

# In the library of Vesuvius' secret scrolls

## Italy

Tom Kington Naples

The three rooms in a Naples library that hold secrets about the origins of western civilisation are deceptively simple, lined with wood and grey metal cabinets and smelling of old books.

Opening the door of a cabinet, Giovanni Bova slowly pulls out a drawer to check on nine black carbonised lumps of papyrus scroll resting on translucent Japanese paper and cotton wool. "The scrolls are safe, barring earthquakes bringing down the ceiling," said Bova, the head of the collection.

Burnt and buried by the massive eruption of Mount Vesuvius in AD79, the scorched scrolls are part of a library dug up during excavations of a wealthy villa at Herculaneum, Pompeii's smaller neighbour, in 1752.

Stored at the National Library of Naples since the 1920s and believed to be the world's only surviving ancient Roman library, the scrolls are making headlines as high-powered CT scans and artificial intelligence are successfully used to decipher them for the first time without unrolling them.

Until now, efforts to unroll the scrolls have mostly produced shredded, crumbling fragments, so historians are drooling at the possibility that AI can find unknown, intact works by Sophocles, Sappho or Aristotle, revolutionising our knowledge of the genesis of western art, science and philosophy.

It is a prospect that makes the hushed, book-lined home of the scrolls a surreal contrast to the explosive works they may contain.

During a visit this week, The Times was escorted through the labyrinthine, frescoed corridors of the library, which is housed in the 18th-century former royal palace in the heart of the city.

Up sweeping staircases, past sleepy

students studying the library's thousands of works and balconies offering stunning views over the bay of Naples, the scrolls are tucked away in three marble floored rooms where 20-foot ceilings and the solid palace walls keep out the summer heat.

Without climate-controlled, locked vaults, Bova leads a team guarding wooden cabinets installed in the 1920s that hold about 500 still rolled scrolls and metal cabinets containing 1,840 fragments left over from attempts to unroll another 300.

In the corner of one room stands the machine invented by a priest in the 18th century that used hooks to slowly unroll them, often destroying them in the process. "You can still see the membrane from animal guts they used to try and keep the papyrus from disintegrating as it unrolled," Bova said.

Occasionally it worked. A cabinet in holds an intact, four-metre stretch of unrolled papyrus containing ruminations on rhetoric by Philodemus, the epicurean philosopher who created the library while he was living at the villa of the Roman aristocrat Lucius Calpurnius Piso at Herculaneum. But the cabi-



Giovanni Bova booked the scrolls their own seat when he flew them to the UK

nets are also packed with shelves containing torn and crumbling fragments, among them a poorly preserved work with geometric triangle designs by Demetrius of Laconia, a 2nd-century BC Greek epicurean philosopher. While most works are in Greek, 80 fragments are in Latin, including a description by Seneca the Elder of the 31BC Battle of

Actium between the forces of Octavian and Cleopatra. "This could be part of Seneca's lost history of Rome and the rest may be in there somewhere," Bova said, waving at the cabinets.

Down the corridor an infra-red microscope set up Graziano Ranocchia, of Pisa University, is used to glean new words from fragments of Demetrius's treatise *On the Shape of God*. Using the technique infrared hyperspectral imaging, Ranocchia has this year boosted the legibility of fragments to discover the exact burial spot of Plato in Athens.

But the headline-grabbing breakthrough last year was the use of a CT scanner in Oxfordshire by a Kentucky University computer scientist, Brent Seales, to peer inside an untouched, 13-metre long rolled scroll. He obtained data which was unscrambled this year using AI by researchers who earned a \$700,000 prize funded by Silicon Valley investors. They discovered 15 columns of text by Philodemus in which he ponders what makes something desirable, writing: "We do not immediately believe things that are scarce to be absolutely more pleasant."

The text came from one of two scrolls

Seales obtained from Paris, where they had been kept since they were sent to Napoleon in 1802 by the then Bourbon ruler of Naples.

To keep the discoveries coming, Bova flew to the UK in October with three never-unrolled scrolls from the cabinets. "We 3D-printed cases that fit exactly, booked two tickets and they travelled on the plane on the seat next to me, never leaving my sight," he said.

Competitors are now trying to crack the data from the scans of the three new scrolls as well as from the second, unstudied scroll from Paris.

Like last year, the initial prize will be for the AI expert who can decipher one word, followed by another prize for finding entire tracts.

"There are 4-5,000 people working on this and we are very close to getting a word," said Seales, who was in Naples this week to meet the director of the library, Silvia Sciponi.

"I have been watching the interior of a scroll emerge from the mist — it's imminent. Once you see a word, you are 90 per cent there, it's like the roller-coaster is over the top and rushing down," added Seales, who hopes to scan all 500 intact scrolls in Naples and has \$2 million in funding from Elon Musk, making the Tesla and Twitter/X tycoon the project's biggest backer.

While historians around the world are on tenterhooks to know if Philodemus's library will reveal lost Greek tragedies and never-read ruminations by the founders of western philosophy, Seales said he was hoping for something about the early years of Christianity.

Sciponi said: "The huge responsibility we have looking after the scrolls is matched by our curiosity as technology now gives us back works we thought were lost. We also need to consider protecting them better from volcanic dust because Vesuvius may erupt again."

## Buried treasures

### AD79

The eruption of Mount Vesuvius buries Pompeii in pumice stones and ash, and engulfs Herculaneum in super-heated, boiling mud that instantly seals scrolls kept in the library of a wealthy family's villa, carbonising them but keeping out the oxygen that would have allowed them to burn completely.

### 1752

Workmen hired by the Bourbon rulers of Naples discover what is today known as the Villa of the Papyri.

### 1756

Antonio Piaggio, a Vatican priest, uses a machine equipped with hooks and silk thread to slowly unroll scrolls, a few millimetres a

day, inadvertently damaging many of them.

### 1802

King Ferdinand IV of Naples gives six rolls to Napoleon, which are taken to France.

### 1810

Eighteen scrolls are given to the future George IV. The king gives four to the University of Oxford's

Bodleian Library. The others are in the British Library.

### 2023

The Silicon Valley investors Nat Friedman and Daniel Gross join Brent Seales, a computer scientist, to launch the Vesuvius Challenge, awarding more than \$1 million over the year to competitors deciphering data from scans of scrolls.