

Building Big Dreams

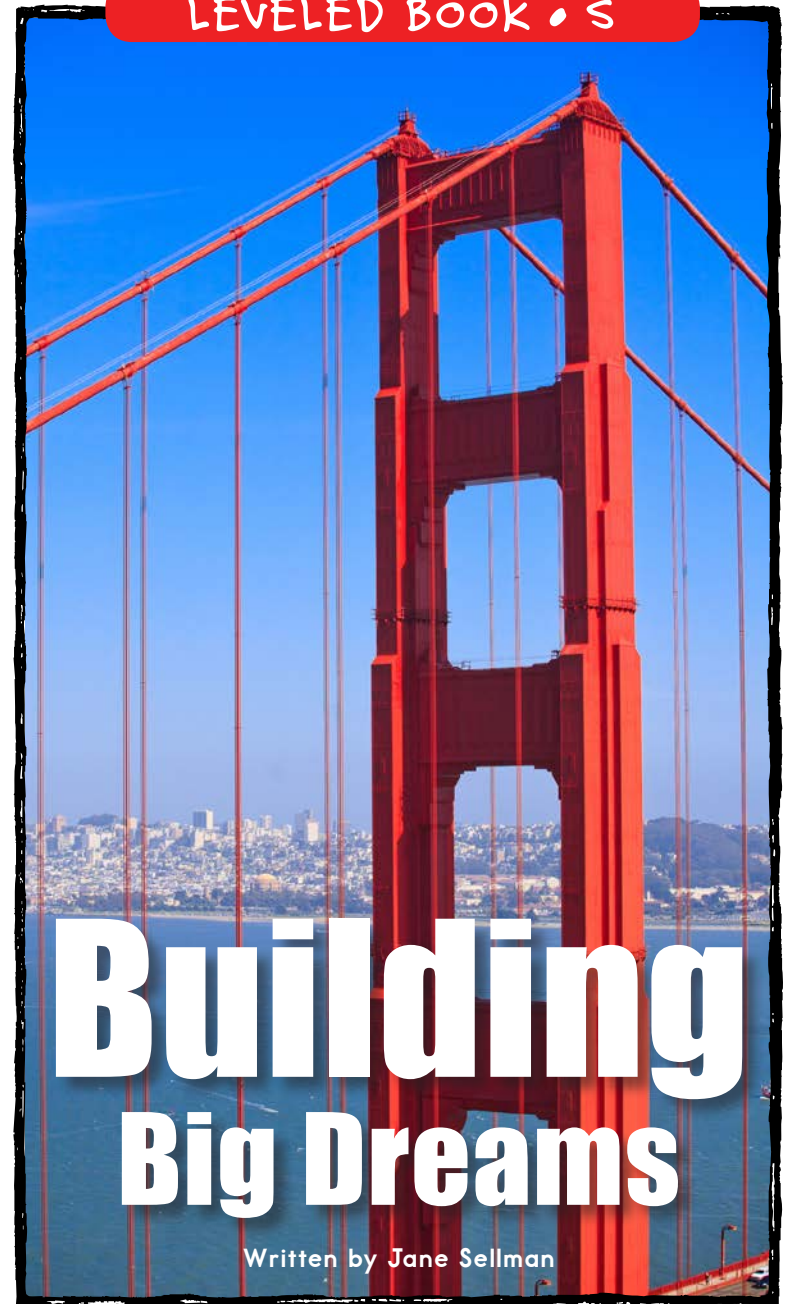
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Written by Jane Sellman

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Glossary

canal (<i>v.</i>)	a waterway dug across land that is used for transportation or irrigation (p. 11)
dammed (<i>v.</i>)	created a barrier that stopped the flow of water (p. 8)
dwarfs (<i>v.</i>)	causes something to seem smaller or less important (p. 17)
engineers (<i>v.</i>)	people who design, build, or repair machines, buildings, bridges, or other structures (p. 5)
feats (<i>v.</i>)	amazing actions or accomplishments (p. 5)
hydroelectric (<i>adj.</i>)	of or relating to electricity generated by using moving water (p. 17)
locks (<i>n.</i>)	gated sections of a canal or river in which water levels are raised and lowered to allow ships or boats to pass (p. 11)
observation deck (<i>n.</i>)	a raised platform used for viewing the surrounding area (p. 10)
skyscraper (<i>n.</i>)	a very tall building (p. 14)

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Front cover: A tower of the Golden Gate Bridge in San Francisco, California

Back cover: Aerial view of ships going through locks of the Panama Canal, in the Republic of Panama

Title page: The Burj Khalifa and its surrounding parks, pools, and malls, in the city of Dubai, United Arab Emirates (UAE)

Table of contents: Constructing the tunnels for the underwater English Channel Tunnel, or *Chunnel*

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Level 5 Leveled Book
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Correlation	
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Reading Recovery	34
DRA	34

Conclusion

Unusually big problems can inspire the biggest dreams and the most imaginative solutions. The unique designs of these seven structures solved problems in several different countries and environments. But even larger projects are being built right now. There seem to be few limits to what the human imagination can create.



A problem solved. By building a vertical, automated, storage garage, a car maker used 80 percent less ground area than is required by a standard horizontal design.

Thinking Critically

What things are important to consider when creating a type of structure that is very tall, very large, or that no one has tried to build before?



The pressure from so much moving water has shaken and reshaped farm fields and caused cracks in nearby houses.

Both the transfer project and the dam are controversial. Millions of people have had to move their homes to make way for the reservoirs and canals. Some historical sites may even be flooded—all to deliver water where it is most needed.



Table of Contents

- Choosing the Biggest 4
- Channel Tunnel 6
- Netherlands North Sea
Protection Works 8
- Canadian National Tower 10
- Panama Canal 11
- Golden Gate Bridge 12
- Burj Khalifa Tower 14
- The South-to-North
Water Transfer Project..... 16
- Conclusion 19
- Glossary 20



The Great Pyramids of Egypt are the only remaining Wonders of the Ancient World. They were built along the Nile River over a period of eighty years. The largest pyramid used 2.3 million blocks of stone.

Choosing The Biggest

Long ago, writers in ancient Greece chose seven great works built by creative human beings. We call these unique structures the Seven Wonders of the Ancient World. These amazing buildings and statues seemed impossible to build for their time and with the simple tools then available. Today, there seem to be few limits to what humans can create.



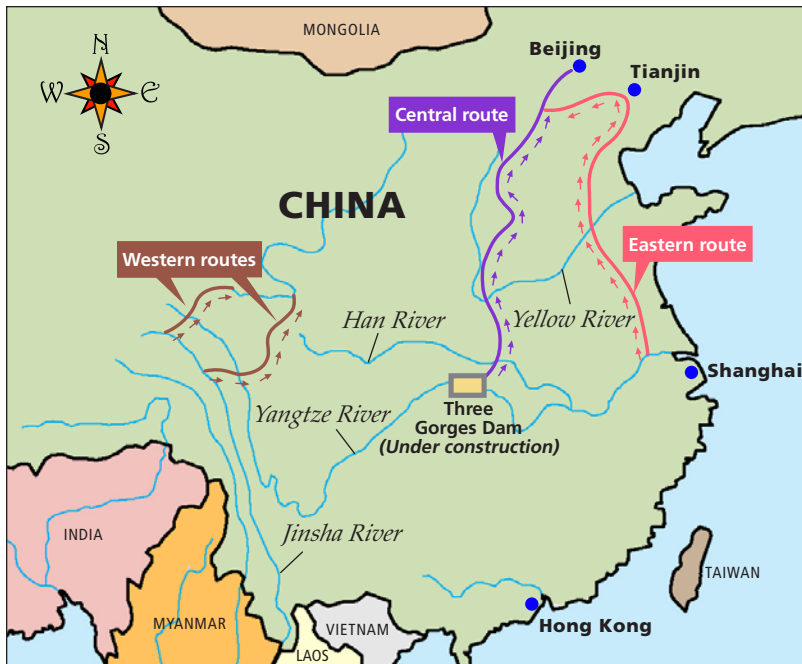
Part of the huge lock complex of the Three Gorges Dam

The project will use a huge system of dams, canals, tunnels, and pumps running for hundreds of miles. Some tunnels will even move one river under another! This project **dwarfs** China's last enormous project, the Three Gorges Dam.

The Three Gorges Dam is the largest **hydroelectric** project in the world. This dam on the Yangtze River is 600 feet high and more than a mile and a half long. The dam protects cities downstream from flooding while it generates more electricity than any other hydroelectric plant in the world. Its reservoir may soon connect with the South-to-North Water Transfer Project.

The South-to-North Water Transfer Project

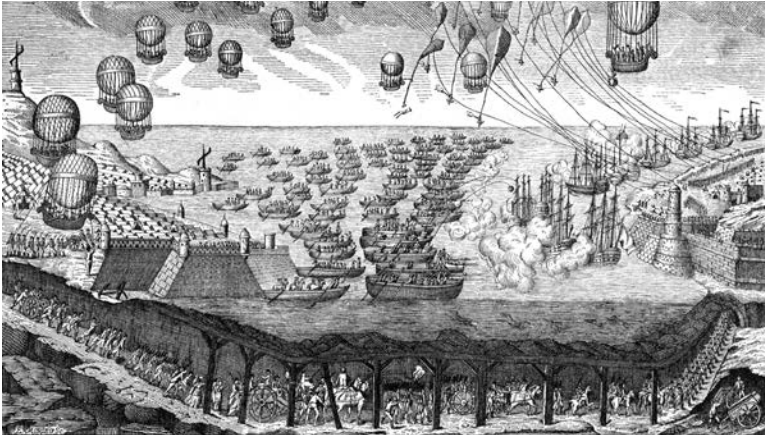
In China, managing the water resources of areas that are either too dry or flood-prone has always been a challenge. Large northern cities, including Beijing, need more water than rain provides. The huge South-to-North Water Transfer Project will carry needed water along three different routes. Water will be moved from rivers and lakes where it is plentiful to Beijing and other high population areas where it is not.



Recently, a group of **engineers** asked modern building experts to select seven new projects that seemed almost too big to imagine. These massive projects are engineering **feats**. Each is known for overcoming former limits of size, length, height, or natural conditions.



The Petronas Twin Towers in Kuala Lumpur, Malaysia. The walkway of the skybridge between the two buildings is not attached to either tower. It can slide in and out of the buildings as the wind moves the tall towers back and forth.



Before Napoleon signed a treaty with the United Kingdom he had plans to attack it. One idea was to build a tunnel under the English Channel. His army would cross the Channel in the tunnel. Other soldiers in hot air balloons would attack from the air.

Channel Tunnel

The United Kingdom, or the UK, sits about thirty-one miles across the English Channel from the coast of France. The Channel seas can be stormy and dangerous. They have often helped to keep foreign armies away. In 1802, French general Napoleon dreamed of digging a tunnel under the English Channel—to walk his troops across. Everyone laughed at the idea.

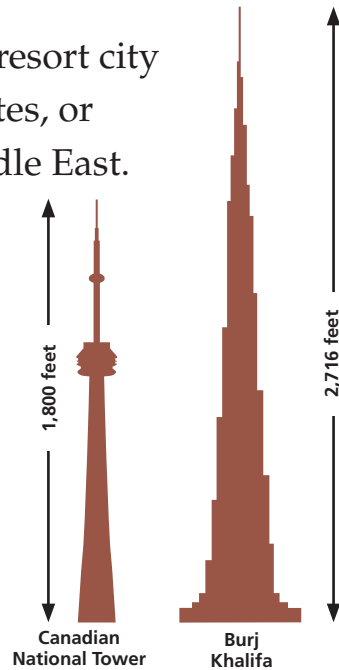
Today, you can easily cross under the Channel by taking the Channel Tunnel train. Trains run through this underwater tunnel system at speeds of 100 to 200 miles per hour!



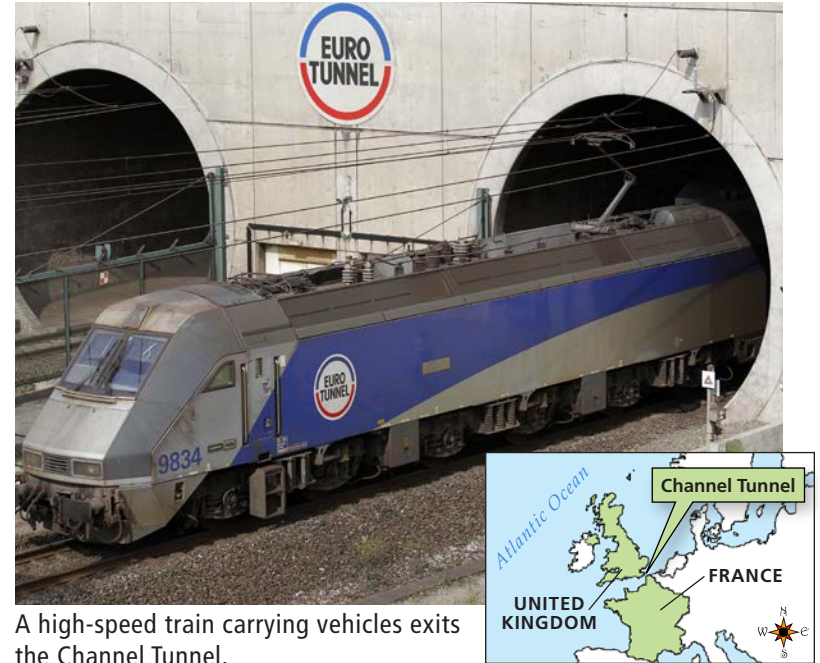
The elevator of the 2,716.5-foot Burj Khalifa in Dubai has the longest travel distance in the world. The Burj Khalifa became the world's tallest building in 2010—surpassing Canada's Canadian National Tower by almost 1,000 feet.

Burj Khalifa Tower

Dubai is a rich coastal resort city in the United Arab Emirates, or UAE, a nation in the Middle East. Dubai has built many of the world's biggest structures, including the Burj Khalifa tower. When this 160-story, 2,716-foot **skyscraper** opened in 2010, it became the tallest human-made structure in the world.



The area around the Burj Khalifa boasts parks, fountains, and the largest mall in the world. Dubai's amazing building projects attract business and tourism, and Dubai is still building! Dubailand Park will have six different amusement parks in one area. When complete, it will be twice the size of Disney World.



A high-speed train carrying vehicles exits the Channel Tunnel.

Some trains carry only cars, buses, and trucks. Drivers sit inside their vehicles during the trip. Other trains carry only passengers, who sit in comfortable train cars.

This massive project took about 13,000 people seven years to complete. Workers dug three huge, 32-mile-long tunnels through the chalk and clay at the bottom of the English Channel. The three train tunnels run alongside each other. Trains travel from England to France in one tunnel and return in another. The middle tunnel is a service tunnel used for repairs.

Netherlands North Sea Protection Works

The small country of The Netherlands faces the cold North Sea. Much of the land there lies below sea level. During storms, waves and floods used to destroy homes and farmland. The ruined farmland resulted in food shortages. The Dutch people dreamed of ways to protect their land, crops, and people from the sea.

In 1927, the Dutch began the North Sea Protection Works. They **dammed** some areas along the coast, but they left other areas open to the sea for shipping and wildlife habitat.



One of the massive storm surge barriers built in The Netherlands. The barriers control high tidal flows and stop flood damage to land and crops.



During construction, eleven workers lost their lives. A net hung under the bridge caught nineteen other workers who fell.

Since the bridge opened in 1937, over a billion and a half vehicles have crossed it, and it draws thousands of tourists a year. Lanes for walking and cycling offer people a wide view of the bay and the city.

Today, the Golden Gate Bridge is one of the most famous bridges in the world due to its size, its distinctive dark orange color, and its spectacular setting.



The 1.7-mile-long Golden Gate Bridge spans the entrance to San Francisco Bay. To build it, 83,000 tons of steel was shipped through the Panama Canal.

Golden Gate Bridge

The beautiful Golden Gate Bridge is a symbol of San Francisco, California—but for decades it was just a dream. Local residents had visualized a bridge across the narrow, windy waterway between San Francisco Bay and the Pacific Ocean. After sixty-five years of planning, construction finally began in 1933.

The crews worked on towers 746 feet above the water. They strung the thick cables in the cold, fog, and wind, with the constant danger of falling. In fact, eleven workers fell to their deaths while building the bridge.



Low-lying farmland is protected by the series of floodwalls and surge barriers throughout The Netherlands.

To control the flow of water and shipping, the Dutch built a floodwall more massive than any other. The wall has giant gates that stay open when the sea is calm. The gates allow ships and wildlife to pass through. During storms, the gates close to prevent flooding. This giant system gave the Dutch over one-half million acres of protected land for farming, livestock, and homes.

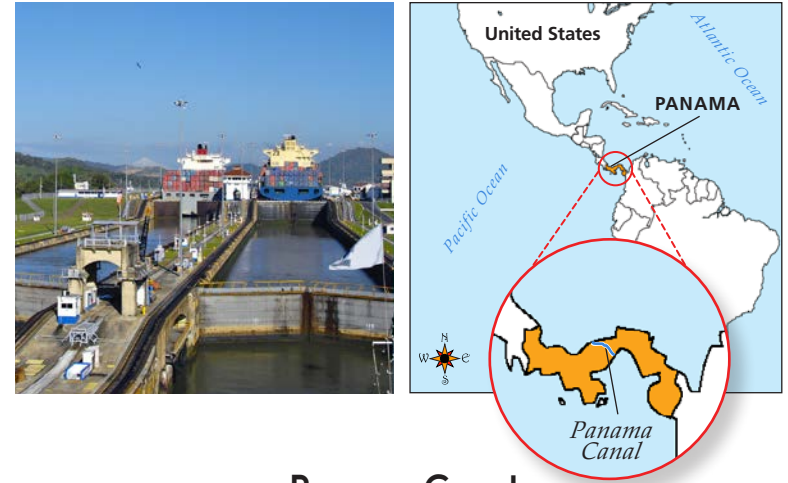
Canadian National Tower

In Toronto, Canada, visitors can stand on the **observation deck** of the Canadian National, or CN, Tower—and see Niagara Falls about eighty five miles away. They can look down through the deck's glass floor and see the city far below.

A helicopter was used to assemble the tower's tall antenna in 44 sections. The finished antenna gave the CN Tower a then-record height of 1,800 feet.



The Canadian National Tower rises high above downtown Toronto, Canada.



Panama Canal

Panama is a narrow nation that acts like a bridge of land between North and South America. Until the 1900s, people who traveled from the Atlantic to the Pacific Ocean had to sail around South America. They dreamed of a shortcut—digging a **canal** across Panama to connect the two oceans. Work finally started on the Panama Canal in 1904.

The 51-mile canal includes a series of gated chambers called **locks**. Each lock in the series fills with water to raise ships from sea level at one ocean—stair-stepping them up, and then down again—to sea level on the other side of Panama. Today, about 14,000 ships pass through the Panama Canal system each year.