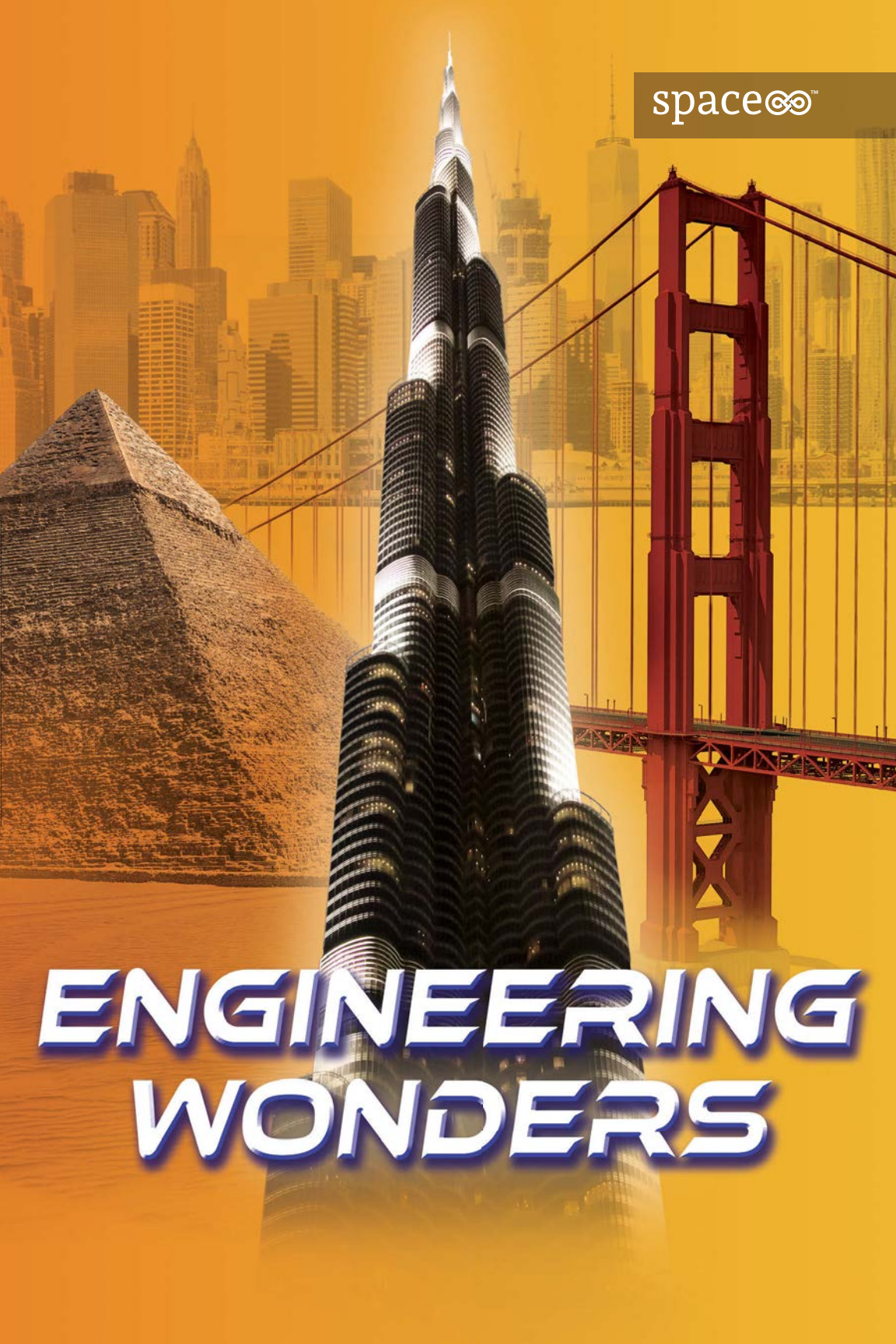

space
ENGINEERING
WONDERS



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CHAPTER 1
TOUCHING THE SKY

A fall from 1,000 feet would kill. From that height, people are hard to see. Cars look like grains of rice. This is the view from the top of the tallest buildings. One of them is the North Tower. It is also called 30 Hudson Yards. That is its address. At 1,296 feet, it towers over New York City.

This is the most expensive building project in the U.S. It cost $25 billion. The building is the fifth tallest in the U.S.

Hundreds of people worked on the plans. Every detail had to be perfect. These workers are called engineers.


30 HUDSON YARDS

Engineers plan structures of all kinds. They design and test them too. Some engineers work on roads and tunnels. Others make objects for outer space. While working, they think about cost and safety. The **environment** is a big concern too. Another consideration is the impact on local plants and animals. Unique projects can become engineering wonders.



TYPES OF ENGINEERS

There are many types of engineers. Each has a special focus.

Civil engineers work on buildings. They build roads and bridges. Their structures need to be safe and strong. These engineers find creative ways to make this happen.

Mechanical engineers build machines. These can include engines and elevators. Engineers make them work faster and better. Engines are more efficient. Elevators go even higher than before. Often the goal is to make the most advanced machines possible.

Electrical engineers work with power. They design circuits and motors. Computer chips are made too. Technology is advancing. Demand is high for electrical engineers.



CHAPTER 2
ANCIENT WONDERS

Modern buildings are built with advanced technology. Construction crews use power tools. Cranes and bulldozers do the work. This was not possible long ago. Human power was used. People had to carry large rocks. Animals moved materials too. These projects took a long time. Many took thousands of years.

The Great Wall of China is huge. It is one of the largest structures on Earth. Construction began over 2,000 years ago. Millions of people worked on it.

A structure like this had to be tall. The Chinese built it to keep enemies out. Strength was important. That way no one could get in.

This wonder is over 13,000 miles long. That is four times the distance between Los Angeles and New York City. It is as tall as a four-story building.

The wall is no longer used for protection. Still, it is a big **attraction**. Over ten million tourists visit each year.


THE GREAT WALL OF CHINA

TEOTIHUACAN



Another ancient wonder is Teotihuacan. This is an ancient city in Mexico. The name means "the place where the gods were created." Teotihuacan is home to large **pyramids**.

The city's design is advanced. Experts do not know when the first buildings were built. Construction may have begun in 300 BC. One structure is the Pyramid of the Sun. It is the third largest pyramid in the world. There are also apartments. Over 2,000 people once lived in them. By the 1400s, no one lived there. Some experts think there was an invasion. Others think **drought** forced the people to leave.

Egypt also has pyramids. More than 100 are spread across the country. The Great Pyramid is the biggest. It was the tallest structure on Earth for 4,000 years. A taller church was built in 1311.

People still debate how the pyramids were built. It seems impossible that it was done by hand. But Egyptian engineers found a way. More than 20,000 people worked on the Great Pyramid.

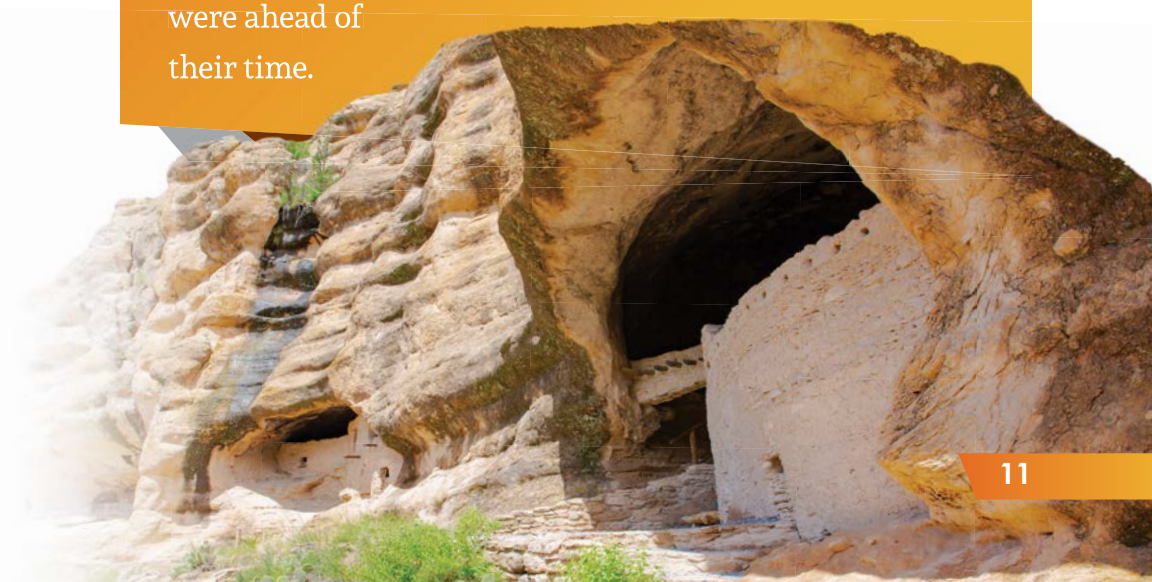
The pyramids have become a symbol of Egypt's history. Pharaohs were buried in many of them. These were Egyptian kings. Some believe their graves have curses and ghosts inside.

GILA CLIFF DWELLINGS

In the 1200s, technology was not advanced. People used simple tools. They found unique ways to make their homes. Some of those people were the Mogollons. They lived in what is now New Mexico.

The Mogollons built their homes into the sides of cliffs. This protected them from the weather. Many walls were made from fallen rocks. People carried these heavy rocks by hand.

Despite the time period, the engineering at this site is very advanced. Rooms were built for different purposes. Several were for storage. Others were for people to gather. Designs were ahead of their time.




space
UNUSUAL
JOBS



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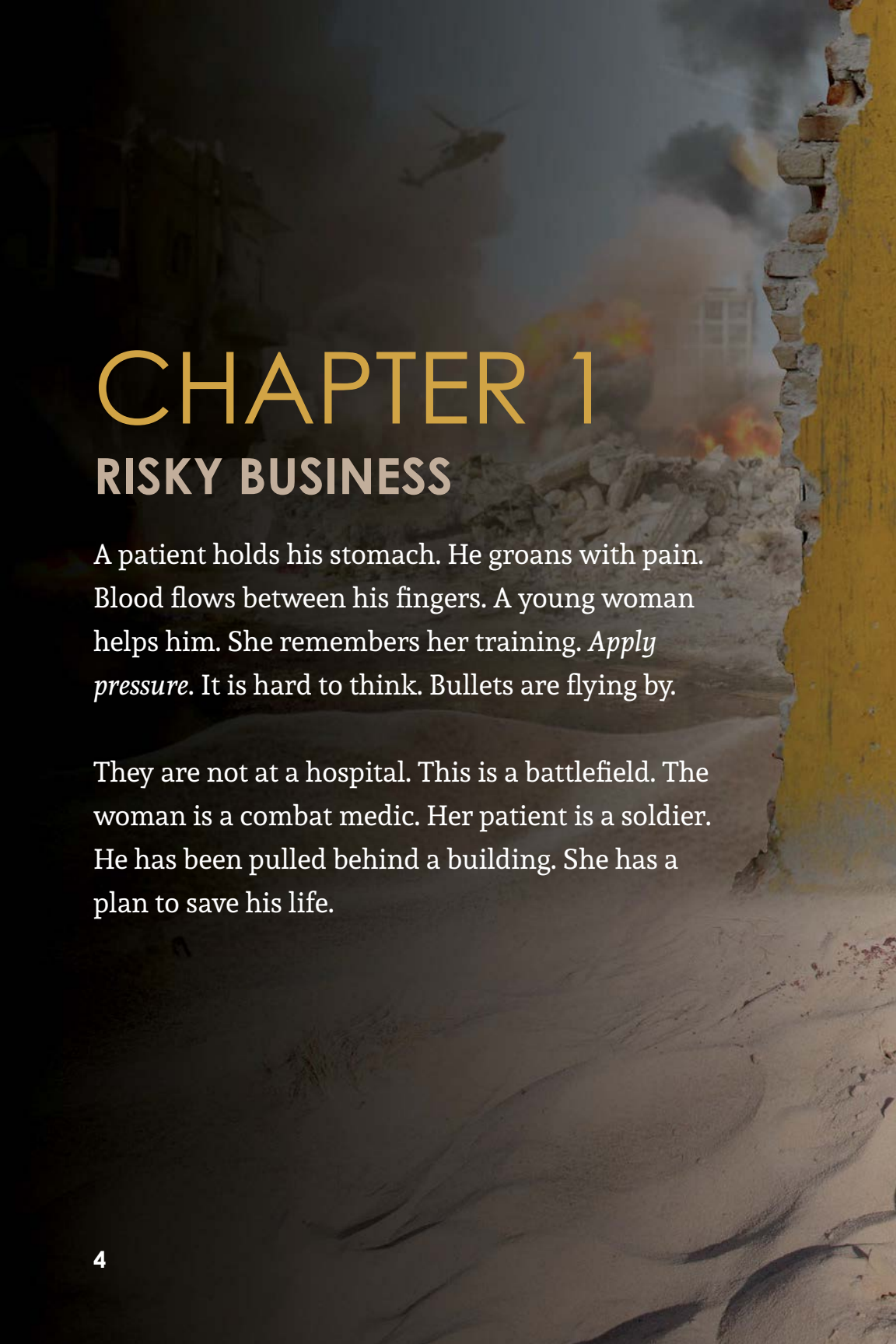
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CHAPTER 1

RISKY BUSINESS

A patient holds his stomach. He groans with pain. Blood flows between his fingers. A young woman helps him. She remembers her training. *Apply pressure.* It is hard to think. Bullets are flying by.

They are not at a hospital. This is a battlefield. The woman is a combat medic. Her patient is a soldier. He has been pulled behind a building. She has a plan to save his life.



Many people do unusual jobs like this. Some study volcanoes. Burns and toxic gas are huge risks. Pyrotechnicians make fireworks shows. They work with dangerous explosives. Astronauts are launched into space. One small **malfunction** and they could die.

People with unusual jobs have unique lives. They might travel to strange places. For some, injuries are common. There is always a chance of death. Passion and a love of adventure keep these workers going.





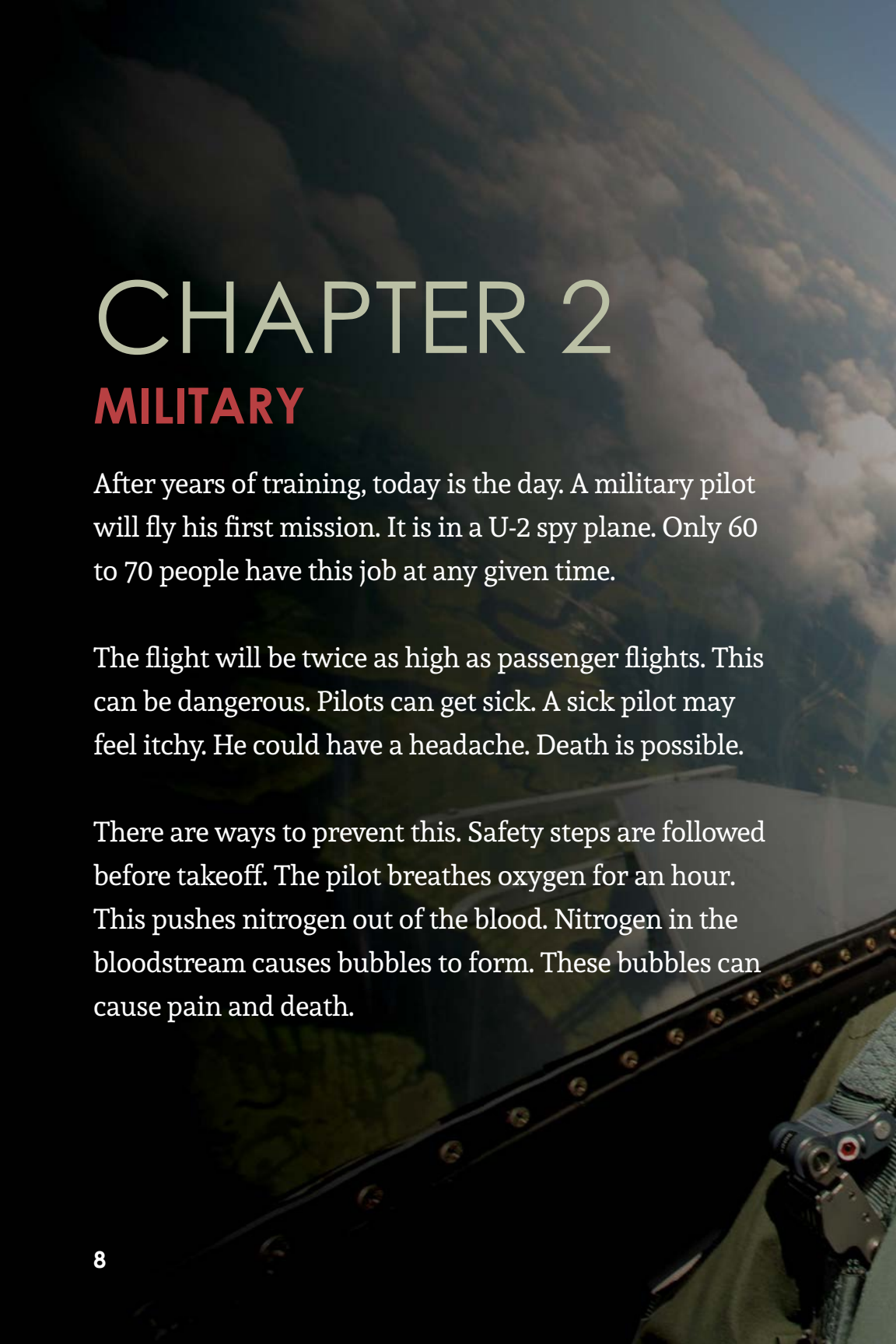
UNUSUAL JOB TRAINING

Job training can start in high school. Those who want to work with animals need science classes. People who dream of studying the earth do too. Future soldiers and firefighters can get stronger in gym class.

Training happens outside school too. Weekend hiking readies students for outdoor jobs. Trail experience is important. Mountain guides and loggers use these skills.

College offers more learning opportunities. Certain jobs require degrees. Others do not. Many unusual jobs offer to train workers.

Internships and apprenticeships allow people to work closely with experts. They are a way to see if a job is a good fit.



CHAPTER 2

MILITARY

After years of training, today is the day. A military pilot will fly his first mission. It is in a U-2 spy plane. Only 60 to 70 people have this job at any given time.

The flight will be twice as high as passenger flights. This can be dangerous. Pilots can get sick. A sick pilot may feel itchy. He could have a headache. Death is possible.

There are ways to prevent this. Safety steps are followed before takeoff. The pilot breathes oxygen for an hour. This pushes nitrogen out of the blood. Nitrogen in the bloodstream causes bubbles to form. These bubbles can cause pain and death.


BB
U-2 SPY PLANE

U-2 pilots spy on other countries. They take pictures. These photos show where enemies are. The locations of important buildings are noted.

In the military, special operations forces take on the toughest jobs. The Navy has the SEALs. Rangers are in the Army.





SEAL stands for "sea, air, and land." Navy SEALs are ready to go anywhere. They do underwater missions. These soldiers jump from planes too.

Army members can go to Ranger School. There, they become special ops soldiers. One of their jobs is to conduct raids. They spy for information. This lets them plan ways to take enemy bases. The job is dangerous. Rangers learn to work in **hostile** territory.



Explosive Ordnance Disposal (EOD) is another military job. EOD workers go ahead of troops. They clear bombs from roads. Bravery and a calm approach are needed.

EOD specialists wear safety suits. Some also use robots. In some ways, it is like playing a video game. Operators guide the robot. Then the robot disarms bombs.

EXTREME WORK UNIFORMS

Certain jobs require uniforms. Explosive Ordnance Disposal team members train in bomb suits. Each suit weighs about 75 pounds. It has its own cooling system. The suit protects its wearer. Bulkiness makes the suit awkward. Moving carefully is key.

U-2 pilots also wear a suit. The helmet is shaded to protect against the sun. Astronaut suits are similar. They are pressurized. An oxygen hose in the suit helps astronauts breathe.

