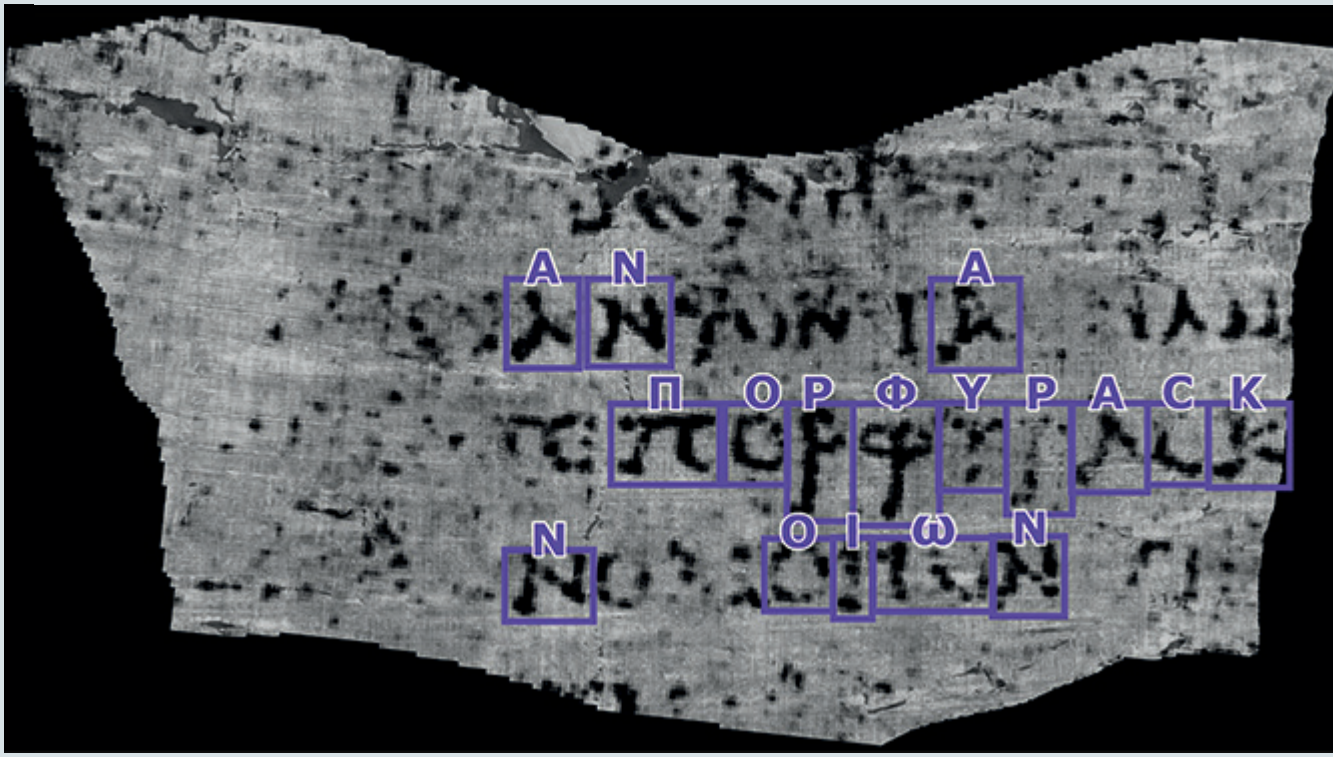
herculaneum archaeology
the newsletter of the Herculaneum Society - Issue 28 Autumn 2023

The End of the Beginning?



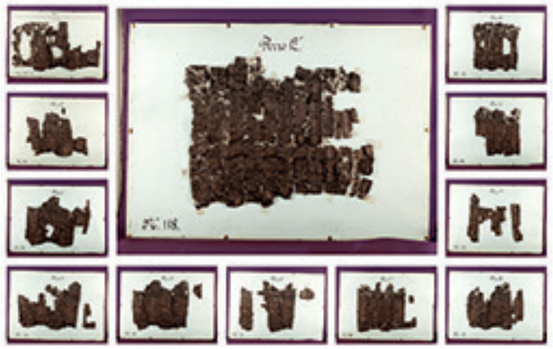
The Greek characters, πορφύρας, revealed as the word "PURPLE," are among the multiple characters and lines of text that have been extracted by Vesuvius Challenge contestant Luke Farritor.
Photo Credit: Vesuvius Challenge.

Digitisation of Herculaneum Papyri: The Kentucky Conference

Bob Fowler
Chairman of Trustees
The Herculaneum Society

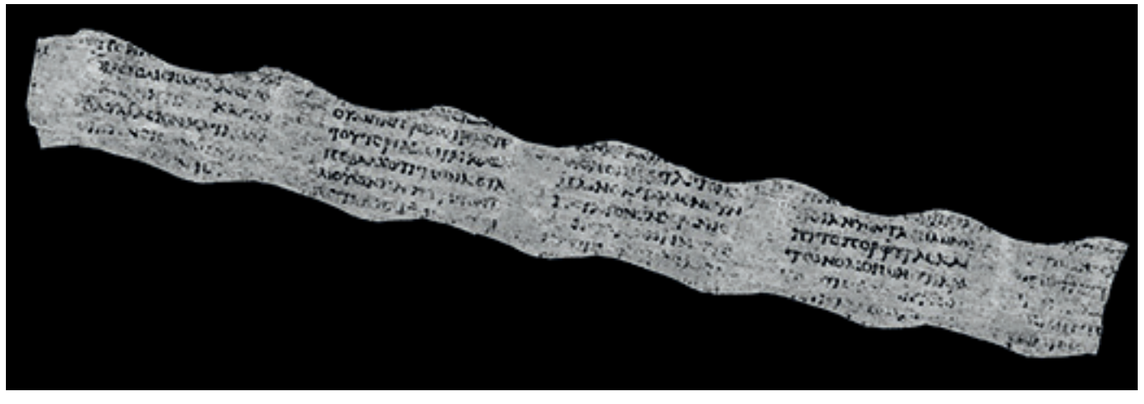
On 11-12 October at the University of Kentucky, Brent Seales and his team hosted a two-day conference to celebrate the latest achievements in virtual unrolling, look back over the past twenty years of indefatigable labour, and scroll forward to the future. Many old friends, members and trustees of the Society contributed talks, as did the entire team of Mellon Foundation / Herculaneum Society scholars from Naples. The event culminated in a press conference in which the "First Letters" first prize of $40,000 was awarded to Luke Farritor, a 21-year-old undergraduate from the University of Nebraska, and second prize of $10,000 to Youssef Nader, 26, a doctoral student at the Freie Universität Berlin. They both fixed on the same part of the papyrus and turned up the word "purple". This one word by itself proves the concept: we now know we can read the interior of scrolls. In fact, during the conference it was revealed that Youssef had already made stunning progress, finding four clear part-columns and many more words. An unscheduled session was organised to let the papyrologists have a go at reading and contextualising his results. One word—"music"—stood out (second column, first word of fourth line), and the suspicion is that we have to do with Philodemus' On Music; but we need more text to be sure. The Grand Prize of $700,000, for reading four continuous passages of 140 characters each with no more than 15% uncertain letters, is definitely achievable. The deadline for submissions is 31 December.

The Society website has links to the two days of the conference, the closing press conference, and other media coverage. Exciting times!



The 12 pezzi, or "pieces," of the opened Herculaneum papyrus scroll known as P.Herc.118. The compilation of images is owned by the Bodleian Library at the University of Oxford.

Herculaneum scroll being scanned inside its scanning case at the Diamond Light Source (Harwell, Oxfordshire). Professor Brent Seales (L) and Dr Stephen Parsons (R). Photo Credit: EduceLab.



Four and a half columns of text that have been extracted by Vesuvius Challenge contestant Youssef Nader. Photo Credit: Vesuvius Challenge.

The Year In Review

Krystyna Cech
Administrator
The Herculaneum Society

Looking back on the past year, the Herculaneum Society has been active on many fronts. The Society aims to keep members informed about new developments at the archaeological site of Herculaneum as well as advances in the field of research, especially in the reading of the carbonised Herculaneum scrolls. To this end, in the past year, the Society organised a Congress in Herculaneum with site visits and scholarly papers by researchers in the field (see the full report in Issue 27 of the Newsletter). Furthermore, the society is affiliated to a number of research projects concerning the Herculaneum papyri, such as "The Digital Restoration of the Herculaneum Papyri" and the "Vesuvius Challenge" not to mention its continued involvement in "The Custodian's Room Project". In our "in-between Congress" years, we organise a study day at a Roman site in England. This year our study day was in Colchester, the first Roman town in Britannia and the site of the only circus discovered so far on our shores. Meanwhile, in Herculaneum, teams of archaeologists and conservators are continuing excavation, conservation and raising public awareness of the site among the local and national communities. An exhibition of the unique, carbonised, wooden artefacts discovered in Herculaneum is now on display at the Reggia di Portici - not to be missed if you are in the area (closes on 31 December). Looking to the future, the next Congress in Ercolano will take place in September 2024 and a 21st Anniversary Conference is planned for 2025. A lot to look forward to.

AGM

The Society's AGM was held on 5 November. The business part of the meeting was followed by a talk by Dr Amin Benaissa, Associate Professor in Papyrology and Greek Literature at Christ Church, University of Oxford who spoke on "Mary Elizabeth Dicker: Britain's first woman papyrologist", whose contribution to the development of the Oxyrhynchus Papyri collection has been largely forgotten. As A.S. Hunt's assistant from 1929 to 1933, she sorted through a large amount of Oxyrhynchus papyri and transcribed and identified a number of important pieces during that short period.

Outreach event on the Herculaneum Papyri

On 5 December, the Faculty of Classics at the University of Oxford hosted four speakers who talked on different aspects of the Herculaneum Papyri Project: Prof. Bob Fowler, Friends of Herculaneum Society, spoke on "Herculaneum: The Villa and its Papyri", Prof. Tobias Reinhardt, University of Oxford, on "What (little) We Know about the Contents of P.Herc. 118 (so far)", Prof. Brent Seales, University of Kentucky, on "Digital Restoration and Scholarly Visualization of Herculaneum Papyri" and Stephen Parsons on his doctoral research into how the science of X-ray micro-Computing Tomography can assist in the virtual unravelling of the layers of carbonised papyri. The day was one example of work on the papyri supported by the Society over many years in the form of grants, bursaries, publications, administrative assistance, outreach and public education.

"Material. The wood that did not burn in Herculaneum"

On 14 December an exhibition of carbonised wooden artefacts from Herculaneum was opened in the eighteenth-century Reggia di Portici, the summer residence of the Bourbon royal family and seat of the Herculanense Museum, among the first archaeological museums in the world and a destination for 19th century travellers on the Grand Tour. Herculaneum preserves an absolutely unique heritage of wooden objects, ranging from accessories such as doors, windows, partitions, to furniture, such as wardrobes, chests, tabernacles, beds and tables. Curated by the Director of the Herculaneum Archaeological Park, Francesco Sirano and by the archaeologist Stefania Siano, the exhibition has proved a great success. It runs until 31 Dec 2023.

Custodian's Room Project at Herculaneum

The room in question is part of the so-called Sede degli Augustales, and contains a low bed on which a skeleton was found by Amedeo Maiuri during his excavations in 1961, one of the few that came to light at that time. The victim was lying face down when overtaken by the eruption, and because of the location of his room by the entrance he has been dubbed the Custodian. The room has been closed to the public for decades for want of funds to research and restore it properly. The project will involve completing the excavation under the bed, thorough scientific examination of the skeleton and the remarkable brain matter vitrified by the heat of the pyroclastic flow, reconstruction of the face, restoration and stabilisation of surfaces in the room, and ample visitor information including a 3D experience with headsets. The Society raised or facilitated donations of over £53,000. This sum enabled the Director of the Archaeological Park, Dr Francesco Sirano, to apply to the Ministry of Culture in Italy under their "ArtBonus" scheme, whereby if at least one-third of a necessary total has been raised for a qualifying project, the Ministry will make up the remainder. The application was successful and the total available for the Project is approximately €200,000. Work was expected to commence in December 2022 but there have been unexpected bureaucratic delays caused by new Ministry requirements. Work is due to start imminently.

The Digital Restoration of the Herculaneum Papyri

This project, led by Professor Brent Seales of the University of Kentucky, to scan all the Herculaneum Papyri, is still ongoing. By the end of summer 2023 virtually all the papyri have been scanned in various modes, the images digitised and equipped with a panoply of analytical tools. On completion of the scanning, a year of post-scanning data processing will follow. This research will enable scholars

all over the world to work with these papyri in ways not previously possible. The Herculaneum Society is very proud to be one of the partners making this possible, alongside the University of Kentucky, the International Centre for the Study of the Herculaneum Papyri (University of Naples "Federico II"), the Biblioteca Nazionale, Napoli, the Officina dei Papiri, and the industrious and talented team of doctoral and postdoctoral researchers on site, led by Dr Federica Nicolardi (who reports on the team's work elsewhere in this Newsletter). The whole project is generously funded by the Andrew W. Mellon Foundation.

Looted Herculaneum fresco returned to Italy
On Monday 23 January, at a press conference in Rome, a fresco looted from Herculaneum depicting Hercules as a child strangling a snake, was on display with 59 other looted artefacts returned to Italy from the United States. The returned pieces had been sold by art dealers and ended up in private U.S. collections but were lacking in documentation to prove they could be legally brought abroad from Italy. Italy's success in retrieving illegally exported antiquities from abroad led to the creation of the Museum of Rescued Art in June 2022 in part of Rome's ancient Baths of Diocletian.

The Vesuvius Challenge (www.scrollprize.org)
After two decades of research, scientists led by Professor Brent Seales, have developed a method of reading the ink on the surface and hidden layers of scrolls by training a machine-learning algorithm to spot subtle differences in the papyrus structure captured by X-ray images. In March 2023, Professor Seales released the software and thousands of 3D X-ray images of two rolled-up scrolls and three papyrus fragments to the machine learning and computer vision communities. Thus, the Vesuvius Challenge was launched with a Grand Prize of $700,000 for the first team to read at least four passages from a Herculaneum Papyri scroll (and $300,000 in subsidiary prizes) with a deadline of 31 December, 2023. Two teams, the Technical and the Papyrological, are reviewing all entries as they come in. The Herculaneum Society fully supports the initiative. Two of the Society's Trustees (Bob Fowler and Gianluca del Mastro), one former Trustee (Daniel Delattre) and one recent recipient of a post-graduate Bursary from the Society (Federica Nicolardi) are on the Papyrology team reviewing applicants.

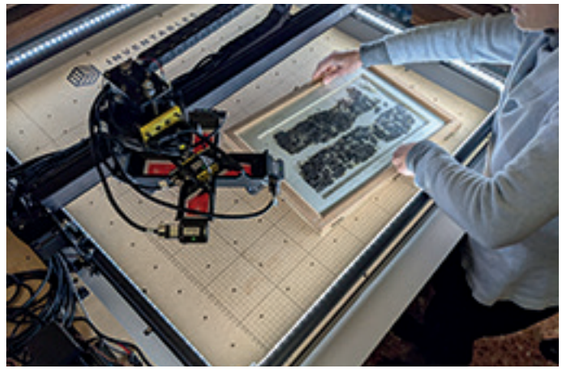
On 25 May, the teams competing in the Vesuvius Challenge had an opportunity to ask papyrologists Professor Richard Janko, Professor Gianluca del Mastro and Dr Federica Nicolardi, questions about the Herculaneum papyri in a Q&A session online. The questions were mainly about the physical attributes of the papyri, such as how papyrus sheets were made, how they were joined, the width of columns and margins, how frequently the scribe dipped his pen in the ink, the difference in the size of inscribed Greek and Latin letters and the differences between draft copies and final copies of text. The answers given in the discussion were not only interesting in themselves but will serve the purpose of assisting the computer scientists competing in the challenge in knowing what to look for when trying to decipher the hidden text on the papyri. The session is available on YouTube at https://www.youtube.com/watch?v=gielO5WHdu4.

So far, a number of segmentation tooling and ink detection prizes have been awarded. Over 1200 teams have risen to the challenge and the results look promising. The 31 December deadline is looming so we are quietly optimistic the code to read the scrolls will be cracked by then.

SEE THE LATEST ON THE VESUVIUS CHALLENGE IN THE BREAKING NEWS ITEM AT THE BEGINNING OF THIS NEWSLETTER

Herculaneum Society study visit to Colchester
The Colchester study day on 2 July was genuinely enjoyable with members having the opportunity to enjoy a day of informed talks with like-minded company sharing an interest in all things Roman. On arrival at the Roman Circus Visitor Centre, members were greeted by a horn-blowing Roman (themed) herald. A talk by Dr Philip Crummy, Director and Principal Archaeologist of the Colchester Archaeological Trust, followed in which he described the discovery of the Roman Circus and its subsequent excavation. After lunch, a walking tour of Roman remains en route to the Castle Museum ensued followed by a guided tour of the Museum and Roman vaults and Castle rooftop. At the museum we were joined by Dr Glynn Davis who gave the group a talk about the Colchester Gladiator Vase and a selected tour of the Roman artefacts on display.


Roman wall and arch, Colchester


Preparing for photogrammetry
Photo Credit: C. Seth Parker


C. Seth Parker and Alessia Lavorante at the photogrammetry system

Mellon / Herculaneum Scholars programme

Professor Federica Nicolardi
Assistant Professor in Papyrology
Università degli Studi di Napoli Federico II

Beginning in the fall of 2022, the Mellon Foundation in partnership with the University of Kentucky and The Herculaneum Society engaged scholars in the field of papyrology to work on W. Brent Seales' Project "The Digital Restoration of the Herculaneum Papyri" (EduceLab, University of Kentucky). The team includes: Federica Nicolardi as Assistant Researcher; one PostDoc scholar, Marzia D'Angelo; and four PhD candidates, Alessia Lavorante, Maria Chiara Robustelli, Claudio Vergara, and Rossella Villa, all of whom have been working on projects dealing with Herculaneum papyri and have extensive familiarity with the collection and the material preserved in the Officina dei Papiri (Biblioteca Nazionale di Napoli). The Mellon/Herculaneum scholars have been acting as the local team of the project, overseeing all the activities taking place in the Officina. The scholars have focused on the spectral imaging and photogrammetry of the opened papyri stored in the collection. Moreover, the project offered the opportunity to capture for the first time spectral images of the *cassetti* ('drawers'), which contain unopened scrolls and fragments of scrolls, and digitize historical analog photographs and negatives stored at the Officina. At the time of imaging, appropriate basic metadata was simultaneously gathered for each papyrus object and other metadata were later added with particular attention to elements that can help track down PHerc. numbers pertaining to the same scroll. The size of the Herculaneum fragment collection posed the greatest challenge to the efforts of the team and required an ambitious imaging target of 50-60 *cornici* (frames containing papyri) per day. A fluid and safe workflow was achieved thanks to the crucial collaboration of the Library staff and constant and effective exchanges with the Kentucky team, its collaborators, Gianluca Del Mastro and Roger Macfarlane, and the Herculaneum Society.

An overview of the shots produced through spectral imaging


Claudio Vergara at the photogrammetry system


Marzia D'Angelo taking a papyrus with its backing out of the metal *cornice*

Digitization of P. Herc. 817: An Historical Overview

Marissa Bischoff

MA student in Comparative Studies
Brigham Young University

My research centers on the digitization and technological work completed on the Herculaneum Papyri through the lens of one scroll, P. Herc. 817. This unique papyrus can offer a case study of the enduring value of each set of digital images in transcription and interpretation research. My MA thesis offers a detailed history of all reproductions of P. Herc. 817, the Carmen de bello Actiaco (anonymous poem on the Battle of Actium between the forces of Augustus and Mark Antony fought in 31 BC).

My initial work on this topic included researching the infrared images made by Brigham Young University, both sets of historic *disegni*, and transcriptions by David Sider and Herbert Benario. I also corresponded with the team from EduceLab, University of Kentucky, to understand the technological innovations they have been utilizing to further unlock the papyri. I reached a point in my research where I needed to confer with the originals to closely compare them with the digital surrogates. Through the generous American Friends of Herculaneum scholarship, I was able to travel to Naples, Italy and work directly with P. Herc. 817 at the Biblioteca Nazionale.

My research goal was to complete a thorough comparison of each *cornice* of P. Herc. 817 in-person with the 2000s BYU infrared images to ascertain what damage had occurred to the original over the intervening years and to evaluate the limitations and benefits of the digital images. To do this comparison, I looked at the originals closely in small increments through the microscope and carefully followed the perimeter of each fragment, while I checked the infrared images on a laptop and made notes of discrepancies on printed, stitched infrared images. After I returned from Italy, I compared the recent 3-D images (courtesy of EduceLab) and the 1960s negatives (courtesy of CISPE, the Centro internazionale per lo studio dei papiri ercolanesi / International Centre for the Study of the Herculaneum Papyri) of P. Herc. 817 with the corresponding infrared images.

In my research in Italy, I found many slight differences between the infrared images and originals, that in many cases signify corruption to the original papyrus. The most notable difference found was between the infrared image from the 2000s and the original image of *cornice* 2, *pezzo* five; on this fragment, a small piece with a character has broken off and rotated another direction and by this damage, has revealed a letter from the leaf underneath. Ascertaining how the piece moved and changed positions was possible only by looking at the 2-D infrared image (fig. 1) and is shown clearly through the 3D infrared layer (fig. 2) and the 3D dark layer (fig. 3).

Through the research in Italy, I was able to substantiate the value of the original images, as well as the value for each other type of digital image: the recent 3-D images, the 2000s infrared images, and the 1960s negatives. There were important contributions from each digital reproduction of P. Herc. 817 which can show the value of the digital images for the entirety of the Herculaneum Library. I want to thank CISPE and the staff at the Biblioteca Nazionale. Their gracious welcome and kindness made this research trip an incredible experience. I am also profoundly grateful to the American Friends of Herculaneum. The AFoH scholarship enabled my own autopsy of the papyrus, and facilitated important scholarly connections I will need to further my research.

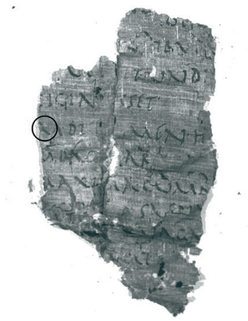


Fig.1: BYU infrared image of *cornice* 2, fragment f5. Circled area indicates where piece will come loose and rotate.

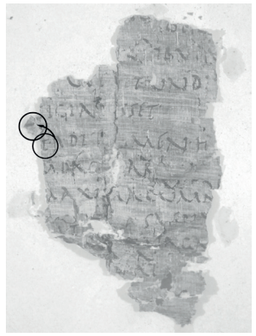


Fig. 2: 3-D image composite of *cornice* 2, fragment f5. University of Kentucky, EduceLab. Larger circled area indicates rotated piece. The small, circled area shows the underlying layer and new character now visible. The arrow shows the path and rotation of the piece.

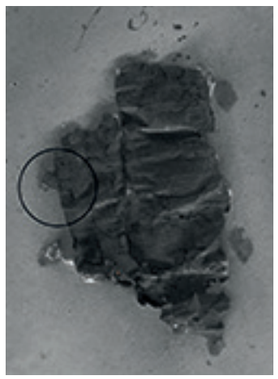


Fig. 3: 3-D image layer of *cornice* 2, fragment f5. University of Kentucky, EduceLab. Circled area indicates where the piece broke off and rotated, and clearly shows grain patterns and layers that more clearly indicate the piece's shape.

Working on Campanian Ceramics

Tara Wells

PhD Student in Classical Studies
Duke University

For June and July of 2023 I had the pleasure of working as a ceramics specialist on the Pompeii I.14 Project, directed by Dr. Allison Emmerson of Tulane University. I am incredibly grateful to the American Friends of Herculaneum for the generous grant I received, which played a significant role in my ability to participate in the project. The AFoH funds aided in my costs of living while abroad, but the grant went mostly towards the cost of round trip travel from the U.S. to Italy – an aspect of archaeological projects in the Mediterranean that generally makes such opportunities inaccessible for students without sufficient resources to afford it on their own.

Thanks to the support of the AFoH, I was able to contribute to the long-standing and ongoing work of better understanding the ancient past of the Campania region. More specifically, this project in Pompeii adds to our knowledge of matters of urban life in Roman Campania. The excavation of Insula I.14 is particularly important because it shines light on the lives of people living at the margins of the city, moving us forward from scholarly traditions of ignoring individuals outside of the highest societal ranks.

My work focused on the ceramics found during the excavation process. I assisted with sorting and documenting the pottery, including drawing vessels and inputting information into the project's database such as quantitative data as well as noteworthy features of particular sherds. Studying a site's ceramics in this way can greatly help in dating particular contexts. It can also indicate contact or trade between different peoples by revealing details like a clay's origins and where it traveled from to arrive in its place of deposit, or suggesting the spread of particular developments in ceramic techniques and styles. Such information will be crucial as research and interpretations of the site continue to grow. Again, I am grateful to the AFoH for their support of this important project, and especially for their assistance in making it possible for me to have a role in it.

Tara conducting fieldwork in Pompeii
Photo Credit: Ana Maria Nunez

Assessing waterproof lining technology at Herculaneum: an archaeological and scientific investigation

Rory McLennan

M.Phil Higher Degree Research Student
The University of Queensland
School of Social Science
Department of Archaeology

My project seeks to use samples of ancient Italian waterproof mortar linings, together with contemporary Latin and Greek written evidence, to explore the development and spread of water infrastructure in the Mediterranean. A major part of my study focuses on water infrastructure in the Bay of Naples, where it remains unclear if a regional mortar industry existed, or if the industry was focused locally, with methods and resources being specific to each site. To address this research question, I have begun to compare the waterproof lining technology of two key Vesuvian sites: Herculaneum and Pompeii. The aim of this comparison is to identify similarities and differences in the lining technology of each site and also to explore the broader socio-economic causes behind technological innovation or variation in this material.

To achieve this, I am relying on a diverse range of evidence, including literary accounts, archaeological material, and scientific data. With the generous support of the AFoH Vesuvian Student Scholarship, I have begun my investigation of the waterproof lining technology of Herculaneum. The beginning of my study involved visiting Herculaneum for the first time in late September 2023 and documenting, through photography and extensive note taking, what waterproof lining technology was present at the site. From my study, I was able to find and record several civic and domestic water features which contained waterproof linings suitable for sampling.

I began my survey by looking at domestic water features. I found several houses with complex rainwater collection systems that were coated with waterproof linings. The courtyard of the House of the Large Portal had extensive waterproofing in the form of *cocciopesto* (lime mortar that contains large quantities of crushed terracotta aggregate). The *cocciopesto* at Herculaneum always consists of two distinct layers: a bottom preparatory layer, which was grey in colour and contained numerous <1mm black volcanic inclusions, and a top water interfacing layer, which was typical *cocciopesto* (Fig. 1). In the courtyard of the House of the Large Portal, several pipes directed water from the roof into *cocciopesto* lined gutters, which then channelled water into the cistern located beneath the courtyard (Fig. 2). Even though they

Fig. 1. The two distinct layers of the waterproof linings in Herculaneum: a bottom preparatory layer with volcanic aggregate and top water interfacing layer with crushed terracotta aggregate.

Fig. 2. Courtyard (room 12) of the House of the Large Portal containing waterproofed gutters and walls, pipes and an underground cistern.

were not directly involved with the water collection system, the walls of the courtyard were also lined with *cocciopesto*. My survey found several instances where architectural features, which were not directly involved in water collection, transportation, or storage, still received a waterproof lining because they were in 'at risk' areas, like outside walls or floors around water features.

The idea that waterproof linings were applied to a range of architectural elements, not just water features, was further reinforced by my findings from the House of the Deer. In the large garden, I found that not only were the gutters that channelled rainwater into the house's cistern lined, but the dado of the surrounding walls was also protected with a *cocciopesto* waterproof coating (Fig. 3A).

Fig. 3A. A wall in the garden of the House of the Deer showing the distinct change in decoration from the *cocciopesto* lining at the top

This intentional choice to only line half-way up the wall appeared to be both practically and aesthetically motivated. The dado was more likely to be exposed to water, as it was not protected by the roof, so it needed to be protected with a cocciopesto coating. However, the *cocciopesto* lining was also seemingly valued for its pink colour. Its application to only the bottom half of the wall replicated the typical red-white plaster pattern seen on inside walls. The use of *cocciopesto* for its aesthetic value was similarly visible at the Terrace of Balbus, where the lower halves of several walls were coated in

Fig. 3B. A wall in the garden of the House of the Deer showing the distinct change in decoration from the *cocciopesto* lining at the bottom.

cocciopesto, but the top halves were not (Fig. 3B). Unlike in the houses however, there was no roof to protect the top halves of these walls from rain and sea spray, leaving them vulnerable to deterioration. The choice to leave the upper halves unprotected showed how aesthetics were just as influential in determining construction practices in ancient Herculaneum as practical considerations.

I also managed to investigate several pieces of civic water infrastructure during my survey, including the large cruciform *natatio* (swimming pool) and small rectangular *natatio* at the *palaestra* (exercise ground), and the entire Suburban Baths. Both pools at the palaestra had waterproof linings that were like those recorded from domestic features. Each pool had thick *cocciopesto* linings on the floor and thinner *cocciopesto* linings on the walls. Interestingly, the *cocciopesto* on the floor (Fig. 4A) had much larger crushed terracotta pieces than the *cocciopesto* on the walls (Fig. 4B).

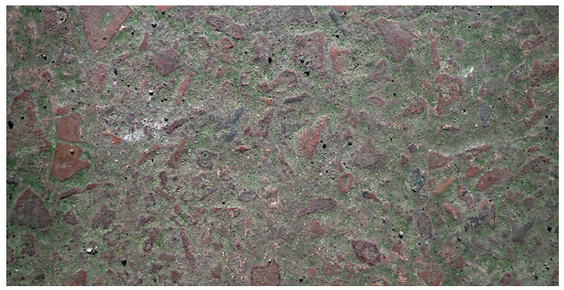


Fig. 4A. The *cocciopesto* floor of the cruciform *natatio* with roughly reduced terracota aggregate.

Fig. 4B. The *cocciopesto* wall lining of the cruciform *natatio* with finely reduced terracota aggregate.

A similar difference between aggregate size in floor and wall linings was also seen in the House of the Bicentennial, the Terrace of Balbus and in the *apodyterium* (dressing room) of both the men's and women's sections of the Central Baths. The difference in aggregate size could have been motivated by aesthetic considerations. By having larger terracotta aggregate in the floor, the pattern of the *cocciopesto* was more pronounced and therefore more impactful as a decorative feature. The difference may have also been economically motivated. It would have been more cost and time effective for the builder to only partially reduce the aggregate used in the floor lining. This seems particularly relevant for the cruciform *natatio* and large Terrace of Balbus, where hundreds of waste bricks, tiles and ceramics would have needed to be reduced to produce the cocciopesto floors of these large areas.

The last, and most unique waterproof lining technique identified on the site was found in the Suburban Baths. Although using water in several locations, no surfaces in the Suburban Baths were found to have a cocciopesto waterproof lining. Instead, the waterproof lining used for the bath's many pools and walls was a bright, heavily polished white mortar with no visible aggregate (Fig. 5A). Clearly, the distinct recipe of these linings was intended to match the opulence of the rest of the bath, which used, seemingly at great cost, large amounts of colourful stone to pave the bath floors and the lips of the pools (Fig. 5B).

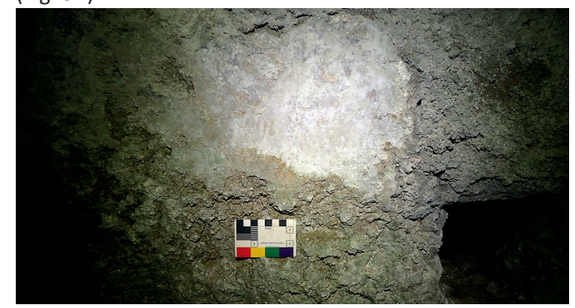


Fig. 5A. A portion of surviving bright white waterproof lining on the wall of the pool of the *caldarium.*

Fig. 5B. The opulent stone paved floor of the *tepidarium*.

Although only a survey of waterproof linings at Herculaneum has so far been carried out, all the samples collected for this research will be studied with petrographic microscopy (PT), and digital image analysis (DIA). These analysis techniques allow the key attributes of each waterproof lining to be quantitatively and qualitatively described. This data is then used to identify and compare changes in the waterproof lining technology of different water features.

An idea of the evidence these instrumental techniques will provide about Herculaneum can be gleaned by looking at the data I have already gathered from my assessment of waterproof linings from Pompeii. The samples I have studied from Pompeii came from the channel of the Pompeii aqueduct, the pool at the centre of the Palestra Grande, and a cistern under the *officina tinctoria* (dyeing shop) of Terentius. I have also collected samples from the Republican and Stabian baths, but these materials are still under investigation.

Using PT, I was able to identify the main aggregate and binder features of the mortars collected from Pompeii. This has allowed me to determine that in Pompeii, local materials, mainly in the form of volcanic beach sand, were initially favoured for use in waterproof linings (Fig. 6A). However, by the late 1st century BCE, crushed terracotta was the main aggregated used in water interfacing layers, though volcanic materials remained the main aggregates of preparatory layers (Fig. 6B).

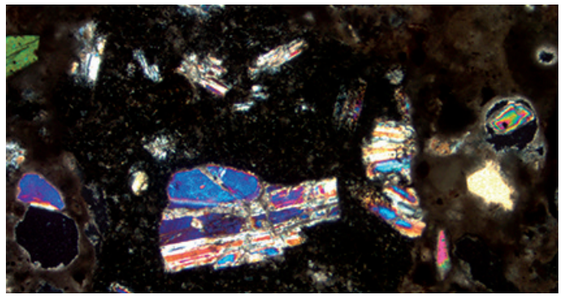


Fig. 6A. A millimetre sized piece of basalt with characteristic sanidine phenocrysts in an early 1st century BCE waterproof lining of a cistern in Pompeii, x40 magnification, XP (cross polarised) light, 1mm scale.

Fig. 6B. A fragment of crushed ceramic in a late 1st century BCE waterproof lining of a cistern in Pompeii, x40 magnification, XP (cross polarised) light, 1mm scale.

DIA, which included the randomised point counting function (n = 500 points) of JMicroVision, also allowed me to quickly determine the area percentage of different features in the Pompeii linings. Using the point counting function, I determined that the binder/aggregate ratio of waterproof linings in Pompeii was high, with all samples having a binder/aggregate ratio of >1. As high amounts of binder have been associated with decreasing mortar quality, these early mortars from Pompeii would not have been particularly durable. Overall, I found that the mortar technology of Pompeii was still developing in quality and sophistication when the eruption of Vesuvius occurred in 79CE.

The instrumental analysis techniques used to study the waterproof lining technology of Pompeii will soon be applied to samples from Herculaneum. Once the lining technology of both sites has been investigated, they can be compared, and any differences and similarities recorded. This intra-site comparison of mortar technology will be the first of its kind in the Bay of Naples and will provide the framework for further multi-site studies to occur. Comparing mortar technology between these Vesuvian sites will also reveal if a regional mortar industry existed in the Bay of Naples, or if the industry was focused locally, with methods and resources being specific to each site.

How It All Began ...

Bob Fowler

Chairman of Trustees
Professor Emeritus
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The Herculaneum Society was incorporated on 15 June 2004, so next year we celebrate our 20th anniversary. How did it all begin?

On 22 November 2001 the legendary Marcello Gigante died (b. 1923). He was Professor of Greek at the University of Naples, and founded the International Centre for the Study of the Herculaneum Papyri (CISPE). Before him, the papyri, disorganised and massively under-researched, languished; through his efforts, CISPE became one of the leading centres in the world for papyrology. Scores of outstanding scholars have trained there, and new editions of the papyri tumble off the presses every year. Specialists from all over the world can be found poring over the microscopes and working on the scanners in the Officina dei Papiri; Gigante was also responsible for putting the Officina on a proper footing within the National Library. The journal he founded, Cronache Ercolanesi, is now in its 52nd year.

Gigante's most spectacular achievement was arguably instigating the excavation of the Villa of the Papyri, whose precise location had been re-discovered in the 1980s. This was controversial from the start, given the impact on the local area and the counterargument that the more crying need was for conservation of the crumbling main site. These two considerations are, of course, still a central part of the debate about whether further excavation should be conducted. Gigante pressed on, securing the necessary funds from Rome, and the excavation proceeded. An enormous access trench was sunk from the Via Mare just north of the main site, uncovering some hitherto unknown structures including a bathhouse. At its far end, part of the atrium quarter of the Villa was excavated to the extent still visible today; astonishingly, it turned out that there were at least two lower levels in the Villa. Also found were a seaside pavilion, swimming pool and landing facilities.

The part-excavated Villa of Papyri (centre) dug out of 25-30 metres of volcanic tufa rock

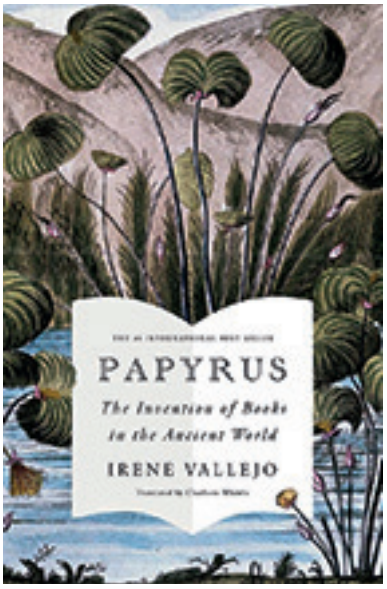
Changes in government led to the overnight end of funding, and the excavation was stopped in its tracks. When Gigante died, some of us were worried about the Villa's parlous state, and concerned about conservation as well as the future of the excavation. As a gesture of homage to our departed friend, we wrote a letter to The Times (what else?). It was published on 13 March 2002. It was signed by the present author, Albert Henrichs, Richard Janko, Mary Lefkowitz, Hugh Lloyd-Jones, Dirk Obbink, Peter Parsons and Nigel Wilson.

We or at least I thought that would be the end of it, but it touched off a minor storm; the phone kept ringing, the emails kept coming, people wanted interviews and copy. The letter was waved in the face of the minister by the opposition in the Italian parliament. The most unexpected consequence was a summons from the Prince of Wales (as was) to tell him all about it. His interest in history and archaeology (in which he has a degree) is well known. I duly presented myself at Highgrove, where I spent an hour in the Prince's study outlining the history and current state of the problem. The legendary garden was visible through the windows, and at times it was hard not to allow one's gaze to wander. At the end of the meeting it emerged that the Prince was actually going to Herculaneum the following week, and could I meet him there? It was in fact very inconvenient in view of other commitments, but when the heir to the throne says "I say, do you think you could meet me next week", you don't say "hang on let me consult my diary". So I went. His idea had been to arrange a debate on the ground, overlooking the Villa, between me and the Superintendent, Pier Giovanni Guzzo, about the pros and cons of digging. Unfortunately there was little time, since everywhere Charles had gone there were speeches, more speeches, and presentations, and the air force had provided a helicopter that could not fly after dark. We did manage a kind of discussion, and in the wake of it I wrote to the Prince telling him what I'd found out on the day. He then wrote to the President of Campania, Antonio Bassolino, saying that in his opinion the excavation should proceed. Which was enough to earn him my vote for King.

An amusing aside was the extreme anxiety of the security people. The short walk along Via Mare to the Villa gave them nightmares—a narrow street, crowds on both sides, balconies loaded with people. During the procession a teenaged girl launched herself at the Prince and planted a kiss on him. The next day, the local paper ran a headline in tabloid-sized letters, not about the pros and cons of digging or anything like that, but about the kiss: "Ho baciato Principe Carlo!", I kissed Prince Charles!

Anyhow, such was the fuss that we thought, we're on to something here, let's found a Society. In the early days many people thought we were a pressure group for the excavation of the Villa. This was certainly the earnest desire of many of us, but not all; there were Friends who held the opposite view, and anyway you can't be registered as a charity if your sole purpose is lobbying. The Society's line has always been that excavation and conservation must, and can, go together. We promote research, education, and public awareness of a World Heritage Site with a view to its beneficial and proper development. Since our foundation, we have pursued our aims in many ways: first and foremost, through public membership (global in its reach); through scholarships and grants; scholarly publications; events (talks, conferences, visits to sites including the biennial trip to Herculaneum); our website, social media accounts, YouTube channel, newsletters and e-bulletins. Our two largest fundraising successes have been supporting a season of the Ancient Graffiti Project's work, and the restoration and development of the Custodian's Room, on which work is starting as I write. We have also been proud to assist the University of Kentucky in the administration of its Mellon Foundation grant for the imaging of all Herculaneum papyri. This is an enviable record; may it continue for another score of years, and scores after that.

Irene Vallejo, Papyrus. The Invention of Books in the Ancient World. (Hodder and Stoughton 2022)



Review by Bob Fowler

Irene Vallejo (b. 1979) holds a doctorate in Classical Philology, and her first book–a study of how the poet Martial talks about books and criticism–looks like the start of a conventional academic career. But it proved to be the inaugural production of a brilliantly successful journalist, essayist, and novelist, as well as a scholar. *Papyrus*, first published in Spanish as *El infinito en un junco* (Infinity in a Reed), won Spain's highest literary honours, and in its English version has sold over a million copies. It has been shortlisted for the British Academy's Book Prize for Global Cultural Understanding (you can read an extract at https://rb.gy/q6f4b.) It tells the story of literature in Greco-Roman antiquity, from Homer through to the end (with glances forward to medieval manuscripts and Gutenberg, and sideways to other ancient cultures); but such a bald description does a grave injustice to this kaleidoscopic work. It's all about books and their power: who wrote them and why; who bought and sold them; private collections and great libraries (starting with Alexandria); heroic efforts to save the books, and despicable attempts to burn them. Herculaneum gets its own chapter. There are few major ancient writers who do not receive attention here, and scores of minor ones, often with original takes, and the big events of ancient history and its social realities get fed into the story too; but this ancient canvas, already vast, is not the book's totality, or arguably its primary focus. Again and again Vallejo dwells on modern events and writers as analogies–or better said, as living examples of her message. The best of humanity, and often its worst, is preserved in its books. Humans are the story-telling animal. Ideas and imagination are everything. In this perspective there is no difference between ancient and modern, and the dizzying, time-traversing juxtapositions of ideas and people on every page of this book make perfect sense. Her reading is stupendous, her powers of connection commensurate, but it does not overwhelm; it is all instantly accessible, with never a whiff of the encyclopedia (her favourite trick is to introduce a big topic with an anecdote or vignette). All this would be lost without the stunning translation by Charlotte Whittle; I have not looked at the Spanish, and would not be qualified to judge its literary qualities, but the English simply sparkles; a masterpiece, and highly recommended.

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