

# The heat from the Vesuvius eruption in A.D. 79 turned one victim's brain to glass

By Sara G. Miller

"This is the first ever discovery of ancient human brain remains, vitrified by heat," one expert said.

When Mount Vesuvius erupted in A.D. 79, the towering ash from the volcano wiped out life in Pompeii, Italy, and the surrounding area. Nearly 2,000 years later, all that remains of the victims are the striking body casts of the people who once lived there, and bones.

What you won't find is flesh or blood — soft tissue or liquids were either vaporized in the heat of the eruption, or decayed away over the millennia.

That makes an Italian team of researchers' findings, published Wednesday in *The New England Journal of Medicine*, all the more surprising: A victim, found lying on a wooden bed buried in volcanic ash in the town of Herculaneum... and his brain.

"The preservation of ancient brain remains is an extremely rare find," said lead author Dr. Pier Paola Petrone, head of the human osteobiology and forensic anthropology laboratory at the University of Naples Federico II in Italy. "This is the first ever discovery of ancient human brain remains, vitrified by heat."

Vitrification is the process through which a material is heated to an extremely high temperature until it liquifies, and then cooled rapidly, leading to the formation of a glass-like material.

That's how the brain was found — in glass-like fragments.

The victim's remains were discovered in the 1960s but the materials in his skull had not been analyzed. The victim — a male about 25 years old — was lying facedown in the volcanic ash, Petrone told NBC News in an email. The intense heat from the eruption had burst open the skull, exposing the "shining black glassy material" within, he said.

Charred wood found near the body confirms that extreme heating and rapid cooling took place: The researchers were able to determine that the wood reached temperatures of 968 degrees Fahrenheit, hot enough to ignite the fat in the brain and vaporize the body's soft tissues. A rapid drop in temperature followed, the report said.

Analysis of the proteins in the mass confirmed that the glass pieces were mostly brain matter, with some vitrified fat from human hair mixed in. That mixing is likely the result of the explosion of the skull and the swirling volcanic ash.

No other vitrified brain remains were found at Herculaneum, Petrone added.

Unlike Pompeii, which is located a bit farther from Vesuvius, the Roman town of Herculaneum was built much closer to the slope of the volcano, Roger Macfarlane, a professor of classical studies at Brigham Young University, said.

The difference in location determined the fate of those who lived there, according to Macfarlane, who was not involved with the new research but whose work focuses on Herculaneum. In Pompeii, the majority of the victims were buried beneath the thick ash that fell from the sky. In Herculaneum, however, extremely hot ash from the eruption swept down the slope and into the town, in what's called a pyroclastic surge.

Not many human remains have been found at Herculaneum. A previous discovery — a mass of skeletons in a shelter on the seafront — illustrated the deadly effects of the extreme heat from that surge. The people in this shelter were protected from the fiery ash, but analysis, also by Petrone's team, of chemicals found in the skulls of the victims indicate that the intense blast of heat caused the brains to vaporize.

The victim with the glassy brain was found farther from the water, in a building in the town called the Collegium Augustalium, according to the report.

Petrone noted that the people in the seafront shelter were probably exposed to slightly lower temperatures than the man in the Collegium, but ultimately, it didn't matter.

"People sheltered in buildings, alone or together with other people, had no chance to survive the intense heat," he said.

<https://www.nbcnews.com/health/health-news/heat-vesuvius-eruption-d-79-turned-one-victim-s-brain-n1119411>

The screenshot displays a news article layout with a main headline, a sub-headline, an introductory paragraph, and several columns of text and images. The main headline reads: "The heat from the Vesuvius eruption in A.D. 79 turned one victim's brain to glass." Below it is a sub-headline: "This is the first ever discovery of ancient human brain remains, vitrified by heat," one expert said. The article includes a large image of an archaeological site, smaller images of the victim's skull and charred wood, and a small video player at the bottom left. Text on the right side of the page reads: "Unlike Pompeii, which is located a bit farther from Vesuvius, the Roman town of Herculaneum was built much closer to the slope of the volcano, Roger Macfarlane, a professor of classical studies at Brigham Young University, said."