

INVESTIGATING THE PAST: Pompeii & Herculaneum Final Script

Following the eruption of Mount Vesuvius in AD79, life stopped suddenly in Pompeii and Herculaneum. The prevailing atmosphere was not one of death and disaster, but rather of a society suspended in time. We gain a unique and comprehensive view of private and public life at the time. Paintings and mosaics shed light on values, beliefs and everyday intrigues. Politics can be traced by proclamations and graffiti on walls. Taverns, bakeries and villas are on view.

It was the destiny of Pompeii and Herculaneum to unlock a chapter in history and for the dead to tell their tales.

INVESTIGATING THE PAST: Pompeii & Herculaneum Main Title

EARTHQUAKE AD 62

Located 200 kilometres south of Rome in the Campania region, were the cities of Pompeii and Herculaneum. Around noon on a winter's day in AD 62, the area was rocked by a massive earthquake. In the cities of Pompeii and Herculaneum, houses swayed, roads split open, statues toppled and buildings were destroyed.

These events were vividly depicted in two stone reliefs found in the atrium of a banker's home in Pompeii. The first illustrates both the Temple of Jupiter and a monumental arch in the Forum lurching precariously. The other shows the collapse of the Vesuvius Gate with the Castellum Aquae next to it. Two mules and a cart narrowly avoid being crushed.

Seneca, the playwright and philosopher, wrote about the impact of the earthquake: "It caused great destruction in Campania...part of the town of Herculaneum is in ruins....a flock of hundreds of sheep were swallowed up in a single instant....some people were deranged and afterwards wandered about unable to help themselves". One thing he could not comprehend was its duration: "Yet why has an earthquake lasted for several days? For Campania did not cease its continuous trembling...."

In the seventeen years that followed, extensive restoration and re-building was carried out in both Pompeii and Herculaneum. Ample archaeological evidence exists to suggest that, during this period, there were at least another two serious earthquakes.

VOLCANIC ERUPTION AD 79

At noon on a beautiful summer's day, the 24th of August AD 79, Mount Vesuvius erupted, remaining active for 20 hours. Initially, a dense rain of pumice and ash pounded Pompeii. Within four or five hours, roofs began to collapse under the weight, killing those who remained indoors and prompting survivors to flee the city.

The eruption was witnessed by Pliny the Younger who provided the only description of events that day. He tells of a cloud "like a pine tree... it spread out and drifted... dirty and blotchy on account of the earth and ash."

He lived at Misenum on the other side of the Bay of Naples, with his uncle, Pliny the Elder, Admiral of the Naval Fleet.

Pliny the Elder, a noted scholar, wished to observe the phenomenon more closely. He received a note from Rectina, the wife of a friend, pleading for him to come and rescue her. Prompted by this, he set off. However, with fiery ash and pumice pounding his boat, he was forced to travel south away from danger. He came ashore at Stabiae to the south of Pompeii, hoping to continue in the morning.

It was during this night that the fate of Pompeii and Herculaneum was sealed. The column of ash that had risen 30 kilometres above Vesuvius began to collapse. A series of super-hot pyroclastic surges formed. These surges travelled down the mountain like avalanches, at over 100 kilometres an hour. They consisted of glowing clouds of gas and fine ash with temperatures reaching up to 400 degrees Celsius. In all, there were six of these surges.

Herculaneum initially remained unaffected. But, in the middle of the night, it was hit by the first deadly pyroclastic surge. Many residents had already escaped, but those who remained in the city or had gathered on the seashore, were killed instantly. They died from burns, or suffocated from the ash-saturated air. In some instances their brains boiled inside their skulls. Others would have been flattened or thrown vast distances. This surge was followed by a pyroclastic flow, a glowing river of rock and pumice which swept through the town, and out to sea.

A second surge and flow covered more of Herculaneum in the early hours of the next day. Before dawn, a third totally buried Herculaneum and, at the same time, reached the walls of Pompeii. An hour later, the fourth stage asphyxiated the people of Pompeii who had not yet fled. Half an hour later, a fifth added another layer of mud over both cities.

By daybreak, Herculaneum had been buried under roughly 23 metres of volcanic material, the equivalent of a six storey building. This is graphically apparent today.

The sixth and final stage buried Pompeii's dead. This glowing avalanche and its huge black cloud turned day into night and terrified the inhabitants of Misenum, 32 kilometres from Mount Vesuvius. Pliny the Younger described it as: "shining great flames on the side of the mountain that lit up the night...large tremors... the sea continued to be huge....a night blacker and denser than any other night..."

It was on this morning that Pliny the Elder died from inhaling deadly sulphur fumes on the beach at Stabiae. His nephew, only eighteen at the time, had stayed with his mother to protect her and to concentrate on his studies.

Information of these events has been found mainly in letters written 25 years later by Pliny the Younger to his friend Tacitus, a Roman Senator and historian. This is the only primary source available, as the whereabouts of any replies are unknown.

He recorded each phase of the eruption, now called a Plinian Eruption, providing helpful geological clues to modern volcanologists. In fact, his description correlates perfectly with data collected at the time of the massive eruption of America's Mount St Helens in 1980. This allowed eminent American volcanologist Haraldur Sigurdsson, working in Pompeii, to accurately reconstruct the six phases of the Vesuvian eruption. Sigurdsson did this by examining the size of granular volcanic material that blanketed the cities, stating: "grain sizes are the fingerprints of an eruption". Sigurdsson believed that 10,000 people perished, roughly half the population. Although only 1000 bodies have been recovered, he felt many more died in their attempts to escape to the countryside and were engulfed by surges.

Following the eruption Titus, who had been Roman Emperor for only a month, rushed to Campania to organise a relief effort. But there was nothing that could be done to restore the cities. Survivors of the disaster fled to Capua, Naples and Sorrento, and these towns were given privileges and benefits as a reward.

There are however, weaknesses in the reliability of Pliny's accounts. He acknowledges this in a letter to a friend saying "...a letter is written to a friend, history is written for everyone." His account was written 25 years later, based on witness information, and therefore could be considered biased or inaccurate.

His personal experience of the eruption was from some distance. The fact that these letters were specifically written to honour Tacitus and his late uncle could also cast doubt on their reliability.

Pliny wrote “he died in the calamity of those most exceedingly beautiful of lands... thus will always be remembered... He himself wrote lasting words but the immortality of your writings will add more still to his immortality.”

DISCOVERING THE BURIED PAST Eighteenth Century

The locations of Pompeii and Herculaneum had not been completely forgotten. Both cities are indicated on this Roman road map dating from the 4th Century AD, despite the cities being buried centuries earlier. Over centuries following the eruption, the fertile soil covering Pompeii was farmed, with olive groves and vineyards on the slopes of Mount Vesuvius. A new town called Resina was established on the site of ancient Herculaneum.

In the early 1700s, a peasant in Resina deepening his well discovered some marble blocks. He sold them to Prince d’Elbeuf, an Austrian who was building a villa nearby. The prince then purchased the peasant’s land and excavated further, discovering the ancient theatre of Herculaneum. He removed everything he could, destroying valuable archaeological evidence.

Charles, son of Philip V of Spain, wrested control of southern Italy from the Austrians and, in 1735 was crowned Charles VII and Naples became his capital. Charles and his wife Maria Amalia were intrigued by the earlier excavations, and generously supported further work. Charles employed a Spanish military engineer, Alcubierre, to supervise the work. His brief was to obtain valuable artefacts for the king, without documenting anything of the archaeological site. Most of the antiquities were transported back to the royal museum in Naples. Sections of paintings and mosaics were torn from walls and floors and he failed to record small finds such as objects used in daily life. This destruction and lack of any interest in the history singled out Alcubierre for criticism from archaeological societies throughout Europe: “*The incompetence of this man...has caused the loss of many beautiful things*” Johann Joachim Winkelmann.

During this period, excavations began in Pompeii but, when no spectacular discoveries were made, the focus shifted back to Herculaneum. This unscientific and random approach continued for many years.

The appointment in 1749 of Karl Webber, a Swiss military engineer as assistant to Alcubierre, was archaeologically significant. His duties included overseeing the daily operation of the excavations, compiling weekly summaries of all finds, and producing detailed site plans, particularly ones of the Villa of Papyri in Herculaneum, for which he was well known. He followed the path of a street when digging and stopped the practice of dumping rubble back into excavated tunnels. Discoveries made at this time have provided direct evidence of the influence of other cultures on Pompeian life. A tomb excavated outside Pompeii revealed the placement of Greek vases with the deceased, in a typically Greek fashion.

CHANGING METHODS of 19TH CENTURY ARCHAEOLOGY

The first scholarly excavations of Pompeii began around 1812. The site started to look much like it did in antiquity, and not merely a series of quarries. The town walls, amphitheatre, public buildings and main roads crossing the city were revealed. During this period, however, there was a great deal of theft, corruption and bribery. In 1848 a plan to transform the administration of the sites was drawn up, but nothing came of it.

The establishment of the Kingdom of Italy in 1860 had a dramatic impact on the excavations at Pompeii. They became a showcase for the new kingdom, but development of the site had much to do with the energy and vision of renowned scholar Giuseppe Fiorelli. He was appointed inspector of the excavations in 1860 and, by 1863, was superintendent of Pompeii and Director of the Naples Museum. For 15 years, Fiorelli led some of the most significant and groundbreaking archaeological excavations in the area.

Originally, only nobles and influential citizens were allowed to see the antiquities. Fiorelli opened Pompeii to the public by instituting an entrance fee, which paid for custodians and guides. The site became part of the Italian cultural heritage, for the education and enjoyment of all.

Fiorelli's method of excavation was innovative. After clearing streets of any debris and pumice, he excavated the buildings from the top down, room by room. This was unusual for the time, but Fiorelli wanted to stop walls collapsing, to preserve any discoveries. The rooms were then 'shored up' and stabilized.

Fiorelli divided Pompeii into a regular grid pattern of streets and nine regions, providing a detailed overview of the site.

Each region was numbered, as were the 22 *insulae*, or street blocks, and *domus* or houses. The Fiorellian Method avoided any ambiguity about the location of a particular building, originally named only after its owner, or by the artefacts or frescoes discovered within. The House of the Surgeon, known for the many medical instruments discovered there, is located at VI.1.10. This translates into Regione 6, Insulae 1, Domus 10. Modern names were also given to the streets of Pompeii and Herculaneum. Main crossroads are either Decumanus or Cardo. Fiorelli's system is still in use today.

This model recorded the condition of buildings as they were excavated. For some structures, it is the only remaining record of the wall-paintings and mosaics once adorning them. Fiorelli also wrote accurate, detailed journals of all discoveries, and their positions in the various layers of ash. Where possible, he preferred to leave an object in its original position, in 'situ.'

Giuseppe Fiorelli was probably best known for his plaster casting of victims' remains from the eruption. He knew that when biological matter decomposes, gases are released. These gases were trapped inside the cooling lava, retaining the victim's shape, features and skeleton. A small hole was drilled through the solidified lava, into the cavity created by the decomposed body. Plaster was then poured into the hole, filling the cavity. After the plaster set, the ash and lava was removed, revealing a solid cast of the body. Preserved were the victim's shape, physical features, and an outline of the clothing they wore at the moment of their horrific death. Many bodies were found in rigid poses or the 'pugilistic effect'. This is the result of the extremely high temperatures, which caused powerful muscle spasms and contractions, contorting the bodies. Fiorelli's technique was so successful it was also used on doors, animals and later tree roots, allowing excavators to identify plants and crops grown at this time.

Fiorelli strongly advocated against the export of antiquities from Pompeii, ensuring that as much material as possible remained in Italy. He left Pompeii in 1874 for a new position in Rome, but his work was continued by two of his archaeology students. Michele Ruggiero's most important work was the consolidation and restoration of 600 frescoes. Following him, 1893 to 1901, Giulio de Petra completely excavated and restored the House of the Vettii. The location of much of the garden sculptures and household artefacts was preserved, recreating an image of daily life. Also during this period of the 19th century, roofs of houses were reconstructed with wood and tiles to protect the remaining frescoes and mosaics.

Private and clandestine excavations were conducted outside the city limits. Artefacts were sold and exported with authorities unable to prevent it from happening. In 1895 silver vessels, gold coins and jewellery secretly discovered in a villa at Boscoreale were sold to the Louvre Museum in Paris, well before authorities even knew of their existence. Investigations into the affair continued for years until laws were passed to prevent the sale and export of important artefacts.

INVESTIGATING & PRESERVING THE PAST IN 20TH CENTURY ARCHAEOLOGY

The advent of motion pictures at the beginning of the 20th century was an instant success. Italian director Mario Caserini's film "Last Days of Pompeii" portrayed, as well as possible, how Pompeii may have appeared at that time.

However, scientific advances made during this century would give us a far more accurate picture.

When Vittorio Spinazzola (1911 – 1923 supered) became Director of Excavations, he implemented new techniques and ideas. First, he refined Fiorelli's use of plaster casts on tree roots, trying to discover which crops were grown in Pompeii's gardens. Spinazzola also initiated the use of technical rather than artistic drawings, to document the excavations. And photography became a major tool for recording stages of the unearthing process. Spinazzola documented his findings accurately, with emphasis placed more on restoration than excavation. Many houses depicted in wall paintings were shown to have upper floors, deemed unremarkable by earlier archaeologists. New excavations were then designed to reconstruct as accurately as possible facades, windows, balconies and roofs. To achieve this, when 600 metres of the Via Della Abbondanza was excavated, facades and upper stories were restored.

The advent of World War 1 interrupted the completion of Spinazzola's work. After the war his opposition to the new Fascist regime meant that he was forced to step down as director at Pompeii.

Amedeo Maiuri became Director of Excavations in 1924, and his first task was to complete Spinazzola's work along the Via Della Abbondanza. But Maiuri had grander plans, and the political climate at the time enabled him to pursue them. As in Fiorelli's day, Mussolini and his Fascist Party saw the archaeological sites as evidence of Italy's past and future glory. As a result Maiuri received enormous funding, and was able to conduct his excavations on a grand scale.

A major result of this was the revival, in 1927, of excavations at Herculaneum. Within 15 years the entire town, as visible today, had been uncovered. A house, excavated by Maiuri at Herculaneum between 1934 and 1936, has recently undergone emergency consolidation works.

Funded in cooperation with the Packard Humanities Institute of America, the House of the Telephus Relief is named after a marble relief discovered there. Decorative surfaces have been consolidated to prevent them from falling off, and a maintenance programme was initiated to protect marble floors and important frescoes. This is part of an ongoing case study of houses within the Insulae Orientalis II.

Also included in the emergency operation is the main sewer that runs under the buildings of Insulae Orientalis II, excavated by Maiuri in 1949. It is 3 metres high and 1.8 metres wide. Current work is to empty it of material accumulated over the last 50 years. Then, decisions will be made towards establishing a functioning drainage system in the ancient city once again.

In Pompeii, Maiuri continued work along the Via Della Abbondanza up to the Large Palaestra and Amphitheatre. Two of his greatest discoveries in the period prior to World War Two were the House of Menander and the Villa of Mysteries. They were immediately restored and opened to the public.

Maiuri's research suggested that Pompeii never really recovered from the 62 AD earthquake. It seemed to him that the city was slowly being abandoned due to damage, and resettled by squatters. Prominent scientists agreed with him. Brian Brennan and Estelle Lazer stated: "The old families... did not have the funds to rebuild their properties and had to sell their houses to shopkeepers and tradesmen who subdivided and opened business premises in them."

In September 1943 during World War Two, Pompeii was bombed by the Allies who believed German troops were hidden in the ruins. Many houses and temples were either destroyed or damaged, and the museum was totally ruined. Maiuri himself was shot in the foot trying to escape to Naples during the bombardment.

For 38 years, Maiuri was Director of Excavations, but he was criticised by eminent scientists for publishing only spectacular finds, while smaller discoveries with less artistic merit were left out of inventories. In fact, the post-war period up to his retirement in 1961, was marked by unrecorded and unpublished findings, inaccurate methodology and inadequate

instruments. Chronic under-funding, poor craftsmanship and a lack of proper restoration when working too quickly, greatly affected the sites.

NEW RESEARCH & TECHNOLOGY Chapter Heading

Major developments in archaeological research and technology during the latter part of the 20th century, have expanded our knowledge of life and death prior to the eruption of Mt Vesuvius.

From 1982 to 1988, American archaeologist and forensic anthropologist Dr Sara Bisel was financed by the National Geographic Magazine to conduct a study at Herculaneum. Her work concentrated on skeletons found at the boathouses excavated on the beach. One of her earliest discoveries was that of a mother and child, who presumably died from one of the pyroclastic surges. This artistic impression shows how the woman tried in vain to protect her baby.

Bisel analysed the proportions of calcium, magnesium and zinc in a variety of teeth and bones, in an attempt to accurately calculate the health of the victims. Other studies identified the victims' ages at death, sex, social status, occupation and height. From this information, she was able to determine their diet, which contained vegetables and seafood, but very little sugar and red meat. Additional research revealed that the lower social classes and slaves had pelvic abnormalities, an indication of hard work from labouring.

Research undertaken by Sara Bisel and anthropologist Dr Estelle Lazer of Sydney University has revealed interesting information. They have concluded that some women suffered from a hormonal disorder caused by lead poisoning, presumably from lead water pipes. This would produce headaches, hairiness and obesity, suggesting that the depiction of some women in frescoes may be inaccurate.

Estelle Lazer incorporated modern technology such as the use of CT scans and X-rays. In 1994, she upgraded the Fiorellian Method by using translucent resin instead of plaster. Her study of the Lady of Oplontis proved to be an outstanding success, in terms of restoration, study and maintenance of skeletons. She was able to establish the genetic structure of the population by statistical analysis of skulls, hips, pelvises and leg and arm bones.

When volcanologist Haraldur Sigurdsson began working at Pompeii in the 1980s, he was able to accurately calculate the timeframe and phases of the eruption.

He achieved this by studying Pliny's account and by comparing volcanic layers found at the 1980 eruption of Mount St Helen's with those at Pompeii. Comparisons with Mount St Helens also revealed how victims of the Vesuvius eruption perished. The majority of the 67 victims of Mount St Helens were asphyxiated by ash, while five others died of thermal shock from the extremely high temperatures. This verified Sigurdsson's theory that the victims of Vesuvius suffered a similar fate.

For 35 years, from the late 1970's onward, Professor Wilhelmina Jashemski of the University of Maryland conducted research into crops. Her findings indicated a high level of agricultural production within Pompeii. From the carbonised nuts, seeds and plants discovered there, she was able to identify 184 different plants. She combined this with studies of frescoes and literary references to build a profile of plant life at the time. Pompeii has rich, fertile soil and evidence was found that olives, grapes, apples, peaches, cabbage, onions and peas were grown in large open areas of the city. Smaller plots were cultivated in more densely populated locations and provided an additional food supply. Jashemski's work suggested that nearly 10% of Pompeii was used for the cultivation of food crops.

3D laser scan technology is now an essential tool in archaeological conservation. In 2006, a survey using a 3D laser scanner began on Herculaneum's Suburban Baths. This was carried out with support from the Department of Computer Science at the University of North Carolina, and the Packard Humanities Institute. The scanner was used in conjunction with a high resolution digital camera to create a three dimensional model. With this technology, it is possible to view sections through the digital model, obtaining the plan, section or elevation required. The infinite number of views available could prove to be invaluable in the future conservation and restoration of the baths.

ETHICAL ISSUES Chapter Heading

Collecting, studying and displaying human remains, often without consent, has been commonly practiced in western society. Studies have provided insight into our ancient ancestors; their height and appearance, what kind of work they did, and their life expectancy. However, debate will always remain concerning the ethics of displaying human remains.

The issue of respect for the dead, and their descendants, is a culturally sensitive one. During the latter half of the 20th century, various communities around the world advocated to have ancestral remains returned for reburial. This is particularly important to indigenous Australians.

Pompeii is a UNESCO World Heritage site and, as such, all aspects of it should be accessible to the public. This includes skeletons and plaster casts of victims. These are an integral part of the history of the site, as much as the excavated ruins.

At Pompeii and Herculaneum, how appropriate is it to display someone at the moment of their death? The victims of Mount St Helens were autopsied to establish cause of death. However, we would not expect to see remains on display or view photographs of the bodies. It is felt by some that the plaster casts originally made by Fiorelli to be more acceptable, as they are only impressions, and do not contain skeletons. They provide visitors with some understanding of the agony that the people of Pompeii must have experienced in their last moments of life. Unfortunately, many of the casts there are inappropriately stored. Perhaps they could better preserved by displaying them in a museum, where controlled conditions would ensure their safe-keeping.

At Herculaneum, bodies have only been discovered in the last few decades. Dr Sarah Bisel was concerned with the affect of exposing unearthed skeletons to the elements. The problem was solved by making plaster casts of them, to display in the original locations. The actual material has been studied, then stored appropriately.

But, the question remains - where will the final resting place be for these human beings?

CONSERVATION AND RECONSTRUCTION Chapter Heading

For over 250 years, the cities of Vesuvius have been continuously excavated. Conservation versus reconstruction has become the major issue for authorities. Should money be spent to conserve what has been discovered, leaving it unaltered? Or, should the sites be rebuilt, allowing them to endure, but compromising their authenticity?

There are numerous concerns. With a large surrounding urban population, pollution will increase. More than 2 million tourists visit Pompeii and Herculaneum each year, placing a huge strain on the sites. Footpaths and roadways are eroded by the visitors and walls are accidentally damaged when scrapped by backpacks. Touching surfaces contributes to their degradation. Walls are vandalized by graffiti and pieces of buildings are chipped off for souvenirs. Even the provision of services such as sign posts and toilet blocks cause damage. Tourism, however, provides much-needed funds and stimulates ongoing awareness of the value of these irreplaceable sites.

The cities are constantly under maintenance, with many buildings requiring restoration and reconstruction. Traditional building techniques are proving to be far superior. Weeds and grasses, like phenyl, fig and brambles need to be constantly kept in check. In some areas, plants are taking root under buildings and walls, causing them to crumble and decay. By using organic chemical sprays, no additional toxins are introduced. Unique practices have been adopted, such as releasing hawks to hunt pigeons, whose acidic droppings cause frescoes and mosaics to deteriorate.

In 1997, Pompeii was declared a World Heritage Site by UNESCO. The following year, a law was passed granting all profits from the site be directed entirely to maintenance and administration. Previously the Italian government would take a huge slice of these funds. Administrators of both sites are also permitted to seek private investment. A programme developed with the European Union provided an injection of \$30 million over five years to upgrade and conserve Pompeii. It has been estimated that an additional \$US 300 million would be needed to bring Pompeii to an acceptable level of consolidation and restoration.

Further initiatives provide additional funding for research. The Anglo-American Project in Pompeii, run by the University of Bradford in the United Kingdom, has been excavating and studying an entire insulae in Pompeii for the past ten years. In 2002, the Pompeii Trust was established to provide additional funds for the project.

In 2004, The Packard Humanities Institute financed a \$110 million project to conserve and protect Herculaneum's excavated area from further damage. The work, expected to take ten years, is a joint effort of The Packard Humanities, the British School at Rome and Italian consultants. It is hoped that the Herculaneum project will prove to be a model for other international rescue missions funded by government and private sponsorship.

These truly unique world heritage cities must be maintained for many centuries. "...the Vesuvian sites are regarded as belonging to all of us, no matter where we live on this planet." *Brian Brennan and Estelle Lazer: Pompeii and Herculaneum – Interpreting the Evidence.*

END CREDITS