NO PREP

Herculaneum

Pompeii's Richer, Better-Preserved Neighbor

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Name: Period: Date:

Herculaneum: Pompeii's Richer, Better-Preserved Neighbor

A Different Kind of Burial

When Vesuvius erupted in 79 CE, it killed Pompeii and Herculaneum in very different ways. Pompeii was buried under four to six meters of pumice and ash — dry, porous material that preserved the city's layout and left cavities where organic matter decayed. Herculaneum, the smaller and wealthier resort town to the north, was hit differently. When the eruption column collapsed and pyroclastic surges swept down the mountain, Herculaneum was buried under up to 20 meters of volcanic mud — a dense, wet, oxygen-deprived deposit that set like concrete over the centuries. This difference in burial conditions makes Herculaneum archaeologically extraordinary in ways that Pompeii is not. Volcanic mud excluded oxygen and preserved organic material — wood, rope, leather, food, textiles — that simply does not survive in Pompeii's drier

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The People of Herculaneum: A Wealthier Snapshot

While Pompeii was a busy commercial city with a mixed population of traders, craftspeople, slaves, and freed persons, Herculaneum appears to have been a resort destination for wealthy Romans: a place for second homes and retirement. The houses excavated there are generally larger, more elaborately decorated, and contain more expensive objects than their Pompeian counterparts. Mosaic floors, fine painted walls, and sophisticated plumbing appear throughout. The 'House of the Mosaic Atrium' and the 'House of the Deer' represent some of the finest surviving examples of Roman domestic architecture and decoration anywhere in the world. The

skeletal remains found at Herculaneum tell a particular story. In the 1980s, excavations of the ancient shoreline (where 300 or more people had taken shelter in boat chambers, apparently waiting for rescue ships that never came) revealed a mass of skeletal material. Analysis showed that many of these people were relatively healthy and well-nourished compared to Roman populations elsewhere: evidence of a prosperous community. Some were found with jewelry and money, suggesting they had grabbed valuables before fleeing. At least one was a soldier, identified by his equipment and sword.

The Villa of the Papyri and the Carbonized Scrolls

The most remarkable find at Herculaneum, and perhaps in the entire history of classical scholarship, was the Villa of the Papyri, a massive luxury house excavated in the eighteenth century by tunneling through the hardened volcanic rock. Its library contained over 1,800 scrolls, all carbonized by the heat of the pyroclastic surge. For centuries these scrolls were unreadable. They crumbled at the slightest touch. Scholars knew they contained ancient texts but could not access them. Several strategies were attempted. A monk named Antonio Piaggio developed a machine in the 1750s that could gradually unroll carbonized scrolls without destroying them, allowing some to be read. But the process was agonizingly slow and many scrolls were too fragile to survive even gentle handling. Most remained in their carbonized state, sitting in museum collections as objects of tantalizing frustration for nearly three centuries. The breakthrough came with X-ray and CT scanning technology. Starting in the early 2000s and accelerating dramatically in 2023 with the Vesuvius Challenge (an open-source academic competition), researchers began using high-resolution CT scans and artificial intelligence to read the ink letters inside scrolls without unrolling them. In 2023-2024, the first extended passages were successfully read from previously intact scrolls. They contain philosophical texts from the Epicurean school, likely writings of Philodemus of Gadara. The possibility that entirely unknown works of ancient literature survive in the remaining unread scrolls has made the Herculaneum project one of the most exciting in current classical scholarship.

Excavation Challenges and What Remains

Less than a quarter of Herculaneum has been excavated. The rest lies beneath the modern town of Ercolano, which sits directly above the ancient city. Excavating beneath an occupied city is enormously complex — buildings must be underpinned,

residents consulted, streets closed. The expense and disruption required have limited excavation to specific zones. The area beneath Ercolano's streets potentially contains thousands of wooden structures, organic material, and possibly more scrolls, all preserved in the same volcanic mud that has protected what has been excavated so far.

Key Information: Herculaneum

Detail	Information
Burial Material	Up to 20 meters of volcanic mud — not ash like Pompeii
Why Organics Survived	Oxygen-deprived, dense mud preserved wood, food, textiles, and scrolls
Character of City	Wealthier resort town vs. Pompeii's busy commercial city
Shoreline Victims	300+ skeletons in boat chambers; generally well-nourished
Villa of the Papyri	Luxury house with 1,800+ carbonized scrolls
Piaggio Machine	18th-century device for slowly unrolling fragile scrolls
Vesuvius Challenge (2023)	AI/CT scan competition that read passages from sealed scrolls
Portion Excavated	Less than one quarter; rest beneath modern Ercolano

Case Study: Dr. Chen's Screen

Dr. Mei-Ling Chen is a computer scientist specializing in machine learning. She has never been to Italy. She sits at her workstation in a university lab in California, staring at a CT scan of a carbonized scroll from Herculaneum. The scroll was written around 79 CE. It has not been opened since then. The scan shows layers of the papyrus, compressed and darkened by heat. The ink that the original scribe applied is carbon-based — nearly the same color as the charred papyrus itself. For decades, this made reading the text optically impossible. But Dr. Chen's AI model is not looking at color. It is looking for the subtle surface texture differences between inked and uninked papyrus — microscopic ridges where carbon ink slightly raised the fiber surface, captured in the three-dimensional CT data. She runs the model. On her screen, letters begin to emerge from the blackness. Greek letters. 'As is...the case...with food...and drink...' She sits forward. She is reading something that has not been read in 1,945 years. She does not know yet whether this text is known — perhaps a duplicate of a surviving manuscript — or entirely new. She types the letters carefully, hands slightly unsteady. In the next room, her colleague shouts: 'Mei-Ling! The word at line 12 — does it say what I think it says?' It does.

1. How does Dr. Chen's work illustrate the way modern technology is changing what archaeology can recover from ancient sites?

2. Why are the Herculaneum scrolls potentially more exciting to classical scholars than any other single archaeological discovery at the site?

Multiple Choice

1. What made Herculaneum's organic materials — wood, food, scrolls — survive when similar materials in Pompeii did not?

a) Herculaneum was buried at a greater depth, reducing temperature exposure

b) The pyroclastic surge instantly sealed all buildings airtight before burning

c) Dense, oxygen-deprived volcanic mud excluded air and prevented decomposition

d) Roman builders at Herculaneum used fire-resistant construction materials

2. What technique did the Vesuvius Challenge use to read carbonized scrolls without unrolling them?

a) Chemical treatment with acid solution to dissolve the outer carbonized layers

b) Infrared photography to distinguish ink from charred papyrus

c) Microscopic drilling to access the innermost layers of each scroll

d) CT scanning and AI to detect surface texture differences in sealed scrolls

3. What does the archaeological evidence from the Herculaneum shoreline tell us about the people who died there?

a) They were gladiators from a nearby training school

b) They were relatively prosperous, healthy people who had grabbed valuables

c) They were sailors who had been sent to rescue others from the water

d) They were mostly slaves trying to escape the burning city without permission

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Villa of the Papyri	A) Open-source AI competition launched in 2023 to read sealed Herculaneum scrolls using CT scans
2. ___ Piaggio machine	B) Massive luxury house at Herculaneum containing over 1,800 carbonized scrolls
3. ___ Vesuvius Challenge	C) Superheated avalanche of gas and volcanic material that buried Herculaneum under 20 meters of mud
4. ___ Philodemus	D) 18th-century device developed by a monk to slowly unroll fragile carbonized scrolls
5. ___ Pyroclastic surge	E) Epicurean philosopher whose writings are believed to be in the Herculaneum scrolls

Fill-in-the-Blank

1. Herculaneum was buried under up to _____ meters of volcanic mud, compared to four to six meters of ash at Pompeii.

2. The Villa of the Papyri at Herculaneum contained over _____ carbonized scrolls.

3. Less than one _____ of Herculaneum has been excavated, with the rest beneath the modern town of Ercolano.

Short Answer

Answer each question in 2-4 complete sentences.

1. Compare the burial conditions of Pompeii and Herculaneum. How did these differences shape what survived at each site?

2. Why have the Herculaneum scrolls remained unread for so long, and what has changed in recent years?

3. What challenges prevent the full excavation of Herculaneum, and what might be gained if those challenges were overcome?