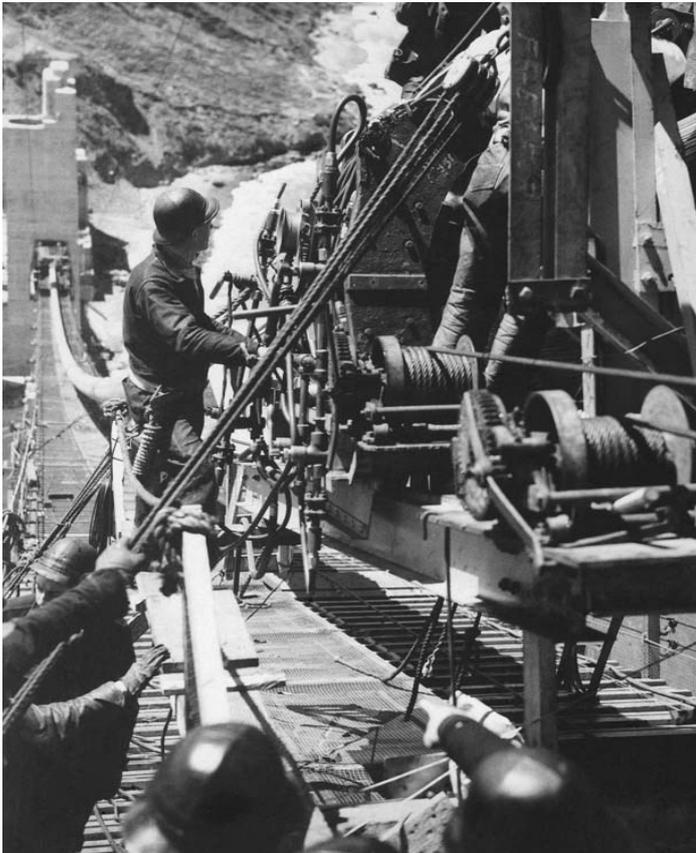
On Friday, May 28, 1937 the bridge was opened to traffic.

In addition to the tournaments begun on the previous day, there was "Massed flight over Bridge by 500 planes from Navy aircraft carriers Ranger, Lexington and Saratoga. [...]"

At noon, accompanied by booming of cannons and blowing of whistles all over San Francisco and Marin County, the Golden Gate Bridge was opened to traffic from two sides simultaneously.

In the afternoon all the capital ships of the Navy led by the battleship Pennsylvania arrived. This was followed by a boat ride and another pageant "The Span of Gold".

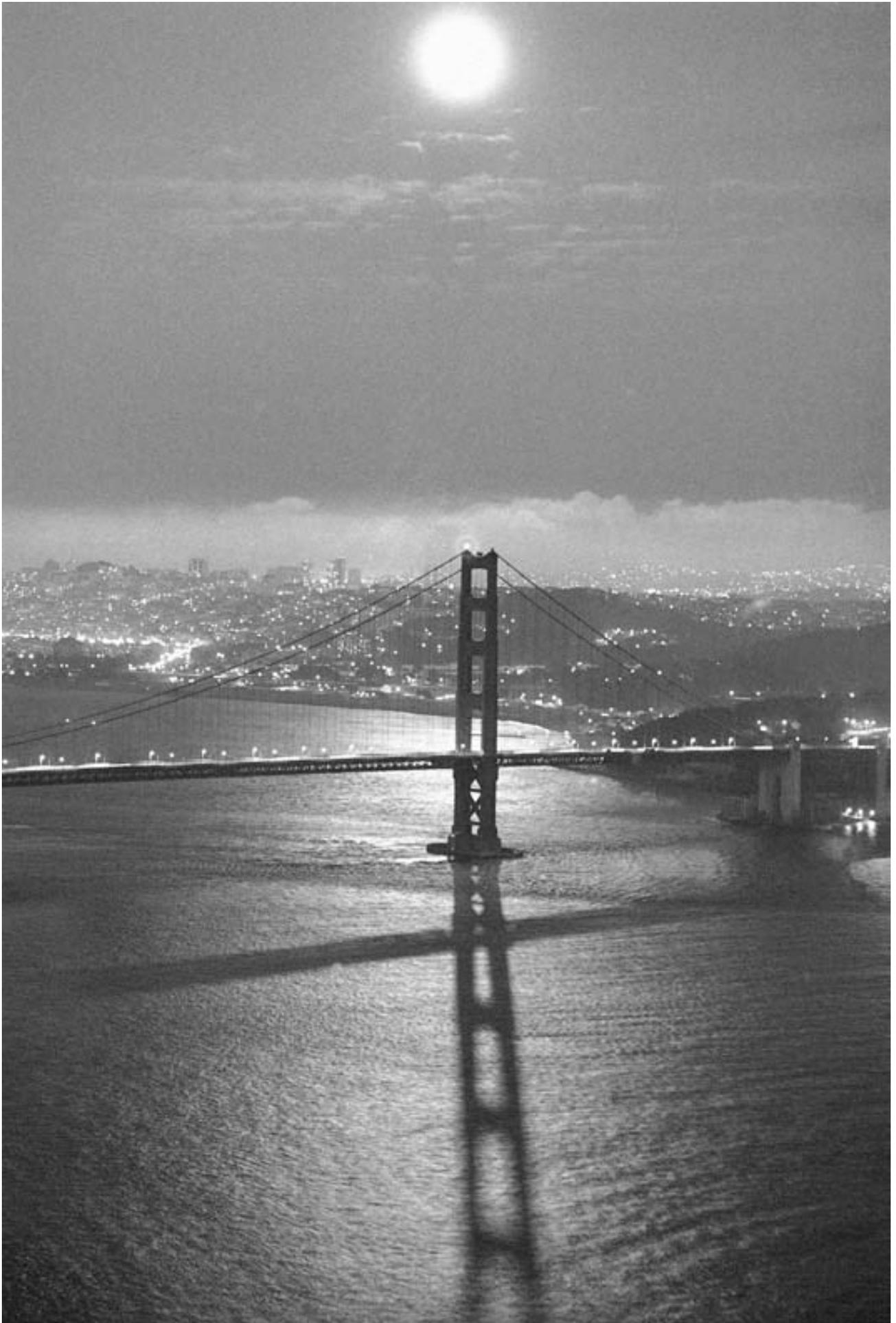
A fireworks display finished the second day of the opening celebration.



Workmen with an intricate mechanism swung high above the rocky shores of San Francisco's Golden Gate on June 6, 1936. The workmen are tying together the myriad strands of the 36 1/2 inch cables that support the Golden Gate Bridge. (AP Photo)



Ed Stanley drives the golden rivet to mark the completion of the \$35,000,000 Golden Gate Bridge spanning the entrance to San Francisco Bay, April 29, 1937. Holding the rivet is Ed Murphy and leaning over them is Joseph B. Strauss, chief engineer of the project. (AP Photo)



The moon shines down on the Golden Gate Bridge in San Francisco, Monday, July 6, 1982 on the night of the lunar eclipse. In the background is the San Francisco skyline. (AP Photo/Paul Sakuma)

Activity Page

Exercise 1: Speaking

Work with a partner.

1. Tell the other student what your dream job would be. Why?
2. If you already have a job, describe what you do and tell them, if this is your dream job. Why? Why not?
3. Talk about the jobs that the workers working on the Golden Gate Bridge had. Why were they difficult?

Exercise 2: Grammar: Articles

Decide if an article is needed in the blanks in the text below and put in the missing ones:

... (1) Golden Gate bridge is one of ... (2) most famous and beautiful bridges in ... (3) world because of its spectacular location, graceful lines, Art Deco detailing, and emblematic color. With towers extending 700 feet into ... (4) sky and over 100 feet beneath ... (5) bay, ... (6) bridge is also ... (7) engineering marvel. You may walk or bike ... (8) entire length of ... (9) 1.2 mile-long bridge, but dress warmly! At ... (10) south end, gifts can be purchased at ... (11) Golden Gate Bridge Pavilion and ... (12) café provides ... (13) food. During ... (14) part of ... (15) year with ... (16) daylight savings time, ... (17) bridge walk is open to ... (18) pedestrians between 5 a.m. and 9 p.m. ... (19) remainder of ... (20) year ... (21) bridge walk is open from 5 a.m. to 6:30 p.m.

(Text from National Park Service website)



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Bill Gaure, maintenance worker on the Golden Gate Bridge in San Francisco, nears the top of the north tower after nearly a half-mile uphill hike from the center of the span, May 15, 1952. In the background at center, is a residential area of San Francisco, and at upper left is part of the Presidio. The bridge was built right where the Pacific Ocean and San Francisco Bay meet. (AP Photo/Ernest K. Bennett)