INSIDE POMPEII'S VICTIMS

Scientists use modern technology to get a new look at the people who once lived in an ancient city.

VOLCANO VICTIMS:
Scientists created plaster casts of the people who died when Mount Vesuvius erupted more than 1,000 years ago (above). Medical scans, like the one of this young boy (below), are now revealing more about the victims than ever before.
ne morning in 79 A.D., the people of the Roman city of Pompeii heard a rumble from Mount Vesuvius, which loomed over them. There had been frequent earthquakes all summer long, so most people weren’t that concerned. Little did they know that the quakes were a warning sign from Vesuvius—which was no ordinary mountain. It was a volcano, and it was about to blow its top.

Vesuvius erupted with a force more powerful than an atomic bomb. Super-hot gas, ash, and rocks shot 32 kilometers (20 miles) into the sky. The cloud collapsed, sending a wave of hot gas and rock, called a pyroclastic flow, racing toward the city at a speed of more than 160 km (100 mi) per hour. The flow quickly buried the entire city and many of its inhabitants.

Scientists discovered Pompeii nearly 1,700 years later. They found the ancient city—and many of its people—almost perfectly preserved beneath a 3 meter (10-foot)-thick layer of ash and rock. “Pompeii is a time capsule for a civilization,” says Roger Macfarlane, a professor of classics—the history and culture of ancient Greece and Rome—at Brigham Young University in Provo, Utah.

Archaeologists (scientists who study the past) have been able to study the jewelry, art, pottery, scrolls, and even food that existed in the city at the time. They’ve also examined some of the ancient remains of Pompeii’s citizens.

Now modern technology has given scientists a new way to study the remains. A team of archaeologists, anthropologists (scientists who study humans), radiologists (doctors who specialize in medical imaging), and other experts from around the world recently began using a high-tech imaging tool to learn more about Vesuvius’s victims.

FROZEN IN TIME

Pompeii, which is located near present-day Naples, Italy, was uncovered in 1748 (see map, right). Since then, archaeologists have been slowly excavating the site.

So far, they’ve dug up the ruins of more than 1,000 buildings. Their work has revealed much about the daily lives of Pompeii’s people: They ate at fast-food stalls, scrawled graffiti on walls, and had indoor plumbing.

As scientists continued to excavate in the region, they also discovered body-shaped cavities in the ash. The cavities formed as the tissue remains of Pompeii’s inhabitants slowly decomposed. Inside the voids lay bones and artifacts, like jewelry. To preserve the discovery, excavators poured plaster inside the holes left behind by the bodies. Once the plaster dried and hardened, they chipped away at the ash to reveal statue-like casts of the victims.

The surfaces of the casts revealed remarkable details, like outlines of the clothing people were wearing, the shapes of pillows they held over their heads to protect themselves from falling rocks, and even their facial expressions at the moment they died.

Inside, the casts held another gold mine of information: the victims’ skeletons. But these remains were trapped within the plaster with no way for scientists to study them—until now.

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INSIDE A CT SCANNER

Doctors typically use a CT scanner to create a detailed, 3-D image of a living patient’s body. But researchers are also using the technology to examine casts of Pompeii’s victims.

1. PLATFORM: A cast is placed on the platform, which moves through the CT scanner.

2. X-RAY SOURCE: An X-ray tube shoots out narrow beams of X-rays as it rotates 360 degrees around the cast.

3. X-RAY DETECTORS: Detectors measure the X-rays as they pass through the cast, creating thousands of cross-sectional images—like slices of a loaf of bread—of the bones and any artifacts inside.

4. COMPUTER: A computer stitches together the snapshot slices of the cast to create a 3-D image of its internal structures. The images shown here are of the same boy displayed at the bottom of page 14.

X-RAY VISION

In September 2015, a team of scientists from around the world began a new investigation of Pompeii’s victims using medical-imaging machines called CT scanners. These scanners use X-rays, a type of electromagnetic radiation, to take a series of images of all of a body’s internal structures. Computers then stitch these images together to create a 3-D picture (see Inside a CT Scanner, left).

The Pompeii team wanted to use the scanners to image the skeletons hidden inside the casts. “The history of a person’s life is embedded in their bones,” says Estelle Lazer, a forensic anthropologist (a scientist who studies skeletal remains) on the team from the University of Sydney, in Australia. By looking at specific parts of the skeleton, such as the jaw and pelvic bones, scientists can tell the person’s gender. The stage of tooth development and the length of certain bones can show how old the person was when he or she died. The bones and teeth can also show evidence of disease and fractures from injuries, which give clues about the person’s health at the time of death.

The scientists set up a CT scanning lab onsite in Pompeii. There, they put dozens of casts
through the machine to see what was inside. The study is still under way, but already the group has uncovered some surprises.

SKELETON SECRETS

Experts had long thought that the victims preserved in Pompeii were very old, very young, or sick—in other words, those who couldn’t escape the eruption. But CT scans revealed that the skeletons belonged to people of all ages. For example, one victim nicknamed “The Beggar,” thought to have been an old man, was actually much younger. That suggests that most of Pompeii’s citizens, regardless of their age, didn’t survive the disaster.

The scans also showed that many people in Pompeii had healthy teeth, despite their lack of modern dental care. The scientists think this may have been due to a diet low in sugar as well as the presence of fluorine—a chemical element that fights tooth decay—in the water around Vesuvius.

The CT scans even revealed artifacts, like jewelry, buried in the plaster casts that earlier investigations couldn’t detect. These objects hold clues about victims’ wealth and social standing. Scans of a 3- to 5-year-old child showed that he was wearing a piece of metal. It may be a bulla, an amulet worn by male children in ancient Rome that was believed to protect them from evil spirits, says Giovanni Babino, a radiologist who coordinated the CT scanning at Pompeii. “It was shell-shaped and probably made of gold, showing that the little victim belonged to the leisure class,” he says.

The team hopes that their study will continue to uncover new details about how the people of Pompeii lived and died. They plan to test the DNA, or genetic material, present inside the bones to discover whether certain victims—like two girls found hugging each other—were related. “We began studying Pompeii nearly 300 years ago,” says Macfarlane, “but there are so many details left to be discovered.”

—Stephanie Warren Drimmer