How were Pompeii and Herculaneum excavated?

By Jane McIntosh, PhD
Archaeologist, researcher for Civilizations in Contact

In the aftermath of Vesuvius’s eruption, Herculaneum lay buried and inaccessible beneath 23 metres (75 feet) of volcanic debris, but Pompeii was more fortunate. After the stones, pumice and ash had cooled sufficiently, citizens who had escaped crept back to salvage what they could from the ruins of their homes, still visible among the 4- or 5-metre (13- to 16-foot) blanket of debris across the city. Looters probably also tried their luck. It was not difficult to tunnel through the debris, and major landmarks were easily identifiable. A systematic operation, probably under official authority, removed the most desirable materials and valued objects from major public buildings such as the Forum, bathhouses, theatres and temples — particularly statues and marble architectural elements.

Thereafter the destroyed towns were consigned to oblivion. Later earthquakes and volcanic eruptions in this tectonically unstable area contributed substantial quantities of material to the layers of soil and debris that accumulate through time over ancient sites. Thus Pompeii, too, became buried and invisible. A chance discovery in 1594 at Pompeii was misidentified as part of a villa; it was more than a century later that the discovery and investigation of the towns began. In 1710 a man digging a well revealed the remains of Herculaneum’s marble-paved theatre; finds from investigations by a local prince sparked the interest of the region’s rulers, the Bourbon kings of Naples and Sicily, and from 1738 major “excavations” were undertaken at Herculaneum, Pompeii, Stabiae and a number of villas in the area. Using pickaxes and often gunpowder, tunnels were dug down to and then through the buildings, with a workforce including convicts. The purpose of this work was solely to recover works of art for the private royal collections, including frescoes hacked from walls and mosaics gouged out of floors. Apparently material not deemed worthy of these collections was destroyed, to prevent it falling into the hands of lesser people. Distinguished visitors, including the pioneering German archaeologist J. J. Winkelmann, protested at the disgraceful waste, and by the 1760s there was some improvement, including rudimentary recording.

Napoleon’s sister, Caroline, who became Queen of Naples in 1808, took a great interest in Pompeii and oversaw the beginning of an ambitious programme of systematic clearance, using a labour force that at times numbered 1,500. She planned excavations to link areas already investigated. She intended to trace the city walls in order to identify gates and the city’s roads that ran through them, and to clear these roads to reveal the location of buildings which could then be systematically investigated by well placed tunnels. Napoleon’s fall in 1815 meant that Caroline was able to fulfill only part of the first objective, but, happily, later Bourbon kings adopted her aims, though they provided scant funding and manpower to execute them. The resulting discoveries included many skeletons whose situation or posture revealed details of their tragic individual stories. These made Pompeii a popular destination for travellers on the Grand Tour, which allowed them to walk along the exposed streets and follow torch-bearing guides along tunnels to see the sights. Exciting objects would apparently be discovered by the excavators before the visitors’ very eyes — and no doubt be covered over after the tourists had left, to be “discovered” again and again.
In 1863, Giuseppe Fiorelli was appointed to take over the excavations for the new Italian king, Victor Emmanuel. His careful work transformed the investigations at Pompeii, while the school he founded (Scuola di Pompeii) ensured that his methods were passed on to the rising generation of Italian, and even foreign, archaeologists. His innovations were many. Abandoning the previous system of tunnelling out from cleared roads, he first had the excavation area cleared of the spoil heaps (mounds of excavated soil and debris) left from earlier work, and then dug down to expose the buildings from above. By this means he was able to gain a complete three-dimensional picture of the structures and their features. He used this to make informed decisions about the best way to restore and conserve each building, employing materials in keeping with those that were originally used. He also successfully advocated leaving as much in place as possible: mosaics, frescoes and other attractive architectural features that had formerly been removed were now left to recreate a vivid impression of the Roman town as its inhabitants had known it. He added to this picture by taking account of everything that was found: he recovered not just the treasures of the wealthy but also the everyday tools and possessions of the ordinary citizens, down to the poorest. In this he was well ahead not only of most of his contemporaries but also of many later excavators.

He kept careful and detailed records of his work. Anticipating another standard archaeological practice of more recent times, his records included the three-dimensional location of finds, information which he used in interpreting their significance. His whole investigation was systematically organised, unlike the random and patchy excavations of earlier times. To make this possible, he divided the city into nine “regions” (Regiones), to which he assigned Roman numerals. Within each of these regions, he gave a number to each block of buildings, using the Roman term Insula (apartment block), and finally, identified each entrance by a number. Thus a house, with its single entrance from the street, would have a designation such as I-8-5 (5th house in Insula 8 in block I), the house on Via dell’Abbondanza in which the Indian ivory figure was discovered. This system continues to be used today.

However, Fiorelli is now best remembered for the creation of plaster casts of Pompeii’s unfortunate inhabitants. The technique of creating plaster casts from holes left by decayed objects was already in occasional use by the time of Fiorelli, but it was he who had the radical idea of applying it to people and who perfected the technique. Liquid plaster was poured or pumped into the hole and left to set; the surrounding volcanic material was then removed by excavation, exposing the plaster cast.

During the first day of the eruption, Pompeii had been subjected to a rain of ash, lapilli and white pumice, which had accumulated throughout the afternoon and evening at a rate of 15cm/6 inches per hour. Lithics (larger stones — “volcanic bombs”) were also falling by late afternoon. At this stage some of those who died had been overwhelmed or struck by debris in the streets; some had suffocated from inhaling volcanic ash, while others had been killed by falling buildings or house fires started by overturned lamps and braziers. As they lay, they had soon been covered by the continuous downpour of volcanic debris, which had settled around them, hugging their shape and hardening through time into a rigid crust whose inner surface followed every detail of their bodies, clothing and other associated things. This crust, however, did not exclude air, so in time the soft tissue and other organic materials such as clothing had decayed, leaving only the bones and artefacts of inorganic materials (such as metal jewellery) within a void that still retained the victim’s form. Earlier excavators had dug into these and exposed the bones and objects; it was Fiorelli’s inspiration to use these voids instead as moulds to create plaster casts of the original people. He was excoriated by some of his contemporaries for what
could be taken as a blasphemous or disrespectful act — but most were fascinated by the results, and moved by the human suffering with which they were now, quite literally, brought face to face. In contrast, Herculaneum was overwhelmed by the first surge and pyroclastic flow, at around 1 a.m. on the second day of the eruption. The extreme heat (around 400-450 degrees C) not only killed people instantly, but also vapourised their flesh, leaving only skeletons. It also carbonised objects of wood, leather and other organic materials such as food, but because these were immediately sealed by ash, they did not ignite. Thus they have survived in their carbonised form. Pompeii also experienced surges and pyroclastic flows on the second day, but these were less hot (250-300 degrees C). The bodies of those killed by the heat often survived, to be buried by ash and eventually made into casts. Clenched fists bear witness to the heat, which contracted their tendons.

Fiorelli’s casting technique continues to be used, recovering the form not only of people, but also, poignantly, of a dog who could not escape his chain as the ashes fell. Wooden doors, shutters and other architectural elements have also been recovered in this way, and even tree roots, which bear witness to the gardens of Pompeii. Later excavators maintained Fiorelli’s high standards of work for the most part, although poor funding often hampered or undermined these efforts. The substandard restorations executed by Amedeo Maiuri from the 1920s to the 1960s are a prime example.

Dr Jane McIntosh has an M.A. in archaeology and anthropology and a Ph.D. in Indian archaeology from the University of Cambridge. She worked in field archaeology and teaching until becoming a full-time writer in 1997. As well as articles and multimedia on archaeology and the ancient world, she has published eight books, including the award-winning Practical Archaeologist. She was elected Fellow of the Society of Antiquities in 2008.