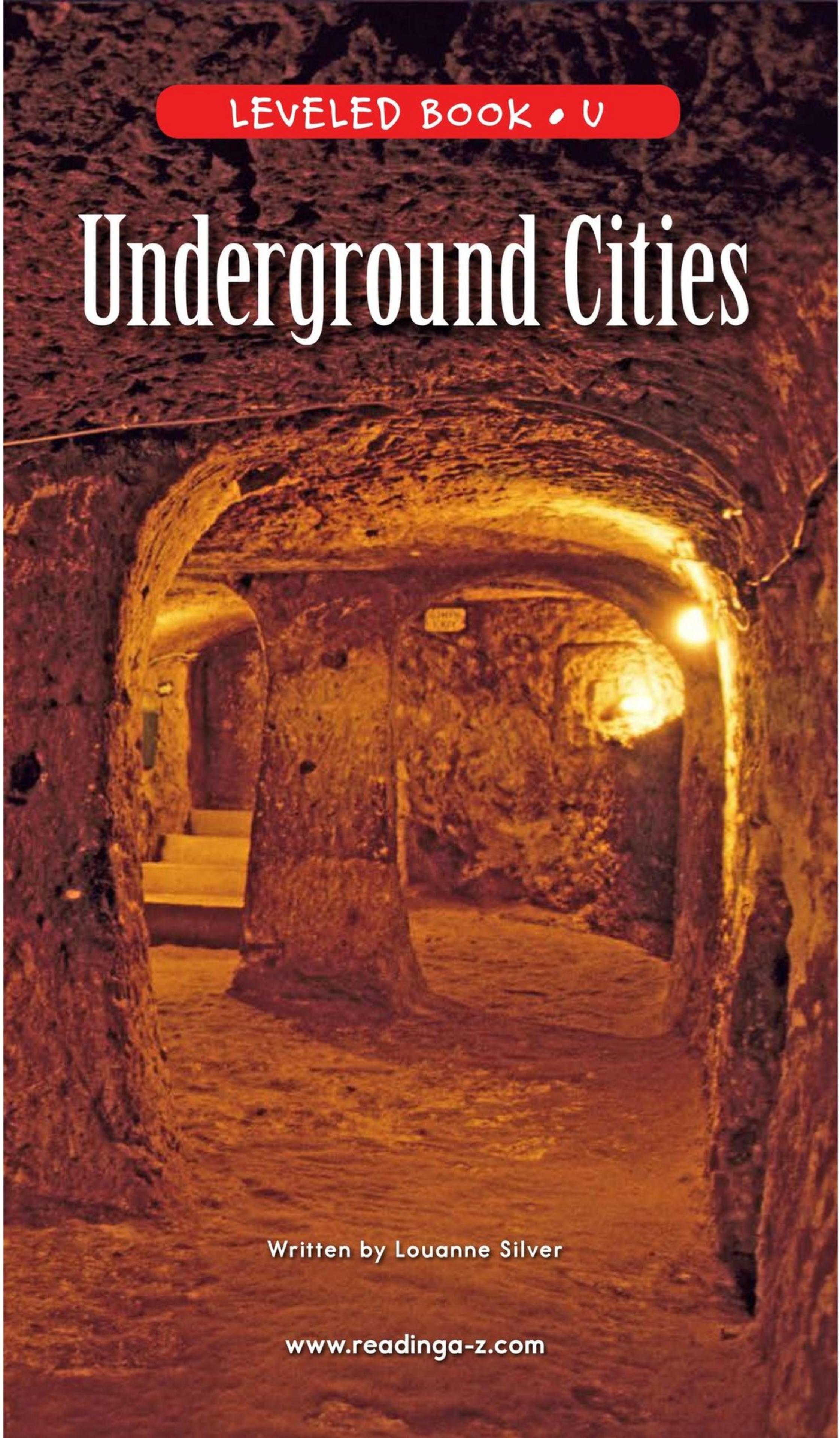


LEVELED BOOK • U

# Underground Cities



Written by Louanne Silver

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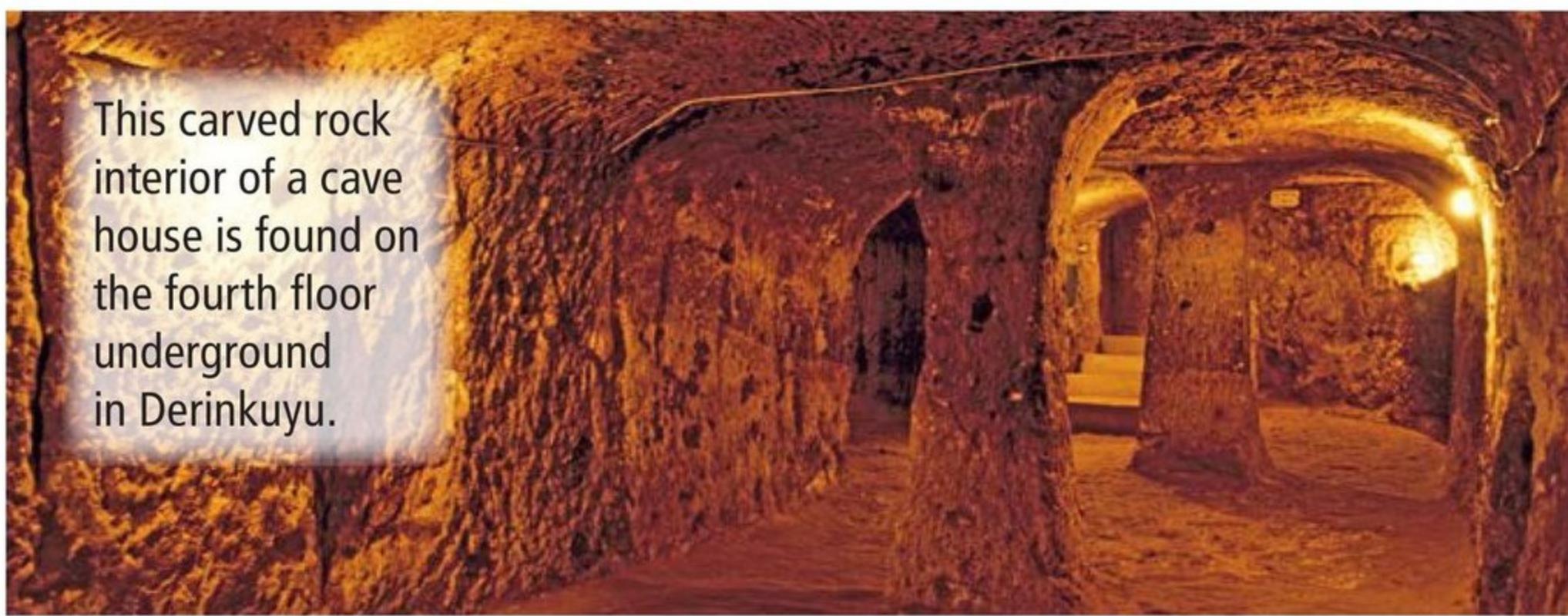


The naked mole rat is one of many types of animals that live underground.

## Introduction

You've probably heard about animals that live underground. Ants, moles, groundhogs, and prairie dogs are just a few examples. But did you ever hear of people living underground?

People around the world have lived underground for hundreds, and in some cases, thousands of years. In some places, they still do. Visiting some of these places reveals many different reasons for choosing these unusual dwellings. Residents may have been seeking protection from enemies or weather, an affordable way to live, or simply more living space. Whatever the reason, underground cities are found all over the world.

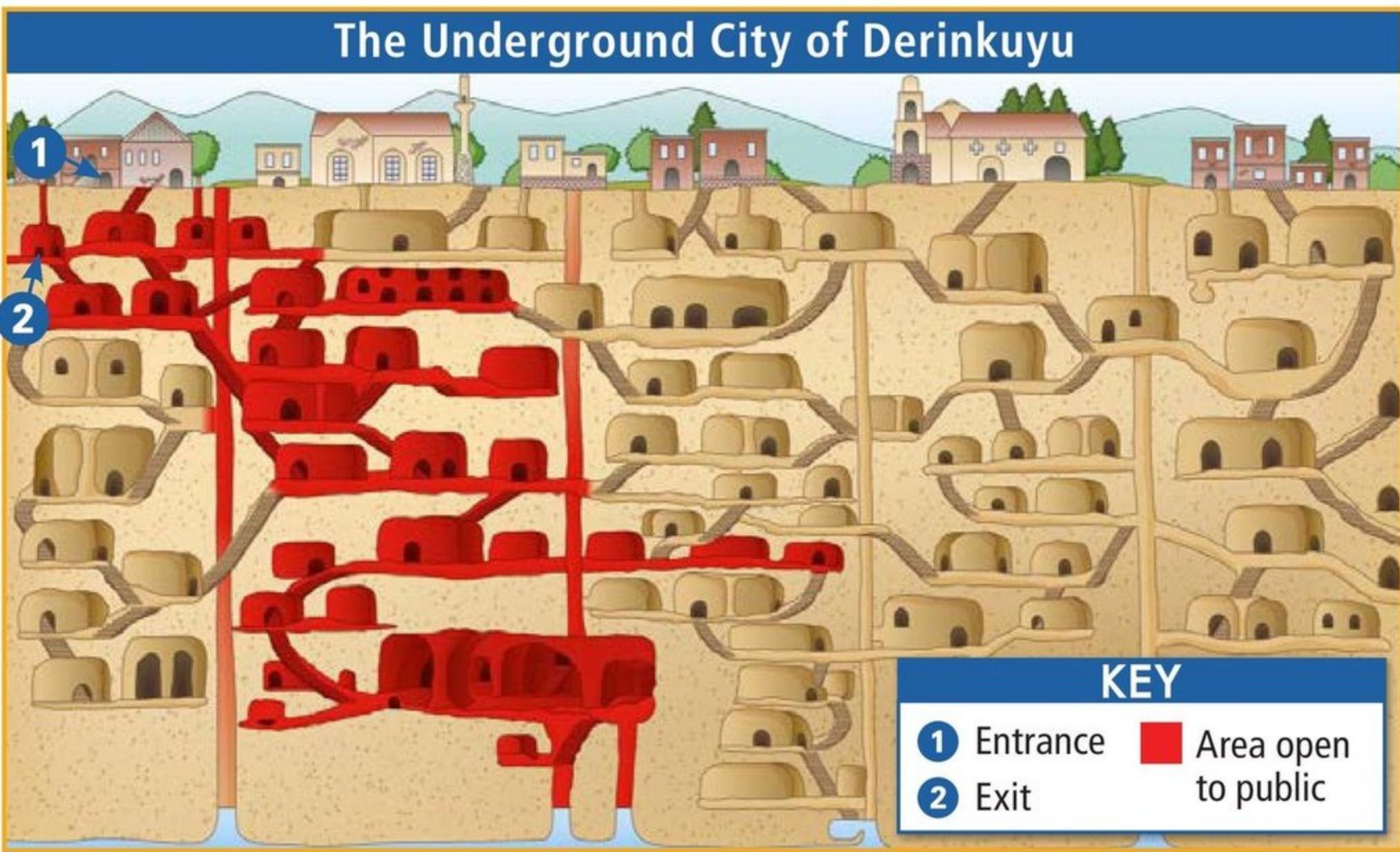


This carved rock interior of a cave house is found on the fourth floor underground in Derinkuyu.

## Ancient Cities *Derinkuyu, Turkey*

The Cappadocia (kap-uh-DOH-shee-yuh) region of central Turkey is known for its ancient underground cities. More than two hundred multilevel underground cities have been discovered in the area. One of the best known is Derinkuyu (deh-rin-KOO-yoo). This ancient city was carved into the soft, volcanic rock that is common in the region. This city includes caves and other land features that were first formed naturally by wind and water. As a result, **archaeologists** have no way of knowing exactly when it was built.

Building Derinkuyu was an amazing feat of **engineering**. The city was at least eleven stories deep, though only eight stories have been **excavated**. Thousands of air shafts made breathing possible at the deepest levels. Scientists say that in order to construct the city, the original builders must have known a lot about engineering.



A local Cappadocian resident accidentally discovered the city while breaking through a wall to expand his own cave home in 1963.

Because the rock is so soft, the **pillars** needed to be very strong so the tunnels wouldn't collapse. This approach worked well because no evidence of collapses has yet been found.

Derinkuyu had room for about twenty thousand people as well as their food and livestock. Stone doors weighing 454 kilograms (1,000 lbs.) could close off the entire city from the inside, and each floor could be closed off from the other floors. Evidence suggests that Derinkuyu was built underground to hide people and supplies during invasions. The city included homes, stables, storage rooms, a school, and a supply of freshwater. A tunnel 9 kilometers (6 mi.) long connects Derinkuyu with Kaymakli, another underground city.

## *City of Caves*

### *Nottingham, England*

Another ancient city lies beneath the streets of Nottingham, England. The City of Caves was carved into sandstone so soft that the material can be shaped with simple hand tools. Unlike Derinkuyu, it didn't use existing caves but instead was cut into solid rock. This ancient city has close to five hundred caves, all of which were carved by hand.

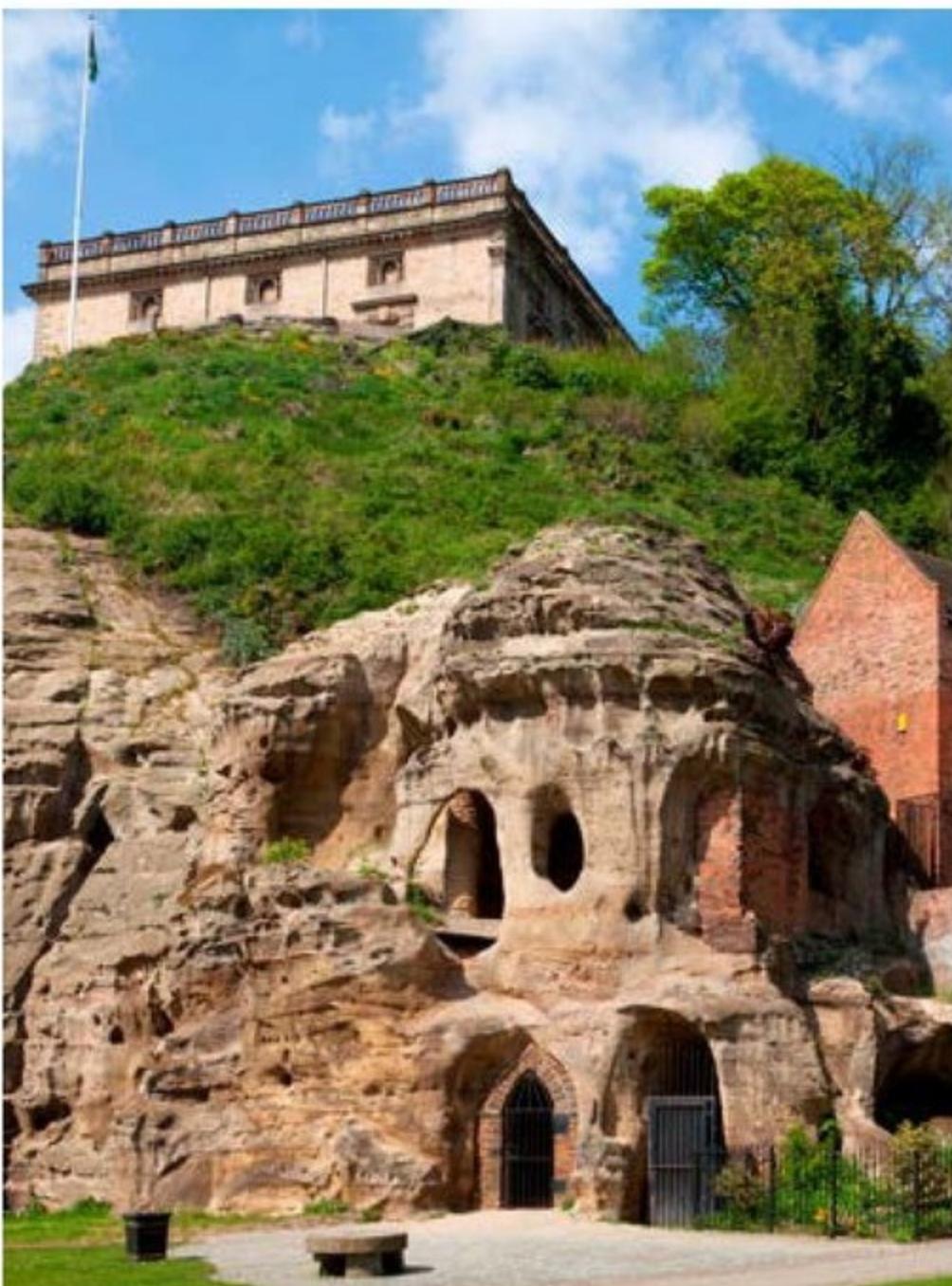
## **Polish Salt Mine**

The world's most unusual salt mine lies deep beneath the ground in southern Poland. The town of Wieliczka (vee-LEECH-ka) was founded in the thirteenth century to mine nearby underground salt deposits. Over the centuries, the miners created dozens of carved statues (right), as well as chapels and a huge cathedral, out of rock salt. The salt mining ended in 1996.



Evidence suggests that people lived in the City of Caves from as far back as the eleventh century until at least the mid-1800s. The people of Nottingham used the caves as homes, work areas, and cellars. One area, called Drury Hill, was once a wealthy neighborhood but turned into a slum by

the nineteenth century. Poor families lived in single-room basements, some of which still remain today. These underground living areas were so overcrowded that diseases spread easily. During World War II (1939–1945), people used the caves as air raid shelters when England was bombed.



Nottingham Castle sits on top of the underground City of Caves.

In the late 1960s, work began on a shopping center above the caves, which were going to be filled in with concrete. After the public decided against it, the local historical society arranged for the caves to be declared an ancient monument. As a result, most of the caves were **preserved**. They have been open to the public since 1978.

## Modern Cities

### *Coober Pedy, Australia*

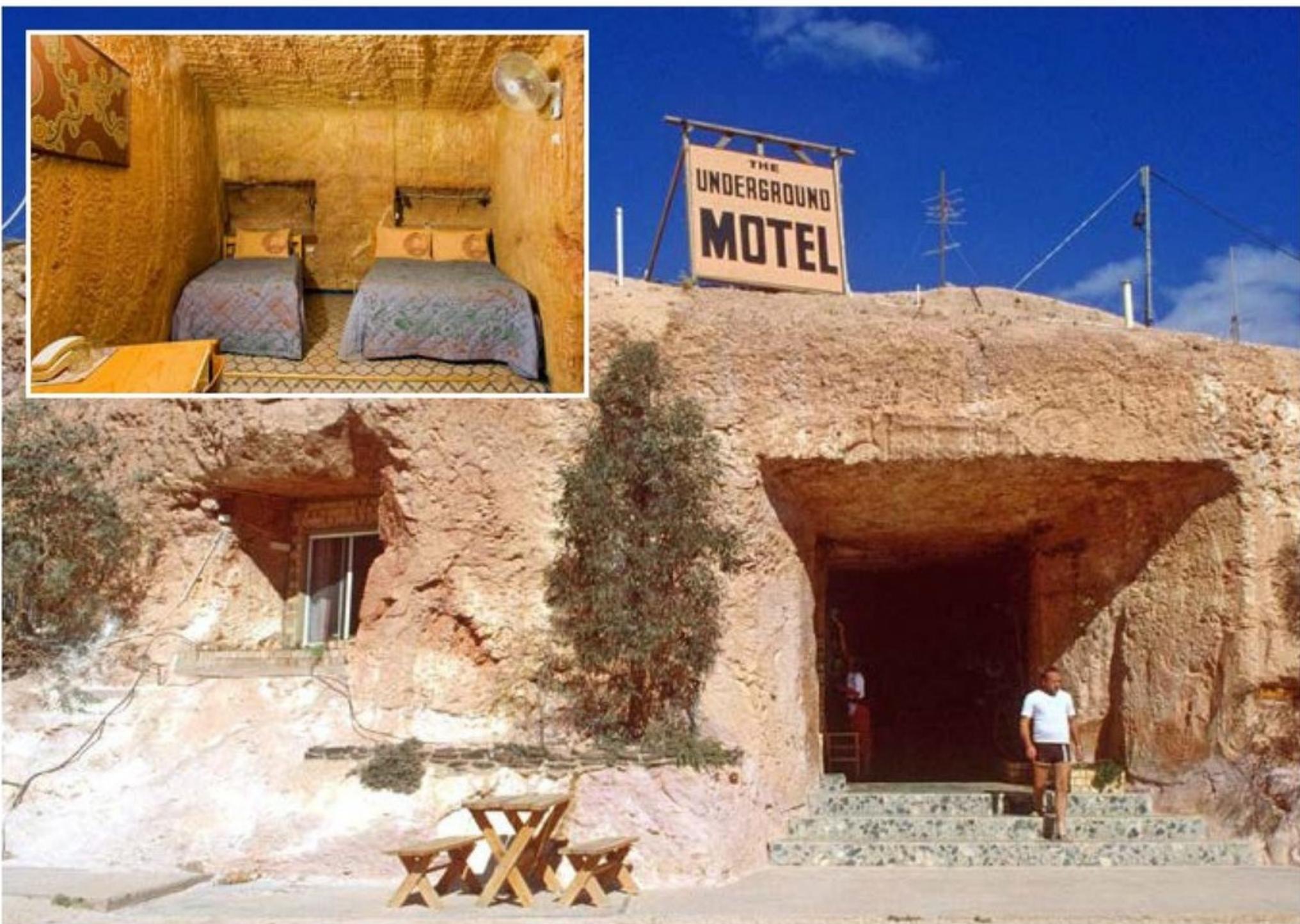
A remote area of South Australia contains a **mine** with some of Earth's greatest treasures. Coober Pedy produces more opals than anywhere else in the world. These unusual gemstones are valued for their changing colors.

Opals have been mined in Coober Pedy since 1915. Because of the extreme summer heat—as high as 40°C (104°F)—many miners live in homes carved into hillsides. These cavelike homes, called *dugouts*, cost about the same to build as aboveground homes. However, because the temperature underground stays constant, residents don't need air-conditioning in the summer or heat in the winter. Homes aren't the only structures built underground. The town also has **subterranean** shops, museums, and churches.

Coober Pedy attracts people from around the world. Visitors can tour a working opal mine, learn about the history of the area, explore underground homes, and dig for opals. During their visit, they can even stay in an underground hotel!



This opal is like those mined in Coober Pedy.



The Underground Motel near the opal mines in Coober Pedy, Australia, welcomes visitors year round.

Julie Knight, a resident of Coober Pedy, has this to say about subterranean living:

“Living underground is better than normal housing. There are no windows in any of the rooms except along the front. Windows are usually kept to a minimum because of our climate. The more windows, the more heat. All rooms have a small air vent to allow natural air circulation. Since hot air rises, it all goes up and out.”

## Do You Know?

The name Coober Pedy comes from the Australian Aboriginal words *kupa piti*, which mean “white man in a hole.”



Originally a one-room home, Faye's Historic Underground House was converted into a full house, including a swimming pool.

"The temperature is a constant 23–25 degrees Celsius (73°F–77°F) year round, so there are no heating or cooling costs. One room has an airshaft that lets in a circle of light. Other rooms are pitch black until you turn on the light.

"Older dugouts in Coober Pedy were dug by hand with a pick. Some residents leave the pick marks on the walls as reminders of how hard it was to dig there in the early days. Others paint their dugouts, usually white to make them brighter and lighter. There is very little dust inside. Dugouts are soundproof, blocking out traffic and neighbor noise. I think I'm pretty lucky to be living in such a unique home, so full of character."



A semi-truck drives along 11.3 kilometers (7 mi.) of paved underground roads in SubTropolis.

### *SubTropolis* *Kansas City, Missouri, United States*

Lying below the Worlds of Fun and Oceans of Fun theme parks in Kansas City, Missouri, is a different kind of world known as SubTropolis. SubTropolis calls itself “the world’s largest underground business **complex**.” Originally a limestone mine, the enormous underground space is now rented out to a variety of businesses for storage, manufacturing, printing, and other purposes. The complex is completely protected from the outdoors, so its tenants never have to worry about rain, snow, ice, wind, or other rough weather conditions. Even though the employees don’t look up and see the sky in SubTropolis, the interior is painted white, which makes it seem light and bright.

Underground temperatures and **humidity** are constant. As a result, businesses use roughly one-quarter of the electricity that they would aboveground, and there's no problem with moisture build-up. Because of this minimal use of electricity, one tenant calls SubTropolis truly environmentally friendly.

Also, due to the constant climate underground, many treasures are safely stored in SubTropolis. These include millions of U.S. Postal Service collectable stamps and old, original film reels from classic movies and TV shows.



The first tunnels under Dover Castle were built in the thirteenth century for soldiers to launch surprise attacks on invading enemies. During the Napoleonic Wars (1793–1815), seven more tunnels were added to accommodate up to two thousand troops. The tunnels were used as recently as World War II as a military command center (pictured above). They are the only underground barracks ever built in Britain.

## Underground Shopping Around the World



Many places around the world have large underground districts. Here are some:

- Vincom Mega Mall Royal City (top) in Hanoi, Vietnam, is an entertainment complex as well as an underground mall. It contains over six hundred shops, a water park, an ice-skating rink, and game centers. Instead of a food court, it has a food street with roughly two hundred restaurants.
- Okhotny Ryad in Moscow, Russia, is a three-story underground shopping mall that connects to a subway station. To protect neighboring buildings during construction, the station's walls were built aboveground and then lowered into the ground.
- Japan's largest underground shopping district is the Umeda underground mall in the city of Osaka. The mall connects with several subway stations next to hotels, banks, and high-rise office buildings. A giant red Ferris wheel sits atop a nine-story building.



## A World View: Underground Cities and Shopping Centers



- |   |   |
|---|---|
| ① Derinkuyu, Turkey                                 | ⑥ Dover, England                              |
| ② City of Caves, Nottingham, England                | ⑦ Vincom Mega Mall Royal City, Hanoi, Vietnam |
| ③ Wieliczka, Poland                                 | ⑧ Okhotny Ryad, Moscow, Russia                |
| ④ Coober Pedy, Australia                            | ⑨ Umeda District, Osaka, Japan                |
| ⑤ SubTropolis, Kansas City, Missouri, United States |   |

### Future Underground Cities

Although many underground shopping areas exist around the world, no new large underground cities are being built today. However, individuals in many countries are building subterranean homes. Underground dwellers say that their homes use less energy, cost less to maintain, and offer more privacy than aboveground homes. Because of skyscrapers, today's cities seem to be growing up toward the sky. In the future, they may instead grow down.

## Glossary

<b>archaeologists</b> ( <i>n.</i> )	scientists who study the remains of ancient cultures (p. 5)
<b>circulation</b> ( <i>n.</i> )	the movement of air or water through a system (p. 10)
<b>complex</b> ( <i>n.</i> )	a group of buildings close to one another, used for a common purpose (p. 12)
<b>dwellings</b> ( <i>n.</i> )	buildings or shelters in which people live; residences (p. 4)
<b>engineering</b> ( <i>n.</i> )	the work of designing and building things using science and math (p. 5)
<b>excavated</b> ( <i>v.</i> )	uncovered or dug out (p. 5)
<b>humidity</b> ( <i>n.</i> )	the amount of moisture in the air (p. 13)
<b>mine</b> ( <i>n.</i> )	a place where minerals are taken from the ground by digging or blasting (p. 9)
<b>pillars</b> ( <i>n.</i> )	posts or columns used for support, usually made of stone, wood, or metal (p. 6)
<b>preserved</b> ( <i>adj.</i> )	kept in the same condition; protected from harm (p. 8)
<b>residents</b> ( <i>n.</i> )	people or other animals that live in a place (p. 4)
<b>subterranean</b> ( <i>adj.</i> )	underground (p. 9)

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Front and back cover, title page, page 3: Caves and passages in the  
underground city of Derinkuyu in Cappadocia, Turkey.

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