A Quaint & Curious Volume

Essays in Honor of John J. Dobbins

edited by
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Gli anni passati, ormai trascorsi senza possibilità di ritorno, si presentano talvolta agli occhi della memoria con forti contrasti, vividi talvolta, oscuri altra volta. Così i visi, i personaggi, gli avvenimenti, i luoghi: obbedendo ad una logica della quale non è mai immediato afferrare la *ratio*. In questo gioco di memoria talvolta potremmo quasi toccare con mano qualcosa di quel passato. Mentre sappiamo, anche se non lo ricordiamo più, che qualcosa di diverso è accaduto: ma per noi, oggi, è come se non fosse stato, tanto pesante è la coltre dell'oblio che, capricciosamente, si è adagiata su parti della nostra vita passata. Ed è così che degli anni passati ad essere responsabile di Pompei alcuni di questi sono ancora vividi nella mia memoria; altri no; di altri ancora non potrei assicurare la perfetta corrispondenza a quanto realmente è avvenuto.

Il settore del Foro e tutti gli archeologi che ci hanno lavorato rientrano a pieno titolo nella categoria della memoria viva. Perché quel settore urbano è la cerniera di gran parte dell'urbanizzazione di Pompei. Assume, inoltre, il Foro la funzione di essere un condensato della storia che l'antica città ha attraversato. Da quando si è per la prima volta strutturata una vita organizzata sul pianoro che dominava la foce del fiume Sarno e la costa del Golfo di Napoli a quando, spentasi la fase parossistica dell'eruzione che ha distrutto la città seppellendola con le sue ceneri e i suoi lapilli, i superstiti hanno cercato, a cominciare dal Foro, di recuperare quanto ancora possibile salvare per assicurarsi un domani.

J. J. Dobbins è fra quanti, operando nel Foro e sul Foro senza risparmiare impegno e fatica, hanno contribuito a darcene una conoscenza più approfondita di quanta finallora se ne avesse. Nel confronto con ricerche analoghe condotte da altri si potranno rilevare interpretazioni differenti delle stesse antiche realtà. Ma è proprio da differenze del genere che la conoscenza procede in avanti, conquistando, per poi superare, traguardi sempre più avanzati. Fra i miei ricordi non oscurati dal tempo da allora trascorso sono le discussioni che si accendevano quando si visitavano i luoghi e i monumenti sui quali si operava. E quelle, non meno apprezzate ed utili, che si sono intrecciate in occasione degli incontri di studio organizzati proprio per confrontare i risultati ottenuti. Discussioni e confronti che sono proseguiti, ed ancora proseguono, nelle pubblicazioni nel frattempo elaborate e diffuse. Pubblicazioni di dettaglio ed altre di sintesi generale: come quel *The World of Pompeii* che J. J. Dobbins ha organizzato e curato insieme a P. W. Foss. In questo ampio e dettagliato panorama su una Pompei, della quale si offre un'aggiornata visione nelle sue parti componenti, il capitolo sul Foro informa e fa riflettere. A proposito dell'essere specchio della vita sociale ed economica della fase tra il terremoto del 62 e la finale eruzione del 79. Questo vuole essere solo un esempio degli spunti che sembra possibile trarre dai lavori del Pompeii Forum Project.

Sono grato a J. J. Dobbins di aver voluto indirizzare la propria attenzione ad aspetti tanto significativi dell'architettura, dell'urbanistica, della storia sociale di Pompei antica. Se i superiori responsabili avessero voluto dedicare solamente una parte della passione e della cura riposte da studiosi, italiani e no, nello studio di Pompei antica, di sicuro la sua situazione contemporanea non avrebbe attraversato periodi di sconfortante desolazione e di lenta ed irreversibile consunzione, come di frequente è accaduto.

Pier Giovanni Guzzo

Istituto Nazionale di Archeologia e Storia dell'Arte

Preface: J.J. Dobbins and the Forum of Pompeii

Bygone years, now passed with no possibility of a return, sometimes leave strongly contrasting memories in our mind's eye, vivid on occasion, or at times hazy. So it is with the faces, people, events, and places of the past. Their recollection obeys an intangible logic that defies clear *ratio*. In this game of memory, sometimes it seems as though we could reach out and touch the past. At the same time, we know that something different must have happened, even if we no longer remember it. For us today, however, it is as if it never was, so heavy is the blanket of oblivion capriciously covering parts of our own past lives. And so it is for the years when I was responsible for Pompeii–some things are still vivid in my memory, others not so much, and for a few, I couldn't be perfectly sure about what really happened.

The forum of Pompeii and the archaeologists that worked there fall squarely into the first category–a living memory–because this area of the city is in large part the lynchpin of Pompeian urbanization. In a sense, the forum represents a microcosm of Pompeii, condensing the city's ancient history, beginning from the time when organized life first appeared on the plateau that dominated the mouth of the Sarno River and the coast of the Gulf of Naples, until the paroxysms of the eruption destroyed the city, burying it in ash and lapilli, and after which survivors attempted to recover whatever could be saved to begin anew, starting from the Forum.

J.J. Dobbins is among those tireless figures who spared no effort or fatigue to bring a greater understanding to the area in and around the forum than those before him ever had. In comparison to research conducted by others, he was able to reach different interpretations from the same ancient realities. But it is precisely because of such differences that knowledge can move forward, setting and then overcoming increasingly lofty goals. Among my memories–those that have not been obscured by the passage of time–are the discussions ignited by our visits to the places and monuments we studied. The conversations woven through our study meetings, which themselves were organized precisely to compare the different results we obtained, were no less appreciated or useful. Debates and comparisons continued, and still continue, in the many resulting publications–specific and general–that have appeared in the meantime. One such example is *The World of Pompeii*, which Dobbins organized and edited together with P.W. Foss. In this broad yet detailed panorama of Pompeian scholarship, which offered an updated look at all of the city's parts, Dobbins' chapter on the forum was informative and provided reflection. Indeed, Pompeii's forum was a mirror of the state of social and economic life of the city at a whole between the earthquake of 62 and the final eruption in 79. This is only one example of the many ideas that can be drawn from Dobbins' Pompeii Forum Project.

I am thankful to J.J. Dobbins for having wanted to give appropriate attention to so many significant aspects of architecture, urbanism, and the social history of ancient Pompeii. If the authorities had dedicated only a fraction of the passion and care for Pompeii that the scholars, Italian or not, have shown in their study of the ancient city, it is certain that the current situation would not have gone through such periods of disheartening neglect and slow and irreversible desolation, as has so frequently been the case.

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(Translation by D.K. Rogers and C.J. Weiss)

Introduction: John Dobbins as Archaeologist, Teacher, and Mentor

Dylan K. Rogers and Claire J. Weiss

John Dobbins arrived at the Department of Art of the University of Virginia (UVa) in 1978, rose to the rank of Professor of Roman Art and Archaeology, and retired in 2019, having had a career of nearly 40 years at the University. Those who have worked or studied with John will know of his high standards in the field and in the classroom. Indeed, his reputation as an archaeologist, teacher, and mentor stretches far beyond Charlottesville and UVa, especially given his involvement with the Archaeological Institute of America (AIA). In this introduction, we explore John's career, not only to situate him within the wider field of Roman archaeology, but also to demonstrate the impact he has made on the study of Roman and Pompeian archaeology, other scholars in the field, and, perhaps most demonstrably, his students. Indeed, his influence can be seen clearly through the following chapters, each written by one of his former graduate students. The topics of these papers span the field, from numerous aspects of Pompeian research, to innovations in Roman baking, numismatics, and Roman sculpture and mosaics. John's approach to scholarship, whether through his teaching or research, is reflected in his own students' work, and therefore we take this opportunity to explore how John himself developed as an archaeologist to appreciate his understanding of the ancient Mediterranean world.

Dobbins before Pompeii

Born in Lynn, Massachusetts, in 1946, John Dobbins attended St. Mary's Boy's School before matriculating at the College of the Holy Cross in 1964 where he received a BA in English literature, with a minor in Classics. Upon his graduation in 1968, he attended Boston University, receiving an MA in English literature. Such training paved the way for him to teach at St. John's Preparatory School in Danvers, Massachusetts, from 1969-1971, while also teaching English at the Berlitz School of Languages in Boston during the summers. His background in English literature would stay with him for the rest of his life.

Although focused on English, John's passions for archaeology also began to grow in this period. In the summer of 1968, John participated in the Bryant Foundation Excavation at Cadiz and Pollentia in Spain. In 1971, he was a volunteer excavator closer to home at the Danvers Historical Society Excavation of the Samuel Parris House in Salem Village, Massachusetts. These experiences would set the stage for his joining the PhD program in Classical Archaeology at the University of Michigan. Very early on in his time as a student at Michigan, John became involved in the Michigan and Dumbarton Oaks Excavations at Dibsi Faraj in Syria, where he dug from 1972-1974 (Figure 1). The excavations were directed by Richard Harper. Evidently, the experience working with Harper was a seminal moment in John's early career, as he would be assigned to publish the Roman lamps from the site, the subject of which became the basis of his PhD dissertation, 'Terracotta Lamps of the Roman Province of Syria'. Indeed, John's

Figure 1: John and team in Syria, 1975. (Courtesy K. Dobbins)

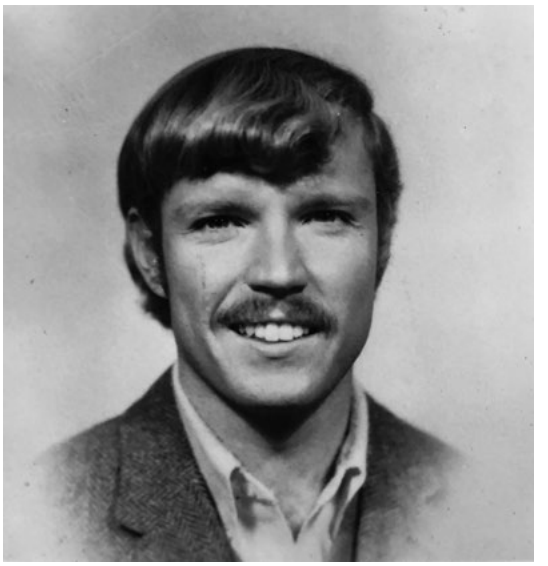

Figure 2: John's 1974 passport photo. (Courtesy ASCSA Archives)

field expertise in Syria was noted by John Pedley, one of his advisors at Michigan, who stated that John 'has benefitted enormously from association with and instruction from Richard Harper who has directed the excavation [at Dibsi Faraj] and from whom he has acquired a familiarity with and admiration for the precise manner of British archaeology'.[1] Anyone who has collaborated with John will immediately recognize his admiration for precision in archaeology.

John's training as a Classical Archaeologist was further strengthened when he participated in the Regular Member Program of the American School of Classical Studies at Athens (ASCSA) for the 1974-1975 academic year (Figure 2). The Archives of the ASCSA retained

[1] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Pedley to Lang, 21 December 1973.

Figure 3: Corinth Excavation Team at Hill House, Spring 1975. Top row (left-right): Robin Rhodes, John Dobbins, Donald Baronowski, Rob Guy; Charles K. Williams, II (in red); bottom row (left-right): Cynthia Patterson, Stella Bouzaki, Nancy Bookidis, Joan Fischer, Alan Shapiro. (Courtesy H.A. Shapiro)

John's application and supporting materials, which reveal a great deal about him at such an early stage in his career, when he was an aspiring teacher and professional archaeologist. Letters of recommendation from John's professors were warm and full of praise, both in terms of his research trajectory and his character. T.V. Buttrey would report:

> There is no doubt of both his seriousness and his capabilities, and he is a stable character who is getting through his graduate program without the familiar crises. I hope that you can take him into the School, for I have no doubt that he is to be a solid member of the next generation of archaeologists, a credit both to the School and Michigan.[2]

John Pedley would go on to say that John 'is a highly gregarious type, and in my view, would contribute a great deal to the School not simply in terms of knowledge and expertise but also in terms of his friendliness, approachability, willingness to help in a million ways, and general bonhomie'.[3] In his own purpose statement to the admissions committee about his reasons for seeking to study at the ASCSA, John expressed the following:

> I hope to attain a teaching position in a college or university while continuing to excavate during the summers. It is evident that the requirements of an archaeologist within a university framework are substantially different from his duties in the field. The close examination of the monuments of Greece through the program of the American School will provide a dimension which is essential to effective teaching. Research (e.g., on the Roman pottery and lamps from Corinth and the Agora excavations) would directly

[2] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Buttrey to Lang, 8 January 1974.
[3] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Pedley to Lang, 21 December 1973.

> contribute to my current work on a Roman site in Syria, in terms of the comprehension of stratigraphy and the interpretation of data.[4]

Indeed, Dobbins' year in Greece would be life changing, especially for his professional life. In a 2017 brochure about the Regular Member Program, John appeared in a special quote, stating 'my year at the American School transformed me and was one of the most important years in my life'.

John arrived in Athens in September 1974, a volatile period in Greece, following the recent fall of the military dictatorship, which had been in power since 1967. Despite the tense time in Greece politically, the Regular Program still provided a vibrant and exciting year to the students. John's student cohort included the likes of Jack Davis, Cynthia Patterson, Robin Rhodes, Alan Shapiro, and Robert Sutton, amongst others (Figure 3). Fellow Romanists, Fred and Diana Kleiner, were in residence at the School during this time period, too. Led by C.W.J. Eliot, the academic program made the traditional school trips to Central Greece and Thessaly, the Northwest (with the island of Corfu), the Deep Peloponnese, and the Argolid and Corinthia. In addition to Eliot, the program was also led by James McCredie, the Director of the ASCSA, and Charles Williams, the director of the Corinth Excavations. As students traditionally give a site report each trip, John was assigned to present on the Tholos at Delphi, Pleuron in Aetolia, the sculpture of the Temple of Zeus at Olympia, and Acrocorinth. Further, when the academic program was in Athens and Attica, in true American School form, the students were toured around by luminaries of the field: Judith Binder, Oscar Broneer, Eugene Vanderpool, Brunhilde Ridgway, Alan Boegehold, Merle Langdon, John Camp, and the late Angelos Delivorias of the Benaki Museum. There were also numerous Associate Members floating around the School, such as Alison Frantz, Virginia Grace, Timothy Gregory, Susan Rotroff, Jeremy Rutter, Vance Watrous, and Jim Wright, who are likely to have influenced John's approach to antiquity. John also used his time in Athens to work on his dissertation, writing up his lamp catalogue in the School's Blegen Library, in addition to consulting comparative collections in the Benaki Museum, the Agora Museum, and at Corinth.

The second half of John's academic year would, arguably, have an impact on his future trajectory as an archaeologist. In April 1975, he participated in the excavations at Corinth, first in the training season, then winning a coveted spot in the regular excavation season under Charles Williams' direction. It can be suggested that the dedicated time in Corinth, with exposure to Williams' meticulous eye for architecture, informed the way in which John would approach architecture thereafter. Indeed, as was common for Regular Members at the time, John completed an end of the year paper, the goal of which was to provide students the chance to engage more critically with monuments, sites, or other material culture or texts. And John did just that, partnering with his fellow student Robin Rhodes, with whom he presented a paper entitled, 'A Re-examination of the Sanctuary of Artemis Brauronia on the Athenian Acropolis'.[5] Their goal with the paper was 'to present a new plan and sequence of building phases based upon 1) the observations of cuttings not previously recorded and 2) a reinterpretation of the evidence'.[6] After working on the material for a few more years,

[4] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Admission Application, 4 January 1974.
[5] ASCSA, Archives, Administrative Records, Box 113, School Papers 1974-1975.
[6] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Report of Program during Academic Year 1974-1975.

Figure 4: John (at center) pickaxing at La Befa, 1980. (Courtesy K. Dobbins)

Rhodes and Dobbins would go on to publish their new findings on the Sanctuary of Artemis Brauronia in 1979 in *Hesperia*, the journal of the American School.[7] In this article, they provided new observations about cuttings in the bedrock of the Acropolis that allowed for new interpretations regarding the phasing of the construction of the sanctuary, especially of the eastern and southern walls. Up until this point, significant attention had not been paid to the bedrock, especially with an eye toward parsing out the chronology of the building. With strict autopsy and the assistance of Williams, Rhodes and Dobbins were able to identify three distinct phases of construction from the evidence of the cuttings in the stone. The impact of the article on subsequent readings of the topography of the Athenian Acropolis cannot be understated. Their careful examination of the chronology of the sanctuary is still cited in any work that engages with the monuments of the Acropolis.[8]

After the American School, John continued to work on his dissertation research, which he would ultimately defend in 1977 in front of committee entirely comprising other Johns: John Pedley, John Eadie, John Humphrey, and John Hayes. And by the time of his defense, John had turned his attention to the Italian peninsula. In 1976, the Etruscan Foundation contacted John, asking if he would direct excavations at a site a few miles away from Mulro at La Befa. He agreed and carried out excavations in the summers of 1976, 1977 and 1980 (Figure 4). These excavations would be John's first time as the sole director in the field, a role that required him to organize a small team of scholars, students, and local help, and eventually had him bringing

[7] Rhodes and Dobbins 1979.
[8] E.g., Hurwit 2004, 194-98.

the project to completion through the publication of a monograph on the excavations—all skills that he would put to great use in the upcoming years of work in Italy.[9] It was during this time serving as director of the La Befa excavations that John also accepted a teaching position in the Art Department of the University of Virginia in 1978. In the early 1980s, John would also begin to participate in the excavations at Morgantina (Sicily), directed by UVa colleague Malcolm Bell. His attention to detail, especially in terms of architecture, would prove to be useful, as he would become the Director of Theater Research at the site, studying the theater during the summers of 1980 and 1982, and excavating portions of the structure in 1983, 1985, and 1992.

Pompeii and Dobbins

John is certainly most widely known for his interest in Pompeii; his concentrated study of the city began during his years at Michigan. At the suggestion of his graduate advisor, John D'Arms, John spent time in Pompeii and in the Eumachia building specifically, examining the architectural fabric of the structure. Such scrutiny ultimately resulted in a career of 'close looking' at the forum of Pompeii, breathing new life into the understanding of the site's center of religious, civic, and economic life. John's attention to the changes evident in the remains of the forum buildings, especially the eastern range of structures, led him to realize that the accepted history of the forum as promulgated by August Mau and Amadeo Maiuri—two of the biggest names in Pompeian archaeology—could not stand as presented. Under the aegis of the Pompeii Forum Project (PFP), John began to rewrite the history of the forum, finding that it was not an abandoned ruin, the leftovers of the desolation caused by the earthquake of AD 62, as had been the prevailing view, but rather an active construction yard, a city-scale project of enormous rejuvenation and revitalization made possible as a result of the unexpected opportunity that came from the earthquake's destruction.[10]

With the publication of his watershed 1994 *American Journal of Archaeology* article, John expanded the project and his research by bringing on colleagues and students under his direction, including several of the authors of chapters in this volume. Supported by the Institute for Advanced Technology in the Humanities (IATH) at UVa, private donations, the team itself, and eventually a National Endowment for the Humanities grant, the Pompeii Forum Project came into its own in the mid-1990s.[11] John and his team employed a mixture of traditional methods and then-cutting-edge digital technology to record and investigate the forum. That mix occasionally was more literal than categorical—John tells a story of having the advanced recording power of an 'electronic theodolite and attached electronic distance measuring device (together called a total station)', but early enough in the history of total station use that the machine they used required a reflector to take each point.[12] What this means in practice is that a reflective object, normally a prism, had to be hand held at the location of every recorded point in the survey.[13] For ground plans, such a requirement presents little difficulty since walking around the bases of walls is no trouble, but for the height of many vertical structures, gaining the necessary access to the tops of walls often

[9] Dobbins 1983.
[10] Dobbins 1997, 86-87.
[11] Dobbins 1994, 629, n. *.
[12] Dobbins 1996, 'Computer Use'.
[13] Hanna 1996, 'Survey Work Report: Overview'.

employed the use of a ladder. Considering the fragile nature of Pompeian walls, or especially in the case of longer walls with prohibitive heights, ladder access is not always possible. Even for those walls that would have been surmountable by ladder, climbing up a ladder, taking a point, climbing down the ladder, replacing the ladder along the next point of the wall, taking the point, and so on was inconvenient and time consuming. John and team devised a method of stringing the prism from a fishing pole in order to take points, thereby extending the reach of a single ladder set up and continuing the survey more rapidly than otherwise would have resulted. His innovation was therefore not only in the application of new technology to the field of Pompeian studies, but also in the specific manner in which that technology was married to archaeological 'MacGuyvering'.

John's non-invasive, observational methods were paired with targeted excavation in a few locations around the forum, with strategically placed trenches, with the hopes of finding answers to specific questions of the forum's history. Knowing full well that the conclusions he had reached about the late dates for the construction of several buildings around the forum's central court would be met with incredulity from the old guard of Pompeian scholarship, especially the Italian scholars who held (and still hold) the earlier conclusions of Maiuri sacrosanct, John chose his locations such that if the material discovered fell in line with his conclusions, the evidence would be sufficient to refute any doubts.[14] Indeed, a *saggio* that incorporated the construction trench for the northwest corner of the Temple of Apollo's precinct wall, which intruded into the roadbed of the vicolo del Gallo, another on the opposite side of a domestic structure's outer wall that had been affected by these ancient interventions, and a third against one of the eastern pier walls of the precinct, were placed exactly for this reason.[15] The excavations brought up exactly the evidence needed—*terra sigillata* pottery in the right deposits and at the appropriate depths—to bolster John's argument that a substantial reconfiguration of the sanctuary, including its tuff colonnade, was Augustan or later.[16] Some giants can be felled by the smallest sherds, but only after we have stood on their shoulders to find those sherds.

It was during this time—the late 1990s to early 2000s—that John rose to prominence as a Pompeian expert and spokesperson, even breaking into popular media coverage. 1998 saw him featured in *History's Mysteries*, a History Channel documentary series, which earned him an IMDb listing.[17] Alongside other Pompeian luminaries, including Ann Koloski-Ostrow, James Franklin, Jr., Haraldur Sigurdsson, and Joseph Deiss, John showcased the then 'cutting-edge computer technology' used by the PFP while he talked about the immediacy of Pompeii's ruins for understanding ancient life.[18] At this same time, John and Pedar Foss collaborated on *The World of Pompeii*, a substantial edited volume of papers that brought together the who's who of Pompeian scholarship at the time.[19] The volume, fittingly dedicated to August Mau, Francis W. Kelsey, and John D'Arms, was envisioned as the modern response to (but specifically *not* replacement of) Mau's *Pompeii: Its Life and Art*, one of the most influential, all-encompassing

[14] Greater detail about the reception and response to the PFP's findings are given by Poehler in this volume. Ball and Dobbins (2013) summarizes the past and present scholarship, as well as the contributions by the PFP.
[15] Dobbins, *et al.* 1998, 743-44.
[16] Ball and Dobbins 2017, 470-78; Dobbins *et al.* 1998, 756
[17] Internet Movie Database 1998. The series was also known by the name 'Ancient Mysteries', and John's episode is viewable on YouTube: https://www.youtube.com/watch?v=pps8VFWq3co.
[18] History Channel 1998.
[19] Dobbins and Foss 2007.

monographs to cover Pompeii.[20] *The World of Pompeii* responded to that single authority and brought in the breadth and depth of knowledge of no fewer than 39 scholars from nearly 10 different countries, demonstrating how the study of Pompeii cannot, and indeed should not, rest on the word of a single individual alone, but rather benefits from the voices of many disagreements and debates.[21]

Collaboration between archaeological neighbors has always been a feature of John's public comportment, often times including the use of materials in the field. For excavations in 1997, the Pompeii Forum Project borrowed a wheelbarrow and tools from Andrew Wallace-Hadrill and the British School at Rome.[22] In 2001, tool assistance and space was provided by Rick Jones and the Anglo-American Project in Pompeii.[23] The Via Consolare Project has housed several items of the PFP's field kit, including a ladder, drafting board, and desk lamp, which has helped both projects in turn.[24] John has always been an example of collaboration between colleagues, a quality he encourages alongside fostering discussion and friendly disagreement. He invites reassessment of past 'accepted truths' with new information, new opinions, and new personalities joining the field and conversation. His focus on the forum of Pompeii has demonstrated time and again that new conclusions can be reached from the long-exposed areas of the city. Although he and the PFP have not conducted excavations in the forum for two decades, the work of the project has continued to find new evidence of changes to the city's center that has gone previously overlooked, perhaps a result of the lack of distraction that excavation brings.[25]

Although John's strongest focus has been on the forum in Pompeii, his view of what constituted the 'neighborhood of the forum' did not stop at the edges of the buildings that defined the space. Instead, his efforts brought to attention the need to understand the thoroughfares that lead up to and away from the forum, as well as the proximal buildings that served as additional nodes of activity and urbanization in the layout of the city as a whole.[26] John's work in many ways presaged the insula-sized, or city-wide scope, that Pompeian studies would turn to after centuries of concentrating on a single, often luxurious building or feature in ignorance of the way that one piece fit into the whole of the city. Indeed, the expansive nature of John's interest and research has been evident in the many and varied sub-fields on which he has dedicated portions of his time and effort through the full span of his career.

Further afield

Beyond Pompeii, John has a number of research interests, many going back decades. One such ongoing project has been the study of Roman mosaics, especially at the site of Antioch-on-the-Orontes. Inevitably, having spent so much time in the Roman East early in his career, especially at the excavations at Dibsi-Faraj, John was exposed to Roman mosaics *in situ*, understanding their meaning from their original context. While still in coursework, John

[20] The volume was conceived of as a work to be published first in English, and therefore Mau's *Pompeji in Leben und Kunst* manuscript was expertly translated by Francis W. Kelsey in 1899. Dobbins and Foss 2007, xxvii.
[21] Dobbins and Foss 2007, xxviii.
[22] Dobbins 1998, 739, n. *.
[23] Ball and Dobbins 2017, 467, n. 1.
[24] Weiss, personal knowledge.
[25] See Ball and Dobbins (2013), especially Ball and Dobbins (2017, 472).
[26] Dobbins 2016.

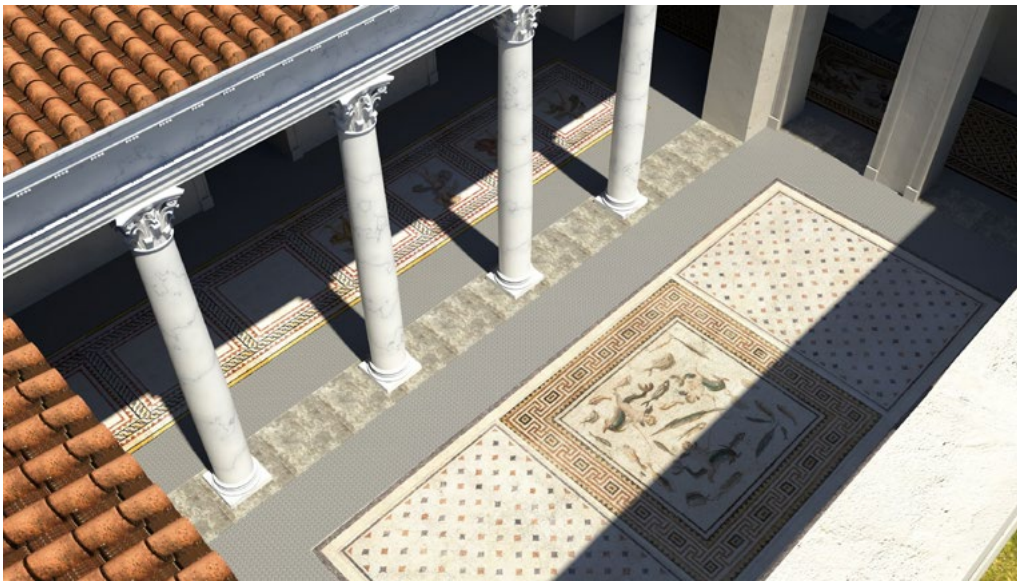

Figure 5: Digital model of House of the Drinking Contest. (Courtesy E. Gruber)

took a seminar with John Clarke, who was a Visiting Assistant Professor at Michigan in 1973-1974. Clarke's methodology of reconstructing a room's superstructure through intricate black-and-white mosaics on the ground would serve John well later, applying the same ideas to the mosaics of Antioch and Pompeii in his own teaching and research.[27] Throughout the 1980s, John went on to lecture on the mosaics from the houses of Antioch at numerous venues across North America, especially at invited AIA talks. Because of the spotty preservation and excavation of these houses, John's goal in his lectures and his publications during this period was to situate the mosaics back in their architectural context, something that was not often done in Antiochene scholarship before, as the mosaics were often just studied in terms of their iconography and style.[28] Further, John's membership in the North American branch of the L'Association international pour l'étude de la mosaïque antique (AIEMA) would provide him with a tangible connection to other international scholars who were also interested in Roman mosaics. Indeed, he helped organize AIEMA's 6th Colloquium on Ancient and Medieval Mosaics and Painting that took place at the University of Virginia in 1992.

As time progressed and new technologies developed in the late 1990s and early 2000s, John's interest in the architectural context of the mosaics of Antioch continued to blossom. John participated in the organization of the groundbreaking 2000 exhibition, *Antioch: The Lost Ancient City*, organized by Christine Kondoleon, and he provided an instructive catalogue chapter on the houses of Antioch.[29] Drastically updating the work of Stillwell from the 1960s, John recontextualized the mosaics within the Antiochian homes themselves.[30] For example,

[27] On this methodology, see Clarke (1979). For examples of John's interest in applying this technique at Pompeii, see Gruber and Dobbins (2013b).
[28] See Dobbins (1982a; 1982b). The latter article explores the Antiochene mosaics found in the Virginia Museum of Fine Arts in Richmond, Virginia, an hour east of Charlottesville, where the University of Virginia is located.
[29] Dobbins 2000.
[30] Stillwell 1961.

in his discussion of the House of the Drinking Contest from Seleucia Pieria, he successfully drew attention to how the mosaics provide information, not only about how space was used, but also how those spaces interacted with other parts of the complex, especially through the use of sightlines. John's work on this house in particular culminated in a collaboration with his former graduate student, Ethan Gruber, at the time a Web Applications Developer and 3D Modeler at the University of Virginia. John, with Gruber's technological expertise, would model the House of the Drinking Contest (Figure 5). The work allowed for the reintegration of all the original mosaics, which had been widely dispersed to museums throughout the world after excavation, and allowed for the simulation of natural and artificial light to understand better the interaction between the natural landscape and its impact on the actual use of these rooms.[31]

In addition to mosaics, John has maintained a range of scholarly interests that he has explored in new and exciting ways over the years. Since his student days at Michigan, he has had a passion for Roman numismatics. John took a numismatics seminar with T.V. Buttrey and worked on the coins of Roman Alexandria held in the Kelsey Museum. Buttrey mentioned in John's ASCSA recommendation letter that John investigated 'patterns of coinage control from varieties in the late third century material; and he came up with conclusions which are certainly publishable'.[32] John would later use this material in a talk given at the American Numismatic Society in August 1979: 'The Organization of the Roman Mint at Alexandria during the Tetrarchic Period'. John's interest in numismatics would reemerge at Virginia, where he worked with the University's art museum to acquire Greek and Roman coins to build a strong teaching collection for students. This work culminated in a numismatics seminar in 2008, the students of which began to digitize the University's coin collection and laid the groundwork for an innovative digital platform to make the objects accessible to the public.[33]

Perhaps even further afield, athletics have often appeared in John's scholarship, probably stemming from the fact that he himself is a fencer and has been involved for years with the University of Virginia's Fencing Club. This interest in sports evidently informed John's reading of some objects of ancient Greco-Roman art, especially those he routinely taught Art History 101 at UVa. One of the pieces that he constantly grappled with was the famous Athenian red-figure krater of Euphronios that depicts the wrestling match between Herakles and Antaios.[34] He noted that the Louvre's explanation of the image—that the fight is at a point near its end—differed by comparison with the reading given in Kleiner's text book—just before the famous lift during which Herakles triumphs—but that neither made any effort to examine the specifics of the wrestling hold show on the vessel in any detail.[35] In order to investigate whether the artist had rendered the wrestling moves realistically, and to determine at what point in the match the antagonists had reached, John worked with Steve Garland and Trent Paulson, head and assistant coaches of the University of Virginia's Wrestling Team, to determine what precisely was depicted in the image, and what moves might have preceded and followed the captured pose (Figure 6). Through this collaboration, they were able to conclude that the vase

[31] Gruber and Dobbins 2013a.
[32] ASCSA, Archives, Administrative Records, Box 109/17, Dobbins, Buttrey to Lang, 8 January 1974.
[33] See: http://coins.lib.virginia.edu. On the development of this project, see Gruber in this volume.
[34] Paris, Musée du Louvre, Collection Campana, G 103.
[35] Kleiner 2013, 122-23, fig. 5-22.

Figure 6: Dobbins observing the University of Virginia wrestling team, in order to understand how Euphronios depicted a similar move on a red-figure krater, 2018. (Courtesy S. Suchak, University of Virginia Communications)

depicts an under hook, a hold that is a preparatory move for a lift, and to explain better the point in time of the ancient fight between the two mythological figures.[36]

Finally, John has served the wider archaeological community with dedication and passion for decades. With ties to the Etruscan Foundation stemming back to his excavation at La Befa, he served on its advisory board from 1991-2005, with a stint as its chair from 2001-2005; he also served on the editorial board of the foundation's journal, *Etruscan Studies*, from 1991-2005. John has also promoted the activities of the North American branch of AIEMA over the years, including serving as their Secretary and Treasurer, in addition to encouraging students to present original research at their colloquia.[37] As for the Archaeological Institute of America, John has been an indefatigable champion of the organization's mission of the promotion of archaeological inquiry and the public dissemination of archaeological knowledge. As such, John served as the Charlottesville Society's president for the remarkable total of 37 years (1980-1987; 1989-2019). In addition to numerous presentations at the AIA's annual meetings over the decades, John has participated as a travelling lecture for the organization (1982-2003; 2008; 2014-2020), speaking on his research interests, including the Athenian Brauronia, Antiochene mosaics, Pompeii, and Digital Humanities—making these important subjects approachable to a variety of audiences. Many of these have been named lectures, most importantly the prestigious Martha Sharp Joukowsky Lectureship with its 13 talks over the course of a year.[38] Further, John has always offered additional lectures and seminars for local societies, providing them with even more access to archaeology. Within the wider Charlottesville community,

[36] Dobbins presented this in a paper at the 2019 Annual Meeting of the AIA: 'Euphronios Knew How to Wrestle'. The collaboration was also covered by *UVAToday* (Reid 2018).

[37] For example, at the 10th AIEMA North America Colloquium (held at Princeton University in 2011), Tracy Cosgriff, Alicia Dissinger, Elizabeth Molacek, and Dylan Rogers presented: 'The House of the Boat of the Psyches at Antioch: A New Reading via a 3D Digital Model'. Part of this research is presented in this volume by Molacek and Rogers.

[38] John held the Joukowsky Lectureship in 2007-2008. Since then, he has held the following named lectureships: Frieda Renne Lectures (2014-2015); Edward J. Bader Lecture (2015-2016); Ahmanson Foundation Lecture, Dorinda J. Oliver Lectures (2017-2018); Richard Hubbard Howard Lectures, John H. & Penelope Biggs Lecture (2019-2020). We thank Laurel Sparks, AIA Lecture Coordinator, for providing this information.

Figure 7: John cutting into Rome's birthday cake, capite velato, 2016. (Photograph by C.J. Weiss)

he has, over the years, provided talks and discussions with various groups, ranging from school groups to retirement communities. His passion for archaeology and especially for sharing his knowledge of archaeology knows no bounds.

Professor Dobbins

While John's research has left a lasting and significant mark in the field of Roman and Pompeian studies, perhaps his greatest legacy is his students and the impact that he has had on them. This volume is a testament to the work that he has directly or indirectly inspired, guided, and fostered: a collection of papers written by his graduate students on the event of his retirement. For the authors represented by the current volume, as his graduate students, our first encounters with John began with, 'Call me John', and explanations about how he saw us, not as his students, but as his younger colleagues. Interactions with John are and have always been based on the foundation of collegiality.

John's passion for teaching began first and foremost with the undergraduate students. Early on in John's tenure at UVa, he co-founded the Interdisciplinary Archaeology Program with colleagues from the Anthropology and History Departments. Thanks to John's efforts, the program continues to thrive, with a cohort of majors and minors graduating every year, along with opportunities for students to gain archaeological experience in Virginia, the USA, and across the globe. Over the years, John has fostered the interest of generations of UVa undergraduates, often sparked by their enrollment in John's legendary Art History 101 lecture course. Other courses that John has taught include Introduction to Classical Archaeology, Etruscan and Roman Art, Roman Sculpture, Roman Architecture, and, of course, Pompeii. He furthered his direct engagement with students through his rigorous seminars, including Roman Coins, Roman Painting and Mosaics, Antioch and the Roman East, and the Age of Augustus, which he taught with John Miller, a colleague in the Classics Department. Such dedication to his students is also reflected in John's receipt of UVa's prestigious All University Teaching Award in 2006. Whether bringing in large-scale plans of the sites and structures that would form the basis of unstructured discussions, holding annual birthday parties for Rome on April 21st, complete with cake and toga, worn appropriately *capite velato* (Figure 7), or holding class out on the lawn of Jefferson's Academical Village with the purpose of measuring and drawing elevations of the Pavilions as both a practical and theoretical lesson in archaeological recording, John has always sought to pull his students out of the textbook and into the practical hands-on of the field. Indeed, in the fall of 2005, John was a 'Mead

Figure 8: John hands a trowel to undergraduate student, Abigail Staub, during fieldwork in Pompeii in 2019. (Photograph by J. Dunkelbarger)

Figure 9: John teaching about the modern reconstructions of the upper walls of the Sanctuary of the Genius of Augustus, 2010. (Photograph by S. Pearson)

Honored Faculty Member' of UVa's Mead Endowment, which seeks to fund initiatives that bring faculty and undergraduate students together outside of the traditional classroom. With this charge, in his seminar, Pompeii: Its Life and Art, John and his students gathered after class to have dinners (their version of the *convivium*) at local Charlottesville restaurants, especially to understand the importance of conviviality for the Pompeians themselves.[39]

Even when in Pompeii, an opportunity for a lesson in the urban development of the city was never missed. Undergraduate and graduate students have joined John in the field over the years, occasionally as their first experience with fieldwork in Pompeii (Figure 8). As is the custom in Pompeii, a site with many projects running synchronously during the summer, John and the PFP would exchange site visits with neighboring researchers. On occasion, these exchanges included conversations about the modern reconstructions of the upper walls of the Sanctuary of the Genius of Augustus (Figure 9), learning about John's visions of how the forum's eastern buildings must have been intended to look by embodying missing columns across the frontage of the Imperial Cult Building, or less formal discussions over barbecue dinners and *bocce* back at camp in the evening (Figure 10). As he was fond of saying in the introduction to the first class of Art History 101, and as he included in his Reflective Teaching Philosophy Statement when applying (and subsequently receiving) the 2010-12 Richard A. & Sara Page Mayo National Endowment for the Humanities (NEH) Distinguished Teaching Professor Award, John's most fundamental goal as an educator was to change his students' lives.[40] It seems at once obvious and necessary to point out that he certainly changed many of ours.

Shortly before John's retirement in the spring of 2019, a symposium sponsored by the Department of Art was held in his honor at the University of Virginia, and event affectionately titled the 'Dobbinalia'. Coordinated by then-Chair of the Art History Department, Carmenita Higginbotham, and organized by John's former PhD students Claire Weiss and Daniel Weiss (no relation), presenters spanned the full range of past PhD students and colleagues who have worked with John, including Jared Benton, Kevin Cole, Steve Gavel, Anne Laidlaw, Ismini Miliaresis, Elizabeth Molacek, Eric Poehler, Dylan Rogers, Peter Schertz, and C. William Westfall (Figure 11). The event celebrated John's far-reaching impact on his students, the field, and beyond. While each of our careers, finding their foundation in John's ministrations, have been molded in part by John's archaeological influence, his background in English literature may be the aspect for which he is better known among the undergraduate community at UVa, including his ability to recite whole passages of famous English literature from memory, such as *Beowulf* as an introduction to his Carolingian lecture in Art History 101, as well as the entirety of Edgar Allen Poe's poem, 'The Raven'. Indeed, whenever any of the graduate students in the department were selected for a fellowship interview from the University's Raven Society (an organization that, among its many activities, keeps up Poe's old dormitory room on the West Range of the Academical Village), John gathered faculty and students together for group recitations of the poem at Poe's doorstep for good luck. The many ways that this poem connects with John specifically and UVa in general led us to select the second line from 'The Raven' as the title of this Festschrift, 'a quaint and curious volume'. We have enjoyed writing and editing these papers of not yet 'forgotten lore' over the two years since

[39] https://www.meadendowment.org/dobbins-john
[40] This Reflective Teaching Philosophy Statement was provided by J.J. Dobbins.

Figure 10: John partaking in less formal discussions over a 4th of July barbecue dinner hosted by the Via Consolare Project in 2016 at Camping Zeus, Pompeii. (Photograph by C.J. Weiss)

Figure 11: Dobbins' 2019 retirement symposium participants, from left to right: back row K. Cole, E. Molacek, C. Weiss, J. Benton, D. Rogers, D. Weiss, B. Gorham, S. Gavel; front row S. Layton Kim, I. Miliaresis, S. Tenant, J. Dunkelbarger, J. Dobbins, E. Poehler.

John's retirement, and, in the words of Kelsey from the preface of the first edition of his translation of Mau's *Pompeii: Its Life and Art*, 'the preparation of ... the volume, undertaken for reasons of friendship, has been less a task than a pleasure'.[41] We can say no less of this volume undertaken to honor John.

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[41] Kelsey 1899, vii.

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Masonry Analysis at Pompeii: The Maturation of a Stratigraphic Method

Eric Poehler

Abstract

From at least the middle of the 19th century, scholars have studied Pompeii's architectural remains in search of evidence for the development of the ancient city and the life of those who inhabited it. Fiorelli's evolutionary model was based on typologies of material, and although it was challenged immediately on stratigraphic grounds, the method persisted nonetheless throughout the 20th century. At the end of that century, John J. Dobbins arrived in the forum at Pompeii with new ideas about how to study and how to understand the vast array of information present in Pompeii's built environment. The first portion of this paper therefore explores the origins of masonry analysis in order to place the work of Dobbins within its larger intellectual history and to set the baseline for measuring his impact. A second section describes Dobbins' major research project, the Pompeii Forum Project, in the context of three other contemporary projects. The final section examines the Pompeii Forum Project's successor projects—directed by Dobbins' students—that adopted and adapted his methods. Although seen through the lens of Dobbins' career, this history of masonry analysis at Pompeii maintains a focus on the evolving frameworks through which the method was expressed and the forms of reasoning—analogical (i.e., typology) and stratigraphical (i.e., physical relations)—that were differently privileged over the course of that history.

Keywords

DOBBINS, MASONRY ANALYSIS, ARCHITECTURE, WALLS, POMPEII FORUM PROJECT, ANALOGICAL REASONING, STRATIGRAPHICAL REASONING, TYPOLOGY, FORUM

Introduction

It is surely Pompeii's most enduring point of fascination that one can enter an ancient city and be surrounded by remnants of the past in all three dimensions. In contrast, at so many other archaeological sites, the architecture has been destroyed down to only a few courses of stone and foundations, requiring that same visitor to imagine any sense of space or inhabitation. The standing remains at Pompeii do more than produce a feeling of enclosure, they preserve at once a centuries-long record of changing architectural choices (e.g., construction techniques and materials), decades of decorative fashions (e.g., styles of wall painting and mosaic), and individual moments of human interventions (e.g., an inserted downpipe or a blocked doorway). It is for this reason that each generation of Pompeian scholars has taken up the opportunity to examine the city through its walls, from Fiorelli, Nissen, and Mau, to Spinazzola and Maiuri, to Dobbins and, now, his students. What has changed in those five generations, however, is the manner in which one approaches the architecture and what one expects to gain from such engagement. In the following pages, I attempt a brief account of the methodology known today as masonry analysis with a particular focus on the impact of this volume's honoree, John J. Dobbins, on that technique. In doing so, I am pleased to rely heavily on the work of the man himself and those, like me, who have been deeply influenced by it.

Figure 1: Map of Fiorelli's Pompeii. (Courtesy Pompeii Bibliography and Mapping Project)

Although the core of this paper is the development of masonry analysis at Pompeii—from its origins in typologies of material and construction type, to its reorientation on the stratigraphic relationships within and among walls (and later with excavation as well), to concern for transparency in interpretation—its conceit is an opportunity to memorialize stories of our honoree and the field, and to share the lore as well as the logic of his research. These detours come at a cost, including detracting from the narrative, over-relying on the Anglophonic tradition at Pompeii, and, embarrassingly, producing an over-exposure of me and my own work. I hope the reader will forgive the indulgence and understand these personal interludes as a paean to how profoundly my interests and my career have been shaped by John Dobbins.

Origins of a debate

By the time Giuseppe Fiorelli was appointed director of Pompeii in 1860, approximately 200,000 square meters of the city had been exposed, revealing no fewer than 46,000 faces of walls to be explored (Figure 1).[1] Recognizing the vast resource before him, Fiorelli attempted the first systematic treatment of Pompeii's architecture, publishing his findings in 1873. His approach was cutting-edge 19th-century science: matching literary sources that described a succession of distinct ethnic groups with the stone types used in the architecture arranged in an evolutionary model. Thus, the Etruscans were to be identified by the use of a yellow travertine (i.e., Sarno stone), the Samnites by a grey tuff (i.e., Nocera tuff), and the colonizing Romans by brick and its related construction styles.[2] Fiorelli's efforts to identify these stone types resulted in the first city-wide distribution map of building materials (Figure 2) and established a long-lived model for subsequent visualizations of arguments based in Pompeii's architecture.[3] As we will see, his ideas are still with us today.

To understand Fiorelli's approach, it is worth pausing to reflect on the intellectual milieu of the early 1870s. It should be remembered that the excavations by Heinrich Schliemann, however inexact and staged we judge them today to have been, provided powerful contemporary support for the veracity of literary sources.[4] Additionally, Darwin's *Origin of Species* had been published only a few years before and many of Fiorelli's exact contemporaries were adopting evolutionary theory, such as Augustus Pitt-Rivers, who explicitly arranged assemblages in chronological order by their perceived complexity and refinement.[5] Because of the wealth of related artistic and epigraphic information internal to Pompeii, it was even possible for Fiorelli to anchor his ethno-historical account with a few 'known' chronological markers, such as the Doric Temple (Limestone Period), the Popidian Colonnade and the so-called Road-Maker's tablet (Tuff Period), and the amphitheater and *Teatrum Tectum* (Colonial Period).[6]

Despite these anchors, Nissen published a careful assessment of the theory undergirding Fiorelli's chronology only four years later and found it wanting on both factual and theoretical

[1] These statistics were derived by overlying the *Nuova Pianta degli Scavi di Pompei* 1860 on the Pompeii Bibliography and Mapping Project, Navigation Map 2, and drawing the outline of the excavations. The Clip function was then used to extract only those data represented in the 1860 map. Fiorelli (1873, VII) gives an area figure of 199,526m^2. The Pompeii Bibliography and Mapping Project: http://digitalhumanities.umass.edu/pbmp/.
[2] Fiorelli 1873, 78-86, tav. II-IIII.
[3] Fiorelli 1873, tav. IIII.
[4] Maurer 2009, 304-06.
[5] Pitt-Rivers 1875, 294.
[6] Fiorelli 1873, IX-XIII.

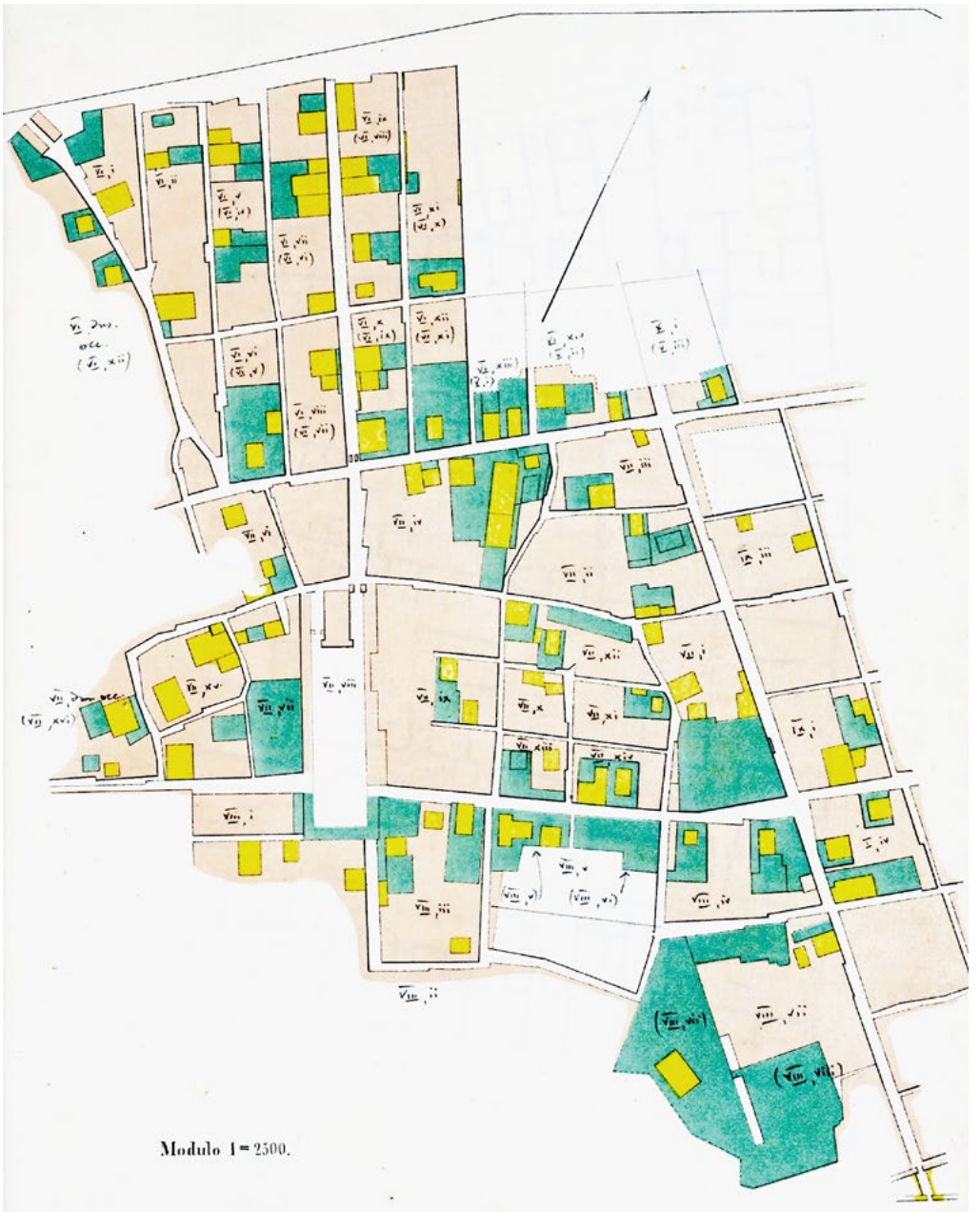

Figure 2: Map of Fiorelli's material types: Sarno stone (yellow), Nocera tuff (green). (After Fiorelli 1873, tav. IIII)

grounds. Nissen realized that Fiorelli's system risked a circularity of reasoning in general and, in particular, did not hold up against the full complexity of Pompeii's architectural landscape. At the heart his argument, Nissen explained that change in materials and in styles of construction is not tied strictly to...

> ... political upheavals, but partly to local inhabitants and traffic conditions, partly to general cultural currents. Technology does not change at a stroke from year to year, not even from decade to decade. The old and the new run beside to each other for a long time, until one, little-by-little, prevails and the other gradually disappears. Thus, even when it is clear that Fiorelli's second and third periods have passed, the Romans still used tuff in traditional styles, for columns in the Forum and the Temple of Venus, for decorative pieces in the Small Theater, and along the tomb-lined streets; conversely, the Basilica teaches us that brick columns were used in Oscan times. The division according to the material here rejects certain facts. The separation between the first and second periods is even more disingenuous.
>
> Has anyone ever limited oneself to the purpose of using Sarno Limestone for construction in Pompeii? Fiorelli affirms the question and thus reaches the most important conclusions, which extend far beyond the area of Pompeii to the total area of ancient civilization.[7]

Nissen thus challenged the underpinnings of Fiorelli's evolutionary model, appealing to both the abundant contradictory evidence at Pompeii and the lived experience of human beings embedded in longer cycles of technological change. Even so, he conceded the broader utility of the model, concluding that 'material retains its value as an important criterion for the age of Pompeian buildings. But it is not the only one'. It will only be another two years before that final point is explored and the interrelations of walls are cited as important chronological markers.

In the forward to his landmark 1879 publication, *Pompejanische Beiträge*, Mau credited Nissen and Schone for identifying the problems in contemporary scholarship that his work was meant to correct (including their own). Still, Mau tasked himself to determine not only the original form and subsequent changes to the major classes of architecture, but also to identify 'in each individual case, the causes of recognizing the historical conditions that gave rise to construction or reconstruction'.[8] In this opening remark, Mau showed that he absorbed Nissen's call to separate the general trends of history from their specific embodiments. Moreover, Mau explained to his contemporaries that each building's architectures will have a unique set of relationships to themselves and to surrounding buildings that must be considered along with material types. More than a century later, Dobbins would repeatedly cite some of Mau's specific relationships among walls in the forum, which we must recognize as stratigraphic relationships, gratefully acknowledging that 'Mau seems to have looked closely at everything'.[9]

[7] Nissen 1877, 35-36.
[8] Mau 1879, v-vi.
[9] Dobbins 1994a, 629.

Nonetheless, every person belongs to their age, and Mau immediately took his remarkable work to recognize four styles of Roman painting (also outlined in *Pompejanische Beiträge*) and applied it to a materials-based chronology in order to further refine that chronology and to add support to his typology of frescoes.[10] Paradoxically, Mau's use of both aesthetic and stratigraphic evidence to refine the traditional typologies served only to tighten the grip of a high-functioning tautology on Pompeian scholarship. By tying an elegant heuristic for understanding wall paintings to the sequence of materials on which those paintings were affixed, Mau made it unpalatable, if not impossible to radically reconsider that material sequence. One could not separate the baby from the bathwater. Thus, like the paintings themselves, Mau's valuable new method plastered over the problems of dating particular buildings by the types and arrangement of their masonry and left the question inaccessible for most of the following century.

Excavations by Maiuri a quarter century later closed off further inquiry by finding ceramic evidence to support Fiorelli's dating of the House of the Surgeon and, by extension, the earliest styles of building in Sarno stone.[11] Soon after, Carrington seized upon Maiuri's findings and brought the tautology full-circle by reversing Mau and using his wall painting styles to refine Fiorelli's basic formulation.[12] Throughout most of the 20th century, and as late as 1988,[13] typologies of material and styles of construction would dominate scholarly opinions of Pompeii's architectural chronology. Of course, throughout this period scholars continued to harbor reservations about this material schema. Still, like those of us today who blush as we acknowledge the specific failings of Eschebachs' definition of building functions before continuing to use them, most scholars had little choice but to carry on using the traditional chronology for want of an alternative or the ambition to supersede it.[14]

Masonry analysis in the late 20th century

It is within this context of a long hiatus in debate that John J. Dobbins first encountered the forum at Pompeii. In 1974, Dobbins was a graduate student at the University of Michigan and his advisor, John D'Arms (who had recently published his own great work on Campania),[15] urged Dobbins to take a critical look at the Eumachia building and the forum more broadly. During these early examinations, Dobbins had an important insight and saw an opportunity, noting that 'the buildings on the Pompeian forum preserve an astonishing amount of information that had never been systematically gathered or interpreted' (Figure 3).[16] Dobbins tested this observation on site in 1982, finding crucial flaws in the *communis opinio* about the forum that required further study and reinterpretation.[17] Perhaps the most important of these flaws was the notion that in AD 79 the forum still lay in ruins following the earthquake(s) of AD 63.[18] Therefore, with the support of the University of Virginia's (UVa's) Summer Grants program, Dobbins returned again to Pompeii in person, and alone, to study the eastern side of

[10] Mau 1879, 6-20.
[11] Maiuri 1930.
[12] Carrington 1933, 126-27.
[13] Richardson 1988.
[14] Eschebach and Müller-Trollius 1993.
[15] D'Arms 1970.
[16] Dobbins 1996b, 'Narrative Description: Nature and Significance of the Project'.
[17] Dobbins 1994a, 629, n. 1.
[18] Dobbins 1994a, 634.

Figure 3: Detail of masonry of Macellum's north entrance, interior (VII.ix.19). (After Martini 1997, 'Images of the Macellum', 'North Macellum', 'jjd-03')

the Pompeian forum in 1988, 1991, and 1992. The culmination of these efforts was his landmark 1994 publication in the *American Journal of Archaeology* (*AJA*), 'Problems of Chronology, Decoration, and Urban Design in the Forum at Pompeii'. Not only did his work demonstrate that a revitalized and monumental heart of the city was nearing completion in AD 79 (upending ideas of the city's lagging political and economic conditions),[19] but also, Dobbins' focus on the interrelations of structural remains elevated the individual, stratigraphic observation to primacy alongside considerations of material and style.

Dobbins presented his method and results regularly in the years prior to the *AJA* article's appearance,[20] and, by the time of its publication, the discipline had made a significant investment in masonry analysis at Pompeii. In fact, the three largest foreign research projects of the late 20th century—each of which had taken on the study of an entire city block—relied heavily on the method. Each did so from an explicit desire to strike out in a new direction in Pompeian archaeology. Thus, while contemporary research on Pompeii's grand residences in the *Häuser in Pompeji* series sought to document the architecture and especially the decoration of these buildings before they fell into ruin, these larger projects placed equal value on those walls that had already lost their fine coats of plaster, leaving the bare masonry exposed to interpretation.[21] Moreover, there was an explicit interest in these projects to address the problems inherent in dating buildings by their materials and construction types.[22] Hearing the echoes of Nissen and Mau of a century before, a new generation appealed to stratigraphic over typological considerations and experimented with new ways to approach the same walls.

[19] These findings contradict Castrén's (1975) notion of a 'Julio-Claudian crisis' (already challenged by Mouritsen 1988) and Jongman's (1988) depiction of the economy.
[20] Dobbins 1989, 1992, 1993.
[21] Häuser in Pompeji was a project of the Deutsches Archäologisches Institut, initiated by V.M. Stroka. Twelve volumes were published between 1988 and 2004.
[22] Bon *et al.* 1996, 940-43; Bon *et al.* 1997, 32; Fulford and Wallace-Hadrill 1995-1996, 76, 80; Jones 2018, xiii; Ling 1997, 18.

The earliest of these major endeavors, Roger Ling's The Insula of the Menander project, was conceived (like Dobbins') in the mid-1970s and conducted in the field from 1978-1986.[23] Although still centered upon one of the largest, most richly appointed, and fully published houses, Ling understood the project's mission was to go beyond the (crucial) documentation of a crumbling site to provide a complete structural history that earlier investigators had ignored.[24] In this way, Ling's project bridged the focus of his contemporaries on big houses, their finds, and their décor, with the budding interest in the more modest sections of such houses, which might reveal their development over time. One crucial distinction with later projects is that Ling did not pair masonry analysis with targeted excavations to provide evidence for absolute dating, relying instead on relationships of the masonry to wall painting styles and rare finds of pottery embedded in the walls.[25] The results of the Menander project are clearly connected to the intellectual milieu of its inception. Four volumes are now published, the first of which details the evolution of the insula in five phases beginning in the late 3rd century BC, while the others address the wall paintings, the artifacts, and the silver treasure found in 1930.[26]

Two other campaigns, both led by British universities, sprang up as the Insula of the Menander project approached publication.[27] The first of these, The Anglo-American Project in Pompeii (AAPP), began in 1994 as a joint project between the University of Bradford (UK) and Hunter College (New York, USA), but the project soon landed with Rick Jones and Damian Robinson, who would be consistent, if not the only, directors.[28] Their choice of insula VI.i was deliberate:

> it is the very state of decay in this fallen 'superstar' [the House of the Surgeon] that has made it possible to document not only its appearance in AD 79 but also to study the standing stratigraphy of its walls and to excavate through its damaged and ill-preserved floors, revealing the full development of the block before its destruction by Vesuvius.[29]

Another campaign, The Insula I.9 Pompeii Project, directed by Michael Fulford and Andrew Wallace-Hadrill, began in 1994 with similar goals to the AAPP and ran until 1998. They too chose their insula, in part, because the...

> ...generally poor condition of the standing remains, with only limited wall-decoration surviving, allowed ample opportunity for close study of construction techniques, variations in fabric, abutments and other relationships, and modifications over time. Even cursory examination indicated a complex history of change in this area.[30]

Unfortunately, a preference for excavation exerted itself on both of these projects as questions of Pompeii's early development became more pressing. Thus, while their subsurface

[23] Ling 1997, vii.
[24] Ling 1997, 1-2.
[25] Ling 1997, 17-20.
[26] These are: Vol. 1: 'The Structures' (Ling 1997); Vol. II: 'The Decorations' (Ling and Ling 2005); Vol. III: 'The Finds, a contextual study' (Allison 2006); vol. IV: 'The Silver Treasure' (Painter 2001).
[27] Ling (1997, vii) notes that the publication was essentially complete by 1993.
[28] There were two other original directors, Sara Bon-Harper and Bernice Kurchin. Later, Jarrett Lobell co-directed.
[29] Anderson and Robinson 2018, 16.
[30] Fulford and Wallace-Hadrill 1995-1996, 79.

stratigraphies were summarized in interim publications of the late 1990s, discussion of the standing architecture would not appear until 2016 (I.9 Project) and 2018 (AAPP).[31] To be fair, Pompeian scholarship overall in the late 1990s was particularly focused on a reassessment of the pre-Roman period, and, by the year 2000, these British projects and others would generate a substantial volume of evidence for pre-AD-79 Pompeii.[32] Publishing those data was therefore as appropriate as it was alluring.

The Pompeii Forum Project

At the same time that these latter projects were laying their first trenches and drawing their first wall faces, Dobbins began the University of Virginia's Pompeii Forum Project (PFP) with the explicit mandate to address urban-scale questions from within the forum and beyond it. Once again, Dobbins was ahead of the curve. With substantial funding, first from UVa's Institute for Advanced Technology in the Humanities[33] and later from the National Endowment for the Humanities,[34] the PFP began a campaign to document the buildings of the forum and the evidence they contained using cutting-edge technologies, including a laser theodolite, CAD modeling software, and photogrammetric reconstructions.[35] These efforts resulted in a number of important online publications and resources, including the annual reports of the 1995 and 1996 seasons, a repository of archival images, and a nested set of 'image maps' that lead the reader from the forum into individual buildings and down to individual viewsheds within each building (Figure 4).[36] Two sections merit particular mention. The first is a deep dive into the forum colonnades and their early modern restorations in the 1995 annual report.[37] Although partially republished in 1997, this report remains the most comprehensive discussion of these issues.[38] The second section of note is a node in the image map that links to the exact location where the Imperial Cult Building overlaps the Macellum and opens an illustrated walk-through of this critical wall juncture. As a discussion of one of the four such junctures addressed in Dobbins' 1994 article, this page serves as an extension of that argument.[39]

The PFP team was composed of archaeologists, computer specialists, an architectural historian, a structural engineer, an historian of landscape architecture, and an urban planner, all of whom provided 'an important link between historical evidence and the theory and practice of modern urban design'.[40] The results of this broad engagement were unique outputs in both concept and format. For example, William Westfall's 'Learning from Pompeii' is a modern urban architectural historian's testimonial of sustained engagement with Pompeii. In this piece, Westfall attempts to teach us to see the city not from a plan, but on the ground and from

[31] Hay 2016; Anderson and Robinson 2018.
[32] All these projects are well represented in two volumes edited by Guzzo and Guidobaldi (Guzzo and Guidobaldi 2005; 2008).
[33] Support for the project in 1994 was already $91,000. See Dobbins 1996, 'History and Duration of the Project'.
[34] Dobbins 1995, 'Funding, National Endowment for the Humanities': 'This consists of an outright grant of $45,000 and a matching grant of just under $50,000. The matching grant means that the Endowment will match outside contributions to the project dollar for dollar up to $50,000. To date, approximately $43,000 have been raised toward the match'.
[35] Hanna 1996.
[36] Dobbins 1994b.
[37] Cooper *et al.* 1995.
[38] Dobbins 1997.
[39] Dobbins 1994c, 'Imperial Cult Building/Macellum'.
[40] Dobbins 1996b, 'Project Staff'.

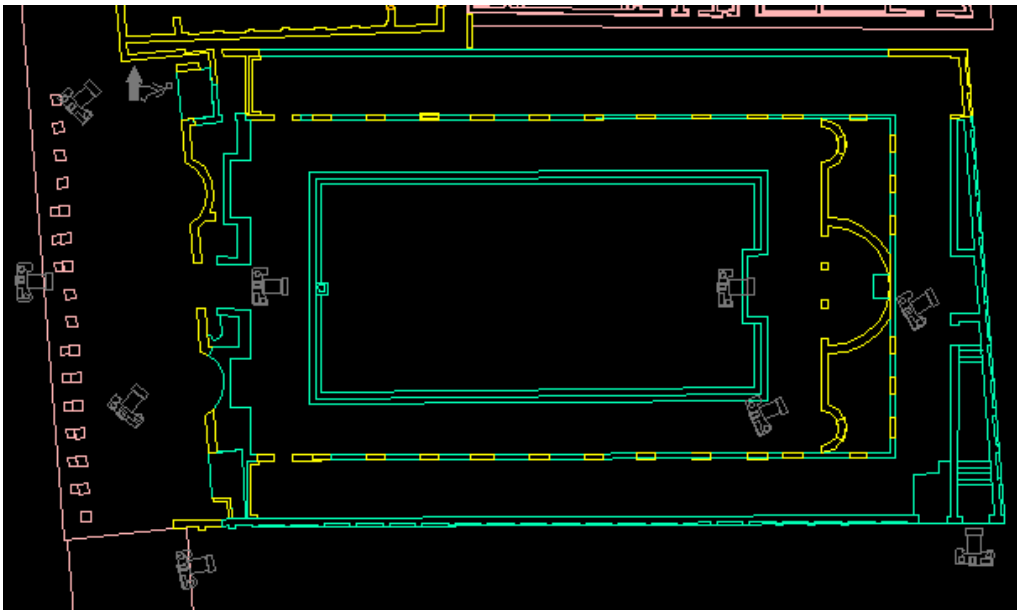

Figure 4: Image map of the Eumachia Building. (After Dobbins 1994b, 'The Eumachia Building')

within our 'field of vision'.[41] Equally important were the principles of structural engineering that Kirk Martini brought to investigations of the AD 62/3 earthquake(s) at Pompeii. Martini's 'Ancient Reconstruction of the Pompeii Forum' detailed the impact of seismic events on ancient architectures, and his work gave Pompeianists both a concept and a term for the long, curving scars in walls across the city, namely 'out-of-plane failure'.[42] Both of these were published online in 1997 and remain available today.

By 1997, the PFP had generated an accurate three-dimensional computer model of the Macellum and completed much of the Eumachia Building as well. Those CAD models, however, were not merely digital wireframes outlining the building's general form,[43] but additionally contained the location—and implicitly, the relationships—of each stratigraphically determined unit of masonry on each wall of the building (Figure 5). Where the 1994 *AJA* article had made the argument for this manner of analysis and demonstrated the power of its results, these models served to visualize the stratigraphic record upon which those arguments were based. From our vantage point more than two decades later, awash in vibrant archaeological visualizations, it is hard to appreciate the value and the novelty of this attempt. In 1997, it was not only rare to publish materials online or to imagine putting such information inside a computer model, but it was also almost unprecedented to attempt to publish the entirety of one's stratigraphic corpus for scrutiny and reevaluation. The PFP was showing its work beyond the four critical junctures, inviting the scholarly community to engage with its data and its method as well as its results.

[41] Westfall 1997.
[42] Martini 1997.
[43] I followed Dobbins' example in producing similar CAD models for the Anglo-American Project in Pompeii (with Arthur Stephens and Alvin Ho) and the Pompeii Archaeological Research Project: Porta Stabia (with Sydney Evans).

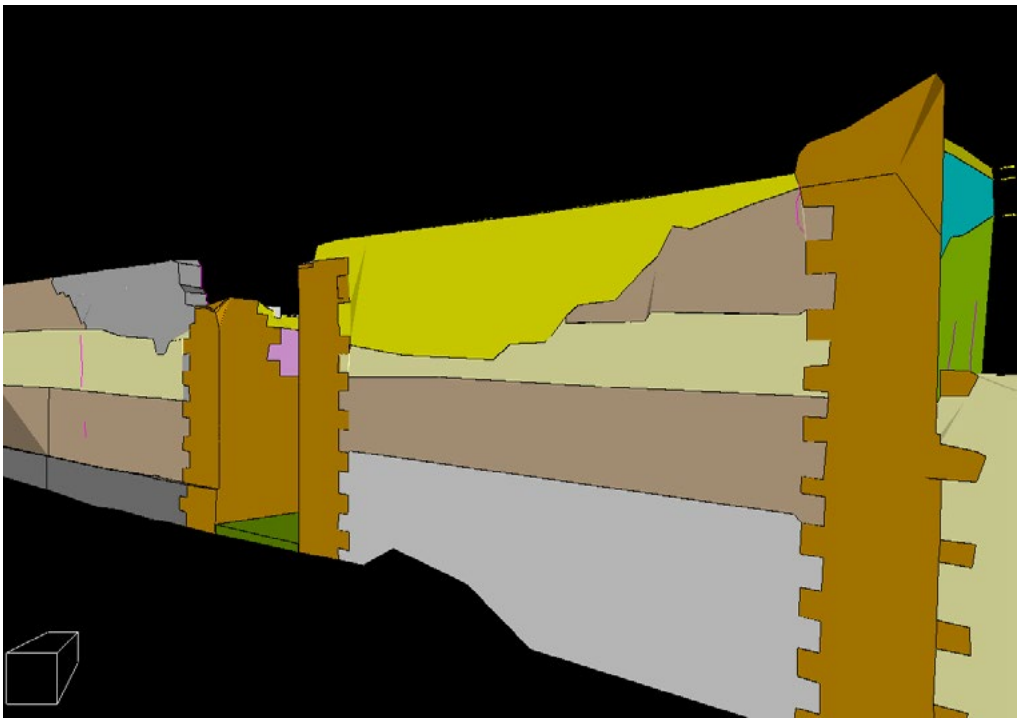

Figure 5: CAD model of the Macellum, south wall exterior. (After Dobbins 1996a, 'View 5')

The invitation to engagement, however, was only partially successful, as the (non-Anglophonic) international community was slow to adopt, or even entertain, Dobbins' ideas about the forum. Such reticence inspired only retrenchment and the PFP entered a second phase that sought, through targeted sondages in 1997 and 2001, to provide incontrovertible stratigraphic evidence to transform our understanding of the forum's history. Before returning to the controversial impact of the PFP in the conclusion, it is important to explore in some detail how Dobbins inspired a new generation of scholars to adopt and adapt the method of masonry analysis. I am lucky enough to be counted among them, and it is at this point that I become part of Dobbins' story.

Masonry analysis: the next generation

I met John Dobbins for the first time almost nine months before matriculating at the University of Virginia at the turn of the millennium. A year before, in the fall of 1999, I was walking corn fields in central Iowa for a contract archaeology company and researching PhD programs. The work was rewarding, but the life was hard and I dreamed of the two summers I had spent digging in Pompeii and of the scrapes in the streets I was just beginning to notice. After five months, I quit my job and—with a (cheaply printed and naively conceived) dissertation prospectus under my arm—I drove to each school to which I planned to apply in an attempt to overcome the deficiencies in my undergraduate education with initiative and determination. Each university was generous with its time, but also honest about the competitiveness of the application process. The visit to UVa, therefore, was remarkable not only for the story Dobbins

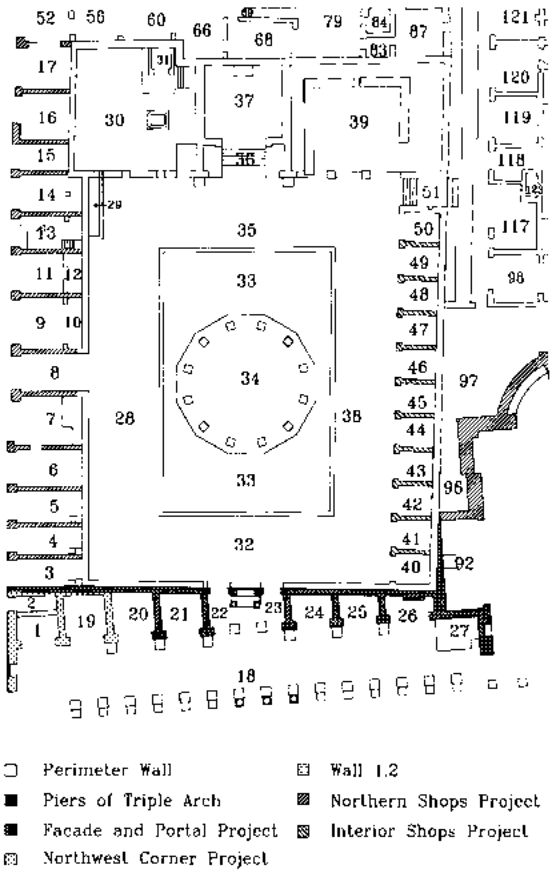

Figure 6: Plan of Macellum. (After Dobbins 1994, fig. 38)

told me of his plans for continued research at Pompeii, but also for the way he listened so carefully to my own. Only hours after that conversation, in a roadside restaurant somewhere on Interstate 81, I rushed to complete the admissions application. Some weeks later, in (I imagine) an otherwise routine graduate admissions meeting, Dobbins argued to take a chance on me. Such are the banalities that explain how I come to narrate this history.

The Pompeii Forum Project at Isthmia

Students more advanced than me were also in the cohort of 2000, including Justin Walsh, who came to work with Malcolm Bell on Greek materials, and Kevin Cole, a Romanist who had already earned a Master's degree on wall painting and narrative. After a year of coursework, Dobbins officially invited Kevin and me to join the Pompeii Forum Project in 2001. He also invited us, because we would be working closely together in the field, to call him John. This initiation and the experience working in the forum was more important than we could have imagined. Not only would that opportunity later influence Kevin's PhD topic and cement our joint work together on overlapping interests at Pompeii,[44] it also provided us with a rare opportunity to examine Roman architecture with Dobbins' particular approach to masonry analysis. For the next four summers, we honed these skills in the buildings adjacent to the forum and in the far northwest of the city, until 2006 when we were asked by Tim Gregory and Steven Ellis to help study the crumbling, late Roman walls of the so-called East Field at Isthmia, Greece. Little did we know that this Grecian sojourn would lead back to Pompeii with a new appreciation of, and a new system for, studying the standing remains. Less still did we realize that we were once again in the footsteps of Dobbins, who, in 1974, had gone to Athens to practice his interpretive skills on the Sanctuary of Artemis Brauronia on the Acropolis.[45]

It is also at this point that developments in the method of masonry analysis escaped Dobbins' direct influence and became part of his legacy. As his students, Kevin and I looked to Dobbins'

[44] Although I am the sole author, Kevin Cole was of equal importance to Poehler 2011.
[45] Rhodes and Dobbins 1979. For more on the study of the Sanctuary of Artemis Brauronia and Dobbins' time in Greece, see also Rogers and Weiss in this volume.

work and that of the Pompeii Forum Project as a model for how to begin our new research in Greece. We quickly learned that although we had been taught well how to identify stratigraphic evidence in the architecture as well as the styles of construction prevalent in Roman times, and even had figured out how to model that architecture in CAD, approaching a new site for the first time required skills and tools we did not possess. The immediate problem was that the peculiarities of the PFP's methods did not translate well beyond Pompeii. For example, the PFP's system of nomenclature, an elegant invention for Pompeii, was based on the numbering of rooms, which lend their numbers to the walls bordering those rooms. Moreover, by position, those numbers also indicate the vantage point of the viewer of a particular wall face. Thus, in the northwest corner of the Macellum (Figure 6), the wall between rooms 1 and 2 becomes 'Wall 1.2' when seen from within room 1 or 'Wall 2.1' when seen from within room 2.[46] The genius of this system is not only that one can use it to extend the Fiorellian address system down to the individual wall face (e.g., VII.ix.3, 2.1), but also that it encodes human readable information about both position and orientation to the reader.

Most other sites, however, do not have anything like Pompeii's exceptional degree of preservation from a single moment of existence. At Isthmia, for example, it was impossible to know (from the plan or even once in the field) what spaces constituted a room defined by contemporary walls and which spaces were accidentally generated by the exposure of walls of different periods. We feared that if, for convenience, we carried on numbering the areas as if they were rooms, we risked creating (and unconsciously reifying) interpretations by means of a label. We could not number the rooms with any confidence, and by extension, we could not label the walls. This was important because, again unlike Pompeii, the architecture in the East Field at Isthmia was between 0.5 m and 1.50 m high, leaving only a single phase of construction to study in each wall. Therefore, the wall face as a unit of analysis was almost meaningless at Isthmia as the evidence for the site's construction history shifted fully away from the plane of the wall to its end points and intersections with other walls.

In terms of nomenclatures, it was clear we needed a unit of analysis and a label that represented a wall as a three-dimensional object. Unfortunately, the PFP system was again unable to help us as its nomenclatures gave at least two names to each three-dimensional representation of a wall. Continuing with the example above, the wall separating rooms 1 and 2 would be both 'Wall 1.2' and 'Wall 2.1'. Picking only one of these implicitly privileges a particular side of the wall, concatenating both numbers; for example, 'Wall 1.2/2.1' generates a complicated label that lends itself to human error. When referring to a long wall intersected by multiple cross walls, such as the northwest interior wall of the Macellum, the system becomes unwieldy; one half of the interior colonnade (28) is intersected from the north by five shops (3,4,5,6,7), which makes this wall face '28.3,4,5,6,7' and the three-dimensional object separating these spaces 'Wall 28.3,4,5,6,7/3.28,4.28,5.28,6.28,7.28'. Finally, this cumbersome label returns us to the concerns about implying that a long wall was built in a single phase by its unification under a single label.[47]

[46] See Dobbins 1994b, 'Key: Numbering System for 'Rooms,' Walls, and Doors'. Dobbins (1994a, 636, n. 19) credits Larry Ball for the invention of this system.
[47] Ellis *et al.* 2008, Appendix A.

From individual observation to site-wide interpretation

If these problems of nomenclature prevented us from getting started with our work at Isthmia, we soon learned that we were equally ill-equipped to put our observations to use once we had made them. Neither in student handbooks, nor on forms for recording wall faces, nor in full publications is it explained how to take a collection of interpretations (of a variety of types) and construct a phased plan of the architecture one has studied. Instead, when the methodology of masonry analysis is described in print, attention is focused on the individual observation and its documentation. For example, Ling offers seven pages on building materials, techniques, and dating these with wall paintings, while the AAPP spares four pages on recording practices for both excavation and architecture in its most recent and most comprehensive publication.[48] The fullest discussion of wall analysis from the AAPP is a single paragraph buried in a publication on failed experiments using photogrammetry.[49] Unfortunately, this focus on the individual observation tends to collapse the methodology into its recording practice and conflates the mechanism of memorializing the state of the object with understanding it. What is more, the omission from the method of the procedures linking an individual observation to the larger interpretive structures (i.e., phases) treats the aggregation of stratigraphic evidence like a secret code,[50] one known to initiates, but only presented as fully deciphered text. Dobbins' 1994 article comes close to explaining how such evidence is brought together by describing and illustrating the larger structural units that his individual observations add up to, such as the Macellum's Facade and Portal Project or Northwest Corner Project.[51] Still, no one explains how to generate such structurally and historically meaningful abstractions. Metaphorically, we had been given the bricks, but not the scaffold.

So, as Kevin Cole, Steven Ellis, and I looked to the area beside the Sanctuary of Poseidon at Isthmia to develop our method further, it became clear that new digital technologies would become essential tools and mediating devices in building that scaffold. Therefore, any system we built had to manage the evidence we found, not only as pieces of an interpretive puzzle, but also as data that would be stored within and passed between several digital platforms, including databases, CAD files, and Geographical Information Systems. We needed a process that would allow us to aggregate our observations, step-by-step, into larger, transparent, interpretive structures, while simultaneously closely aligning with our on-site workflow and our off-site dataflow. Modeling such a process required a deep reexamination of masonry analysis as a method, including identifying what forms of reasoning are appealed to and at what point in the acts of observation, analysis, and interpretation they are applied. What we developed, which I outline in the following paragraphs, not only served our research at Isthmia, but also returned 'home' with us to Pompeii to undergird the architectural analyses of two other projects.[52]

[48] Anderson and Robinson 2018, 26, 32-34; Ling 1997, 14-20. The final AAPP student handbook (Jones *et al.* 2006, 85-90) has six pages on analyzing architecture, five of them on material and building techniques. The 1995 handbook (Bon *et al.* 1995, 34-42) had nine pages, including a statement on photogrammetry and a history of construction techniques.
[49] Bon *et al.* 1996, 945-46. For a detailed history of photogrammetry at Pompeii, see Hay (2016, 27-33).
[50] Ling (1997) never uses the word 'method' in the entire book, instead he describes masonry analysis as 'working-out of structural sequence'. Similarly, the AAPP handbook of 1995 (Bon *et al.* 1995, 34) explains that 'only through painstaking recording of such events can the complete constructional history of the wall be worked out'.
[51] Dobbins 1994a, 669, fig. 38. Additionally, Dobbins offers five pages, or 15%, of the paper to methodology.
[52] For a more comprehensive discussion of this method as developed at Isthmia and redeployed at Pompeii, see,

As already mentioned, unlike the common practice at Pompeii where the basic unit of analysis was the wall face, Isthmia's poorly preserved architecture allowed (and required) the study of wholly three-dimensional segments of masonry. For this reason, our procedure first broke down the architecture into constituent parts, 'atomizing' the plan of the architecture into its smallest 3D elements. Termed Wall Segments (WS), these abstractions represented the sections of masonry that could be defined by the edges of their intersections with other segments. Defining the WS simultaneously identified the locations of the stratigraphic relationships between them where the evidence for bonding, abutting, cutting, or overlying would be found. It was by establishing these relationships that walls separated through our atomization into WS were reunited to form the largest sections of remaining architecture, which we called Wall Construction Units (WCU). Each WCU therefore represented a remnant of walls planned and built in antiquity, but did not assign them to any building. Defining buildings was the function of the next grouping, called the Subphase, while groups of buildings were combined in a Phase by the introduction of evidence for absolute chronologies.

In the process above, only stratigraphic reasoning was applied up to the creation of Subphases. This was both necessary and intentional. It was necessary because, with so little of the wall remaining, it was difficult to identify masonry typologies and group the walls based on their appearances.[53] Additionally, we intentionally used stratigraphic reasoning exclusively at the beginning of our process and forestalled the application of analogical forms of reasoning—that is, finding similarities and dissimilarities of construction style, materials and mortars, elevations, and symmetries—in order to amplify the impact of that analogical reasoning. Such a delay was useful because many construction styles had centuries-long lifespans that limited their utility as chronological indicators. The value of even a common construction style, however, was increased when such typologies could be applied within groups of architectures already bounded by their stratigraphic relationships to other such groups (i.e., WCUs), because such appeals to analogy no longer had to struggle with their vast chronological ambiguity. Materials and construction styles could be matched (or not) within a narrowly defined segment of the larger relative chronology. In this way, it became possible to identify an anomalous construction style as an aesthetic or structural choice within a building rather than necessarily a chronological marker of change to that building.

In the end, this adaptation of the masonry analysis method allowed us to identify 130 Wall Construction Units from the 209 original Wall Segments using stratigraphic reasoning alone. By introducing analogical reasoning, the overall complexity represented by the architectures was reduced further to 17 Subphases and then further still to nine Phases when artifactual evidence was finally reintroduced. The results of the analysis were surprising both historically and methodologically. In the first instance, our work established the presence of several large, well-built structures representing missing elements of the sanctuary's urban infrastructure and topography rather than the small, residential structures assumed by the original excavators. Second, the application of these same scaffolded principles on Isthmia's record of excavation refined our conception of masonry analysis and, by 2008, encouraged us to take its

respectively, Ellis *et al.* (Forthcoming, Chapter 2) and Poehler (Forthcoming(b)).

[53] Paul Clement (1972, 227) identified four types, though recognizing these might be further refined. A team returned in the early 1990s and recognized no fewer than 12 types, recorded in the layers of their CAD file. Brief reports are found in Gregory (1993; 1996).

core back to Pompeii where scholars were still recording wall faces and publishing their work, but not yet explaining how they reconstructed buildings, or even parts of them.

Returning to Pompeii and the Pompeii Quadriporticus Project

The trajectory of research at Pompeii makes the absence of such explanations of process surprising. That is, as research from the 1970s spurred more holistic approaches, scholars sought larger and larger units of analysis (from ensembles of rooms, to complete houses, to entire insulae), and so the need for clear protocols for assembling ever greater data sets should have been a problem researchers were eager to tackle and publish. That this was not the case is illustrated by the most ambitious project of all, the Progetto Regio VI, directed by Filippo Coarelli and Fabrizio Pesando. Initiated in the summer of 2001, this project took an entire region under consideration, a remit that required the efforts and coordination of five universities.[54] The project's first published volume, issued in 2006, described the structural history of a complete insula in the center of the region, Insula X. In their methods section, the authors make clear that stratigraphic principles are crucial to producing the relative chronologies necessary to putting the walls and buildings into historical phases.[55] Indeed, like the British projects described above, the Progetto Regio VI was expressly interested in integrating seamlessly the sequences of architectural soil stratigraphies.

Coarelli and Pesando were equally clear, however, on the importance of wall typologies to date architectures, though they were also critical in their approach to these data. Like our organization of the evidence at Isthmia, their strategy applied typologies after the construction of a relative chronology based on stratigraphy. It appears this is also where our methods differ. That is, while our model used typology only to further refine our relative chronology, Coarelli and Pesando also used building techniques within their absolute chronologies, applying historical dates when such techniques were found to have been used in comparable 'Pompeian buildings of secure chronology'.[56] Such appeals to external chronologies, however, does not escape the problem of long-lived types, only fixing it at a particular (and perhaps preferred) point within that lifespan. Still, Coarelli and Pesando are to be commended for their commitment to publishing deep and detailed descriptions of their architectural stratigraphies. Of the 415 pages in their book, 262 pages (63%) are devoted to documenting units of masonry identified on each wall of the insula. Even so, although each property description concludes with a summary of phasing and their method section is illustrated by both an example of an architectural recording sheet and a map of relationships within their database,[57] it remains unclear how the process of adding up those many hundreds of stratigraphic units (including those many not in the published descriptions)[58] was accomplished.

The innovative work of the Progetto Regio VI, while it appeals to tradition, represents both a culmination of much intellectual development around the masonry analysis method at Pompeii and the milieu within which I began my own architectural research project in the ancient city. Much like Dobbins' opportunity to form the Pompeii Forum Project, our

[54] These are the universities of L'Orientale di Napoli, Perugia, Siena, Trieste, and Venezia. See Pesando (2005, 73).
[55] Coarelli and Pesando 2006, 15-19.
[56] Coarelli and Pesando 2006, 15.
[57] Coarelli and Pesando 2006, tav. I-II.
[58] For example, the threshold of a doorway, USM 158, is referred to eight times throughout the text, but not itself described.

initiation of the Pompeii Quadriporticus Project stemmed from a specific observation, indeed, from a paradox. In July of 2009, I stood with Steven Ellis examining two ends of a massive, curving drain uncovered by Kevin Dicus in the Pompeii Archaeological Research Project: Porta Stabia's excavations. At one end, the drain disappeared into the section and continued northward toward the very center of the *Teatrum Tectum*. Such a large, roofed building would need a substantial drainage structure and that association offered an epigraphically attested *terminus ante quem* of 78 BC for the drain. The other end of the drain bent westward to run under, and to be destroyed by, the perimeter wall of the Quadriporticus building. Because the Quadriporticus has traditionally been assigned to not later than the second half of the 2nd century BC, we were left with the paradox of the drain of one great public building being destroyed by another public building that had been purportedly built 50 years before.

We call this kind of paradox an 'Escher problem' for the way chronologies can ascended, like stairways in the artist's lithographs, back to earlier places and create delightful, but impossible realities.[59] Such logical impossibilities serve as a check on the interpretive process as one integrates relative and absolute dating information. In this case, it was obvious that the Quadriporticus' external wall must date later than the rest of the building and in that realization, the Pompeii Quadriporticus Project (PQP) was born. While this issue was the original impetus for the PQP, the greater mission was to recover the more than two centuries of evolution of spaces and their use within the Quadriporticus building. But the PQP was also a chance to take the scaffolded, interpretive regime created from the simplified architectures at Isthmia and apply it to the vast complexity of Pompeii's urban fabric. In particular, we were keen to see if these techniques could help us produce evidence to evaluate the traditionally assigned functions of the building, including its common identification as a barracks for gladiators. In support of these goals, we also explored the use of new digital and in-field survey technologies, including Apple iPad-based recording procedures, photogrammetric reconstructions, and campaigns of laser scanning and ground penetrating radar. Together, these tools and methods were an exploration in their own right, as the PQP was explicitly interested in testing the reach of non-invasive techniques and technologies in advance, if not in place, of new excavations.

After four years of archaeological research and technological experimentation in the field, we had described more than 2600 stratigraphic units on over 500 wall faces, recorded 1732 'interventions' on the 79 columns of the internal colonnade and propylon, and identified hundreds of early modern and modern restorations to the building from maps, artworks, and photography (Figure 7). Our investment in in-field technologies made our work efficient and the time that efficiency bought was reinvested in interpreting our results while still on site.[60] This interpretative work included experiments with a new concept called the 'Wall Segment Stratigraphic Unit' (WSSU). Essentially, the WSSU is an abstraction that combines equivalent SUs from multiple wall faces of the same Wall Segment (i.e., from opposite sides of a wall) and thus serves to intermediate between the systems of masonry analysis developed at Pompeii and at Isthmia. That is, because of the scale of the architecture at Pompeii, we recorded stratigraphic units as two-dimensional objects on the plane of a wall face, while the Isthmia system expected to find stratigraphic relationships between (equally abstract) sections of

[59] Escher 1961.
[60] See: Poehler Forthcoming(a); Poehler and Ellis 2012, 2; Poehler and Ellis 2013, 3-5; Poehler and Ellis 2012, 2.

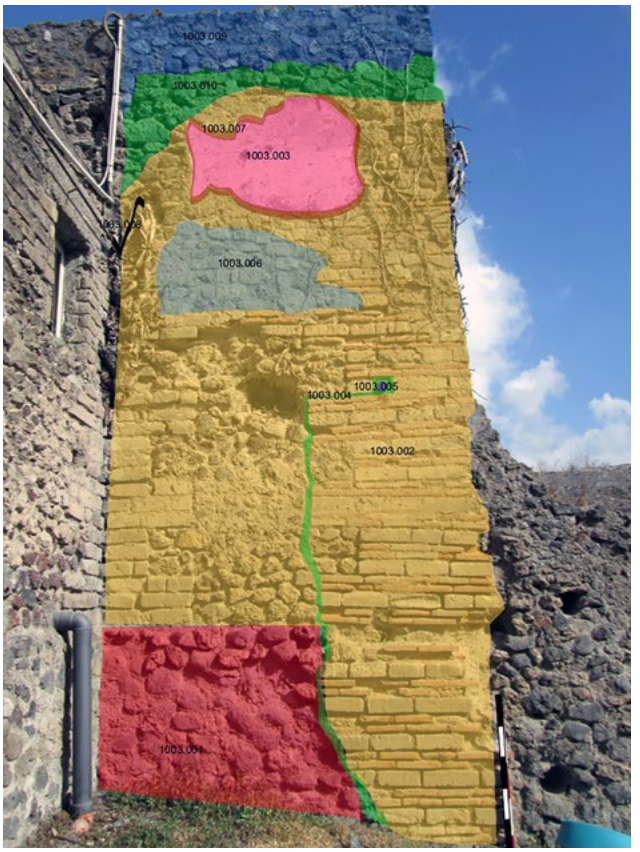

Figure 7: Drawing of stratigraphic units identified on south face (WF 1003) of Quadriporticus, western exterior wall. (Courtesy Pompeii Quadriporticus Project)

masonry in three dimensions. The WSSU therefore was an attempt to reunite SUs representing a single act of ancient construction within a wall segment that had been separated by the modern process of identifying them on the face of a wall.

In its express purpose of reunion, the experiment with WSSUs was a success, providing a new meaningful construct to translate between our systems of recording (wall face analysis) and interpretation (wall segment aggregation). Nonetheless, we stopped using the WSSU concept after rejoining only one-sixth of the total number of stratigraphic units from the Quadriporticus because, although this process was logical, it was also impractical. In many cases, what was rejoined were elements of construction—for example, obvious modern reconstructions at the top of walls and sections of a single layer of plaster—that did not help in the immediate work to establish the Quadriporticus' structural sequences. Moreover, we never found an example of a wall in which opposing sides recorded two acts of construction with significant chronological distinction. It was therefore just as simple to build Wall Construction Units from several wall face SUs as it was to do so from a single WSSU, and, for our interim reports at least, this was our process.

Finally, parallel research conducted by our sister project, The Pompeii Archaeological Research Project: Porta Stabia (PARP:PS), revealed an unexpected benefit to delaying the work to rejoin the many hundreds of stratigraphic units identified on wall faces (Pompeii system) until after the structural sequence could be formed among the wall segments (Isthmia system).[61] The goal of PARP:PS was to understand the evolution of a non-elite neighborhood with excavation rather than masonry analysis as the primary methodology. Because the architectural analysis

[61] The Pompeii Archaeological Research Project: Porta Stabia is directed by Steven Ellis. Since 2006, I have served as the project's Head of Architectural Studies.

team was small,[62] and also tasked with generating a 3D wireframe model of the architecture,[63] much of the analysis of wall faces was limited to those walls surrounding a trench during years of excavation, though the analysis of all wall segments was completed. In the study seasons following the close of excavation in 2013, our team examined each wall face as part of the efforts to integrate the chronology of the excavated and standing remains. This integration process made it immediately apparent that, by forestalling the study of the wall faces, those analyses served to test the validity of the interpretive work previously completed among our wall segments. In a few important instances this process identified previously unrecognized reconstructions that helped to explain differences in the construction style between the top and bottom of a wall and clarified the phase to which each part of that wall belonged. In nearly all examples, however, wall face analyses enriched the history of the room or building it attached to by revealing alterations and adaptations to the inhabited space, many of which occurred between major phases of construction.

Conclusions

These examples of the most recent campaigns of masonry analysis at Pompeii reveal that, even as significant advances have been made in the areas of recording and interpretive transparency, there remains a healthy diversity of ways to deploy this method. The preceding discussion also suggests that room still exists for both the refinement of the present arrangements of abstractions (i.e., SU, WF, WSSU, WS, WCUs, etc.) and modes of reasoning (i.e., stratigraphical and analogical), and further innovation in the management, illustration, and ultimate publication of these components and the narratives that translate them into arguments for how the history of Pompeii unfolded. In part, the space available for this innovation is due to the relative scarcity of fully published examples of masonry analysis from Pompeii. As mentioned, even when published, discussions of method compete with excavation for word count and rarely go beyond a recitation of in-field recording practices.[64] In this sense, the space for innovation is closer to a vacuum. A spectacular exception, however, is the recent dissertation by Dr Sophie Hay.[65] Hay's efforts bring to fruition the work of the Insula I.9 Pompeii Project by not only exhaustively documenting the structural history of the entire southern half of the insula, but also by devoting over 50 pages to the method she used and its own evolution. Her discussion of masonry analysis has been a source of both information and inspiration as I wrote this chapter. Hay's thesis is the latest example demonstrating the great explanatory power of masonry analysis and it returns us to our original example, Dobbins' 1994 article on the evolution of the forum at Pompeii.

Since its publication more than a quarter of a century ago, this article has remained the single most important expression of how careful architectural analysis, even without excavation, can transform our knowledge of whole sectors of an ancient city. Even at its inception, the importance of Dobbins' argument and his method was recognized by his peer-reviewers: 'Dobbins' evidence convincingly supports his conclusions, and his reading of the site will

[62] During excavations seasons the team consisted of Sydney Evans (Surveyor), Greg Tucker (CAD Specialist), and me, joined by Alex Marko and Juliana van Roggen in post-excavation study seasons.
[63] Poehler and Evans 2007.
[64] These are gaps we hope to fill with forthcoming publications: Ellis *et al.* Forthcoming; Poehler Forthcoming(b); Poehler and Ellis Forthcoming.
[65] Hay 2016. Hay also excavated with the PFP in 1997, the results of which are published in Dobbins *et al.* (1998).

almost certainly become the "new orthodoxy"'.[66] Indeed it has. The impact of this article on Anglophonic scholarship is all the more impressive for the unwillingness of some in European communities to give up on the old orthodoxy. As early as 2001, Dobbins and Ball fully understood the perception of their work and wore the skepticism of others proudly, giving their presentations provocative titles, such as 'More Heresy from the Pompeii Forum Project: A Roman Date for the Basilica?'.[67] At a conference in Pompeii in 2002, Dobbins and Ball spoke directly to their critics, stressing the results of their excavations in 1997.[68] In 2006, the situation had not improved, and the important volume by Coarelli and Pesando mentioned above cites Dobbins only once and does so in a manner that can be read as a dismissal.[69] By 2014, the silence had become deafening, so, when Dobbins and Ball presented on the Mummius inscription within the Sanctuary of Apollo, their talk included a slide listing the names of scholars who simply refused to engage with their scholarship.[70] This provocation followed closely on the heels of a somewhat more oblique admonishment in the *American Journal of Archaeology*.[71] In 2015, Jamie Cooper and Dobbins published their findings on the Apollo Temple's design and in their conclusion took direct aim at Pesando's assertions of the traditional chronology,[72] asserting that the traditional model of an unchanged 2nd century BC temple 'is impossible, inconsistent with the evidence at the site, and counterintuitive'.[73]

Scholarly opinions, however, are embedded in structures other than reason and consequently change is sometimes slow. Twenty-three years after Dobbins first warned in the *American Journal of Archaeology* that 'material and technique are not in themselves secure chronological indicators', it was necessary to make the same point and in the same place.[74] His most recent statement is also the most direct: 'The authors [Coarelli and Pesando] systematically reject all forms of modern scholarship, and they cling explicitly to what they refer to as the 'tradizione pompeianistica'—that is, the outdated system in which masonry types are assigned to chronological phases'.[75] But silence is not a form of refutation, and no one has yet argued to overturn Dobbins' 'new orthodoxy' of the development of the forum at Pompeii. Even in their careful excavations, scholars unsympathetic to the Pompeii Forum Project's reconstructions have not found positive evidence for their negative conclusions.[76] Where these others fail is not in excavation, but in masonry analysis. By refusing to consistently apply the very same stratigraphic principles used effectively within a trench to the architectures that surround it, they reach conclusions incompatible with their own chronologies. For the traditionalists,

[66] Dobbins 1996b, 'Project Description: Nature and Significance of the Project'.
[67] Dobbins 2001.
[68] See Dobbins and Ball (2005), discussing Dobbins *et al.* (1998).
[69] Coarelli and Pesando (2006, 16) write: 'Quasi tutta la superficie dei santuari e degli edifici pubblici sannitici di Pompei risulta essere stata ripetutamente sondata e dunque pare difficile che di tali monumenti si possano oggi proporre nuove interpretazioni sulla base delle sole sequenze stratigrafiche fisiche, come, ad esempio, e avvenuto nel caso dei recenti scavi eseguiti nell'area del peribolo del Tempio di Apollo'. The supporting citation is 'Dobbins *et al.* 1998, *contra* Coarelli 2005'.
[70] This presentation was given at the 115th annual meeting of the Archaeological Institute of America (Chicago), session 3D.
[71] At times, frustration seems evident. For example, although distancing the names of the traditional model's proponents in a footnote, Ball and Dobbins (2013, 463) strike a slightly mocking tone in arguing against what they call the 'Pompeii Creation Myth': 'In their minds, it is as if the lovely and venerable Hellenistic Samnite city of Pompeii simply had the tragic misfortune to fall, fully formed, into the Romans' coarser hands'.
[72] Pesando 2006, 233.
[73] Cooper and Dobbins 2015, 7.
[74] Dobbins 1994a, 638.
[75] Ball and Dobbins 2017, 500.
[76] For example, Kockel and Flecker (2008), to be read with Ball and Dobbins' (2017, 474-75) critique.

more evidence is not way out of their quandary. Instead, there must be a reckoning with these methodological inadequacies, some now a century and a half out of date. In the end, what we can appreciate most clearly from John Dobbins' nearly forty-year career in the forum at Pompeii is that while evidence wins arguments, methods transform disciplines.

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There are many people to thank for the long history of engagement with Pompeii and its architecture that made this paper possible. First, I am grateful for the years of collaboration with the editors (Rogers, PARP:PS; Weiss, AAPP) and contributors (Benton, AAPP; Dunkelbarger, PQP) to this volume on several different research projects. Next, enormous thanks go to Kevin Cole and Steven Ellis for a decade of collaboration to develop a new way of studying walls at Isthmia and at Pompeii. Finally, and most importantly, I am immensely grateful to Mr John Dobbins for his faith in me, for the opportunities to work on his projects, and for his years of mentorship, which continue into the present as helpful suggestions on the text and tone of the present paper.

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Disentangling the via del Foro Colonnade at Pompeii

Claire J. Weiss

Abstract

A ten-element, opus latericium colonnade ran along the east side of the via del Foro of Pompeii, fronting a group of commercial and domestic spaces within insula VII.iv. The colonnade has been described as having a single-phase of construction (Della Corte), as two phases (Maiuri), or three (Ball and Dobbins), with the last phase connected to post-earthquake interventions. In part because of the visual presentation as a cohesive unit, its proximity to the Temple of Fortuna Augusta—a construction funded by and built on the private land of Marcus Tullius—plus other circumstantial evidence, the colonnade has often been connected to Tullius. Maiuri labeled it the 'Porticus Tulliana', while Della Corte used the evidence of the colonnade to suggest that the properties to which it corresponded must also have belonged to Tullius, indeed that nearly a third of the insula was under Tullian ownership. Through close examination of the visible remains—the mortar, brickwork, construction style, spacing, and relationships to the surrounding features of the sidewalk—it becomes clear that the phasing of the colonnade is much more complicated than has been previously described, with several possible scenarios that might account for the variations preserved by the standing remains. The multiple phases, distinct subsets of pillars, columns, and pillar-columns, and comparative evidence of other façade colonnades at both Pompeii and Herculaneum give reason to disentangle the construction from the sole ownership of Marcus Tullius and instead consider that the via del Foro colonnade could provide evidence for cooperation between neighbors who each built distinct, but necessarily coordinated column groups to monumentalize their collective frontage between the temple to the north and the forum to the south.

Keywords

POMPEII, VIA DEL FORO, MARCUS TULLIUS, PORTICUS TULLIANA, COLONNADE

Introduction

Despite being a fairly short stretch of road, the via del Foro in the ancient city of Pompeii seems to have been a remarkably important thoroughfare (Figure 1). The street underwent a level of monumentalization that few other stretches of the Pompeian road system could claim. The city block that bordered its western side held the Forum Baths, while at its northeast corner the Temple of Fortuna Augusta presided over the intersection, the temple's stairs projecting into the roadway. At each end of the street was an honorific arch: the so-called Arch of Tiberius announced the northeastern entrance to the forum at the south, while the so-called Arch of Caligula spanned the via del Mercurio at the north. The two arches acted as monumental staples that fixed the street's significance in place. At an earlier time, a gate through the defensive wall of the city permitted a direct line of access from the hinterland to the forum by way of the via del Foro.[1] Perhaps because it functioned to funnel all traffic coming from the northern areas of the city toward the forum, the street segment had a remarkable width, approximately 5.6m from sidewalk to sidewalk at either end, but nearly 8m across at its widest point. Only the via del'Abbondanza could claim to have been wider.

[1] Maiuri 1929, 158.

Figure 1: Plan of the via del Foro and surrounding area of Pompeii. (Illustration by C.J. Weiss)

The width of the via del Foro was not the only aspect that marked it out as special. It was also colonnaded along a portion of its east side. Colonnaded streets were a rare feature within the walls of the ancient city of Pompeii.[2] Many residential buildings within the city possessed internal colonnades that ringed their peristyle gardens, and colonnades were the defining features of several larger porticus structures, such as the Quadriporticus, but only three places within the walls of Pompeii had external, street-lining colonnades of more than only a few columns along some portion of their lengths. One adorned a portion of the northern side of the via Marina as it ascended from the Porta Marina. A second constituted the monumental entranceway to the Triangular Forum. The third ran along the east side of the via del Foro.

[2] Outside the city walls, colonnaded or arcaded frontages were more common. Beyond the Porta Ercolano, a long arcade fronted the shops along the east side of the via dei Sepolcri supporting the upper floors of the Villa delle Colonne a Mosaico, and a shorter arcade adorned the west side of the same street in front of the Villa di Cicerone. Outside the Porta Marina, an arcade defined the edge of the northern sidewalk of the via Marina along the façade of the Suburban Baths, while a colonnaded portico ran parallel to the city wall along the lower level of the Villa Imperiale. See Emmerson (2020, 21-26) on the Porta Ercolano suburb.

Figure 2: The so-called 'Porticus Tulliana' (via del Foro colonnade) between the Temple of Fortuna Augusta to its north and Pompeii's forum to its south. (Photograph by C.J. Weiss)

This third colonnade–often referred to as the Porticus Tulliana–and the buildings adjacent to it, are the subject of the current chapter. This via del Foro colonnade comprised a series of ten columnar elements built in *opus latericium* (tile and/or brick),[3] a mismatched set of columns, pillars, and pillars with engaged half-columns (Figure 2).

Given the rarity of colonnades or arcades in Pompeii, it might be thought that the so-called Porticus Tulliana should have attracted abundant attention in the scholarship of the city. Instead, the colonnade has received most consideration only as a result of its close proximity to the forum and the Temple of Fortuna Augusta, becoming associated with each despite not being part of either. Since it was first uncovered in the early 1800s,[4] the colonnade made appearances in many of the earliest published illustrations of the discoveries at Pompeii, although usually on the edges of the illustrated scenes, rather than as their main focus. Several of the *Real Museo Borbonico* plates illustrating the Temple of Fortuna Augusta or the northeastern arched entranceway to the forum included a portion of the colonnade, with a few of the columns gracing the edge of the images' frames (Figure 3).[5] Similarly, three of the illustration plates in Gell's volumes presented the temple or the Forum Baths with the colonnade only included by its proximity.[6]

[3] Maiuri (1942, 198) uses *latericium* and *testaceum* interchangeably when discussing this construction type.
[4] Eschebach 1993, 272.
[5] For example, *MB* vol. 1, tav. 26; *MB* vol. 2, tav. B; *MB* vol. 4, tav. 10.
[6] Gell 1837, plates 20, 22, and 24.

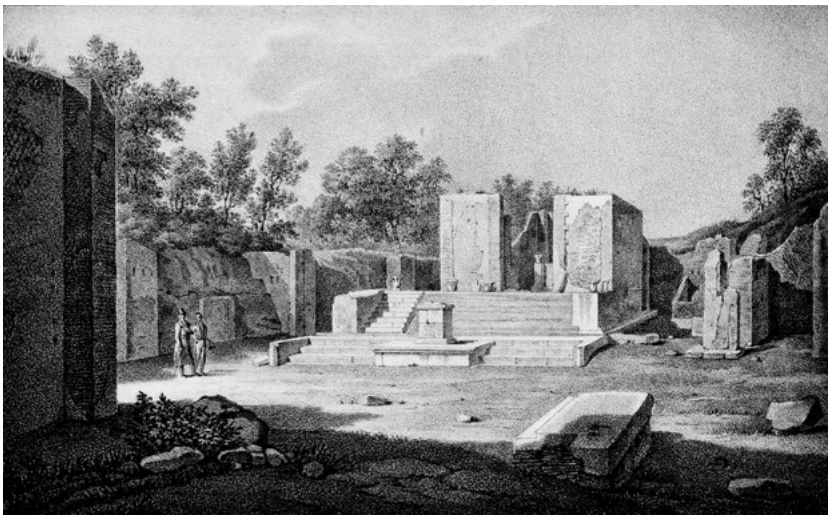


Figure 3: View of the Temple of Fortuna Augusta. First two columnar elements of via del Foro colonnade are visible at the extreme right of the image field. (After MB 4, tav. X)

The Temple of Fortuna Augusta and Marcus Tullius

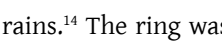
The Temple of Fortuna Augusta (VII.iv.01), by comparison, suffers no lack of study, with a strong body of evidence in support of the identification of the individual responsible for its construction. Indeed, the owner of the land on which the Temple of Fortuna Augusta was built is known with certainty. A dedicatory inscription found within the temple's cella gave the name of its benefactor as Marcus Tullius, son of Marcus, and his titulature as duumvir with judicial power three times, quinquennial, augur, military tribune by popular demand. The inscription also named Tullius as the owner of the site on which the building was constructed, and the source of the funding for the construction project.[7] Additional inscriptions from within the temple and elsewhere in and around the forum gave more information about the offices of the cult of Fortuna Augusta, the fluctuating number of office holders, and information that allowed for the dating of the foundation of the temple to nearly exactly AD 3.[8] A cippus installed in the access pathway just to the south of the temple provided further epigraphic evidence for the use and ownership of the spaces in proximity to the via del Foro colonnade (Figure 4). The cippus marked off an *area privata* constituting a three-room space, including a triclinium, a kitchen, and a staircase with adjacent latrine.[9] As the cippus indicated, the space was owned by Tullius and perhaps reserved for his use, or was space provided for the office holders of the cult.[10] But Tullius' ownership has been speculated to have extended much further than the areas so conveniently marked with his name.

Maiuri first coined the name 'Porticus Tulliana', noting that, simply by proximity, the construction and ownership of the colonnade running from the southwest corner of the Temple should perhaps be credited to Marcus Tullius.[11] Della Corte pushed adjacent land

[7] *CIL* 10.820: *M(arcus) Tullius M(arci) f(ilius), d(uum)v(ir) i(ure) d(icundo) ter(tium), quinq(uennalis), augur, tr(ibunus) mil(itum) / a pop(ulo) aedem Fortunae August(ae) solo et peq(unia) sua.* Translations by Cooley and Cooley (2014, 134). See also Van Andringa (2015, 101).
[8] Gasparini 2016, 47-48.
[9] Fiorelli 1875, 212.
[10] As suggested by Van Andringa (2015, 105).
[11] Mairui 1942, 177.

Figure 4: Cippus (at the center of the frame) marking out the area privata for M. Tullius behind, located between the Temple of Fortuna Augusta to the left and the shops associated with the via del Foro colonnade to the right. (Photograph by J. Dunkelbarger)

Figure 5: Western third of insula VII. iv, including the properties to the east of the colonnade purportedly owned by Marcus Tullius. Details include the Casa della Parete nera (in red) and Casa delle Forme di Creta (in dark blue) and their party wall zig-zagging back and forth between (dotted), the shared shop across both properties (in yellow), and the angiportus to which both had access (in light blue). (Illustration by C.J. Weiss)

ownership further. The atrium houses to the east of the temple—the Casa della Parete nera (VII.iv.59) (Figure 5, in dark blue), Casa delle Forme di Creta (VII.iv.62) (Figure 5, in red), and their adjacent shops (VII.iv.58, 60/61, 63)—as well as the commercial buildings to the south of the temple (VII.iv.3-7), were added to the list of properties credited with Tullian ownership in a theory built by Della Corte.[12] The theory began with a bronze signet ring that was found in the Casa delle Forme di Creta. A fortuitous discovery, the ring was picked up by a *custode,* not during the initial excavations of the house,[13] but nearly 100 years later, exposed after abundant September rains.[14] The ring was inscribed with the letters  , which Della Corte reconstructed to signify 'L T(ullius) FA(ustus)', although he expressed some hesitation about the interpolation of the *cognomen.*[15] Della Corte declared that the coincidence of finding such an object in a large, well-appointed house bearing an inscription with the same *gentilicium* as the benefactor of the temple to which the house was adjacent should leave little room for doubt that the house must have been owned by a member of the same *gens*. Recognizing it might stretch belief that the ring was indeed owned and dropped in the house by the house's owner, Della Corte martialed other topographic information about the properties adjacent to the temple to further support his interpretation, pulling in more properties and additional square footage of the insula in order to do so. He therefore argued for Tullian ownership of most of the western third of the insula, using details of the properties' constructions to bolster the argument. For example, he found it unlikely that the properties would exhibit 'so much freedom of construction and so much mutual interference' necessary to create the meandering party wall between the Casa della Parete nera and Casa delle Forme di Creta (Figure 5, dotted line).[16] The western three rooms off of the Casa della Parete nera's atrium—two cubiculi and an *ala*—projected into the Casa delle Forme di Creta, which had a blind wall with no smaller rooms on the east side of its atrium. The eastern peristyle wall of the Casa delle Forme di Creta projected back into the west side of the Casa della Parete nera, if more shallowly. In addition, Della Corte pointed to the overlap of the shop at the north of both properties (VII.iv.60-61) to which these houses seem to have shared access across their frontages (Figure 5, in yellow), as well as common access to the *angiportus* at VII.iv.8 (Figure 5, in light blue), to which these houses and several other surrounding properties connected.[17] Finally, Della Corte found the 'single monumental continuous portico' fronting the shops at VII.iv.3-11 particularly telling that all these properties must have a single owner.[18] It seems that he took the colonnade to have had one phase, built from the start as a single, unifying frontage construction existing to adorn the landholdings of the Tullian family and visually connect them to the temple. Therefore, he dubbed the colonnade and all the properties he understood to be under the

[12] Della Corte 1965, 122-24. Gasparini (2016, 46) takes Della Corte's pronouncement of the Tullian ownership of the Casa delle Forme di Creta and the constructions to its west as established truth. See Castrén (1975, 31-33) for issues with the use of Della Corte's attributions and their promulgation as 'unquestioned facts'.
[13] Fiorelli 1875, 209.
[14] Spinazzola 1917, 258.
[15] Della Corte 1965, 122. Castrén (1975, 231-32) lists no evidence for a member of the Tullii with the *praenomen* Lucius, nor the *cognomen* Faustus. There is evidence, however, for an L. Tetteius Festus (Castrén 1975, 228; *CIL* 4 supp. 1, 358) and an L. Tussidius Verus (Castrén 1975, 232; *CIL* 4 supp. 1, 368) in the wax tablets of Caecilius Iucundus (tablets 69 and 95 respectively), but no comparanda for a person with an identified *praenomen* and *gentilicium* that began with L and T, followed by a *cognomen* involving an F or A.
[16] Della Corte 1965, 123: 'tanta libertà di costruzione e tante reciproche interferenze'. Translation by the author, along with all subsequent translations from original Italian texts.
[17] Della Corte 1965, 122-23.
[18] Della Corte 1965, 123: '...un unico monumentale portico continuo'.

Figure 6: Location of Arthur's excavations (red line) down the angiportus, through doorway VII.iv.*8, and turning south along the sidewalk. (After Arthur 1999)*

same ownership as the Insula and Porticus Tulliana, a landholding of significance, and one that would position the Tullius *gens* as substantially influential in the city.

The evidence of the colonnade

Ideally at this point, one would turn to stratigraphic evidence for the pillars that make up the via del Foro colonnade, their dating, and how their construction related to the buildings of the insula in order to determine the structure's creation, use, and the changes that it was subjected to through its existence. Little excavation of the sidewalk and the structures immediately adjacent has taken place. A portion of the colonnade's walking surface was excavated by Arthur in 1980-1981 as a consequence of the need to install new power and water lines to serve the offices of the Direzione degli Scavi that were built into the Casa di Bacco (VII.iv.10).[19] These excavations, comprising a linear trench of one meter width, ran down the length of the *angiportus* that bordered the north side of the Casa di Bacco (VII.iv.8), turned south as it exited the *angiportus* to run along the sidewalk in front of the house and adjacent shops, and therefore only incorporated the southern portion of the insula frontage (Figure 6).[20] As is often the case for sidewalk excavations undertaken for the purposes of laying modern utility lines

[19] Arthur 1986; 2019.
[20] Arthur 2019, 1-2.

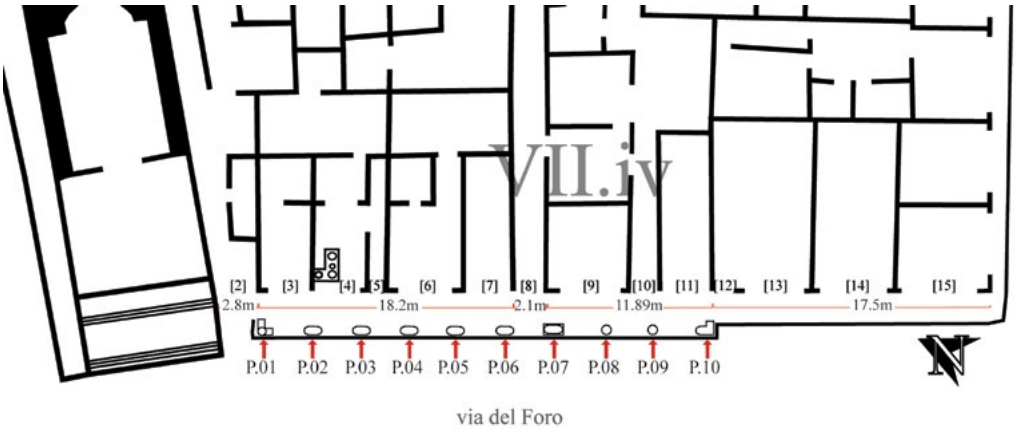


Figure 7: via del Foro Pillars numbered P.01-P.10 from north to south and measurements for spacing of the features. (Illustration by C.J. Weiss)

in the city, these trenches did not extend the full breadth of the sidewalks through which they were cut except in a few places, intervening only as much as necessary to bury the water pipes or electrical lines, or to install a conduit to carry those amenities.[21] The excavations were not focused on the full length of the colonnade, and were never published in full.[22] Therefore, the only available evidence is the colonnade itself, its construction, masonry details, and design.

Observations of the standing remains of the colonnade, visible above modern ground level, were conducted on site over the summers of 2018 and 2019, and through the creation and close examination of extensive photographic records, which were also marshalled into a 3D model of the colonnade for additional measurements.[23] The details of the colonnade as a whole, then each pillar of the colonnade, as well as their relationships to the other elements in the colonnade help to demonstrate the complexity of the phasing of the structure. For ease of reference, each pillar will be referred to by a number (P.01-P.10) from north to south (Figure 7, Figure 8).

The via del Foro colonnade did not extend along the full length of the insula. It began some 2.8m south of the lateral side of the Temple of Fortuna Augusta's podium, leaving a space between the temple's platform and P.01, a space that was at least partially paved with street-paving stones (see Figure 4). The colonnade also terminated 18.7m north of the southwest corner of the insula. Thus, the colonnade embellished 38.2m of frontage, only slightly more than half of the full length of the block, spanning the frontages of doorways VII.iv.3-11 (see Figure 7). The pillars did not quite line up with those properties' doorways. Instead, the spacing of P.01-P.07 was dictated by a regular 2.4m intercolumniation in front of doorways 3-8 (approximately eustyle). The regularity broke down in front of doorways 9, 10, and 11, where the intercolumniation of P.07-P.10 was a less regular 2.7m, 2.9m, and 2.9m from north to south.

[21] Excavation of the north and south sides of insula VII.vi by the Via Consolare Project, for instance, revealed similar modern narrow trenches cut for water and electrical lines respectively (Anderson *et al.* 2012, 22).
[22] Arthur 2019, 4.
[23] Software package used for 3D model creation was AgiSoft PhotoScan Professional (Version 1.2.6; 2016). Retrieved from http://www.agisoft.com/downloads/installer/

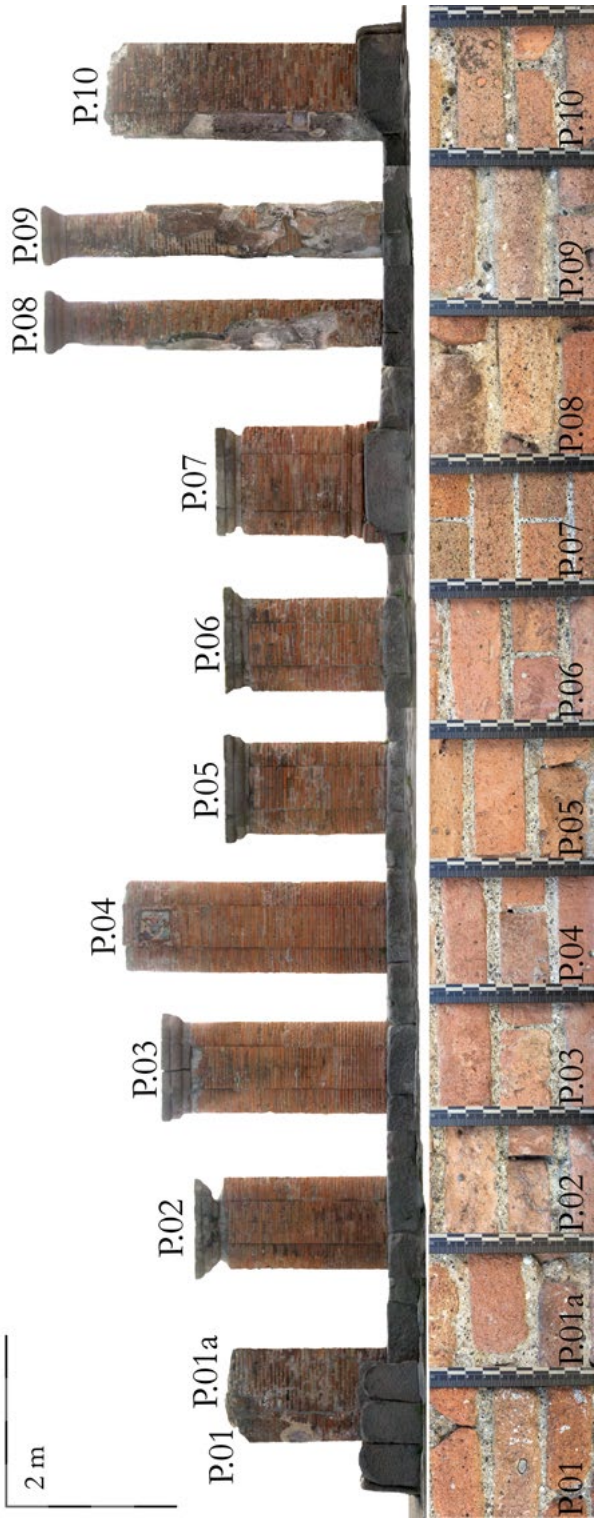


Figure 8: The via del Foro colonnade elements and mortar/construction details for each pillar-column, as labeled. Note that the first two mortar/brick images are details of the cylindrical column portion (P.01) and the western rectilinear pillar portion (P.01a) of the construction, respectively. (Illustration by C.J. Weiss)

Figure 9: P.01, the northernmost columnar element of the via del Foro colonnade, comprising a cylindrical column with rectilinear portions added to create an L-shaped pillar, with upright orthostates protecting the outer faces. (Photograph by C.J. Weiss)

The first pillar (P.01) was constructed in three parts (Figure 9). A once free-standing cylindrical column had two rectilinear elements appended to its southern and eastern sides to create an L-shaped construction that defined the northwest corner of both the colonnade and sidewalk. The cylindrical column created a smoothed corner to the bend in the L of the pillar. The northern edge of the P.01 was well aligned with the north wall of VII.iv.3, associating its construction with the property limit, and providing a northern terminus for the colonnade as a whole. The pillar stood approximately 2.8m south of the outer face of the Temple of Fortuna Augusta's podium, leaving an access route into the irregularly shaped *area privata* spaces just to the south of the Temple. The current state of the pillar makes it difficult to discern the relative order or contemporaneity of the southern and eastern additions to the construction with certainty. Each of the three parts of the pillar-column were constructed with ceramic building materials of various sizes and fabrics using mortar with an assorted aggregate mix that included large, visible lime chunks, resulting in a relatively haphazard appearance for the construction (see Figure 8). The heterogeneity was covered by plaster that masked the inconsistent materials. The whole of the pillar-column combination appears to have been constructed atop a foundation of stone and mortar—also a mix of materials—that is only just visible above modern ground level. Remnants of plaster remain on the pillar-column, with enough surviving pigment to suggest that it was at least in part painted red. A portion of the finished plaster face runs behind a mass of masonry around the norther and western faces of the construction, now obscured by plant growth, demonstrating that the plaster preceded the placement of the masonry. Cladding the street-facing sides of this masonry mass were a series of vertically oriented black lava orthostates—two on the north face, and three on the west face—that protected the less robust mortar constructions of P.01 and suggest a certain volume of traffic threatening regular wear and tear when accessing the space south of the Temple (see Figure 9).

Pillars two through six (P.02-P.06) were constructed as a matching set that created a porticus frontage for several shops at VII.iv.3-7 and the *angiportus* access alley at VII.iv.8, ending at the southern property line of a shop at VII.iv.7 (see Figure 7). Each pillar took the form of a rectangular pier of 45cm in length with an engaged half column with a diameter of approximately 57cm appended to each end. The combined construction elements resulted in

Figure 10: P.07, the pillar-column with a rectangular pedestal and more ornate purpose-made brick base. (Photograph by C.J. Weiss)

'double half-column pillars' each with a length of one meter and a width of 62cm at their widest points.[24] The half-column pillars were constructed with well-made bricks of fairly regular 3cm widths and approximately 0.7cm mortar bed joints between each course using a fine, well-sorted mortar containing consistently sized small inclusions of crushed black lava and very few large lime inclusions (see Figure 8). P.02, P.03, and P.04, the northern three double half-column pillars, are the best preserved of the set, surviving to heights of approximately 1.8m, 2m, and 2.6m respectively. Of these, the tallest (P.04) also preserves an inset square *opus sectile* plaque with a poorly preserved design in purple porphyry, green porphyry, and serpentine.[25] P.05, P.06, the next two pillar-columns, survive to a height of approximately 1.5m each, and exhibit significant damage to many of the courses of brick, the brick facing broken off to expose the masonry core within, and then repaired with modern patching and repointing. Each of the double half-column pillars was topped with a Doric capital carved from tuff to match the shape of the pillars. These capitals were replaced atop the pillar-columns in the modern day, added at to the highest surviving height of each, although P.04, as the only pillar that is preserved closest to the full height of the colonnade, did not have a capital replaced on its top. None of these pillars was plastered.[26]

Pillar seven (P.07) at a passing glance looks as though it was identical in construction to the previous five (see Figure 8). It, like its northern neighbors, was a rectangular pillar with double half-columns appended to its north and south faces, but it was distinct in several ways from the standard construction of P.02-P.06 (Figure 10). First, the rectangular portion of the pillar was 20cm wider than the others of similar form. The mismatch in size is additionally apparent from the capital replaced in the modern day on top of its surviving construction. This capital was clearly meant to top P.04 mentioned above, and not the notably wider P.07 where it sits now. Further, this pillar was constructed on a rectangular pedestal, also *opus latericium*. The brickwork of P.07 and its pedestal were 2.5cm in width set in mortar bed joints of 0.3-0.4cm between courses, creating a much tighter construction of narrower bricks set more closely than those of P.02-P.06 (see Figure 8). The mortar had a lighter base color, but otherwise used

[24] Maiuri's (1942, 177) description: 'doppia semicolonna'.
[25] Ling 1990, 58-59, 64.
[26] Maiuri 1942, 177.

Figure 11: Plaster applied to P.08 that overlies the curbstones. (Photograph by J.S. Dunkelbarger)

Figure 12: Opus incertum foundations visible below P.01-P.04, indicated with arrows. (Photograph by C.J. Weiss)

a similar admixture of aggregate as the other double half-column pillars. Most striking about the pillar is an elegantly wrought base of purpose-made bricks that Maiuri described as 'the most beautiful example of any contoured cornices in terracotta that Pompeii has given us to date'.[27] The curbing of the sidewalk in relation to this pillar also differed from the other similar pillars, with a single, large, horizontally oriented black lava orthostat fronting the street-facing side of the pillar pedestal, rising from the street surface up to the bottom of the pillar base's first torus contour.

The next two columns (P.08 and P.09) were true cylindrical columns (see Figure 8) of either Doric or Tuscan order that framed the *fauces* of the Casa di Bacco at VII.iv.10. Both were topped with Doric/Tuscan capitals carved from black lava. They were each approximately 55cm in width at their lowest point (brick core construction only), tapering to approximately 48cm at the juncture of the shaft and capitals' echinus. Their complete height of approximately 3.8m including their capitals is still preserved. These columns were also constructed in *opus latericium,* but of less fine materials than those of the pillar-columns to their north, a difference that led Gasparini to suggest that they were older than the other colonnade construction elements.[28] A selection of ceramic building materials made up the courses to much the same effect as P.01. The columns were finished with a thick layer of red-painted plaster that increased the overall diameter of the columns by an additional 10cm. The curbstones that were placed adjacent to the columns were shaped to curve around the street-facing side of the columns, respecting their placement, and making clear that the columns preceded the placement of the curbstones. The plaster on P.09, however, was added after the curbing was in place, applied to the column so that it overlay the upper surface of the curbstones next to P.09 (Figure 11).

The final pillar (P.10) aligned with the southern wall of the shop at VII.iv.12 (see Figure 7). Like its northern partner, it was L-shaped, but unlike P.01, was constructed as such from the beginning. The leg of the L that was parallel with the street had an engaged half-column appended to its northern face, matching the other double half-columns of P.02-P.07. The rest of the pillar was constructed with 90-degree corners. Only the inner, sidewalk-facing surfaces of the pillar, plus the half-column seem to have been faced with a thick application of plaster and painted red, while the street-side faces appear as though they may have been left bare deliberately. As was the case for the cylindrical columns and the northern L-shaped pillar, the ceramic building materials used for this pillar were of mixed, inconsistent sizes in a range of fabric colors (see Figure 8). The south and west sides of the base of the pillar were each clad with a single black lava orthostat, oriented horizontally, matching most closely the orthostat cladding of P.07. The curbstone at the northern end of the pillar, however, curved around the construction of the engaged column, just as the curbing adjacent to cylindrical columns P.08 and P.09 curved in respect to their placement, while the column's plaster was added overlaying both the orthostat and curbstone.

There are suggestions of earlier constructions that were superseded by the current pillar-columns. The four northern pillar-columns, P.01, P.02, P.03, and P.04, each sit partially atop the sidewalk curbstones of the sidewalk, but also appear to have been built on rough, primarily black lava *incertum* foundations that are just visible above the ground surface of the sidewalk

[27] Maiuri 1942, 177: 'da costituire il più bell'esempio di cornici sagomate in cotto che Pompei ci abbia finora dato'.
[28] Gasparini 2016, 53, n. 47.

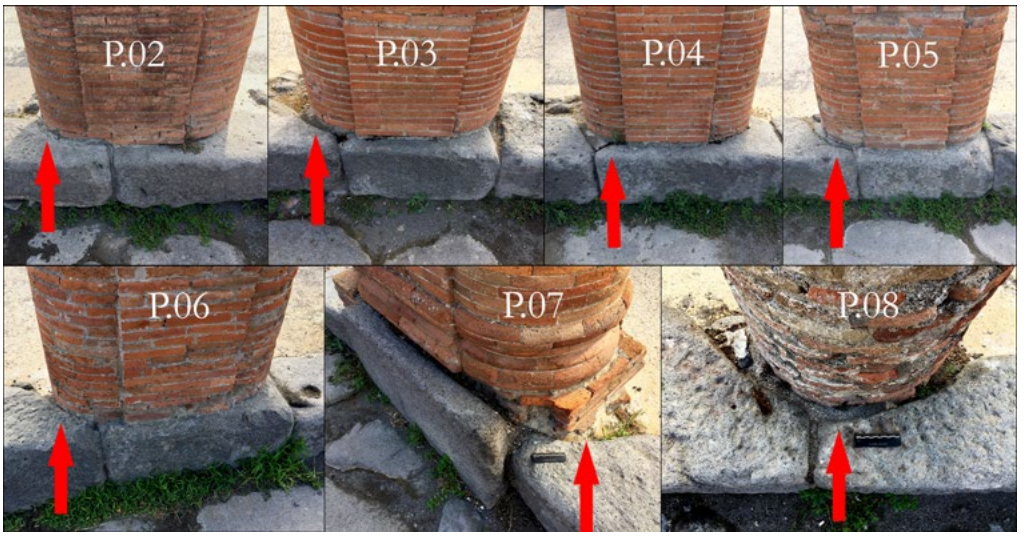


Figure 13: Evidence for the curbstones having been shaped to fit around no-longer-present cylindrical columns just visible below the later constructions of P.02-P.07, and the fully worked curbstones curbing around P.08 for reference. (Photographs and illustration by C.J. Weiss)

(Figure 12). The pillar-columns were aligned over top of these foundations; only P.02 comes close to being centered atop the rough masonry on which it was built, suggesting that they were not foundations constructed specifically for the pillar-columns, but rather were reused to support them, if only partially, and perhaps only by happenstance. The visible portions of the foundations do not have consistent dimensions, ranging between approximately 1.4 to 1.5m in length and 0.4 to 0.5m in width, nor were they equally spaced, insofar as can be discerned from the remains visible above modern ground level.

The curbstones lining the colonnade's sidewalk also show evidence of possible structures that were removed or replaced by the current arrangement. P.02, P.03, P.04, P.05, and P.06 each were constructed partially over the sidewalk curbstones, but where the northern side of each meets one of those curbstones, the curb's inner face appears to be shaped to respect the placement of a column in the same way that the curbstones associated with P.08 and P.09 were worked to curve around the columns (Figure 13). The same form is apparent on the southern side of P.07, curving around the rectilinear base of that pillar-column. It is possible that these worked curbstones indicate that a true colonnade of cylindrical columns preceded the pillar-columns. Indeed, the spacing of these features allows for regularly spaced columns approximately every 3.5m, the same spacing between P.08 and P.09. The full length of this hypothetical earlier colonnade would not have been entirely consistent, however. Between the curbstone curves under P.06 and P.07 is a gap of approximately 4.3m, perhaps allowing wider access to the *angiportus* at VII.iv.8 between the columns framing this alleyway. The worked curbstones suggest that a full colonnade could have run along the sidewalk, including P.09 and P.08, the Casa di Bacco columns, and the column embedded within P.01.

Notably, the much wider southern three commercial spaces of the west face of the insula (VII.iv.12-15) had no colonnade embellishing the sidewalk that ran across their fronts (Figure

Figure 14: The southwest corner of insula VII. iv, showing both the low tuff curbstones and the regular brick quoining of the shops at doorways 12-15. (Photograph by C.J. Weiss)

14). Low, tuff curbstones, set back behind the line of the colonnade, defined the sidewalk's outer edge along this southern portion of the city block. The curbing began at the southern property boundary of the Casa di Bacco's frontage where the sidewalk width had a notable jog and where the use of black lava for the curbing ended and tuff stones began. This shift in material and sidewalk alignment marked out the shops at the end of the block as a distinct construction, and therefore perhaps under separate ownership. The construction of the shops themselves was also distinct from the properties to their north. These shops' walls were constructed in *opus incertum* with substantial *opus latericium* quoins of eight course toothing that continued on the south face of the insula to include all the frontages through VII.iv.20, visually connecting the frontages of the southwest corner of the insula, and suggesting a single construction for these properties, and likely separate ownership from the other properties under scrutiny here.

Past attempts to phase the colonnade

While Della Corte regarded the colonnade to be a single construction, as discussed above, Maiuri identified two phases for the structure.[29] The first phase included four of the current arrangement of elements: P.01 and P.10, the most northern and southern pillar/columns, as well as P.08 and P.09, two cylindrical columns in front of the Casa di Bacco (VII.iv.10). He assumed that the whole of the colonnade must have been a complete set of cylindrical columns, beginning at the south with the L-shaped pillar and running along the same portion of the street with its wider sidewalk. In his view, the colonnade was constructed by Marcus Tullius in conjunction with the Temple of Fortuna Augusta, and therefore contemporary with it. Maiuri believed that many of these columns fell during the earthquake of AD 62, requiring a second construction phase that saw the replacement of the fallen cylindrical columns with six

[29] Maiuri 1942, 177.

double half-column pillars, P.02 through P.07, while P.08 and P.09, the Casa di Bacco columns, remained standing. Maiuri took the earthquake as the reason for the addition of support piers on P.01, the northernmost column, as necessary to shore it up after its seismic shake, which resulted in its current, L-shaped form.

Ball and Dobbins subscribe in large part to Maiuri's phasing, but also expanded upon it.[30] They postulated that a full colonnade of cylindrical columns, including cylindrical column portion of P.01, *predated* the construction of the Temple of Fortuna Augusta, starting from and including P.10 and running north. They assert, however, that the colonnade continued further north than its current endpoint, terminating instead where the northwest corner of the insula would have been prior to the temple's construction. The complete colonnade in their view would therefore have had 13 elements in total: 11 cylindrical columns between framing L-shaped engaged column-piers with the three northernmost elements located in the space that is now occupied by the projecting stairs of the Temple of Fortuna Augusta. They suggested that P.10, the southernmost L-shaped pillar that currently serves as the terminus of the colonnade at the Casa di Bacco property boundary, should be included in this initial phase, and that it would have had a twin at the northern end of the colonnade. P.01, the current northernmost column, in their view was originally the fourth element and third cylindrical column from the north end of the colonnade, and was only given its L-shaped form to match P.10 when the temple's construction destroyed the northern part of the colonnade, recreating (quasi-)mirror image L-shaped framing elements at either end of the shortened colonnade after the Temple's placement. They propose that the changes evident in the colonnade demonstrated how much modification was necessary to the surrounding buildings to successfully insert the temple into the existing urban fabric. Their third phase for the colonnade adhered to Maiuri's second, in which they too proposed that the earthquake of AD 62 caused the collapse of six cylindrical columns, replaced by double half-column pillars.

From these detailed observations of the construction of the colonnade given in the previous section above, however, it is clear that the structure was not a single-phase construction, as Della Corte believed, and is likely to have had a more complex building history than either Maiuri or Ball and Dobbins advocated. The remains as they survive today allow for several possible phasing scenarios, which complicate attributions of property division and especially ownership.

Possible colonnade phasing

As Maiuri first suggested, the earliest still-surviving elements of the colonnade must be P.08 and P.09, the two columns that front the Casa di Bacco. While these columns are often considered to be the oldest parts of the colonnade because of their irregular—which is therefore equated to 'more primitive'—construction materials, their unsophisticated construction is not the reason for their greater age.[31] There are two more reasonable indications of their earlier construction. First, they do not align with the Casa di Bacco's *fauces* walls, suggesting that they may have responded to an earlier arrangement of the Casa di Bacco's frontage. Second, the columns predate, or were contemporary with, the addition of the curbstones that were shaped to curve around the columns' bases. In contrast, many of the other colonnade elements, especially the

[30] Ball and Dobbins 2017, 491.
[31] Gasparini 2016, 53, n. 47.

double half-column pillars, were built on top of the curbstones, therefore clearly post-dating the placement of the curbing. These observations result in a couple of possibilities for the early form of this portion of the colonnade. Columns P.08 and P.09 could have stood alone, creating a column-framed porch in front of the residence's primary entrance, marking out that entrance on an important street, which is a common feature of buildings in other Roman cities, especially Ostia. At Pompeii, however, there are only a very few examples of houses that had such framing elements in front of their *fauces*, including I.xxi.2, the house that connected to the Garden of the Fugitives, which had a pair of Sarno stone and *opus mixtum* Doric columns constructed in front of the house's façade. In addition, a few houses had engaged columns framing their entranceways, such as VI.xvii.36 and II.iv.6, which created a similar visual effect but without taking up any space of the sidewalk. Of note, both of the latter two properties' engaged columns were constructed in *opus latericium.*

P.08 and P.09 could also have coordinated with additional colonnade elements in their first phase. P.10, the single-construction L-shaped pillar, seems the most likely element to have been built together with the Casa di Bacco columns, based on several points of evidence. First, the curbstone adjacent to P.10 was worked to curve around the pillar's construction in the same way that those adjacent to P.08 and P.09 did, demonstrating that this pillar also predated or was contemporary with the curbing. It is possible (although entirely hypothetical) that there could have been a second L-shaped pillar matching P.10 aligned on the northern limit of the Casa di Bacco's property, creating a four-element porch in front of this house's entrance. Such a porch would have regularized an otherwise very irregularly shaped frontage and would have highlighted the entrance to the domestic property and the shops that flanked its *fauces* tucked in between the many commercial spaces around them. Although porches of this type were exceedingly rare in Pompeii at the time of its destruction, their rarity seems to have been peculiar to Pompeii. Frontage embellishments of this nature were more common in Herculaneum where several private houses added short colonnades or porches to their entrances of exactly this type.

An alternative scenario, as suggested in part by both Maiuri and Dobbins and Ball, is that P.08 and P.09 were two surviving columns of a full cylindrical colonnade that ran the length of this segment of the via del Foro. The curbing adjacent to the colonnade, as noted above, exhibits working that could be the result of the stones having been shaped to fit around cylindrical columns (see Figure 13). The colonnade (and perhaps its curbing?) could either have terminated at the same point to the north that it does now, or it could have continued up the length of the insula to the corner prior to the interruption of the temple's porch construction, but there is no evidence to support or refute either scenario. Regardless, curbing was added to the arrangement of colonnade elements, whatever number and shape they took.

It is also possible that the colonnade was always made up of separate, but coordinated, groupings of columns fronting smaller portions of the insula. Evidence for a second grouping may be the masonry foundations below P.01, P.02, P.03, and P.04 in front of the shops at VII.iv.3-5. These foundations could be the remains of support structures for a four-element porch that fronted the northern properties. The masonry of these foundations was built up against the back side of the curbstones, and therefore post-dated the curbing, complicating the phasing of the curbstones and columnar elements. Perhaps this northern four-element porch and the Casa di Bacco's four-element porch, proposed above, were joined by two

intervening columns or pillars between the two porches (for which, it should be noted, there is no supporting evidence). A piecemeal colonnade with distinct sub-groups of columns or piers would have unified the insula frontage while also distinguishing various properties in a construction method similarly employed within Pompeii's forum itself. That is, although the eastern side of the forum was fully colonnaded in its last phase with a continuous columnar screen, that colonnade was made up of four distinct subsets of columns, each related to a specific monumental building that was constructed along that side of the forum. The various colonnade groups supported the different façade elements of these buildings, whether open galleries, enclosed second stories, or two-story rises. The various portions of the via del Foro colonnade, like the forum, would have had to synchronize and cooperate with their neighbors, resulting in a coordinated presentation, if different from one part to another.

A colonnade along the north side of the Porta Marina provides a comparison. This colonnade was more complicated than that along the via del Foro. It was made up of 12 elements in three sub-groupings of columns and piers: an engaged rectangular pier and four cylindrical columns, all in *opus latericium* began the line at the west, followed by three rectangular piers, also in *opus latericium*, and then three, more substantial cylindrical columns of *opus latericium* constructed over monolithic column drums in worked black lava stone. Each group of these colonnade elements adorned the frontage of a different property, but all clearly cooperated with one another across the various property divisions. A second example comes from Herculaneum, adding a comparison beyond the walls of Pompeii. Just like the via del Foro in Pompeii, the Decumanus Maximus at Herculaneum was lined with a colonnade along the north side of its length.[32] Also constructed in *opus latericium*, this colonnade comprised 20 elements and appears at a glance to be a homogenous series of columns, but that impression dissolves immediately on closer inspection. Rather than a line of perfectly matching columns or piers, the colonnade was instead a mix of cylindrical columns, double half-column pillars, single half-column pillars, and rectangular piers in subgroupings of various number and type. Much like the relationship of Pompeii's via del Foro colonnade to the monumental arches at either end of the street and the Temple of Fortuna Augusta, Herculaneum's Decumanus Maximus colonnade ran between a four-way honorific arch at the entrances to the so-called Basillica and the monumental entranceway for the 'upper Aula' of the Palaestra,[33] but was not constructed with or as part of these public monuments. Instead, it adorned the frontages of a collection of shops, smaller properties, and a grand private house, all with direct access to a street of great public significance.[34] The Herculaneum colonnade also carried a projecting second story, the exterior wall of which has been reconstructed in the modern day. The projecting second story likely would have extended west to include an L-shaped single half-column pier with a Doric capital but with no matching L-shaped single half-column pier at the east end. Instead, the next three elements were cylindrical columns, followed by a double half-column pier, then a column, another double half-column pier, and finally the line was concluded with a single half-column pier, all built with similar materials and then plastered. From the examples that the via Marina and Decumanus Maximus colonnades provide, it seems certainly possible, perhaps even common that multiple property owners could and

[32] Thanks to James Andrews for recalling and reminding me of the similarity of this colonnade at Herculaneum.
[33] Wallace-Hadrill 2011b, 141.
[34] Wallace-Hadrill 2011a, 238. The number of properties remains undetermined because these properties have not been excavated. The scarp of unexcavated material begins just inside the façade line of the insula, making assumptions of property divisions ill-conceived.

did coordinate different constructions on their frontages for shared but distinct urban appearance. The regular use of different construction materials for sidewalk curbstones along different property frontages reinforces this likelihood.[35]

As for Maiuri's second and Ball and Dobbins' third phase, there is no direct evidence that the colonnade suffered damage from the earthquake. Maiuri's supposition that P.01, the northernmost colonnade element, required shoring up with additional masonry because of seismic damage is a reasonable suggestion, but if the rest of the colonnade was to be replaced with the much more ornate double half-column pillars, it seems unlikely that the first element of that line would have been excluded from the reconstruction effort, even if it remained standing through the earthquake. The earthquake is a convenient, often over used event to blame for any mismatched construction that has no other clear cause for its inconsistency, especially when that construction involves the use of brick.[36] Without supporting evidence of damage or datable material, post-earthquake reconstruction is too convenient. Although possible, unless additional evidence is found through excavation, connecting the construction of the double half-column pillars with post-earthquake recovery, it should not be assumed that the change in the colonnade was a result of earthquake damage.

Whatever the arrangement of colonnade elements may have been that fronted the sidewalk in an earlier phase, these elements are instead more likely to have been replaced with the final double half-column pillar construction as a result of some other stimulus than the earthquake. Whether that stimulus was changing taste, or the desire to increase the curb appeal of the adjacent properties, other substantial construction and refurbishment projects, including the construction of the Temple of Fortuna Augusta, would have given ample reason for property owners to want to take advantage of the improvements made in their vicinity at that time. Those improvements may have included alterations to the via del Foro shops. The solid, high-quality construction of the pillar-columns suggests that they were load-bearing, constructed to address a need for more substantial support, perhaps turning a simple overhanging roofline supported by columns into a more involved projecting second story or balcony that extended over the space of the sidewalk. It is clear that most northern shop (VII.iv.03) had an upper story, as demonstrated by a surviving stair base preserved within the property and an independent upper story apartment entrance stair two doors down (VII.iv.05). It does seem, however, that P.02-P.06 are most likely to have been constructed by a single property owner because they are identical constructions.

The columnar elements that do not match their neighbors are those that were constructed where property lines may have intersected and therefore where there may have been contested control or ownership. P.07, the single, wider, much more ornate pillar-column, for instance, was constructed at the intersection between the Casa di Bacco's northern property line and the southern line of the *angiportus* at doorway VII.iv.8. This pillar-column fits with none of the other subsets of columns, posing a problem for grouping its construction and phasing in relation to the others. It could have been the first of the double half-column pillars constructed, followed by less elegant versions to the north on account of cost cutting, or it could have been an upscale replacement for a pillar-column that had matched those to the north. Perhaps it was the final loadbearing pillar that did the double duty of carrying the southern

[35] Saliou 1999, 204.
[36] Esposito 2019, 169.

end of a projecting second story over the wide space of the *angiportus*, as well as carrying the northern end of the Casa di Bacco's roofline, necessitating the heft of its construction. It is certainly a unique feature amidst the other elements of the colonnade, but it was not alone in its difference from the other elements. At the northern end of the colonnade, P.01 may also have split the property lines of the shop at VII.iv.3 and Marcus Tullius' *area privata* at VII.iv.2. Although the cylindrical column that the L-shaped construction of P.01 contains may have been part of an earlier, no longer surviving set, in its final form, it is poorly matched to any of the other elements, including its supposed mirroring element, P.10, the other L-shaped pillar. Perhaps in the case of both of these elements, their difference is reflective of conflicting opinions or ideas of the neighboring property owners about how each construction should be handled. The difference in their constructions in comparison to the other surrounding elements could be the result of neighborly cooperation, if not quite agreement.

Conclusion

The via del Foro colonnade presents a complicated urban construction that belies its first-glance impression. It has been interpreted in a number of ways, considering evidence that goes beyond, and often ignoring, the evidence of the pillars themselves. Although giving close attention to the constructions does not present clear phasing, nor answer the question of who owned the colonnade and the surrounding properties, the evidence does point toward a much richer history for cooperation between property owners and neighbors than a more simplistic association of the whole northwestern corner of the insula with Tullius' adjacent temple. Properties across the whole of Pompeii, perhaps especially in insulae of more irregular shape, exhibited clear signs of alterations in the constructions that they shared with their neighbors as each flexed or contracted with changing fortunes, exchanging land back and forth. At the boundary between the Casa della Parete nera and Casa delle Forme di Creta, Della Corte's insistence that 'the reciprocal recessions and protrusions of the communal intermediate dividing wall' should indicate a requirement of single ownership of both properties is, frankly, ridiculous.[37] These two houses, which have only a distant relationship to the via del Foro colonnade, become an excellent example of urban cooperation. The colonnade itself is another example, brought out to the edge of the sidewalk, signaling the seriousness with which multiple property owners who may have had control of a smaller portion of the space took the presentation of their collective frontage, but who also wished to maintain and show their individuality. At this location in the city, with a temple and the forum on either end of this insula façade, capitalizing on the importance of the setting with a grander frontage presentation would be all the more vital for several smaller buildings. In this way, the colonnade demonstrates the will of people who were individually much less influential than Marcus Tullius, but who collectively could affect their self-presentation within the city in a public, recognizable way.

It is possible, however, despite the interpretation(s) put forth here, that the whole colonnade and the adjacent properties on the via del Foro could have once been owned by Marcus Tullius at one time. If indeed the colonnade once comprised a line of matching columns with curbstones shaped to fit around their street-facing side, maybe it was this phase that Marcus Tullius owned the complete set and the properties to which they joined. The variations in the

[37] Della Corte 1965, 122: 'fra le case stesse, le reciproche rientranze e sporgenze del comune muro intermedio divisorio'.

elements in their last phase, however, would need to be explained. Perhaps Tullius, facing the twin threats of declining health and waning fortunes,[38] planned for the future by parceling out his landholdings, selling off portions of the properties along the via del Foro in anticipation of his constructing the Temple of Fortuna Augusta, which he then bestowed upon the city. Not retaining ownership of all the street-facing properties may have been the reason for his need to install the *cippus* in front of the access point to the spaces at the south of the temple, asserting his retention of the *area privata* (or at least its control) between the religious land of the temple and the shops that he also no longer owned. While the benefaction may have taken care of his legacy immediately following his death, since the *decuriones* of Pompeii granted him space outside the Porta Stabia for a *schola* tomb, perhaps in thanks for his gift, that notoriety seems not to have persisted. When discovered, ancient debris covered the *schola* tomb, demonstrating that it was no longer maintained by the time of Vesuvius' eruption.[39] The substantial affluence and notoriety that Tullius enjoyed at the height of his career seems not to have continued long after his life, if the state of his *schola* tomb is any indication.

The via del Foro colonnade should therefore not automatically be credited with Tullian ownership for its entire existence because of convenient circumstantial evidence, any more than we should look for a house owned by Eumachia in the immediate vicinity of the insula on which she constructed her eponymous building. While 'Porticus Tulliana' is certainly an expedient and enticing identifier for the via del Foro colonnade, evoking a story of a long and glorious continuous inhabitation of the area by the *gens* Tullii, culminating in Marcus generously ceding a portion of his considerable landholdings over to the city, either from the euergetistic goodness of his heart or to make a visible urban mark in direct competition with his contemporaries, it is nonetheless a likely fiction. The construction of the elements that make up the colonnade demonstrate that it had a much more complex history of changing form than any suggested in the scholarship to date. The information that the structure holds, even without excavation, is enough to suggest the influence of several property owners over a period of time. Disentangling ownership of the Porticus Tulliana from the purported Tullian family residence because of its proximity to the Temple of Fortuna Augusta should be an easy response to this evidence presented by the colonnade itself. Until clearer evidence is found through excavation that connects Tullius with the ownership of the additional properties around the Temple of Fortuna Augusta, the colonnade should remain only the via del Foro colonnade.

Acknowledgements

This paper found its genesis during my dissertation defense in April 2018. John Dobbins, who was, as for all contributors to this volume, my advisor and chair of my dissertation committee, brought up the via del Foro colonnade in reference to changes in the urban layout and their effects on the changes to connectivity of sidewalks in Pompeii. From our discussion, it was clear that John and I did not share a common vision of the phasing and construction history of the colonnade. When it became clear that a *Festschrift* would be one of the ways that his students honored his career and retirement, I took the opportunity to engage more closely with the remains of and extant research on the colonnade, knowing especially how much John appreciates scholarly disagreement and discussion. In addition, as I have always been a strong

[38] Castrén 1975, 231.
[39] Emmerson 2010, 79.

proponent and practitioner of the technique of 'close looking' that John teaches and on which much of his research rests, the colonnade was a perfect subject on which the technique might be deployed, since excavation was not possible for this paper. Thus, the current work honors John's professional interests in many ways, as an application of his methods, an emulation of his love of reappraising the available evidence and accepted interpretation, and a direct address of some of John's own published work.

Abbreviations

CIL *Corpus Inscriptionum Latinarum*. 1853-present. Berlin: Akademie der Wissenschaften.
MB *Reale Museo Borbonico.* 16 volumes. 1824-1857. Naples: Stamperia Reale.

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Drain Outlets and the Pompeian Street: Evidence and Meaning

Janet S. Dunkelbarger

Abstract

This paper addresses one aspect of urban waste management in ancient Pompeii: the drain outlets that connected the internal drainage systems of the city blocks to the urban drainage network of Pompeii's streets. Drain outlets were located either cut through the curbstones that line the city streets or as perforations through the external walls of the buildings, marking the point at which the drainage systems of private properties met the drainage system of the city as a whole. The evidence of these drain outlets demonstrates the potential applicability of extant Roman law to urban behaviors in Pompeii and reveals how the structure of Roman law allowed for the people of Pompeii—the local officials, property owners, and members of the community—to become active participants in the making of their city. The evidence to support this was collected during a survey of Pompeii (a sample of the excavated streets), resulting in the identification of 855 drain outlets. Drain outlets were ubiquitous throughout Pompeii and are representative of Pompeii's specific situation and approach to water and waste management. Connected to cisterns, downpipes, decorative water fountains, and industrial installations, drain outlets were an integral part of Pompeii's water and waste management systems, and an important component to understanding the scope of the city's water collection, storage, supply, and uses in the activities of daily life. Their evidence indicates that drain outlets were designed to facilitate the flow of water out of the city along the city streets and were placed to avoid flooding the street in front of one's property. Based on the evidence of drain outlets in Pompeii, it would appear that Pompeii's drainage was influenced by contemporary Roman law and that the people of Pompeii were active agents in the making of their city.

Keywords

POMPEII; DRAINAGE; WASTE MANAGEMENT INFRASTRUCTURE; URBANIZATION; ROMAN LAW

Introduction

By no means an attractive topic, waste management is nevertheless important to the discussion and study of antiquity. A settlement, city, and civilization cannot survive if it does not eliminate its waste, whether the runoff from a rainstorm, the byproducts and pollution from daily life and economic activity, or human waste. Indeed, waste management tells us much about social mores, legal and political systems, urbanism, and communities of the past. Therefore, understanding the waste management system engineered by a group of people is essential to understanding their values, as it allowed for the flourishing of daily life and culture.[1]

Drainage, the removal of water and waste from an established settlement or city, is an essential element of infrastructure, the use of which is necessary to avoid sanitation problems for a settled population. A settlement's drainage method is determined in part by its age,

[1] Wilson 2000a, 151.

topography and geology, and density of settlement.[2] Changes to a settlement prompt changes in how that settlement manages its waste. Increased population, increased area of a settlement, and denser building construction reduces the amount of absorptive ground and increases the amount of water supplied to and used by a settlement.[3] These conditions increase surface runoff and require greater drainage system capacity, therefore requiring new or adjusted drainage mechanisms. Drainage in the cities of the Roman world was managed initially with simple individual conduits leading to cesspits, to the open street, or to an open channel in the street surface, but evolved over time to become more enclosed and integrated systems under the street surface. These changes were necessary to cope with increased urbanism, such as the runoff from public buildings, the volume of water from public baths, and the excess water from water displays and piped water to homes.[4] Underground drainage and sewerage systems at Roman settlements emerged beginning in the 1st century BC at Merida,[5] Toulouse,[6] and Sagalassos,[7] and became prevalent by the 2nd century AD, perhaps reflecting a changing cultural preference, demonstrated by the frequency of pre-existing and *ex novo* sites being equipped with underground sewers beginning in the Imperial period.[8]

At Pompeii in AD 79, drainage via an integrated, enclosed, underground system, like those known elsewhere in the Roman world, was not yet fully established. Instead, Pompeians relied on cesspits to manage solid waste, particularly human waste, in part because the city's porous, volcanic subsoil made it suitable for the leaching of any liquid from the deposited waste.[9] Although not without their drawbacks, cesspits may have contributed to a more hygienic living environment, with the mouth of the cesspit sometimes located outside of the house, such as in the garden or property-adjacent sidewalk, while the lack of direct sewer connection prevented the admission of foul stenches and vermin into a property.[10] Drainage of rainwater, overflow water from fountains and cisterns, and other wastewater, however, was managed by using the natural gradient of the site and the street surfaces, which acted as the primary water drainage conduits of the city.[11] The design of the internal drainage infrastructure of Pompeii was influenced by the city's urban architecture. Most properties had drainage systems that collected water from the back of the property to the front, with a drain outlet to the street placed somewhere along the front façade. Drainage systems of atrium-peristyle houses, for instance, were constructed to collect rainwater from the roof, diverting it either into underground cisterns for later use, and then channelling unwanted or excess water through drainage channels to the front of the property and out onto the street (Figure

[2] Jansen 2000a, 37; Jansen 2011, 71; Koloski-Ostrow 2015, 63, 75; Wilson 2000a, 151, 169.
[3] Jansen 2000a, 41; Wilson 1997, 201.
[4] Jansen 2000a, 38-42.
[5] Elsitdie *et al.* 2008, 251-62.
[6] De Filippo 1999, 235-64.
[7] Martens 2006, 165-71.
[8] Köhler 2011, 121-22; Koloski-Ostrow 2015, 66, 77; Radbauer 2011, 122; Radbauer and Kunst 2011, 18; Radbauer and Petznek 2011, 97; Wilson 1997, 211; Wilson 2000b, 307, 310; Wilson 2008, 311. On one of the first studies of Pompeii's waste management systems, see Mygind (1921).
[9] Jansen 2000a, 38-42; Jansen 2000b, 278; Jansen 2002, 62-63; Jansen 2007, 262; Jansen 2018, 7; Koloski-Ostrow 2015, 75, 81; Scobie 1986, 408-14.
[10] Camardo *et al.* 2011, 76; Scobie 1986, 408-14.
[11] Eschebach *et al.* 1995, 8-13; Jansen 2000a, 38-41; Jansen 2002, 72; Jansen 2011, 76-77; Koga 1992, 57-59; Koloski-Ostrow 2015, 75-76; Poehler 2012, 97-99.

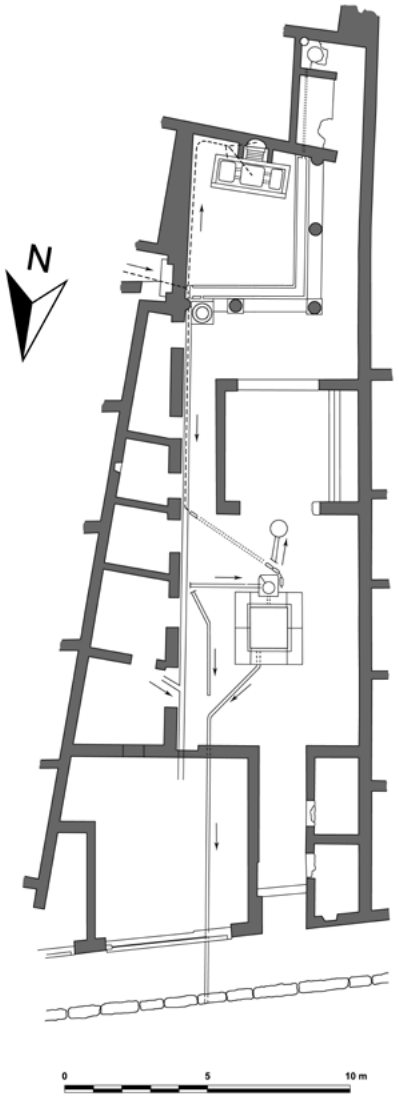

Figure 1: Plan of the Casa del Granduca (VII.4.56), illustrating its water features and organization of drainage systems. Piped water supply is indicated with a dashed line. Drainage channels indicated by solid, parallel lines. (Drawing by D. Weiss, after Sear 2004, fig. 2)

1).[12] Once discharged from the insulae and into the streets, overflow and wastewater were deliberately distributed to avoid concentration in any one part of the city.[13]

Pompeii had limited sewer networks, constructed primarily in association with large, public buildings that would have generated a lot of wastewater, such as the Forum Baths and Stabian Baths, or buildings that created significant runoff, such as the forum.[14] These sewers, built sometime in the 2nd century BC, also accepted street-surface runoff from public fountains and other buildings at particular locations.[15] To the extent that Pompeii employed sewers, however, they were fragmented, planned in connection to the construction of these public structures. With the addition of the Serino aqueduct and increased urbanization in the 1st century BC, street surface drainage was modified with the construction of 'Water Management Mechanisms' to mitigate the effects of increased water volumes and surface runoff.[16] Depending on the location, surface drainage would be directed to exit the city through city gates, drains next to city gates, or via the few underground sewer systems that evacuated through the city walls. Pompeii's drainage system in AD 79, therefore, consisted of two parts—the internal drainage systems of properties of the insulae and the external drainage system of the city–connected by the construction of drain outlets that linked the internal and external drainage into one system. These drain outlets are the focus of the current chapter.

Roman drainage: legal framework

The design of Pompeii's drainage system, comprising insula drainage systems and

[12] Jansen 1991, 147-50; Jansen 2002, 63, 70-71; Jansen 2007, 258-59.
[13] Jansen 2000a, 40-41; Jansen 2007, 259-64; Poehler 2012, 99-104; Scobie 1986, 409.
[14] Eschebach *et al.* 1995, 141-47; Jansen 2000a, 38-42; Jansen 2018, 11; Koloski-Ostrow 2015, 76; Poehler 2012, 95, 105.
[15] Arthur 1986, 37; Jansen 2000a, 40-41; Jansen 2002, 67-68, 70-73; Jansen 2007, 264; Poehler 2012, 107-08, 115-16.
[16] Poehler 2012, 99-104, 114-15.

the urban street surface drainage network, may have been affected by contemporary laws and the responsibilities of local government officials as we understand them from the legal documents of the broader Roman period. Building regulations that dictated methods of installing a drainage system in one's property or for integrating that private system with the public drainage of the city do not survive. Instead, the Roman legal codes provided a means of responding to potential outcomes or consequences of drainage, especially for those elements that were involved in Pompeii's particular drainage infrastructure system in which wastewater from private properties was evacuated into the public city street using sidewalks and curbstones.

According to the text of the 1st-century-BC *Tabula Heracleensis* (an inscription on two bronze tablets preserving municipal laws from the Republican period of Rome, found near Heraclea in southern Italy), the city *aediles* (local officials) were responsible for enforcing the maintenance of Rome's streets, including their paving, drainage, and cleaning, delegating the actual maintenance to property owners, public slaves, or criminals.[17] The text records that property owners were responsible for the maintenance of the 'footpath' and up to half the width the street in front of their property.[18] In addition to delegating responsibilities for urban maintenance, the *Tabula* also prohibits the flooding of the street in front of one's property, resulting in standing water that could inhibit the use of the road.[19] In this way, the city charter protects individuals' rights to access public spaces. As defined (and protected) in the precedent law of the 6th-century-AD *Digest*, public spaces included roads, footpaths, fields, the sea, seashore, and air, and were available for use by all.[20] Anyone denied access to public spaces could sue for *iniuria* (injury), through the law of *delict*, because hindering another from using and enjoying public space was, in a sense, an insult to one's rights as a citizen.[21] *Delict*, specifically *damnum iniuria datum* (loss from damaged property), could also be invoked against someone who enjoyed their own property to the detriment of another's property or enjoyment of that property, for example by smoke, fire, water, or other structural damage.[22] The law provided for the compensation of the value of the property to the owner should it be damaged, a protection known to have existed prior to the 1st century BC.[23]

Although none of these surviving legal documents were from Pompeii specifically, the laws that they preserve may have applied or existed in a similar form in Pompeii. If these kinds of laws did exist in Pompeii, property owners likely took care in how their wastewater exited their property and behaved in the street, a concern that would have been built into the design of their drainage and drain outlets. Ideally, to avoid potential legal ramifications, wastewater

[17] *Tabula Heracleensis* II.20-28, 32-45. See Crawford (1996, 355-91) and Johnson *et al.* (1961, 93-97). See also: Geertman 2007, 91; Jansen 1991, 158-59; Jansen 2011, 77; Koloski-Ostrow 2015, 81; Scobie 1986, 412; Wilson 2000a, 170; Wilson 2000b, 307, n. 7; Wilson 2008, 311. On the use of condemned criminal and public slaves, see Pliny the Younger (*Letters* 10.32). On the existence of public officials directed to carry out the works of the *aediles*, see Cassiodorus (*Variae* 3.30). For a similar provision that exists in the Urso Charter (*Lex Coloniae Genetivae* 77), see Crawford (1996, 393-454).
[18] *Tabula Heracleensis* II.20-55. See Crawford (1996, 355-91).
[19] *Tabula Heracleensis* II.20-23. See Crawford (1996, 355-91).
[20] *Digest of Justinian* 43.7.1, from Pomponius, *Sabinus* 30; *Digest of Justinian* 43.8.2, from Ulpian, *Edict* 68; *Digest of Justinian* 43.8.3, from Celsus, *Digest* 39. See also Crook (1967, 140). For an earlier definition of roads as public space in the 1st-century-AD Urso Charter (*Lex Coloniae Genetivae* 78-79), see Crawford (1996, 393-454).
[21] Sirks 2015, 254-63. See also: Buckland 1939, 318-26; Buckland and Stein 1975, 585-87; Kolbert 1979, 67.
[22] *Digest of Justinian* 9.2.30.3, from Paul, *Edict* 22; *Digest of Justinian* 47.10.44, from Javolenus, *Posthumous Works of Labeo* 9. See Sirks (2015).
[23] Sirks 2015, 258-59. See also: Buckland 1939, 323-26; Buckland and Stein 1975, 585; Crook 1967, 162; Kolbert 1979, 83.

Figure 2: Map of Pompeii, with streets included in the survey denoted in white, and those excluded denoted in red. (Map by C.J. Weiss)

Figure 3: Example of curbstone drain outlet (from shop VII.2.40) with clear path from the threshold and through the sidewalk to the curbstone. (Photograph by J.S. Dunkelbarger)

should not have been allowed to flood the street–a public space–and should not have caused harm to another's private property or to that owner's enjoyment of his property, for example by flooding or structural damage. Therefore, to determine the extent to which these kinds of laws may have existed in Pompeii, we must turn to the evidence of drain outlets along the city streets of Pompeii, which demonstrate drainage in practice.

Surveying and documenting Pompeii's drain outlets

A survey of the drain outlets on the street frontages of those areas of ancient Pompeii that were accessible to the tourist public was conducted between 2010 and 2019 (Figure 2). Drain outlets were identified by examining the thresholds of properties, the exterior walls of properties, and the curbstones that lined the streets and sidewalks surrounding the city blocks. Drain outlets to the street were most often easily identifiable as a cut into a curbstone (Figure 3). These curbstone drain outlets were sometimes accompanied by exposed drainage channels in the sidewalk, under the threshold, or in the wall. The frequent association of these features also allowed for more confident identification of curbstone drain outlets when curbstones were badly damaged or eroded.

Each drainage feature was recorded, given a sequential number, related to a property address, and described, including drain outlet material(s), shape (see below), size, physical location, and location in relation to surrounding architecture.[24] Confidence values were also given to each drain outlet, classified as: 'Definitely', 'Definitely_Maybe', 'Maybe', 'Maybe_No'. These descriptive categories were assigned respective numerical values of 1.00, 0.75, 0.50, and 0.25 in order to calculate numerical value for the 'degree of certainty' in the identification of these features. The features were recorded on a map, providing a more specific location for each example. These records were subsequently digitized in ArcGIS, and then joined to preexisting shapefiles that allowed for the attribution of a category of property type to each drain outlet.[25]

As mentioned, the shape of each drain outlet was recorded, which resulted in the identification of 13 discrete curbstone drain outlet shapes. These shapes include: Circular, Ovoid, Gap, Rectangular, Trapezoid, Rounded Triangle (concave), Rounded Triangle (convex), Triangular, Semi-Circular, Tear Drop, T-Shaped, U-Shaped (down), and U-Shaped (up) (Figure 4). Circular drain outlets were, as the name suggests, circular, although not perfectly so, and were carved through and entirely contained by the curbstone or between two curbstones (Figure 4a). Ovoid drain outlets were more elongated (Figure 4b). Gap drain outlets were formed by a larger space between two curbstones (Figure 4c). Gap drain outlets were more often identified, not by a specific shape in the curbstone, but by a drainage channel visible exiting from the insula architecture, through the sidewalk, to a gap between two curbstones. Rectangular drain outlets were cut to have square edges (Figure 4d). Some examples of Rectangular outlets retained sharp lines and edges, possibly indicating it had been cut shortly before Pompeii's destruction and had not yet been subject to much erosion. Trapezoid drains may have been cut as Rectangular drains, but with time, the top of these outlets eroded to create a trapezoidal shape (Figure

[24] Many thanks to Claire J. Weiss for her photographs of the sidewalks of Pompeii, whereby I was able to retrieve information about some of the curbstone and wall drain exits remotely for this study.
[25] Property types are those presented by Eschebach (1970) and Eschebach and Müller-Trollius (1993, 1-5, 453-66), including Entertainment Buildings, Guilds, Market Gardens, Private Dwellings, Public Buildings, Shops, Temples, and Workshops. Although these categories oversimplify how we understand the function of a property and the use of space, they create discrete categories and allow for the analysis of data.

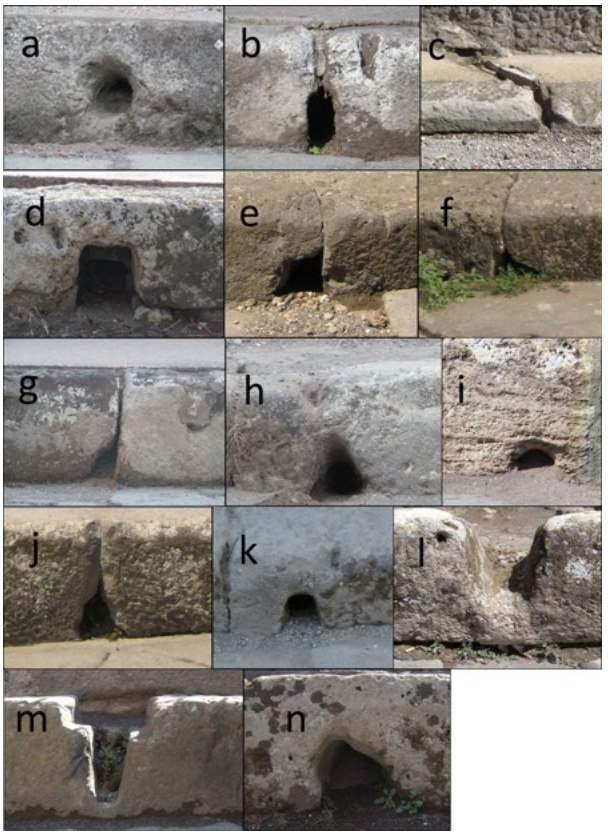

Figure 4: The 14 drain outlet shapes: (a) Circular (VI.vi.1, 9m north of 13); (b) Ovoid (VI.ix.6); (c) Gap (VII.xi.15); (d) Rectangular (VI. viii.16); (e) Trapezoid (VI.xv.5/6); (f) Rounded Triangle (concave) (IX.xiv.4); (g) Rounded Triangle (convex) (VI.vii.17/18); (h) Triangle (VI.vi.9); (i) Semi-circular (VI.i.10); (j) Tear Drop (VIII.4.23); (k) U-Shaped (down) (VII.x.13/14); (l) U-Shaped (up) (VII.ii.40); (m) T-Shaped (VII.xiv.19); (n) Irregular (VII.ii.25). (Photographs by J.S. Dunkelbarger and C.J. Weiss)

4e). Rounded Triangle (concave) and Rounded Triangle (convex) (Figures 4f and 4g) similarly varied between sharp or subtle in their shaping, suggesting that erosion may have altered these drain outlets over time. By contrast, Triangle drain outlets had clear, strait lines that created right or equilateral triangles (Figure 4h). Semi-circular drain outlets were half-moon shaped and could be cut vertically so that flat side of the cut was defines by the edge of a neighboring curbstone, or horizontally so that a flat base was formed by its meeting the street paving stones (Figure 4i). Tear Drop drain outlets took the form of a narrow point at the top of the outlet that gradually widened at the outlet's base and may have been the result of erosion over a significant period of time (Figure 4j). U-Shaped (down) and U-Shaped (up) drain outlets were similar to Semi-circular, but were cut deeper, creating a U shape, rather than a half-moon shape. These drain outlets only appeared cut into the top or bottom surfaces of curbstones, never at the vertical junctures between two curbstones (Figure 4k and 4l). T-shaped drain outlets were formed by a horizontal and vertical cut into a curbstone forming a capital letter T (Figure 4m). These outlets were found either capped with terracotta tiles or stone to close the drain channel, as they would have been in antiquity, or missing their cap. In addition to these shapes, there were also drain outlets classified as Irregular, which were either a composite of two defined shapes, or lacked a distinct geometry (Figure 4n). Some Irregular shaped drains may have had defined shapes when they were first cut, but may have been made unrecognizable by erosion of the drain outlet over time. Finally, as a result of relying on photographs for the typological identification of a portion of the drain outlets, the shape of some could not be determined because of obstruction by vegetation or debris in the photographs and those outlets were categorized as 'Cannot Determine'.

Figure 5: Wall drain outlet example, located approximately 9 meters east of doorway no. VII.12.26, demonstrating a wall drain outlet with an associated 'Gap' curbstone drain outlet. (Photograph by J.S. Dunkelbarger)

Drain outlets were also identified in the exterior walls of the insulae. Wall drain outlets were found most frequently when there was little to no sidewalk against an insula wall, which abutted the curbstones directly. Sometimes a wall drain outlet was coordinated with an associated curbstone drain channel that led the wastewater from the exit in the wall to the street (Figure 5). Wall outlets often included ceramic material that partly or completely defined the drain outlet channel. Wall drain outlets were most commonly associated with Private Dwellings and Market Gardens, likely because these properties utilized 'weep holes'–intentional perforations through the bases of walls associated with garden or open spaces–to prevent trapped water from accumulating at the base of the wall, which could undermine the structural integrity of the wall.

Drainage outlets in Pompeii

In the areas of the city surveyed, 855 drain outlets were identified (Figure 6).[26] Drain outlets were often located in close proximity to doorways and therefore a drain outlet was most often able to be associated with the nearest property and doorway. Some were perfectly centered on the axis of a doorway, others were placed elsewhere within a doorway's width, some were aligned at the edge of the doorway, and others still were located beyond the boundaries of a doorway or in direct association with a doorway. Some drainage channels, however, ran obliquely away from a doorway, through the sidewalk, and then issued through drain outlets into the street located closer to a neighboring doorway or property, such as those located at VII.i.23/24, VII.i.27, and VII.i.39, but these are most often exceptions. Approximately 80% of properties had a drain outlet exiting from the main front entrance of the property, an arrangement largely dependent on the organization of properties within the insula. Having a drain outlet at the front of a property did not preclude it from also having drain outlets at the side or back.

Drain outlets were most commonly constructed either aligned on the center of a doorway, or located to the eastern or southern side of the doorway. These patterns can be explained by a drain outlet's relation to Pompeii's overall topography. The highest points of elevation in city were in the northern and western parts of the site, meaning the drain outlet locations corresponded to the descent of Pompeii's topography. The location of drain outlets relative to

[26] In Poehler's 2017 monograph, the number of drain outlets in Pompeii was reported as 'more than 600 drains in the excavated portion of the city' (Poehler 2017, 84). This number has since grown, the result of a consolidation and cleaning of collected data for the current paper.

Figure 6: Map of drain outlet locations. Drain outlets are indicated by blue points. (Map by J.S. Dunkelbarger)

a doorway might therefore reflect a concern with facilitating the flow of water out of the city, to avoid flooding in the street directly in front of a property, or to prevent wastewater already flowing through the streets from flowing back up through the drain outlet and drain channel into the property. The drain outlet locations suggest an awareness of how the site's topography could be utilized in the urban drainage network and represent deliberate design choices—either by property owners or hired specialist builders—to conform to societal expectations of how drainage should be managed, or to avoid legal repercussions. For example, along via Stabiana, a street that falls over 30 meters in elevation from its north end at Porta Vesuvio to its south end at Porta Stabia, there is a high concentration of drain outlets constructed on the south sides of doorways.[27] At the southern end of the street, however, there was a cluster of drain outlets placed oddly on the north sides of doorways, just before the water was diverted to exit the city gate through a large drain, suggesting a loss of significance in their placement with so much water accumulating in that area already. Another example is found at a fullery (VI.viii.20-21, 2), whose drain outlet exited through the sidewalk and curbstone at a 45-degree angle, as opposed to perpendicular to the street.[28] This choice to angle the drain may have been deliberate, perhaps to facilitate the drainage of large quantities of water to the south and to avoid flooding the street when the four large washing basins were emptied through the one drain.

Drain outlets also varied in where they were carved through curbstones, which likely reflected differences in the effort necessary to create drain outlets in various positions. Over half of drain outlets (494, or 58%) were located at the junction between two curbstones and one-third (254, or 30%) were cut through and contained within a single a curbstone (Figure 7).[29] Additionally,

[27] On the topography of Pompeii and how it affected drainage on Pompeii's streets, see Jansen (2000a, 38) and Poehler (2012, 98).
[28] Flohr 2008, 4.
[29] The remaining 12% unaccounted for could not be determined by examination or use of photos after fieldwork to

Figure 7: Two examples of curbstone drain outlets. On the left, a drain outlet at a junction point of two curbstones. On the right, a drain outlet carved entirely through a curbstone. (Photographs by J.S. Dunkelbarger)

most drain outlets (643, or 75%) were carved along the bottom edge of the curbstone. Just 6% of curbstone drain outlets (51) were carved into the middle of the curbstone and 7% (57) were carved along the top edge of the curbstone. Choosing to cut a drain outlet in the middle of, or along the top edge of curbstones likely represented the particular situation of a property. For example, perhaps drain outlets cut at higher positions in curbstones helped to maintain a certain gradient of the internal drainage system, a gradient that also controlled the speed of the flow of wastewater into the street. If water came out too quickly, it may have flooded the street or flowed to the opposite side of the street and into a neighbor's domain. Overall, the most common position of drain outlets was at the junction of two curbstones and along the bottom of the curbstone, perhaps the simplest way to make a drain outlet and the most efficient means of debouching wastewater onto the street surface. This kind of drain would only require one or two cuts of the stone to create the outlet, rather than three or four, as would be the case if the drain where contained within the body of a single curbstone. Carving a drain outlet along the bottom edge of a curbstone also allowed the water to flow directly onto the street surface, which may have reduced the potential of the water pooling in the street in front of one's property and may have minimized erosion of the curbstone, extending the use-life of the drain outlet and curbstone, and reducing the frequency of *aedile*-ordered maintenance projects.

Curbstone drain outlet material was dictated by curbstone material. Drain outlets were made, therefore, of lava, tuff, Sarno limestone, or a combination of stone types if an outlet exited at the junction of two curbstones of different material. Lava curbstone drain outlets were most common (315, or 37%), followed by tuff curbstone drain outlets (289, or 34%), and finally by Sarno curbstone drain outlets (115, or 14%).[30] The predominance of lava and tuff as choices for curbstone material that had drain outlets may reflect a general need for a hard and durable material to facilitate drainage. Their frequency, however, closely matches the overall frequency

extract data for study categories. For the following paragraphs, any remaining percentages should be assumed to be omitted for the same reason.

[30] 6% of curbstone drain outlets were made in mixed materials, and 1% could not be identified with certainty.

Drain Outlet Shape	Drain Shape Count	Percentage of All Drains	Lava	Tuff	Sarno	Mix Material	Cannot Determine (Material)	NA-Wall Drains (Material)	Blank
Circular	35	4.1%	11	12	5	1	0	6	0
Ovoid	9	1.1%	3	5	1	0	0	0	0
Gap	109	12.7%	44	38	11	12	4	0	0
Rectangular	159	18.6%	47	56	26	11	3	16	0
Trapezoid	11	1.3%	6	3	0	1	0	1	0
Rounded Triangle (concave)	8	0.9%	3	3	0	2	0	0	0
Rounded Triangle (convex)	45	5.3%	25	13	3	4	0	0	0
Triangular	88	10.3%	51	25	9	3	0	0	0
Semi-Circular	99	11.6%	40	27	28	4	0	0	0
Tear Drop	10	1.2%	7	3	0	0	0	0	0
U-Shaped (down)	34	4.0%	7	16	9	0	0	2	0
U-Shaped (up)	27	3.2%	7	17	2	1	0	0	0
T-Shaped	32	3.7%	9	20	2	1	0	0	0
Irregular	99	11.6%	38	39	11	7	0	4	0
Cannot Determine (Shape)	40	4.7%	17	10	8	3	1	0	1
NA-Wall Drains (Shape)	28	3.3%		2		1	0	24	1
Blank	22	2.6%	0	0	0	0	0	10	12
Total	**855**	**100.0%**	**315**	**289**	**115**	**51**	**8**	**63**	**14**

Table 1: Curbstone drain outlet shapes in Pompeii and the frequency of these shapes depending on the curbstone material(s). Please note the following: 'Cannot determine (material)' means that the material could not be determined based on photographs or in-person examination. 'Cannot determine (shape)' means that the drain outlet was obscured in photographs, was reconstructed or repaired between initial notation and later study by the author, or was a threshold drain that lead through a sidewalk to no obvious outlet. 'NA-wall drains' relates to wall drains or drains onto a street with no sidewalk. 'Blank' are drains that were mapped and notated, but that were either obscured by reconstruction or not available in photographs to make determinations during later study by the author.

of curbstone materials used in Pompeii: 39.7% of curbstones were lava, 34.9% were tuff.[31] Sarno, however, was used much less frequently for drain outlets compared to its use as a curbstone material (23.5%), suggesting that it was an unsuitable material for drain outlets, likely due to its porosity and softness, which would have required more frequent replacement because of erosion and ware.[32] The fact that Sarno was used as a curbstone material and for drain outlets at all demonstrates that material hardness could not have been the only factor in the selection of material: availability, cost, and aesthetics must have also influenced this decision. Sarno was used sporadically, but there is one particularly dense area of Sarno curbstone drain outlet use, just north of the intersection of via Stabiana and via degli Augustali.[33] This intersection was an important one in the city, leading people from the via Stabiana to the forum, and was

[31] Weiss 2018, 190.
[32] Weiss 2018, 190.
[33] The insulae of note are VII.ii and IX.iii.

embellished with an arcade, a water standpipe, a shrine, and fountain.[34] Perhaps the use of Sarno for the curbstones was meant to draw additional attention to this area, the white stone standing out in a sea of grey lava and tuff. Alternatively, the cost or availability of materials may have been of significance; perhaps Sarno stone was a less expensive material.

Five curbstone drain outlet shapes dominate the sample: Rectangular, Gap, Semi-Circular, Irregular, and Triangular, collectively making up 64.8% of the recorded drain outlets (Table 1). These were shapes that were easiest to create with the least stone cutting effort expended. The greatest number of drain outlets were Rectangular in shape, which required just two or three straight cuts through a curbstone. Similarly, a Gap drain outlet shape only required a wider spacing of two curbstones and, therefore, no stone-cutting effort. Semi-circular drain outlets, depending on the material, likely required greater effort to achieve a curve, especially in the harder lava stone. Finally, Triangular drain outlets were also easily made, requiring just one or two cuts of the stone, depending on the outlet's position on the curbstone. Although Rectangular drain outlets were the most numerous, they were not found in dense clusters. Gap and Rounded Triangle (convex), on the other hand, although fewer in number, were densely clustered. Gap drain outlets were found most along vicolo della Maschera and the street between I.viii and I.ix, while Rounded Triange (convex) appeared most on the vicolo del Balcone Pensile. Triangular drain outlets also tended to cluster, appearing especially along the vicolo Storto. It is possible that high densities of drain outlet shapes represent a reflection of an approach to drainage at a particular moment in time, either the result of community action to renovate at the same time, or the result of multiple properties along the street being owned by a single individual who renovated all of them at once in a single intervention. It is also possible that the dense concentration represents a shared knowledge and technical approach to drainage in that area of the city, which resulted in the same drain outlet shape used in many properties. Perhaps one property used this drain shape and others followed because the shape was particularly advantageous to the drainage of properties in that area. It is also possible that this localized grouping represents a unified technical approach to drainage by a construction firm hired to carry out maintenance of the sidewalk and street infrastructure. In the same way that artist workshops had their own technical or signature style,[35] perhaps drain outlets could similarly be used to identify construction firms.

The qualities of curbstone material may have affected the choice of a particular shape for a drain outlet (Table 1). Triangular drain outlets, especially those created at the junction between two curbstones, were most common in lava curbstones. Indeed, 82 of the 88 Triangular drain outlets occurred at the junction of two curbstones. Most often, creation of this type of drain outlet only required the corner of a single curbstone to be altered to create the drain. The use of the simplest design makes sense for use with the hardest of the curbstone materials. Similarly, the most common drain outlet shape that appeared in tuff curbstones was Rectangular. The softness of tuff meant it could be easily sawn and therefore it would not have been difficult to cut Rectangular drain outlets into tuff curbstones. Sarno limestone is also relatively soft, making it easier to create the Semi-Circular and Rectangular drain outlet shapes, which comprise about half of the drain outlets identified in Sarno curbstones. The significance of the hardness of the curbstone material as it relates to drain shape is perhaps

[34] Westfall 2007, 132.
[35] Squire 2015, 172-94.

Eschebach Property Type	Property Type Count	Property Type %	Drain Count by Property Type	% of Drains by Property Type
Urban Supply System	5	0.3%	1	0.12%
Temples	13	0.9%	7	0.82%
Guilds	18	1.2%	5	0.58%
Public Buildings	37	2.4%	14	1.64%
Market Garden	39	2.6%	37	4.33%
Workshops	185	12.2%	150	17.54%
Entertainment Buildings	193	12.7%	114	13.33%
Private Dwellings	440	29.0%	333	38.95%
Shops	588	38.7%	193	22.57%
unlabeled	0	0.0%	1	0.12%
Total	**1518**	**100.0%**	**855**	**100.00%**

Table 2: Property types in Pompeii (Eschebach and Müller-Trollius 1993), compared to the frequency of drain outlets by property type.

further demonstrated by discrepancies of U-Shaped drain outlets among the three curbstone materials. U-Shaped (down) and U-Shaped (up) make up 4% and 3.2% of all drain shapes, but are under-represented in lava curbstone drain outlets and over-represented in tuff and Sarno curbstone drain outlets. The U-shape would have been difficult to achieve in the hard lava stone, but more easily achieved in the softer tuff and Sarno stones.

Examination of the frequency of drain outlets by property type reveals that the presence of drain outlets depended, in part, on the function of the property from which a drain exited (Table 2). Private residences, although not the most numerous type of property in Pompeii's cityscape (29%), were most likely to have associated drain outlets (39%). Shops, on the other hand, although the most numerous property type (38.7%), were not as often associated with drain outlets (22.6%). Such a mismatch in frequency is not surprising considering the simple architecture of many shops that made them less likely to use, and therefore have the need to drain away, large volumes of water, while the variety of water features within private dwellings would give these structures more need for higher volume drainage. Only 1.6% of drain outlets were related to Public buildings. The drainage of public buildings in Pompeii were the first to be connected to sewers because of the large quantities of wastewater and runoff they produced.[36]

Although there was a discernable relationship between curbstone material and drain outlet shape, there was no clear relationship between property type and drain outlet material or drain outlet shape. A correlation of property type and drain outlet curbstone material revealed that, compared to all drain outlet curbstone materials, drain outlets from public buildings used tuff (54%) more than lava (20%), drain outlets from entertainment buildings (i.e., *thermapolia*) utilized Sarno more frequently (24%), and market gardens had a high incidence of tuff (47%). Relative frequencies of materials used by shops, workshops, and private residences roughly adhered to the overall frequencies of the curbstone material. Similarly,

[36] See above, n. 13 and 14.

Figure 8: Point density map of the drain outlet locations. Cold and hot spots are identified by blue-green colors and yellow-red colors, respectively. (Map by J.S. Dunkelbarger)

compared to the breakdown of drain outlet shapes for the whole city, workshops had a higher quantity of Gap drain outlets (21%). Public Buildings more frequently used Rectangular (33%) and Semi-Circular (20%) drain outlets, but Gap drain outlets (7%) were much less common for this property type. Entertainment Buildings (i.e., *thermapolia*) had a higher incidence of Triangular drain outlets (20%), but a low incidence of Gap drain outlets (10%), and Private Dwellings had a slightly higher percentage of Irregular drain outlets (15%). These differences may have resulted for numerous reasons, including the aforementioned cost and availability of materials, physical properties of the materials, and aesthetics, or the volumetric capacity of internal features that needed to be drained.

Most drain outlets were located within 4 meters of another outlet, usually finding a common spacing between 3.5 to 4.0 meters. They were not uniformly distributed along the city streets, however, and appear to have clustered. A Point Density Map of the drain outlet locations reveals a high density of drain outlets along the main thoroughfares of the city, including the via Stabiana, via dell'Abbondanza, and via di Nola (Figure 8). Some dense clusters of drain outlets were also evident along the narrower, internal streets of the city, such as at the intersection of vicolo della Maschera and vicolo del Balcone Pensile, and at the intersection of via delle Scuole and vicolo della Regina. These high-density concentrations of drain outlets suggest large volumes of water entered the street at these locations, potentially creating localized flooding hazards.

A similar distribution of drain outlets should be expected in those areas of the city not included in the current survey (see Figure 2), given how frequently they appear in the sample area. There were, however, areas of Pompeii that lacked drain outlets entirely (see Figure 8). Areas of the city without drain outlets were highly unusual and deserve careful consideration to understand the lack in these areas. In some cases, preservation or incomplete excavation

explain the lack of drain outlets. Some streets were so poorly preserved that little to no evidence of insula drainage survives, including the vicolo del Conciapelle, the unnamed vicolo between I.ii and I.iii, the south end of the vicolo di P. Paquius Proculus, the vicolo dell'Efebo, vicolo di Lucrezio Frontone, the north end of vicolo del Fauno, and the east end of via di Nola. Streets that were both poorly preserved and not fully excavated, obscuring evidence of drain outlets, include: the vicolo that passes between I.ix, I.xi, I.xvi, I.xvii, I.xxii, and I.xxiii; the vicolo della Nave Europa; the vicolo del Fuggiaschi; via della Palaestra; and the north-south oriented streets of Region II. Two areas lacking drain outlets, however, are of interest: the via dell'Abbondanza between VII.i and VIII.iv and the via del Foro between VII.iv and VII.v. The roadbed of the via dell'Abbondanza between VII.i and VIII.iv was elevated in the 2nd century BC and was transformed into a plaza-like space, nestled between the Stabian Baths to the north and residences and commercial spaces to the south.[37] The creation of this plaza coincided with the construction of a sewer, traditionally dated to the 2nd century BC, to which the Stabian Baths were connected.[38] The sewer managed the drainage of the Baths' vast quantities of water.[39] The shops along the southern façade of the Baths and the residences and commercial spaces on the opposite side of the street required drainage, and yet none of these properties had an outlet onto the via dell'Abbondanza plaza. It is possible that these properties had other drainage arrangements, perhaps draining east to the via Stabiana, or perhaps using soakaways or cesspits within their properties. It is also possible that the drainage of these properties was collected under the sidewalk and diverted to the west, where wastewater could have been deposited into the sewer. There was a sewer access point on the via dell'Abbondanza that collected water from the street surface outside VIII.vi.6.

The second area that lacked drain outlets from the insulae to the streets was the via del Foro, between VII.iv and VII.v. This street also acted as a plaza-like space just north of the forum.[40] The street was defined at the west by the Forum Baths and properties of mixed function. In concert with the example above, the lack of drain outlets outside of a public bath and in a space that had been transformed into a plaza suggests a deliberate choice to not have wastewater debouching into this kind of space to enable people to gather.

Conclusion: individual and collective agency in city making

Drainage from the insulae to the city street, and not drainage into underground sewers, was indeed the predominant convention for excess and waste water removal at Pompeii. Drain outlets that exited from the insulae to Pompeii's streets were numerous and varied, ubiquitous throughout the ancient city, and carefully placed. The evidence of drain outlets presented here demonstrates that conventions of drainage infrastructure in Pompeii may have been governed by the Roman laws presented above, or by similar local statutes. Specifically, the construction of drain channels and outlets angled in the direction of the topographic slope and the position of drain outlets on the curbstone indicate an intention to facilitate the flow of water onto the city streets, perhaps to avoid violating laws that protected access to and enjoyment of private property and public space.

[37] D'Arms 1988, 59-61; Eschebach and Müller-Trollius 1993, 244-45; Poehler 2012, 115; Westfall 2007, 132-33.
[38] See above, n. 13 and 14.
[39] Eschebach 1979, 6.
[40] Westfall 2007, 136-37.

Pompeii's drain outlets are important features in the overall history and understanding of Pompeii's water and waste management system. Outlets that drained onto Pompeii's streets were the connection between the waste management systems of individual properties and the waste management system of the city. Each criterion of drain outlet construction identified in this study—the material, shape, location, etc.—represented a choice. These choices were presumably informed by many variables, such as cost, the physical properties of the stone, preferred techniques, capacity of the water and drainage system, aesthetics, and the law. These choices would likely have been made with consideration of the whole system and required the interaction, coordination, and cooperation among neighbors and community members, property owners (and/or whomever they chose or hired to do the work), and city *aediles* and other specialists who understood the function of the city's street surface drainage system *in toto*.[41] The groups of people involved all had a stake in the creation of Pompeii's urban environment and were active agents in the making of the city. Pompeii's drain outlets therefore represent choices and interactions that together built a shared, urban environment in which wastewater was eliminated from the city in such a way that did not impede inhabitants' access to and enjoyment of public space and private property.

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[41] On the existence of public officials directed to carry out the works of the *aediles*, see Frontinus (*On the Water-Management of the City of Rome* Preface 1-2) and Cassiodorus (*Variae* 3.30). Frontinus makes it seem that many or most elected officials relied on the advice of their assistants and subordinates to carry out the duties of their office. Though there is nothing explicit about the training or resumes of these assistants and subordinates, perhaps they were specialists (in this case on water infrastructure) that could advise Frontinus and the other officials who occupied the office every few years. Cassiodorus, on the other hand, is explicit, stating that a public, salaried officer was delegated the maintenance of the Cloaca Maxima in Rome.

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Heating the Stabian Baths at Pompeii

Ismini Miliaresis

Abstract

Roman baths were a place of innovation and ingenuity, where new technology and architectural elements were invented and implemented. The Stabian Baths at Pompeii are one of the earliest Roman bath complexes to have been discovered thus far. They were transformed from a rudimentary space heated by braziers to an elaborate complex with subfloor and intramural heating systems that influenced other structures in Pompeii and throughout the Roman world. This paper presents preliminary annual fuel consumption values for the Stabian Baths and compares them to other bath buildings. The structure and heating systems of the Stabian Baths are described and evaluated in terms of their efficiency. The Stabian Baths contained both tubuli and tegulae mammatae, which were used to heat the walls of the baths. This arrangement is very unusual, and it is unlikely that these devices could have worked symbiotically. Rather, one device was probably being replaced by the other in the post-AD 62 earthquake reconstructions that the bath was still undergoing at the time of the eruption. The structure is evaluated with both of these elements present and in its current state. Computing fuel quantities under different scenarios reveals how different structural elements and operational choices affected consumption. Modeling these values over the course of a month and a year provides quantitative data that can be used in further studies related to deforestation and environmental impact, the transport and storage of resources to and within the city, along with the cost of maintaining such a facility.

Keywords

ROMAN BATHS, ANCIENT TECHNOLOGY, HEATING SYSTEMS, FUEL CONSUMPTION, ROMAN ECONOMY, SUSTAINABILITY

Introduction

The convenience of public bathhouses was essential to ancient Romans in every city, small town, and military outpost. Romans of all classes would have made a daily trip to their local bath not only to wash, but also to exercise and socialize. Public baths were often lavish buildings decorated with elaborate paintings and mosaics and they were equipped with technologically advanced heating systems. As a result, they offer valuable information about Roman art, architecture, social stratification, construction practices, and the relationship that the ancient Romans had with their environment. More specifically, evaluating the heating systems helps to demonstrate how people moved through spaces, how baths were connected to health rituals, and what level of expenses were considered appropriate for such an institution.

Even the smallest bathing complexes usually had at least two rooms and one pool that needed to be heated, suggesting that exorbitant amounts of fuel were consumed by these institutions. The operation of the heating system, consisting of furnaces that filled hollow floors and walls with heated air, however, allowed for fuel to be used efficiently without unnecessary waste. Several bath complexes have been uncovered at Pompeii, including the Stabian Baths, Forum

Baths, Central Baths, Suburban Baths, and the Sarno Baths. Most of these bathing facilities retain their heating implements and much of their original structures, allowing for the design of various heat study models that can illustrate how they operated under different conditions. Wood, charcoal, peat, and other materials were burned in many other industries, including food production, cremation services, and ceramics and glass production, suggesting that fuel production and transportation to urban centers was a major undertaking. By studying the technology behind heating buildings and, more broadly, the ways in which fuel was exploited by the Romans, it is possible to gain a deeper understanding of the role that fuel played in the economy and the environment.[1]

This chapter focuses on the Stabian Baths, which is the earliest bath complex at Pompeii and one of the earliest known Roman baths to have been discovered.[2] The heating systems used in the Stabian Baths are described, along with the spaces that they heated. The amount of fuel consumed on a daily basis to operate the Stabian Bath is modeled and tested in a study designed to quantify the impact on the local environment and economy and to compare it with that of other Roman bathing facilities.

Location and history

The Stabian Baths of Pompeii, or Terme Stabiane (VII.i.8.14.15-17.48.50.51), are located at the intersection of via dell'Abbondanza and via Stabiana (whence it gets its name), and they served as the bath complex for the eastern and southern sectors of the city.[3] They occupy nearly an entire *insula* of about 3,000m^2.[4] The original structure dates to the early 4th century BC, but the heating system being examined is part of a later refurbishment that incorporated a double-zoned plan to allow for separate gendered sections.[5] The Stabian Baths underwent

[1] On the importance of fuel in the Economy, see Veal (2019, 11-12). For data on fueling pottery kilns, see Leitch (2019, 54-55, 58). For fuel use in glass production, see Cool (2019).

[2] A debate had been ongoing to determine if the Stabian Baths at Pompeii or the baths at Olympia were older. Eschebach (1979) determined that a 'true' hypocaust system was in operation as early as the second half of the second century BC in the Stabian Baths. In the baths at Olympia in Greece, a hypocaust was installed sometime around 100 BC in the final phase of these baths. This debate was put to rest between 1996 and 2002, with the discovery and excavation of the baths at Fregellae (Italy), whose bath complex operated between 320 and 125 BC, when the site was destroyed by Roman forces. On the Fregellae baths, see Rogers (2020, 132-35), Tsiolis (2013), Yegül (2010, 84-87), and Yegül and Favro (2019, 42).

[3] Since their excavation in the 19th century, the Stabian Baths have been the subject of several studies. Foremost among these is the monograph by Eschebach published in 1979. It was demonstrated in Trümper (2017) and Trümper *et al.* (2019) that many of Eschebach's reconstructions need to be updated. They have been explored in various specific contexts, including their technological aspects. For example, in 1901 Krell explored the heating system of the Stabian Baths, as did Schween in 1936; Jorio (1981) assessed the validity of these two studies and also attempted a fuel consumption study for the bathing facility. The Stabian Baths have also been treated more generally in the publications of Menchelli (1987, 83-85), Yegül (1992, 48-64, 180, 357, 363, 374-79, and 2010, 13, 32, 52-54, 84-94), Fagan (1999, 44, 57-59, 64, 76, 208), Keenan-Jones (2015, 197), Koloski-Ostrow (2015, 8), and Yegül and Favro (2019, 65-67). For information on damage to the facility due to the AD 62 earthquake, see Ruggieri *et al.* (2018). For more on gardens in the Stabian Baths, see DeLaine (2017, 170-74).

[4] The insula was trapezoidal in shape to accommodate two existing streets and a garden, which were later transformed into a domus with peristyle and atrium. See Menchelli (1987, 83).

[5] Eschebach (1979, 38-39) argues it is possible that the Stabian Baths date as far back as the end of the 5th century BC, but Yegül (1992, 434, n. 19) finds the evidence for this early date insufficient. The Bathing Culture and the Development of Urban Space in Pompeii Project (Trümper *et al.* 2019, 105) demonstrates that many of Eschebach's claims related to phasing and the footprint of the baths need to be reassessed. Included in these is the arrangement of fourth-century BC hip baths from his first phase and the immersion tub from his second phase, which finds no parallels in the Roman world (Trümper *et al.* 2019, 110-15). Also of note, Koloski-Ostrow (2007, 231) describes an inscription that seems to serve as a label for the women's section.

Figure 1: Plan of the Stabian Baths at Pompeii: (A) main entrance; (B) palaestra; (C) natatio; (D, E) basins; (F) locker room?; (G) passage bay; (H, I, J) slave quarters?; (K) frigidarium; (L) apodyterium; (M) tepidarium; (N) caldarium; (O) praefurnia; (P, Q) entrances to women's baths; (R) apodyterium; (S) service corridor; (T) tepidarium; (U) caldarium. (Drawing by C.J. Weiss, adapted from Menchelli 1987, 84)

another major restoration in 80 BC when Pompeii became a Roman colony under Sulla. These renovations included the addition of a circular *laconicum* (sweat room) and a *destritarium* (a room for anointing and scraping). At the end of the 1st century BC, the *laconicum* was changed into a *frigidarium* (cold room), and a circular pool was added that filled most of the floor of the room.[6]

In its final-phase configuration, the rooms of the Stabian Baths were designed on a single axis, allowing the bather to progress through a sequence of spaces with different temperatures (Figure 1). This arrangement allowed for efficient heat control, water supply, drainage, and flow of people.[7] The main entrance (A) to the bathing complex was from via dell'Abbondanza on the south side of the complex and it led to the *palaestra* (B), or exercise yard. Both the *frigidarium* (K), or cold room with a pool, and the *apodyterium* (L), or changing room with storage spaces for belongings, of the (presumed) male section of the baths were accessible through a passage bay (G) facing the *palaestra*.[8] The *apodyterium* led to the *tepidarium* (M), or warm room, which in turn, led to the *caldarium* (N), or hot room. The *caldarium* contained a heated pool and a *labrum,* or a round basin set on a base resembling a modern birdbath.[9] The

[6] Fagan 1999, 57; Ling 2005, 44, 57; Menchelli 1987, 79, 83; Tummolo 1987, 68; Yegül 1992, 61.
[7] On the Roman style of bathing, see Yegül 2010 for previous bibliography. For discussions of the flow of people through Roman baths, see: Vitruvius, *On Architecture* 5.10; Galen 11.10; Kraus 1975, 31; Menchelli 1987, 79, 83; Tummolo 1987, 68; Yegül 1992, 37, 61.
[8] For more information on the conversion of the earlier *laconicum* into the *frigidarium*, see Yegül (1992, 469, n. 100).
[9] Well-preserved examples also can be seen in the Forum Baths at Pompeii. Yegül (1992, 376-77) describes that in these

northern section of the Stabian Baths had much smaller heated rooms with less elaborate decorations, suggesting that this bathing suite was for women.[10] Two entrances (P and Q), one off the vicolo del Lupanare and one off the via Stabiana, led to the women's *apodyterium* (R). A small pool for cold water ablutions was installed in the *apodyterium* perhaps to compensate for the lack of a *frigidarium* in the women's section.[11] The *tepidarium* (T) could be accessed both from the *apodyterium* and service corridor (S), and it led to the *caldarium* (U). The energy to heat both the men's and women's sections was generated by *praefurnia* (O), or furnaces. The wood for the furnace was probably stored in the nearby service corridor.[12]

The women's section of the Stabian Baths of Pompeii is one of the best-preserved Roman bathing complexes that has been found. Not only are the heating systems still mostly intact, but also a great deal of the paint, stuccowork, and even permanent furniture can still be observed *in situ*. In contrast, the rooms of the men's section are in a poor state of conservation. The *caldarium* and the *tepidarium* of the male section were the largest rooms in the baths and the quality of the decorative program can only be imagined. There is still evidence for a pool and a *labrum*, but none of the revetment on the walls or floors remains, and the vaults of the ceiling are mostly gone. Enough of the heating systems remain to determine that they were heated by the same hypocaust system.[13] Comparisons to the women's sections, which are very well preserved, as well as other early bath structures, prove useful for recreating the fabric of the men's sections. Several early studies conducted on the Stabian Baths also provide valuable structural information that is no longer available due to continued deterioration.[14]

Heating systems in the Stabian Baths

Sufficiently heating and controlling temperature fluctuations in the baths was essential to their function. Indeed, the whole layout and organization of a bathing complex was planned in order to optimize the use of the heating implements.[15] Several systems and devices were used in the Stabian Baths to facilitate this process: the *praefurnium*, hypocaust, *tubuli*, *tegulae mammatae*, boilers, and the *testudines alveolorum*. Each of these heating apparatuses is described briefly below.

The *praefurnium* provided heat to the hypocaust and was also used to heat water in boilers. *Praefurnia* were made of fire-resistant brick and were composed of a low arch that opened directly into a hollow space under the floor of the rooms to be heated.[16] The *praefurnia* of the

early examples, the base of the basin was heated. The base contained a channel that was connected to an outside furnace that provided heated air. This air helped keep the water in the basin hot. Yegül contends that once wall heating was introduced, making rooms hotter, the basins were only used to contain cold water.

[10] Kraus 1975, 32.

[11] Menchelli 1987, 83, 85; Yegül 1992, 376.

[12] Cantarella and Jacobelli 2003, 98; Kraus 1975, 32; Menchelli 1987, 83; Yegül 1992, 376.

[13] Ling (2005, 61) states that vaults first appeared in Pompeii in the Stabian Baths and the Forum Baths and then spread in use to domestic structures.

[14] Two of these were from the early part of the 20th century, by Krell and Schween, who recorded an extensive amount of data that is useful for a heat study. Eschebach's 1979 monograph on the baths provides detailed descriptions and drawings of the bathing complex, and it is especially useful for dimensions of wall sections. The article by Jorio (1981) also contributes useful information about the walls and structures of the Stabian baths. See: Eschebach 1979, 8-17; Jorio 1981, 176-80; Krell 1901, 58-66; Schween 1936, 3-29.

[15] Yegül 1992, 356; Yegül 2010, 80-94.

[16] Unlike most modern furnaces, Roman furnaces lacked metal grates and the fire was built directly on the floor. Consequently, it can be deduced that they had a very slow oxidation rate and combustion level. See: Jorio 1981, 172;

Figure 2: View to the southwest wall, with pilae visible on the floor and the labrum in situ along the wall. Men's caldarium, Stabian Baths, Pompeii. Photograph taken in 1895 by William Henry Goodyear. (Courtesy Brooklyn Museum Archives, Goodyear Archival Collection, Image S03i0387n01)

Stabian Baths are damaged, but some information can still be obtained from examining them.[17] The room providing access to the *praefurnia* is 3.6m by 11.5m, and evidence suggests that it contained three boilers. For the purposes of this study, the heat lost within the *praefurnium* space itself is not considered.

Chimneys must have also been used in conjunction with the furnace to maintain the proper circulation of the heated air and expel spent gases, although they are rarely preserved. Square or round terracotta pipes embedded in the walls could also have served to create a draft in the system.[18] The chimneys would have helped pull heated gases from the *praefurnia* through the hypocausts of the *caldaria* and beyond to those of the *tepidaria*, heating both rooms with a single furnace. Jorio identifies several openings in the heated rooms that may have functioned as chimneys, but inspecting the *in situ* remains casts doubt on some of these identifications: four above the pool in the men's *tepidarium* (the way this wall abuts other walls makes these unlikely candidates for chimneys), one in the north wall of the men's *caldarium*, two in the

Yegül 1992, 368-69; Yegül 2010, 89-90.

[17] For example, the furnace of the male sector of the baths communicated with the hypocaust towards the south through a canal covered with a brick vault, which is significantly damaged today. Another canal (0.6m wide and 0.8m high) toward the north-west, led to the hypocaust of the women's sector, which is in a somewhat better state of preservation. Jorio (1981, 185) mentions that an auxiliary *praefurnium* existed on the east wall of the men's *tepidarium*, but Eschebach (1979, 13) states that it was no longer in use in antiquity and dated to an earlier phase of the Stabian Baths.

[18] Evidence of chimneys can sometimes be seen from triangular or square openings found at the level of the springing of vaults. See Yegül (1992, 357-58, 381).

Figure 3: Tegulae mammatae still attached to wall. Women's tepidarium, Stabian Baths, Pompeii. (Photograph by I. Miliaresis)

west wall of the women's *tepidarium*, and two in the west wall of women's *caldarium* (there is not enough evidence to identify these openings as chimneys).[19]

The hypocaust, which literally means 'a furnace that heats from below', was central to the controlled heating of a Roman bath.[20] The 'true' Roman hypocaust was formed by placing the floor of a room on top of short supports in the form of pillars, called *pilae* by Vitruvius (Figure 2).[21] Space was left between the supports, so that heated air could freely circulate under the floor. Only the hot gases ever came into contact with the space below the floors, and never the flames from the fire.[22] In both the men's and women's sections of the Stabian Baths, the hot air passed through the hypocausts of the *caldarium* and the *tepidarium* with the assistance of a graded sub-floor and chimneys.[23] Due to some energy loss through the floors to the spaces above, the temperature of the air moving below the *caldaria* would have been reduced somewhat when it reached the hypocaust of the *tepidaria.* The pillars, along with the tile floor beneath them, also absorbed some of the heat. This temperature reduction helped to maintain a lower temperature in the *tepidaria*, which was supposed to be about four degrees centigrade cooler than the *caldaria.*

The walls of the Roman baths were another essential element in heating the bathing facilities. Like the floors, the walls were constructed to be hollow so that hot air could pass through the void and radiate heat into the adjoining room. The application of hollow walls in baths created a way to provide radiant heating, to use the remaining energy of the hot gases from the hypocaust, and to maintain the proper temperature of rooms more easily. Yegül argues that this method of heating walls a major breakthrough for both technology and architecture because it allowed for a tremendous increase in the size of heated rooms in baths, without

[19] Jorio 1981, 178-79.
[20] Simpler methods of sub-floor heating devices, such as channel systems were attempted throughout the Mediterranean as early as the 5th century BC. For more, see: Yegül 1992, 361; Yegül 2010, 81-83.
[21] Vitruvius, *On Architecture* 5.10.2; Jorio 1981, 172-73; Shepard 1987, 42; Yegül 1992, 357-60; Yegül 2010, 82-83; Yegül and Couch 2003, 169.
[22] The major advantages offered by the hypocaust system were that furnaces could be kept at low temperatures with a slow burning fire, there was a low draft, and there were only minor chimney losses. See: Jorio 1981, 172; Yegül 1992, 357, 381; Yegül and Couch 2003, 169.
[23] Shepard (1987, 42) suggests that it was important that the sub-floor of the hypocaust be made to slope down towards the *praefurnium*, to facilitate the upward flow of the hot air.

compromising the temperature.[24] Since more surface area was heated and could serve as a radiator, the system could be heated to a lower temperature, thereby consuming less fuel.[25] This system also made it possible for walls to be punctured with large windows without compromising the flow of heat.

One method of creating hollow walls was to use *tegulae mammatae* (Figure 3), which were large, rectangular tiles with bosses, or nipples, projecting from one face of the tile.[26] When attached to the walls with T-clamps or nails with the bosses facing inwards, a void for hot gases was created. One of the earliest known uses of *tegulae mammatae* was in the Stabian Baths on the walls of the women's *caldarium* and *tepidarium*, the men's *tepidarium*, and portions of the men's *caldarium*. *Tubuli*, or box tiles, were hollow terracotta bricks that were arranged in continuous vertical rows, also permitting the movement of hot air within the walls. The bricks had curved corners and were attached to the walls and to each other with mortar, metal clamps, or both when necessary.[27] The first known rectangular *tubuli* were found in the Stabian Baths, but only on the north, west, and south walls of the men's *caldarium*, while *tegulae mammatae* were used on the eastern wall.[28] It should be noted that the evidence for wall heating does not survive on most of the walls of the *caldarium*, but it is clear from on-site inspection that *tegulae mammatae* were used on the inside of the pool.

The presence of different devices in the same structure, and perhaps, even in the same room, was rather unusual in the Stabian Baths.[29] Air would have moved differently in the spaces created by the *tubuli* versus those created by the *tegulae mammatae*, making it unlikely that both systems operated at the same time. A more likely scenario is that they were in various stages of restoration after the AD 62 earthquake when the eruption occurred. In fact, the Stabian Baths may not have even been open for use in AD 79.[30] DeLaine conjectures that the *tubuli* were being installed to replace the earlier *tegulae mammatae*.[31]

The hypocaust and heated walls would have helped keep water in pools warm for an extended period, but the water was heated initially in a boiler. The Stabian Baths at Pompeii were fed by cisterns and wells until they were connected to the aqueduct constructed in the Augustan period.[32] Lead pipes were used to conduct the fresh water to the baths, either directly into the cold pools, or into metal boilers. The boilers were usually encased in insulating masonry and placed in front of, or directly above the furnaces used to heat the hypocausts. They were

[24] Yegül 1992, 363; Yegül 2010, 86.
[25] Yegül and Couch 2003, 169.
[26] On wall heating systems, see Yegül 2010, 87-89.
[27] *Tubuli* could also be used to create the hollow spaces for heated vaults. Their shape allowed for more flexibility than the large *tegulae mammatae*, and, according to Thatcher (1956, 190, n.66), Bidwell (1979, 33), and Koçyiğit (2006, 114), they were more efficient because they enclosed about twice as much space and they contributed to the insulation of the wall. See also: Jacobelli 1999, 227; Yegül 1992, 363.
[28] The earliest use of *tubuli* was in the second phase of the bath at Fregellae. Although these elements were cylindrical, their placement and relationship to the hypocaust leaves little doubt that they had the same function as *tubuli*. Most publications on the Stabian Baths predate the discovery of the site of Fregellae, explaining why they credit the Stabian Baths as having the earliest known *tubuli*. Those in the Stabian Baths are the earliest 'rectangular' *tubuli*, and they reflect the shape of most subsequent ones found throughout the Roman world. See also: Eschebach 1979, 11-12; Jorio 1981, 174; Kretzschmer 1958, 36; Shepard 1987, 43; Yegül 1992, 363, 464, n. 23; Yegül 2010, 87; Yegül and Favro 2019, 65.
[29] Another example is the Suburban Baths of Pompeii; see Jacobelli 1999, 227.
[30] Fagan 1999, 64-65; Maiuri 1942, 73-74; Richardson 1988, 100; Tummolo 1987, 68; Zanker 1998, 129.
[31] DeLaine 2020, 78.
[32] For more information on the aqueduct line that supplied Pompeii, see Keenan-Jones *et al.* (2011, 132-34).

often connected by valves to two other tanks, one filled with tepid water and one filled with cold water, which allowed for a careful regulation of temperature. The tanks could be stacked one on top of the other or arranged side by side.[33] The boilers are often missing from the archaeological record, but sometimes the space that once held them can be identified, as is the case with the Stabian Baths.[34]

Another mechanism for maintaining the temperature of the water in the bathing pools, known as the *testudines alveolorum*, was uncovered in the women's *caldarium* of the Stabian Baths in very good condition.[35] This device was a semi-cylindrical container made of metal sheets rivetted together. The flat bottom was placed above the furnace fires in front of the boilers. This container opened directly into one of the short sides of the pool, allowing water to circulate freely and continuously warm the pool.[36] The *testudo* was added to the pool after the earthquake, but Yegül states that it was probably never used.[37]

Dimensions and components of heated rooms

In order to conduct a heat study, it is important to understand the dimensions and the composition of the spaces that were heated, as well as those of the surrounding spaces. Determining the surface area of floors, walls, and ceilings is necessary both to compute how much energy was lost to the outside, and how much energy was gained within the rooms from the furnaces. Normally, heat is lost through the floors to the foundations of a building, through the walls to the outside or to adjacent rooms, and especially through the ceiling as heat rises. In the case of the Roman baths, the inside of the floors and walls (and sometimes ceilings) was heated, which not only helped prevent heat loss, but also contributed to heating the room. The fabric of the floors, walls, and ceilings must also be examined to determine how heat moved through the baths, since the quantity of energy that passes through each layer was dependent on the type of material it was made from and its thickness. Heat was also lost or gained through openings such as windows, doors, and chimneys, so locating such apertures and measuring them is essential as well. (Specific dimensions can be found in Appendix 1.) The remainder of this section provides a description of the walls, floors, and ceilings of the *caldaria* and *tepidaria* of the Stabian Baths, all of which will be integral in our discussion of the heat transfer that was occurring throughout the complex while in operation.

The women's caldarium

Thanks to the excellent level of preservation in the women's *caldarium* (Figure 1, U), it is possible to take measurements and fully assess the fabric of the structure. These values are compared to those from previous scholarship for a more accurate reconstruction of the baths.

[33] Vitruvius, *On Architecture* 5.10.1; Jorio 1981, 179; Nielsen 1990, 16; Yegül 1992, 373, 374; Yegül 2010, 91-92.
[34] Kretzschmer 1958, 34-36, fig. 59; Pappalardo 1999, 234-35; Poccardi 2001, 168, fig. 8; Ragazzo 1999, 19.
[35] Like the boilers, *testudi* are rarely found *in situ,* however, a semicircular imprint is sometimes left behind in the masonry of the pool. For further information of these devices, see Yegül (1992, 365, 369, 373-374).
[36] The name '*testudo*' refers to the shape, which resembles a tortoise shell. The mechanism functioned through natural convection – hotter liquids are less dense and move upwards, while colder liquids are denser and move downwards. More specifically, as the water in the *testudo* was heated by the furnace fire, it would rise into the space of the pool, and eventually to the surface. As the water in the pool cooled, it would move below the warmer water, descending back into the *testudo*, where it was reheated. In this way, the water in the pool was continuously kept warm. See: Brödner 1983, 20; Nielsen 1990, 16; Yegül 1992, 373-74; Yegül 2010, 93-94.
[37] Yegül 1992, 374.

Figure 4: Labrum and mosaic floor. Women's caldarium, Stabian Baths, Pompeii. (© Mentnafunangann, Wikimedia Commons, CC BY-SA 3.0)

Figure 5: Pool basin and tegulae mammatae on walls (to the right of the image field). Women's caldarium, Stabian Baths, Pompeii. (© Mentnafunangann, Wikimedia Commons, CC BY-SA 3.0)

The women's *caldarium* is a rectangular room with a *labrum* (Figure 4), or marble water basin with a thick pedestal, on the west side and a pool basin, or *alveus*, against the east wall.[38] The room measures 12.3m in length, including the pool area, and 5.0m in width. The height from the floor to the top of the vault is approximately 51m, and the height from the floor to the beginning of the vault is approximately 2.8m.[39] The walls are also in a good state of preservation, with moldings and bright red and yellow paint colors still intact. Moreover, *tegulae mammatae* can still be seen attached to the wall (Figure 5).

The walls

The walls of the women's *caldarium* were made of *opus caementicium*, except for the south wall, which is modern.[40] Significant portions of the walls are still covered with a layer of mortar, the *tegulae mammatae* tiles (0.02m thick), stucco, and paint.[41] The thickness of the walls, mortar, and stucco varied from wall to wall (see Appendix 1 for exact values). The *caldarium* had one opening in the west wall that was approximately 1.2m by 1.3m, which has been identified as a window. There are no extant materials to determine if there was glass in the windows, or if they were open to the air. Glazing the windows has been shown to reduce heat loss in ancient bathing structures, so assessing their possible presence is useful in determining fuel consumption.[42] There is evidence of window glazing in the *caldarium* of the Suburban Baths at Herculaneum, and there are several small round windows with glass or pieces of glass still *in situ* in both Herculaneum and Pompeii.[43] The Suburban Baths of Pompeii also contained a long rectangular window that was covered with glass, and the *caldarium* had a fenestrated apse.[44] Since the presence of glazing is impossible to determine in the Stabian Baths, both glazed and unglazed scenarios are tested in this study, as is discussed below.[45]

There were two doors leading to and from the women's *caldarium*: Door 4 (1.1m wide and 2.0m high) communicated with the *tepidarium* and another door (0.7m wide and 2.0m high) led to the *praefurnium*, but it was bricked over in antiquity and thus omitted from this study.[46] Evidence of two openings (0.2m diameter) was also found in this space.[47]

[38] The *labrum* may originally have been located in front of the south wall to benefit from proximity to the service area (Trümper *et al.* 2019, 126).
[39] Eschebach 1979, 14; Jorio 1981, 179; Schween 1936, 16.
[40] Eschebach 1979, 14.
[41] The *tegulae mammatae* tiles are 0.5m by 0.5m, and they are arranged with their edges flush to one another. The air space formed by the bosses of the *tegulae mammatae* against the wall is approximately 0.05m.
[42] DeLaine 2020, 84; Miliaresis 2019, 47.
[43] On glass in Roman baths, see: Broise 1991, 62-63; Ortiz Palomar and Paz Peralta 1997; Pappalardo 1999, 237-38.
[44] During the AD 79 eruption of Vesuvius, the windows in the *caldarium* of the Suburban Baths at Herculaneum were blown out from the impact of the pyroclastic flow. A *labrum* that once stood next to a window was also pushed across the room by this violent force, leaving an imprint in the volcanic material. Fragments of double window frames and of glass that had been blown into the *labrum* were found in this imprint. The evidence, according to Pappalardo (1999, 237-38), proves that this window was closed not only with glass, but also that it was closed with a double pane of glass. See also: Bachman 2008, 121; Broise 1991, 62-63; Jacobelli 1999, 227.
[45] Jorio 1981, 177.
[46] Eschebach 1979, 15; Jorio 1981, 179-80; Schween 1936, 23-26.
[47] Jorio 1981, 179.

Figure 6: Opening of the testudo device in pool basin. Women's caldarium, Stabian Baths, Pompeii. (After PPM 6.1, 214, fig. 118)

The floor and the ceiling

The floor of the women's *caldarium* was covered by a mosaic of square white *tesserae* (0.01m by 0.01m), with a strip of black *tesserae* (0.11m wide) framing it (Figure 4). The hypocaust is fully preserved, with the pillars ranging in height from 0.8m to 0.9m.[48] The eastern sector of the room is filled with a pool that measures 1.2m by 4.1m on the inside, excluding a step that bathers could have sat on to immerse themselves in the warm water (Figure 5). There was a rim around the pool and a step in front of the pool for access. The steps and the pool were faced with white marble. A metal pipe for water can be seen on the southern wall of the pool, as well as the opening for a *testudo* device (Figure 6). The western portion of the women's *caldarium* contained a *labrum*, still in excellent condition. The base had a diameter of 1.9m, was 0.7m tall, and was made of brick masonry and plaster. The water basin part of the *labrum* had a diameter of 2.2m and was made of basalt.[49]

The ceiling of the women's *caldarium* was a vault (approximately 0.4m to 0.5m thick) covered with stucco and white paint. Grooves following the lines of the arching of the vault were formed in the stucco, perhaps to help prevent water from dripping on the heads of bathers.[50]

[48] There was an upward gradient of 1.5% from south to north in the hypocaust, to improve circulation of hot gases, according to Eschebach (1979, 14). Schween (1936, 19-20) shows the hypocaust floor as level, without a gradient.
[49] Eschebach 1979, 15.
[50] Eschebach 1979, 14.

The women's tepidarium

Like the *caldarium*, the women's *tepidarium* is also very well preserved (Figure 1, T). The walls are still adorned with stucco decorations and red, yellow, and blue paint. Most importantly for this study, the preservation of the structure allows the layers of materials comprising the walls and floors to be observed and measured. The women's *tepidarium* was a rather small rectangular room 8.2m in length and 5.0m in width. The height from the floor to the top of the vault was measured to be 5.1m and the height from the floor to the beginning of the vault was measured to be 2.6m.[51]

The walls

A thorough understanding of the construction of the *opus incertum* walls of the women's *tepidarium* can be obtained, since all the walls retain portions of *tegulae mammatae*, stucco, mortar, and paint. Surprisingly, the thickness of the terracotta *mammatae* tiles used on the walls of this room varied considerably, unlike the rather uniform ones used in the *caldarium*. For example, the *tegulae mammatae* on the north, east, and west walls were approximately 0.02m thick, while those employed on the south wall were only 0.10m thick. Thicknesses of each tile varied as well, perhaps suggesting that the quality of these tiles was lower than those used in the *caldarium*.[52]

The women's *tepidarium* had a rectangular window in the west wall measuring 1.1m by 1.4m. There were also two doors leading to and from the *tepidarium*: Door 3 (approximately 0.9m wide and 2.1m tall) communicated with the *apodyterium*, and Door 4, mentioned above.[53]

The floor and the ceiling

The floor of the women's *tepidarium* was covered by a mosaic with the same design as the mosaic that was in the women's *caldarium*. The hypocaust pillars ranged in height from 0.4m to 0.8m, and the terracotta tiles that formed them were 0.20m by 0.22m.[54] This room did not contain a pool or *labrum*, or any other permanent furniture that would have affected how heat passed through the floors.

Some fragments of the ceiling decoration remain, showing that it was painted white, but most importantly, parts of the vault itself are preserved. The thickness of the ceiling varied between 0.45m and 0.48m and had a layer of stucco on it that was 0.06m thick.

The men's caldarium

The *caldarium* was the largest room in the Stabian Baths of Pompeii, and it was also probably the most lavish (Figure 1, N). The hot room was formed by three sections, a large rectangular area in the middle (approximately 13.8m in length, 7.3m in width, and 6.3m high); a smaller rectangular area contained a pool on the eastern side (approximately 2.1m long, 6.2m wide,

[51] Eschebach 1979, 15; Schween 1936, 23-26.
[52] Eschebach 1979, 15; Schween 1936, 23-26.
[53] Eschebach 1979, 15; Jorio 1981, 179-80; Schween 1936, 23-26.
[54] The height of the pillars increased moving from east to west and there was an upward gradient of 1.5% from southeast to northwest in the hypocaust (Eschebach 1979, 15-16).

Figure 7: Opening in the apsidal area and the remains of the labrum. Men's caldarium, Stabian Baths, Pompeii. (© Lienyuan Lee, Wikimedia Commons, CC BY-SA 3.0)

Figure 8: Hypocaust and pool basin. Men's caldarium, Stabian Baths, Pompeii. (Photograph by I. Miliaresis)

and 5.5m high); and an apsidal area, or *schola*, that held a *labrum* (approximately 4.5m at its longest point, 6.6m at its widest point, and 6.0m at its highest point).[55]

The walls

The walls of the men's *caldarium* were built in *opus caementicium*. Their thickness varied and have been assigned different values by different scholars.[56] My own values have been used for this study where it was possible to measure the thickness of the walls. Schween's values are used otherwise, since his study was carried out when more of the walls may still have been intact.[57] Eschebach estimated that the highest point of the rectangular section of the *caldarium* was 6.3m, that of the apsidal area was 6.0m, and that of the pool area was 5.5m. His measurements are used for heights.[58]

Several openings have been identified in the walls of the men's *caldarium*, including a door, Door 2 (approximately 1.0m wide and 2.5m high) in the south wall that led to the *tepidarium*. Jorio also found evidence of possible chimneys in the *caldarium*, although it is difficult to prove their function with certainty. There were two openings in the apsidal area, and a vertical canal on the north end measuring 0.1m by 0.3m.[59] The apsidal area of the men's *caldarium* also had a round window (Figure 7) with a diameter of 0.5m, 3.2m above the floor.[60]

The floor and the ceiling

The floor of the *caldarium* is now almost completely missing, although many of the *pilae* of the hypocaust are still *in situ* (Figure 2). The rectangular section in the middle measures approximately 11.2m by 7.3m and was covered with a white marble slab that was 0.03m thick.[61] There was a pool basin (Figure 8) in the eastern end and a *labrum* (Figure 7) in the western end, both of which would have affected how heat was radiated up through the floor from the hypocaust. The inside of the pool measured approximately 5.7m by 1.2m, contained a step and was surrounded by a rim on all sides. There were two steps in front of the pool, but they are badly damaged. The pool is also assumed to have been faced with marble. The *labrum* was a basin on top of a cylinder made of bricks and covered with limestone. The diameter of the basin ranged between 2.3m and 2.6m.[62] The ceiling of the *caldarium* is missing, with only some

[55] The *labrum* may originally have been located in front of the north wall to benefit from proximity to the service area (Trümper *et al.* 2019, 126). See also: Cantarella and Jacobelli 2003, 98; Eschebach 1979, 11; Heinz 1983, 75; Jorio 1981, 169, 177; Kraus 1975, 32; Menchelli 1987, 83; Yegül 1992, 376.
[56] Schween (1936, 4) claimed that the north and south walls of the rectangular area and the *schola labri* area had a thickness between 0.86m and 0.91m, the west wall of the rectangular area had a thickness of 0.61m, and the three walls and eastern pool area of the room had a thickness of 0.62m. Jorio (1981, 177) assigned a thickness to all of the walls to be between 0.50m and 0.75m. Jorio also concluded that, in a previous phase of the baths, there were two rows of niches along the walls. These were in turn covered over in order to create a smooth wall surface for the application of *tegulae mammatae* and *tubuli*, used in conjunction with the hypocaust system. See also Eschebach (1979, 11).
[57] Schween 1936, 4.
[58] Eschebach 1979, 11.
[59] Jorio 1981, 177-78.
[60] Eschebach 1979, 11-12.
[61] The hypocaust had a 0.4% drop in grade from south to north, which helped improve the circulation of hot gases below the floor as it facilitated the rising of the hot air coming out of the furnace to a greater distance (Eschebach 1979, 11).
[62] Eschebach 1979, 11.

Figure 9: Hypocaust and pool basin. Men's tepidarium, Stabian Baths, Pompeii. (© S.T. DeSimone, Wikimedia Commons, CC BY-SA 3.0)

small sections of joins with the vault remaining. It is assumed that most of the characteristics of the ceiling were similar to the women's section.[63]

The men's tepidarium

The men's *tepidarium* was a rectangular room measuring approximately 12.5m in length and 6.9m in width (Figure 1, M). The height can only be assumed since the top portion of the room is now missing. Therefore, 6.0m from the floor to the top of the vault was taken as the assumed height of the ceiling.[64] The height from the floor to the springing of the vault was calculated to be approximately 3.0m.

The walls

The north, south, and west walls were all constructed of *opus caementicium* and were approximately 0.6m, 0.6m, and 0.8m thick, respectively. The east wall was made of *opus incertum* and had a thickness of 0.4m.[65] Each of the walls, excluding the west wall, had niches for storing belongings or bath supplies, like those found in the *apodyterium*. The walls were all covered with a layer of stucco, *tegulae mammatae*, another layer of stucco, and paint.[66] There were no windows in the room, but there were two doors in the *tepidarium*: Door 2 (mentioned above) and Door 1 (approximately 1.1m wide and 2.1m high) on the south side that served to connect the *tepidarium* to the *apodyterium*.[67]

[63] Eschebach 1979, 11-12.
[64] Eschebach 1979, 10; Schween 1936, 10.
[65] Eschebach 1979, 10; Schween 1936, 10.
[66] For the purpose of calculation, the thickness of these materials was taken to be the same as the uniform values measured in the women's *caldarium*. The walls are too damaged to take any accurate measurements of what once covered them. See Eschebach (1979, 10).
[67] Eschebach 1979, 9, 11.

The floor and the ceiling

The hypocaust of the men's *tepidarium* is still relatively intact. Too little of the floor remains to discern if it was covered by marble revetment or by a mosaic. A rectangular pool (Figure 9) was located on the eastern side of the room, which was approximately 1.7m by 3.4m on the inside. Unlike the other heated pools in the bathing facility, the rim of this pool only touched the eastern wall of the room at the back of the pool, and there was no step inside the pool. There was a step in front of the pool for access.[68] Due to the poor conservation of this room, when needed, structural measurements were assumed to be equal to those of the women's section.

Heat transfer analysis and method

The heating systems of the ancient Roman baths and the amount of fuel they consumed can only be understood fully through the proper application of modern heat transfer principles. Heat transfer operates on the condition that systems want to be in equilibrium. For temperature equilibrium to be maintained, an object of higher temperature will transfer some of its heat energy to an object of lower temperature, until the two reach the same temperature.[69] This phenomenon is expressed through Fourier's Law:[70]

$$\dot{Q}_{cond} = -kA\frac{dT}{dx}$$

where:

$\dot{Q}_{cond}$ = rate of heat transfer during conduction in J/s (Joules per second) or W (Watts)

k = thermal conductivity of conducting medium in W/mK (Watts per meter Kelvin)

A = area perpendicular to direction of heat transfer in m^2 (square meters)

$\frac{dT}{dx}$ = temperature gradient in K/m (Kelvin per meter)

The equation determines the amount of heat energy (Q) that passes through the surface area (A) of an object with a thickness (dx) and with a specific heat transfer coefficient (k), when there is a temperature difference (dT) between one side of the object and the other.[71] The

[68] Eschebach 1979, Taf. 8.

[69] Heat can be transferred through convection, conduction, or radiation. Convective heat transfer is only considered for the ceilings. Conduction heat transfer specifically depends on interactions of particles and is driven by the temperature difference between them; it is the result of lattice vibrations, unbound electron flow, and molecular collisions. Conduction and radiation are the most effective methods for directly counteracting heat loss from the human body. See: McQuiston *et al.* 2000, 124; Thatcher 1956, 171; Turns 2006, 249.

[70] Joseph Fourier (1768-1830) was a renowned mathematician and a high official in Napoleon's government. He established many theories on heat conduction. He published formulas in 1822, beginning his book, *Théorie analytique de la chaleur*, with what is known as Fourier's Law. See also: Lienhard 1981, 9-11; McQuiston *et al.* 2000, 124; Turns 2006, 224, 249.

[71] The formula carries a negative sign, because the rate of heat transfer moves in a positive direction of x when the temperature gradient is negative. Put simply, if the temperature is decreasing as it moves through the thickness of a substance, then the energy flux will be positive because it will be flowing in the same direction as the substance. See: Lienhard 1981, 11; McQuiston *et al.* 2000, 124; Turns 2006, 249.

heating systems of Roman baths operated on the concept that a significant temperature difference, or gradient, between the fire in the *praefurnium* and the air outside the facility would create a suction effect throughout all the hollow sections of the floors and walls, thus moving heated air throughout the system and warming the adjacent spaces.

This study is based on the formula known as Fourier's Law. All parts of the floors, walls, and ceilings need to be processed through this formula to determine how much heat is gained or lost by the system. Many other equations are necessary for determining heat loss through openings, heat contributions from the sun, energy required to heat water in pools, and the physical amount of fuel that had to be consumed to maintain high temperatures in the baths.[72] Due to volume of data and the many formulae through which those data must be processed, I used a computational database that I designed in Microsoft Access as part of my previous research on the Forum Baths at Ostia.[73] The database processes all of the information through the necessary formulae once they have been entered, but it also allows for minor changes to be made for countless permutations. For example, the type of fuel that is tested can be changed by selecting a different wood type from a pull-down menu that already contains the corresponding constants and energy values for that fuel type. Time of day, month, covering options for windows and doors, and temperatures can all be changed easily using the pull-down menus, as well as material for each layer of the building fabric. In this way, a multitude of different scenarios can be tested very quickly. The other benefit to this method is that final fuel numbers can be tested against those of the Forum Baths at Ostia (and any other bathing facility that is evaluated), with all other parameters kept the same.

In order to use this database and Fourier's Law, several pieces of information must be collected or assumed. The surface area, thickness, and heat transfer coefficient of materials can all be established by examining and measuring the *in situ* remains of the bath. Determining what temperatures were used is more difficult. Several studies related to the heating systems of ancient Roman baths have been attempted in the past, with the Stabian Baths being a focus of a few, but efforts to understand the ranges of temperatures that could be achieved by the Romans have yielded conflicting results.[74] The room temperatures used in the current study were the same as those employed in my previous research, where fuel consumption was modeled in the Forum Baths at Ostia. Values were selected based on several factors: the general consensus of a temperature throughout different studies, the logical agreement between values in different types of rooms, and the scientific level of the methods employed in each study.[75] For the *caldaria*, 45.0 degrees Celsius was used for the surface of the floor, 35.0 degrees for the air in the room, and 53.5 degrees for the hot air inside the walls. For the *tepidaria*, 34.2 degrees Celsius was used for the for the floor, 28 degrees for the air in the room, and 51.4 degrees for the air inside the walls.[76] Adjacent unheated rooms were set to 20 degrees Celsius, which is a standard average employed in modern building design. The temperatures for the outside environment are also required, since heated rooms would have been in contact with the outdoors through chimneys, windows, and other openings. Meteorological averages

[72] For a complete discussion of all of the necessary formulae, see Miliaresis (2013, 191-239).
[73] For an in-depth description of the database and how it operates, see Miliaresis (2013, 239-44).
[74] For a synthesized discussion on all of these heat studies, see Miliaresis (2013, 224-30). For a more recent simulation of how temperature in the baths was affected by openings, see Oetelaar *et al.* (2014). For problems in determining temperatures in baths, see Rook (2019, 36).
[75] Brödner 1983, 109; Kretzschmer 1958, 36; Rook 2002, 17; Yegül 1992, 381; Yegül and Couch 2003, 169-74.
[76] For the derivation of these values, see Miliaresis (2013, 229-30).

from modern Pompei were used, since ancient temperatures cannot be known with certainty and variations would have occurred throughout each day.[77]

The final factor that needs to be considered to conduct a fuel consumption study is the type of fuel. Different fuel sources produce different amounts of combustible energy, and predicting what would have been used on any given day is impossible. Examining the efficiency of various types of energy sources in conjunction with what was available in the region surrounding ancient Pompeii provides a more realistic and complete picture of the operation of the baths. Wood was the most common fuel that was used to heat the Roman baths, especially in Italy where forests covered a great deal of the countryside in ancient times.[78] Jashemski conducted extensive studies in Pompeii and other nearby towns to understand more thoroughly the flora of the region. The trees she identified included ash, beech, chestnut, hazel, walnut, elm, poplar, oak, and cypress.[79] A more recent study undertaken by Veal confirmed that ash, beech, oak, chestnut, elm, and some other species grew on the hills around Pompeii at various elevations.[80] The most common species that Veal identified in the charcoal remains that she studied was beech.[81] Ash was also tested for all the same permutations in order to be able to directly compare results from this study to those of my study on the Forum Baths at Ostia. Both beech and ash exhibit similar excellent combustion properties.

Results and greater implications

Once all of the data was inputted into the database, results were obtained for a number of different permutations and compared to other fuel consumption studies. A base study, or baseline simulation, was established for comparative purposes so that the effect of changes to the environment or operation of the baths could be detected easily. In the base study, variables were set to: doorways are closed with wooden doors, openings in the ceiling are unglazed *tegulae mammatae* and *tubuli* were assumed to have been on the walls where they were currently found (ignoring issues of phasing or refurbishments in progress), the time was set to 1 PM and the month to October (which has the closest approximation to the annual average temperature in modern Pompei). Other variables, as well as the time and month, were changed for each study to demonstrate the overall effect. For example, windows were either set to glazed or unglazed in different studies, but all the other variables were held constant so that any difference in efficiency was solely due to the window arrangement. All scenarios were tested for both ash and beech wood. In every case, more beech wood was necessary than ash wood to heat the baths, but the difference was not substantial, as can be seen below.[82]

Several study sets were created to test the effects of changing variables in the baths, over a period of time. Study sets combine a number of different permutations (i.e., testing heat lost at every hour of the day and in every month) to create a comprehensive evaluation of the amount of fuel consumed. Study Set 1 was used to examine fuel consumption values for each of the twelve months. Study Set 2 involved modeling an entire day in each season to obtain

[77] MeteoBlue: https://www.meteoblue.com/it/tempo/previsioni/modelclimate/pompei_italia_3170335
[78] See Malanima 2013, 15-16, 27; Rehder 2000, 31; Sherwood *et al.* 2020, 54-56; Veal 2012, 19; Yegül 1992, 368.
[79] Jashemski 2002, 16.
[80] Veal 2012, 23.
[81] Over sixty percent of the charcoal remains were from beech wood. Oak comprised the next largest category, which was less than nine percent of the total; see Veal (2012, 27-28, tab. 2, 33).
[82] Veal 2012, 27-28, tab. 2, 33.

Study Name	Ash Fuel Consumed (kg/hr)		Beech Fuel Consumed (kg/hr)	
	Unglazed Windows	Glazed Windows	Unglazed Windows	Glazed Windows
Base Study - January	7.60	7.40	7.79	7.59
Base Study - February	7.53	7.33	7.71	7.52
Base Study - March	7.23	7.04	7.42	7.23
Base Study - April	6.80	6.63	6.99	6.82
Base Study - May	6.12	6.27	6.31	6.46
Base Study - June	5.57	5.48	5.75	5.66
Base Study - July	4.98	4.93	5.17	5.12
Base Study - August	4.93	4.90	5.12	5.09
Base Study - September	5.52	5.46	5.70	5.65
Base Study - October	6.06	5.97	6.24	6.15
Base Study - November	6.87	6.72	7.06	6.90
Base Study - December	7.45	7.26	7.64	7.45

Table 1: Study Set 1 Results

consumption values for a whole year, with and without glass covering window openings. By combining the results from these study sets, an approximation could be made for the amount of fuel that was needed to compensate for the heat lost in the baths (through openings, doors, ceilings, etc.). This value was then added to the amount of fuel that was needed to initially heat the baths from the cold state and to heat the water in the boilers.[83] The total was then converted into number of trees that were cut down on an annual basis.

Study set 1

The first study set demonstrated how fuel consumption values would have fluctuated over the course of the year. Each month was tested both with unglazed windows in the heated rooms and with glazed windows with 0.003m thick glass (Table 1). The results show that there was not much difference in the amount of ash wood versus beech wood being consumed, although even this small difference would have added up to more substantial quantities over the course of a month. The more surprising result was that having glazed windows did not make much of a difference in the amount of necessary fuel as compared to having unglazed windows. In the similar study of the Forum Baths at Ostia, almost one and a half times more wood was needed to heat rooms with unglazed windows than ones with glazed windows during the month of May, and more than twice as much was needed in the coldest months.[84] In the Stabian Baths in the month of May, not having glass in the windows was actually more efficient. Although this outcome seems counterintuitive, there are two explanations for it. First, the windows were not very large (in comparison to ones that would be used in later baths, such as the Central Baths at Pompeii or the Forum Baths at Ostia), so less heated air would have escaped. Second, this study set was tested for a time-of-day scenario at 1 PM, when the solar contribution would have been very significant since the energy produced by the radiation from the sun

[83] In my previous study (Miliaresis 2013, 253, 260, 274), I demonstrated that it was more efficient to keep the baths heated at all times, instead of shutting down the furnaces at night. The amount of energy needed to heat up the baths was based on the surface areas of the floors, walls, and ceilings; therefore, the value did not change for any of the permutations.
[84] Miliaresis 2019, 46.

through the windows would have been higher without glass diffusing some of it.[85] Some expected results are notable, such as the fact that much less fuel was needed to heat the baths in the summer months.

Study set 2

The second study set provided a more detailed look at fuel consumption on an average day in four different months, representing the averages for each season (Table 2). The effects of solar radiation can clearly be noted here, with the least amount of fuel being consumed at noon. The most fuel was needed in the early morning hours and in the evening hours, when the sun was rising or setting, and during nighttime hours, there was no solar contribution to compensate for heat lost through openings and windows. Logically the most fuel is needed in the winter and the least in the summer.

Total fuel consumption

The initial fuel needed to heat the baths was not dependent on eventual losses, but only on the fabric of the structure itself. This value, therefore did not change for different permutations, and it was only added to the final totals once, with the assumption that the baths were never shut down. If the baths were shut down every day, this quantity would have to be multiplied for every day of the year, significantly changing fuel consumption numbers. Determining how much water was consumed in a day poses another challenge, since we cannot know how often water was changed in the pools. Because the Stabian Baths had a *testudo* device, and water was so expensive to heat, it was envisioned that the pools were only filled once a day.[86] Combining all this data allowed for tangible, comprehensible quantities of necessary fuel for an entire year (Table 3).

The final number of trees that needed to be cut down would have been dependent on the size of the trees. Mature ash tree species that grow in the Mediterranean area can reach a height of 25.0m and a girth of 0.9m. Beech trees can grow larger than ash trees, reaching heights of up to 40.0m and diameters up to 1.5m, but they would have taken longer to grow.[87] If a more conservative estimate is assumed, with a height of 12.5m and a diameter of 0.5m for both species, each tree would have produced 2.0m^3 of wood, or 1034.8kg per tree. As can be seen in Table 3, the total number of trees did not vary greatly on an annual basis between glazed or unglazed windows or with the use of either of the two types of hardwoods.

Many factors that could not be accounted for may have shown substantial variations in the number of trees that were cut down each year, including the size of the trees, other types of fuel that were used intermittingly, the dryness of the wood when it was burned, and the knowledge and ability of the person operating the baths. The values produced, however, did

[85] The fluctuations of wind and other weather patterns on an hourly basis were not taken into account for this study for the sake of simplicity. For more on the results of the window study conducted in the Forum Baths at Ostia, see Miliaresis (2019).
[86] To test how much fuel would have been consumed if the water was changed more often, one needs only to multiply the number shown in Table 3 by that amount.
[87] Approximately 0.025 cubic meters of hardwood is equivalent to 13.0kg. See DeLaine (1997, 215) and Ulrich (2007, 251).

Study Name	Ash Fuel Consumed (kg/hr)		Beech Fuel Consumed (kg/hr)	
	Unglazed Windows	Glazed Windows	Unglazed Windows	Glazed Windows
January, 8 AM	7.88	7.61	8.07	7.79
January, 9 AM	7.74	7.50	7.93	7.69
January, 10 AM	7.65	7.44	7.84	7.62
January, 11 AM	7.60	7.40	7.79	7.59
January, Noon	7.59	7.40	7.78	7.58
January, 1 PM	7.60	7.40	7.79	7.59
January, 2 PM	7.65	7.44	7.84	7.62
January, 3 PM	7.74	7.50	7.93	7.69
January, 4 PM	7.88	7.61	8.07	7.79
January, No Sun	7.88	7.61	8.07	7.79
Total for January Day	**187.56**	**181.38**	**192.05**	**185.84**
May, 5 AM	6.39	6.47	6.58	6.63
May, 6 AM	6.42	6.48	6.60	6.64
May, 7 AM	6.36	6.45	6.55	6.60
May, 8 AM	6.29	6.39	6.48	6.55
May, 9 AM	6.21	6.34	6.40	6.49
May, 10 AM	6.16	6.29	6.34	6.45
May, 11 AM	6.12	6.27	6.31	6.42
May, Noon	6.10	6.26	6.29	6.41
May, 1 PM	6.12	6.27	6.31	6.42
May, 2 PM	6.16	6.29	6.34	6.45
May, 3 PM	6.21	6.34	6.40	6.49
May, 4 PM	6.29	6.39	6.48	6.55
May, 5 PM	6.36	6.45	6.55	6.60
May, 6 PM	6.42	6.48	6.60	6.64
May, 7 PM	6.39	6.47	6.58	6.63
May, No Sun	6.39	6.47	6.58	6.63
Total for May Day	**151.53**	**153.83**	**156.01**	**157.62**
August, 6 AM	5.26	5.13	5.44	5.26
August, 7 AM	5.19	5.09	5.38	5.21
August, 8 AM	5.11	5.03	5.30	5.15
August, 9 AM	5.03	4.97	5.22	5.09
August, 10 AM	4.97	4.93	5.16	5.05
August, 11 AM	4.93	4.90	5.12	5.02
August, Noon	4.92	4.89	5.10	5.01
August, 1 PM	4.93	4.90	5.12	5.02
August, 2 PM	4.97	4.93	5.16	5.05
August, 3 PM	5.03	4.97	5.22	5.09
August, 4 PM	5.11	5.03	5.30	5.15
August, 5 PM	5.19	5.09	5.38	5.21
August, 6 PM	5.26	5.13	5.44	5.26
August, No Sun	5.26	5.13	5.44	5.26
Total for August Day	**123.72**	**121.41**	**128.20**	**124.40**

Study Name	Ash Fuel Consumed (kg/hr)		Beech Fuel Consumed (kg/hr)	
	Unglazed Windows	Glazed Windows	Unglazed Windows	Glazed Windows
October, 7 AM	6.47	6.27	6.66	6.27
October, 8 AM	6.32	6.16	6.51	6.31
October, 9 AM	6.20	6.07	6.39	6.22
October, 10 AM	6.11	6.01	6.30	6.15
October, 11 AM	6.06	5.97	6.24	6.11
October, Noon	6.03	5.95	6.22	6.09
October, 1 PM	6.06	5.97	6.24	6.11
October, 2 PM	6.11	6.01	6.30	6.15
October 3 PM	6.20	6.07	6.39	6.22
October, 4 PM	6.32	6.16	6.51	6.31
October, 5 PM	6.47	6.27	6.66	6.27
October, No Sun	6.47	6.27	6.66	6.27
Total for October Day	**152.52**	**148.38**	**157.00**	**149.71**

Table 2: Study Set 2 Results

take many different factors into account and they can be directly compared to those produced in other studies.

Comparison to other studies

Although a number of studies, discussed above, were conducted on the heating of the Stabian Baths, most did not compute actual fuel consumption. The exception is the study conducted by Jorio. He determined that 168kg of fuel were needed to heat the baths initially, which diverges significantly from the value of 35.15kg produced in the current study.[88] He also determined that 31,240 kilocalories of energy were needed to replace the heat lost from the men's *caldarium*.[89] Converting kilocalories into kiloJoules produces a value of 130,795.6kJ. Jorio did not mention what type of wood he used in his calculations, but if ash wood was assumed, then approximately 7.0kg were needed to heat the men's *caldarium*. He does not specify if this value was per hour, per day, or some other segment of time, and he did not address what time of day or year was assumed. If his value was taken per hour, then it is comparable on average to that produced here. Unfortunately, he did not give his results for the other heated rooms.

Sixty trees a year was not difficult number for the Romans to produce and maintain on an annual basis, but the Stabian Baths were not that large, making this value somewhat surprising when compared to that of the Forum Baths at Ostia. The Forum Baths of Ostia would have consumed approximately 94 ash trees to make up for the losses incurred in the baths, while the Stabian Baths would have consumed approximately 54 ash trees. The fuel needed to initially heat the baths and to heat the water in the pools was excluded in both cases to provide a more direct comparison. This result seems logical, since the Forum Baths were larger, but the Stabian Baths consumed more fuel per square meter. The Forum Baths contained at least eleven rooms that were heated, covering an area of approximately 922.8m^2, meaning that 0.1 trees were consumed per square meter. The Stabian Baths only contained

[88] Jorio 1981, 188.
[89] Jorio 1981, 189.

Study Name	Ash Fuel (kg/yr)		Beech Fuel (kg/yr)	
	Unglazed Windows	Glazed Windows	Unglazed Windows	Glazed Windows
Fuel Totals				
Total Fuel to Replace Lost Energy	56082.41	55149.66	57719.42	56294.89
Total Fuel to Initially Heat Baths	35.15	35.15	36.01	36.01
Total Additional Fuel for Heating Water	7980.88	7980.88	8177.04	8177.04
Total Fuel Consumed in Bath Annually	64098.43	63165.68	65932.47	64507.94
Total Trees Consumed Annually	**61.94**	**61.04**	**63.72**	**62.34**

Table 3: Total Quantities Consumed Annually

four heated rooms, covering an area of approximately 310.5m^2, meaning that 0.2 trees were consumed per square meter. The Stabian Baths consumed over fifty percent more of what the Forum Baths consumed, even though they were a third of the size.

Several factors could account for this lack of efficiency in the Stabian Baths compared to that of Ostia's Forum baths. For example, most of the walls in the Forum Baths at Ostia were close to a meter in thickness, while those in the Stabian Baths were closer to half a meter. A significant amount of heat would have been stored in the walls, so increasing their thickness would have reduced heat lost by the system. In fact, increasing the wall thickness by half a meter on just three walls of the men's caldarium would cause fuel consumption values to drop from 1.46 to 1.15kg per hour at 1 PM in January. Another likely possibility could be the size of the windows. Although it seems counterintuitive, having large windows (especially with glazing) would have reduced heat loss in the system due to the effects of solar radiation.[90] Having a smaller window, like those in the Stabian Baths, would have let less heated air escape through ventilation, but a larger window, like those in the Forum Baths that measured over five meters in height (Figure 10), would have allowed for a great deal of sun to enter the heated spaces. The comparison of fuel efficiency in these two facilities will be explored further in a forthcoming article.

Conclusions

A preliminary attempt to understand how the heating systems of the Stabian Baths at Pompeii functioned has been made in this heat study, along with an approximation of how much fuel would have been consumed. The fabric of the structure was examined and sources of heat loss identified. Testing various scenarios yielded an estimate of 60 trees' worth of wood consumed by the baths each year, which is a reasonable amount for the Romans to have harvested and maintained without leading to major deforestation. Since these kinds of trees grow relatively quickly and can reach heights between 5.0 to 8.0m in just ten years, their supply could replenished at reasonable speeds. Pompeii may also have had designated forest land that could have been used for fuel production, just as Rome did.[91] This study has demonstrated that fueling the Stabian Baths of Pompeii on a daily basis would not have led to an insurmountable

[90] DeLaine 2020, 82; Miliaresis 2019, 43.
[91] Meiggs (1982, 327-29) stated that the city of Rome had established an extensive mountain reserve by the 2nd century BC, and that other towns followed suit to ensure a ready supply of wood.

Figure 10: Window openings. Tepidarium (Room 18), Forum Baths, Ostia. (Photograph by I. Miliaresis)

drain on local resources, which suggests that Romans were able to make potentially wasteful and unsustainable industries into efficient operations from an early date. The presence of both *tegulae mammatae* and *tubuli* in this facility, which probably resulted from repairs and refurbishments in progress, also implies that the Romans regularly endeavored to improve their technologies to create even more efficient systems.

Another benefit of this study is that it provides new quantitative data to support analyses about how fuel was transported to and through the city and where it was stored in proximity to the furnaces of the bath. Wood is heavy and bulky, but frequent cart deliveries could have alleviated some of the burden of moving the fuel from the local forests to the city. Upon entering the city, the wood would have probably been moved by small hand-carts or by hand. By studying how specific quantities of fuel were moved in conjunction with data on traffic patterns and pedestrian movement, a better understanding of the distribution of goods entering the city in general might be gained.

By converting the mass of required fuel into volume, it is possible to illustrate how much physical space was needed to store the wood. Modeling the exact quantities of fuel needed to supply the baths for a month's use within the confines of the bathing facility illuminates how the baths were operated and maintained.[92] Finally, using the numbers produced in this study, it is possible to shed light on how much it would have cost to operate such an establishment. By incorporating these fuel consumption approximations with economic studies, it is possible to estimate the daily cost for operating the baths.[93] Such information can provide a more complete assessment of economics in the city of Pompeii during various time periods,

[92] A contract uncovered at the baths at Vipascum in Portugal (*CIL* 2.5181), states that the operator of the bath must have at least a month's supply of fuel on hand at all times for use in the baths.
[93] Blyth (1999, 87-92), for example, used Diocletian's Price Edict from AD 301 to compute that a cartload of firewood (approximately 394kg) would have cost between 30 and 33 HS (7.5 and 8.25 *denarii*). DeLaine (2020, 87) further explores this method.

particularly if fuel numbers from later baths and other industries are included. The level of expense can also demonstrate if a single individual could have paid for the operation of the baths, or if city funds may have been necessary.

Many other questions that need further analysis and on-site examination have arisen through this study. Included in these are whether it was possible for *tubuli* and *tegulae mammatae* to be used at the same time, and what made these baths so much less efficient than the Forum Baths at Ostia? Despite the importance of the Stabian Baths as one of the oldest surviving Roman baths, very little detailed information has been published on them in English. It is hoped that this essay has compensated for this *lacuna*, and that it has offered some new insights into the structure and functioning of this facility. Moreover, by sharing the data developed in this study with others, it is anticipated that the Stabian Baths, baths at Pompeii, and baths in general can be better understood from a commercial and economic standpoint.

Acknowledgements

This project originated as part of my MA thesis at the University of Virginia, under the direction of John J. Dobbins. His extensive work on trying to understand the evolution of Pompeii encouraged me to pursue these questions in the bathing facilities.

Rooms and Openings	Wall	Wall	Length (m)	Height (m)	Area (m^2)
Men's Caldarium (Room N)	a	South	6.1	6.3	38.61
	b	West (southern side)	0.3	6.3	1.90
	c1	West (straighter part of apsidal area)	1.5	6.0	8.93
	c2	West (curved part of apsidal area)	10.3	6.0	61.80
	c3	West (straighter part of apsidal area)	1.5	6.0	9.00
	d	West (northern side)	0.5	6.3	2.85
	e	North (rectangular area to step)	11.2	6.3	70.90
	f	North (with outer pool step)	0.4	0.6	0.24
	f	North (without outer pool step)	0.4	5.7	2.29
	g	East (north side by step with step)	0.6	0.6	0.36
	g	East (north side by step without step)	0.6	4.9	2.91
	h	North (pool area with pool)	2.0	1.6	3.20
	h	North (pool area without pool)	2.0	3.9	7.70
	i	East (pool area with pool)	6.2	1.2	7.13
	i	East (pool area without pool)	6.2	4.3	26.66
	j	South (pool area)	2.1	1.6	3.36
	j	South (pool area without pool)	2.1	3.9	8.09
	k	East (southern side with step)	0.6	0.6	0.36
	k	East (southern side without step)	0.6	5.7	3.44
	l	South (outer pool step with step)	0.3	0.6	0.18
	l	South (outer pool step without step)	0.3	4.9	1.46
	m	South (rectangular area to step)	4.2	6.3	26.59
		Two openings in Wall c	0.1	0.3	0.04
		One opening in Wall e - blocked	0.1	0.3	0.04
	2	Door in South Wall to Tepidarium	1.0	2.5	2.45
		Round Window in Absidal Area	0.3		0.22
Men's Tepidarium (Room M)	a	South	6.8	6.0	40.94
	b	West	6.9	6.0	41.24
	c	North	4.0	6.0	24.08
	d	North	7.6	6.0	45.45
	e	East	1.4	6.0	8.43
	f	East (pool area with pool)	4.2	1.2	4.77
	f	East (pool area without pool)	4.2	4.9	20.45

Rooms and Openings	Wall	Wall	Length (m)	Height (m)	Area (m^2)
	g	East	1.4	6.0	8.13
	h	South	4.6	6.0	27.69
	1	Door in South Wall to Apodyterium	1.1	2.1	2.43
Women's Caldarium (Room U)	a	North (to outer step)	3.2	5.1	16.26
	b	North (pool area with pool)	2.1	2.2	4.62
	b	North (pool area without pool)	2.1	2.9	6.05
	c	East (pool area with pool)	5.0	1.2	5.75
	c	East (pool area without pool)	5.0	3.9	19.65
	d	South (pool area with pool)	2.5	2.2	5.50
	d	South (pool area without pool)	2.5	2.9	7.20
	e	South (to outer step)	9.8	5.1	49.78
	f	West	5.0	5.1	25.40
	g	North	5.4	5.1	27.43
		Two round openings in wall f (chimneys)	0.1		0.03
		Window in West Wall	1.3	1.2	1.44
	4	Door in North Wall to Tepidarium	1.1	2.0	2.20
		Door in South Wall to Praefurnium	Bricked Over in Antiquity		
Women's Tepidarium (Room T)	a	North	7.1	5.1	36.28
	b	East	5.0	5.1	25.55
	c	South	1.8	5.1	9.20
	d	South	5.4	5.1	27.59
	e	West	5.0	5.1	25.55
		Two round openings in wall e (chimneys)	0.2		0.03
	3	Door in North Wall to Apodyterium	1.0	2.1	2.00
		Window in West Wall	1.1	1.4	1.49

Appendix 1: Dimensions of the Walls

Rooms	Length (m)	Width (m)	Area (m^2)
Men's Caldarium			
Rectangular Section Floor	10.95	7.30	79.9
Apsidal Area Floor - Straight	1.50	6.55	4.6
Apsidal Area Floor - Curved - No Labrum	3.28		16.9
Men's Labrum	1.29		5.2
Inside of Pool	5.68	1.20	6.8
Inner Step of Pool	5.68	0.25	1.4
East Rim of Pool	5.68	0.13	0.7
West Rim of Pool	5.68	0.25	1.4
North Rim of Pool	1.83	0.25	0.5
South Rim of Pool	1.83	0.25	0.5
Outer Step of Pool by pool	6.18	0.25	1.5
Outer Step of Pool by step	6.18	0.25	1.5
Men's Tepidarium			
Floor Without Pool	12.54	6.85	74.7
Inside of Pool	3.40	1.95	6.6
East Rim of Pool	3.40	0.13	0.4
West Rim of Pool	3.40	0.25	0.9
North Rim of Pool	2.20	0.25	0.6
South Rim of Pool	2.20	0.25	0.6
West Outer Step of Pool	4.4	0.25	2.2
Women's Caldarium			
Floor Without Pool	9.80	5.00	46.1
Inside of Pool	4.10	1.20	4.9
Inner Step of Pool	4.10	0.22	0.9
East Rim of Pool	4.10	0.25	1.0
West Rim of Pool	4.10	0.34	1.4
North Rim of Pool	2.01	0.34	0.7
South Rim of Pool	2.01	0.34	0.7
Outer Step of Pool	6.00	0.61	3.7
Women's Labrum	0.97		2.9
Women's Tepidarium			
Floor	8.20	5.00	41.0

Appendix 2: Dimensions of Floors

Rooms and Openings	Wall	Wall	Heating Type	Stucco On Tile	Terracotta	Air Space	Stucco	Wall	Stucco Out
Men's Caldarium (Room N)	a	South		0.060	0.020	0.046	0.060	0.870	0.060
	b	West (southern side)		0.060	0.010	0.070	0.060	0.340	0.060
	c	West (apsidal area)	Tubuli	0.060	0.010	0.070	0.060	0.610	0.060
	d	West (northern side)	Tubuli	0.060	0.010	0.070	0.060	0.340	0.060

Rooms and Openings	Wall	Wall	Heating Type	Stucco On Tile	Terracotta	Air Space	Stucco	Wall	Stucco Out
	e	North (rectangular area to step)	Tubuli	0.060	0.010	0.070	0.060	0.610	0.060
	f	North (with outer pool step)	Tubuli	0.060	0.010	0.070	0.060	0.610	0.060
	g	East (north side with step)		0.060	0.020	0.046	0.060	0.634	0.060
	h	North (pool area)		0.060	0.020	0.046	0.060	0.374	0.060
	i	East (pool area)	Tegulae	0.060	0.020	0.046	0.060	0.374	0.060
	j	South (pool area)	Tegulae	0.060	0.020	0.046	0.060	0.374	0.060
	k	East (southern side with step)	Tegulae?	0.060	0.020	0.046	0.060	0.634	0.060
	l	South (with outer pool step)		0.060	0.020	0.046	0.060	0.634	0.060
	m	South (rectangular area to step)	Tubuli	0.060	0.020	0.046	0.060	0.850	0.060
Men's Tepidarium (Room M)	a	South	Tegulae	0.060	0.020	0.046	0.060	0.890	0.060
	b	West	Tegulae	0.060	0.020	0.046	0.060	0.754	0.060
	c	North	Tegulae	0.060	0.020	0.046	0.080	0.870	0.060
	d	North	Tegulae	0.060	0.020	0.046	0.040	0.850	0.060
	e	East	Tegulae	0.060	0.020	0.046	0.060	0.374	0.060
	f	East (pool area)	Tegulae	0.060	0.020	0.046	0.060	0.374	0.060
	g	East	Tegulae	0.060	0.020	0.046	0.060	0.374	0.060
	h	South	Tegulae	0.060	0.020	0.046	0.060	0.890	0.060
Women's Caldarium (Room U)	a	North (to outer step)	Tegulae	0.070	0.020	0.046	0.070	0.720	0.070
	b	North (pool area)	Tegulae	0.070	0.020	0.046	0.070	0.234	0.070
	c	East (pool area)	Tegulae	0.070	0.020	0.046	0.070	0.194	0.070
	d	South (pool area)	Tegulae	0.070	0.020	0.046	0.070	0.234	0.070
	e	South (to outer step)	Tegulae	0.070	0.020	0.046	0.070	0.234	0.070
	f	West	Tegulae	0.070	0.020	0.046	0.070	0.324	0.070
	g	North	Tegulae	0.050	0.010	0.120	0.050	0.720	0.070
Women's Tepidarium (Room T)	a	North	Tegulae	0.075	0.023	0.070	0.075	1.050	0.075
	b	East	Tegulae	0.043	0.020	0.072	0.043	0.451	0.425
	c	South	Tegulae	0.070	0.020	0.046	0.070	0.720	0.070
	d	South	Tegulae	0.060	0.020	0.046	0.060	0.720	0.060
	e	West	Tegulae	0.070	0.020	0.145	0.070	0.245	0.070

Appendix 3: Thickness of Wall Materials in meters

Materials	Thickness
Floor	
Terracotta Bottom Slab	0.08
Cocciopesto Layer	0.18
Mortar Layer	0.03
Mosaic Floor	0.03
Labrum Above Floor	
Brick Base	0.67
Basalt or Limestone Basin	0.10
Approximate Water Layer	0.11
Pool Above Floor	
Pool Approximate Water Layer	0.40
Inner Step Brick	0.25
Outer Step Brick by Pool	0.35
Outer Step Brick by Step	0.17
Step Cocciopesto Layer	0.03
Step Marble Revetment	0.03
Rim Brick	0.80
Rim Cocciopesto Layer	0.06
Rim Marble Revetment	0.03
Inner Step Water Layer	0.20

Appendix 4: Thickness of Floor Materials in meters

Room	Vault Radius (m)	pi*r	Length or Height (m)	Area (m^2)	Stucco Width (m)	Wall Width (m)
Men's Caldarium	3.65	11.47	11.20	128.43	0.09	0.45
Apsidal Caldarium	3.28	10.29	3.10	31.89	0.09	0.45
Pool Caldarium	3.10	9.74	2.70	26.30	0.09	0.45
Men's Tepidarium	3.43	10.76	12.50	134.50	0.06	0.47
Women's Caldarium	2.50	7.85	12.30	96.60	0.09	0.45
Women's Tepidarium	2.50	7.85	8.20	64.40	0.06	0.47

Appendix 5: Ceiling Properties

Abbreviations

CIL *Corpus Inscriptionum Latinarum*. 1853-present. Berlin: Akademie der Wissenschaften.
PPM *Pompei: pitture e mosaici*. 1990-2003. Rome: Istituto della enciclopedia italiana.

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Pistore Panem Petimus: Specialization in the Late-Roman Baking Industry

Jared Benton

Abstract

The traditional Roman baker (pistor) is typically thought of as having been horizontally specialized; that is to say he or she performed all the tasks involved in converting raw materials (grain, salt, and water) into bread. This means that they were, in early modern terminology, both millers and bakers. The two professions are generally thought to have vertically specialized within the industry sometime at the end of antiquity. Previously, scholarship has only casually treated this instance of specialization and for the most part it is thought to have been driven by technological innovation, specifically the watermill, which took milling out of the workshop and put it in the hinterland or on the outskirts of cities. In this paper, the argument is made that technological innovation did not drive this specialization, but rather that socially stratified workforces and the vertically integrated strategies of urban businessmen introduced perspectives that transcended the workshop's social and economic needs, allowing for the two tasks (milling and baking) to be separated from one another both spatially and professionally.

Keywords

BAKERS, *PISTORES*, SPECIALIZATION, WATERMILLS, VERTICAL SPECIALIZATION, VERTICALLY INTEGRATED ECONOMIC STRATEGIES

Introduction

Ancient bakers, *pistores* in Latin, not only baked bread, but they also milled grain into flour, or at least that is the generally accepted truth. The functional split of the miller and the baker is thought to have occurred in the late 3rd century or early 4th century AD, a response to the advent of the watermill.[1] Yet watermills had been around—and probably in use—for centuries before the 4th century AD and still Roman bakers continued to mill their own grain.[2] Relying on such technological determinism to explain developments in Roman industries prevents us from seeing how ancient craftsmen made economic decisions, which was certainly not by waiting for the next innovation. Moreover, the idea that ancient *pistores* were miller-bakers and their Medieval counterparts exclusively produced bread, but not flour, is reductive and neglects the economic complexity of the ancient world and regional variation in foodways and in networks of producers and service providers. The simplistic narrative of specialization occurring at the end of antiquity, compelled by technological innovation, has largely been driven by textual and juridical evidence that pertains largely to Rome.[3] A survey of the archaeological remains of bakeries reveals that the situation was far more complex during both antiquity and the Middle Ages. Moreover, scholarship on the subject has probably been conflating two separate phenomena: vertically integrated economic strategies implemented

[1] Erdkamp 2005, 253-54; Marquardt 1886, 423; Sirks 1991, 307; Tengström 1974, 76 ff.; Wacke 1992, 648. On the social and professional lives of bakers in the western Roman world, see most recently Benton (2020).
[2] Brun 2007; Wikander 2008.
[3] Sirks 1991.

by a socially stratified commercial baking industry and vertical specialization. Parsing these two phenomena suggests that the former may have played a role in the latter, but that the ultimate specialization of separate millers and bakers occurred later than the late 3rd century AD.

Etymologies and businessmen: integrated economic strategies and a socially stratified baking industry

Although specialization in the late-antique baking industry is often alluded to, it has not been the subject of intensive study. Nevertheless, there is a coherent narrative about how millers and bakers became separate occupations that deserves to be revisited and critiqued. The etymology of occupational or professional terms, largely derived from inscriptions and ancient literary sources, has formed the basis of which tasks scholars assign to various craftspeople. Sirks uses shifts in legal jargon and the etymology of the words for 'bakery' to suggest a shift in the practices of commercial bakers.[4] He notes that the word for bakery in juridical evidence had been, since at least 200 BC, *pistrinum*, literally the 'milling' or 'grinding place'. But around 350 AD, the legal texts began using the term *paneficium*, literally the 'bread making place' or 'the duty of baking bread'. From this, Sirks infers that bakeries, at least some of those in Rome, were baking but not milling. A similar phenomenon is evident in north Africa where the terminology for bakers in certain cities shifts in the early 4th century from *pistores*, to *furnarii*.[5]

The underlying hypothesis of Sirks' narrative is that the meaning of the word for 'bakery' reflects the productive reality within the workshops. But this was never true of *pistrina*, which we know often housed both milling and baking, despite being called simply the 'milling place'. Varro, for instance, speculated that the derivation of *pistrinum* came from the verb *pinsere*, to grind or pound.[6] Yet we know that *pistrina* were places of both milling and baking by the end of the 1st century BC, and Varro's need to explain the etymology of *pistrinum* suggests that the original meaning of the word had long been forgotten. Moreover, the first mention of *pistor*, which is found in Plautus' late 3rd-century BC play, the *Asinaria*, should mean something akin to 'miller', but the playwright writes *pistore panem petimus,* 'we seek bread from the *pistor*'.[7] The etymology of the *pistrinum* clearly did not reflect the industrial realities occurring within them; in turn, why must a *paneficium* be a place where baking occurred, but not milling?

Rather than a change in the operation of the bakery, the shift from *pistrinum* to *paneficium* might instead be a consequence of a shift in the social fabric of the baking industry of large urban centers. The jurists' use of *paneficium* rather than *pistrinum* coincided with a general shift in baking terminology in Rome that began in the 2nd or 3rd centuries AD and culminated in Late Antiquity, a transformation that is tied to the social stratification of the baking industry in Rome and in some other major urban centers. *Pistores*, sometimes referred to as miller-bakers, continues to be the term for the voluntary association of bakers in Rome and at Ostia (the *corpus pistorum* or the *collegium pistorum*) well after the 3rd century AD, but the

[4] Sirks 1991, 307.
[5] *CIL* 8.16921 = *ILAlg* 1.579; Amraoui 2017, 200-01.
[6] Varro, *On Agriculture* 1.63.
[7] Plautus, *Asinaria* 200.

titles of the associations' officers begins to display increasing complexity as early as the 2nd century AD.

Such positions within the *collegium* are referred to as the *quinquennalis*, *aedile*, *senator*, and *pater*. Honorifics deployed within the ranks of a single *collegium* suggests that its membership was diverse and socially stratified. Participation in the Roman baking industry by individuals of varying power and wealth is corroborated by titles adopted by a number of individuals in the Roman empire. During the second half of the 20th century, most scholars of the ancient economy were in agreement: Roman elites did not participate—or were socially incentivized to eschew participation—in economic activity in bakeries.[8] In the post-Finley era, this issue has been repeatedly revisited, but often within the context of the 'social status of agents in the Roman economy'.[9] Such work largely focused on the social status of master craftsmen and on elite animosity toward working folk, but more recent work has come to challenge those narratives and has shown the intersections of social status, wealth, and professional activity were more prosaic than the Finleyan model might suggest. Tran, for example, identifies Caerellius Iazemis, who was not only *quinquennalis* of the *collegium pistorum* of Ostia, but also *codicarius* (shipper) and *mercator frumentarius* (grain merchant).[10] Shoevaert argues that such complementary activities suggest Iazemis was more than a simple baker, who was confined to the practice of his profession.[11] Schoevaert further argues that the man's cognomen, Iazemis, is neither Latin nor Greek, and Valjus identifies the name as Cappadocian, a region reputed for the quality of its bread.[12] A similar situation is evident also at Hierapolis in Phrygia, a town similar in size to Pompeii.[13] M. Aur. Papianos Plychon (Μ. Αὐρ. Παπιανὸς Γλύχων) gave 100 *denarii* to the association of linen manufacturers, the secretaries of which were required to distribute the interest to the group's members.[14] If the association broke this trust, the money was to go to the bakers' association (ἐργασίας τῶν ἀρτοποιῶν). Papianos was connected with two different occupational associations, the members of which came from different occupations altogether. In at least one case, there is potential for elite investment in commercial baking. Licinius Privatus was originally a member of *collegium fabrorum tignuarium*, the builders' association at Ostia, then joined the *collegium pistorum* as a *quaestor* and *quinquennalis*.[15] Tran argues that this shift in participation happened with Privatus' acquisition of several bakeries.[16] We know that he was also a man of wealth and power from other inscriptions, including one that recorded his donation of 50,000 HS to the city and his subsequent induction into the order of the local decurions. Perhaps the adoption of *paneficium* over *pistrinum* did in fact reflect a shift in the productive reality of bakeries in Rome, but one can make the case that it was merely part of a larger complex phenomenon of nomenclature that was informed by the needs of participants

[8] E.g., see Moeller (1976), whose work on the fullers of Pompeii suffered from a number of theoretical and evidentiary missteps, offers a notable exception.
[9] Andreau 2002, 209.
[10] *CIL* 14.4234; Tran 2006, 223-29.
[11] Schoevaert 2018, 192.
[12] Valjus 1998, 259-64.
[13] The size of an ancient settlement alone does not determine population because population density varied from city to city, predicated on the nature of each city's urban environment. Ostia had *insulae,* or large apartment complexes; Pompeii was characterized by atrium houses. Hierapolis resembles Pompeii in both urban character and size, leading Ahren (2017, 132) to estimate that the city had about 12,000 inhabitants.
[14] Guizzi and Ritti 2012, 659, no. 15; See *SEG* 62.1218 for discussion in *apparatus criticus*. Special thanks to Elizabeth Meyer for bringing this inscription to my attention and to Mali Skotheim for finding a better citation.
[15] *CIL* 14.374.
[16] Tran 2006, 105.

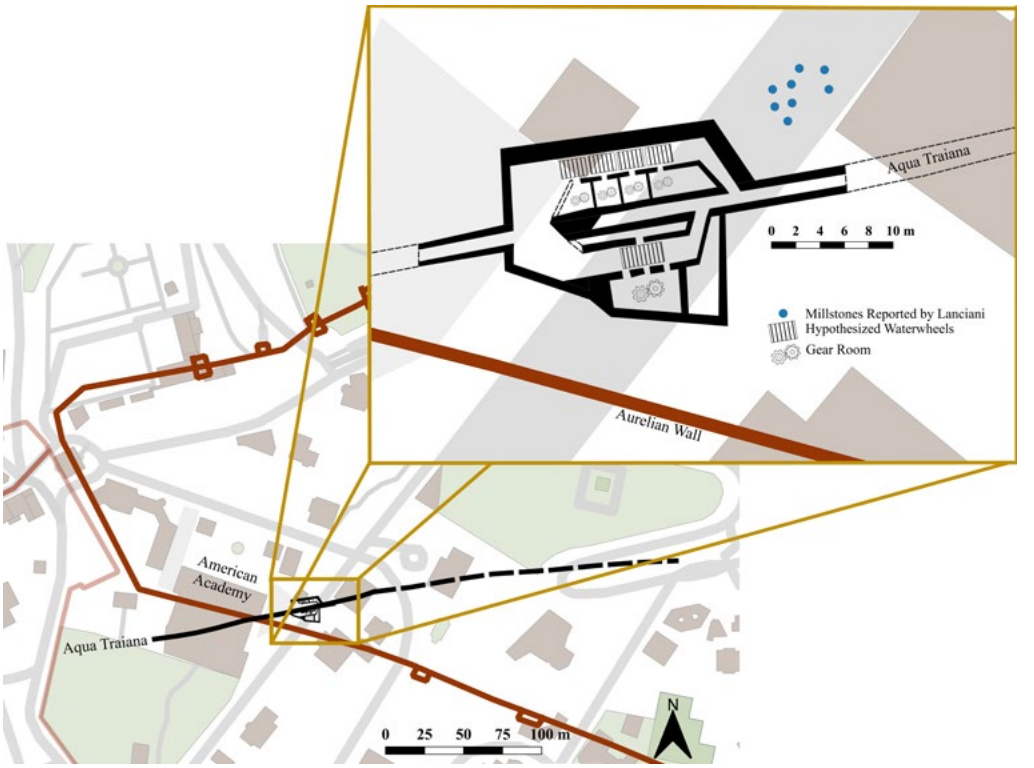

Figure 1: Water mill on the Janiculum hill in Rome. (Adapted from Wilson 2000, figs. 1, 4, and 5)

in the Roman baking industry such as Iazemis and Privatus, who not directly involved in production and may well have operated complicated systems of supply. Such systems may have included bakeries that did not mill their own flour, quite literally baking places distinct from more traditional *pistrina*.

The teleology of technological innovation and specialization

Scholars that date the split of the miller and the baker to the later 4th century find parallels for this shift with the adoption of the water mill, which they say removed milling from bakeries to places with water sources. Indeed, the water mills found in Rome on the Janiculum (Figure 1), dated to the 3rd century AD, are consistent with the shift in juridical terminology a century later, and Procopius singles out water mills as playing an important role in provisioning Rome, probably with bread but perhaps also with flour for home baking.[17] This hypothesis has merit in the broadest strokes of history; the availability of new technologies surely affected how craftsmen made choices, but the underlying assumption is that craftsmen were actively searching for technologies with higher productivity and were constantly seeking to increase their production levels and thereby their profits. There is some good evidence to support this, particularly in the increasing size of millstones in commercial bakeries from the 3rd

[17] Procopius, *Gothic Wars* 5.19.8-19; Bell 1994, 73-89; Wikander 1979, 13-36; Wilson 2000, 219-46.

century BC to the 2nd century AD.[18] Such a framework for innovative technologies and their relationship with technology is teleological in that we are describing eventual outcomes of specialization and technological innovations, not the initial causes of such phenomena. In this case, we see that specialized millers, freed from the tether of proximity to customers, eventually relocated to more rural areas deploying water or wind-powered mills. But we do not really know that the hydraulic mill played a role in the specialization of separate millers and bakers, even if they came to define commercial milling later.

In fact, we have evidence that hydraulic mills and miller-bakers coexisted for centuries before specialization. We find that water-milling technology was actually available long before the late 4th century AD. Vitruvius and Strabo describe such devices as early as the 1st century BC.[19] Even if they were only implemented in the 3rd century AD and later, for which there is significant evidence to the contrary, Wikander notes that the mills on the Janiculum could not have provided for more than 5 or 6% of the City's population.[20] Furthermore, there is a section in the *Codex Theodosianus*, entitled *De pistoribus et catabolensibus* ('Concerning Bakers and Pack-Animal Drivers'), the entirety of which is dated to the late 4th century AD.[21] At no point in the text are the millers addressed separately from the bakers. Moreover, there is reason to believe that the water mills in Rome were largely state run; the operators of the water mills are referred to as *apparitores*, some sort of civil servants. The first reference to millers as a group dates to the second half of the 5th century in the edict of Dynamius, the city prefect.[22] Indeed, most scholars confronting the relationship of the Roman miller-baker to the water mill acknowledge the likelihood that some *pistores* may have continued to mill in their bakeries after the fourth century AD, which demands redress because if such craftsmen are motivated by increasing production and profits, why would they have ignored an innovative technology that represented a massive increase in productivity, such as the hydraulic mill?[23]

All of this presents a confusing portrait of commercial baking during the 1st to the 5th centuries AD that, I believe, results from the limited sample of evidence. For instance, the evidence presented by Sirks and others pertains almost exclusively to Rome and Ostia. One cannot infer a model of empire-wide specialization from the jurists or epigraphy in Rome and Ostia. Similarly, the work of Tengström, Erdkamp, and Sirks was largely focused on the provisioning of Rome, not the ancient economy broadly speaking. It is worth examining what other evidence exists for specialization in the Roman baking industry writ large. A Greek inscription from Side in Pamphylia (Turkey), dating to the first half of the 3rd century AD, commemorates the harmony between two different groups of professionals whose titles appear to be based on individual processes in the production of bread:

> [-]ὑρ γ Κενδεας Κενδεου τῇ ὁμόνοίᾳ τῶν συνβιωτῶν· ἀλευροκαθάρτες καὶ ἀβακίταις ὁμονοίας χάριν ἀνέστησα τὸ κιόνιν εὐτυχοῦμεν.[24]

[18] Peacock 2013, 80-91.
[19] Vitruvius, *On Architecture* 10.5.2; Strabo, *Geography* 12.3.30. For fuller discussion, see: Moritz 1958, 193-96; Oleson 1984, 118-20; Wikander 1979, 15-16. See also Sherwood *et al.* (2020, 42-44).
[20] Wikander 2002, 130.
[21] *Codex Theodosianus* 14.4.0.
[22] *CIL* 6.1711; Sirks 1991, 349.
[23] Tengström 1974, 77.
[24] *SEG* 33.1165. κιόνιν = κιόνιον. Translation by the author.

> I, Kendeas son of Kendeas, have set up this small pillar of *Concordia* so that we the flour-sifters and the dough-kneaders might prosper living together in harmony.

The first profession mentioned, the ἀλευροκαθάρτες, is a combination of ἄλευρος, 'flour', and καθαρτής, 'cleanser'. The second derives from ἀβάκιον, 'slab', and σταῖς, 'dough'.[25] Despite the hopeful sentiments of the inscription, van Nijf suggests that the emphasis placed on ὁμόνοια, 'harmony', might indicate 'considerable tensions between different specialists' in the commercial baking industry.[26] This inscription raises a number of interesting questions about exploitation of labor and possible union-like associations, but, for our purposes here, one is tempted to identify this as an example of vertical specialization in a large urban center, with one group needing reconciliation—or at least co-existence with—another group. Side was a large city with population estimates as high as 60,000, similar to that of Ostia, making the temptation to see vertical specialization, which often correlates with population size, all the more enticing.[27] What is interesting, however, is that both processes alluded to in the titles (sifting and kneading) would occur after milling and thus have no bearing on the specialization of millers and bakers into separate occupations. One does not imagine that there was a specific workshop for, and specialists focused on, the sifting of flour. Mitchell assumes that the two groups are two different bakers' associations.[28] Her work was focused on the language of reconciliation, not economic complexity, but it is an interesting suggestion. Such names would be almost like nicknames, of the sort preferred by modern roller derby teams, that are related to the profession, but not meant to indicate the specific tasks performed while at work.

An early sixth-century rental contract among the papyrus documents discovered at Oxyrhynchus records the lease of a bakery by two craftsmen, Cataminas and Abraham, described as both bakers and millers *(κριβανεῖς καὶ μυλόναρχοι).*[29] This father-son enterprise attests that at least some bakers, as late as the 7th century AD, were still baking and milling. Moreover, the bakery itself was already outfitted with three ovens and up to four millstones. It is worth noting, however, that the author of the contract feels obliged to explain that the craftsmen are both millers and bakers, rather than using one word to encompass both tasks. The need to explain the craftsmen's activities may simply be pleonastic, establishing their credentials to meet the terms of the lease. It may, on the other hand, suggest that not all craftsmen in the business of milling and baking performed both tasks and clarification was necessary.

The inscription from Side and the papyrus contract from Oxyrhynchus serve to highlight several flaws in how we have studied commercial baking and milling in the Roman world. Legal texts and inscriptions such as the one from Side are often unclear and contain little information about what really went on in workshops. One of the challenges in studying ancient craftsmanship is that we have a relatively large number of inscriptions, legal opinions, and historiography, but very little in the way of contracts, leases, or ledgers, which would provide more direct evidence for the activity in bakeries. Even if we found two or three additional

[25] van Nijf 1997, 15, 236.
[26] van Nijf 1997, 15, n. 57.
[27] For population estimates of Ostia, see Meiggs (1973, 532-34) and Schoevaert (2018, 77-78).
[28] Mitchell 1993, 64, 106; Lau 2010, 100.
[29] *POxy* 1890.

documents, such as Cataminas' contract, they would almost certainly pertain to a small area in Egypt.[30] In other words, all of this textual data is anecdotal rather than empirical.

Expanding the evidence base: the evidence from workshops

Etymologies and specific occurrences of craftspeople from a single region make bad proxy-data for the productive realities of industries in Roman cities empire-wide.[31] The reliance on such evidence is all the more confusing considering the fact that we actually have the material remains of bakeries. A growing body of scholarship has been examining workshops and the various technologies and features found inside them, but it is not always clear how to infer process and activity from the often poorly preserved workshop. As such, it is worth reviewing what we mean when we say 'specialization'. The division of labor, wherein certain producers or service people focus on specific tasks and not others, is often framed in terms of *vertical* or *horizontal* specialization.[32] Ruffing elegantly summarizes the distinction:

> Horizontal specialization describes the diversity of goods and services produced in a society by using different professional formations or work roles. Thus, for example, the demand for skills for the production of amphorae is different from that for the production of shoes or textiles, and so on. The number of goods and services produced in an economy in this way is proportional to the number of specializations. Vertical specialization, on the other hand, describes the number of separate work roles and skills used in manufacturing a single product. A good example is the building of an ancient ship, which requires a set of different skills: carpentry, ironwork (for nails), rope-making, as well as textile production (for the sails). Moreover, both the building process itself and the supply of building materials and finished products need to be coordinated.[33]

For our purposes, the horizontal specialization in the commercial baking industry occurred when households stopped baking bread and began buying it from specialist bakers, which is really a topic for a separate article. Instead, the specialization of the miller and the baker would fall under the category of vertical specialization and, to continue Ruffing's example, in this case bread would correspond to the boat. The final product was baked by the baker, but a number of ingredients, such as flour or salt that might have been produced by a vertically specialized craftsman, such as the miller or a *saunier*, 'salt-worker', could have contributed to the final product. In some ways, milling establishments independent of baking, such as the hydraulic mills, are important, but only as long as we also find bakeries without millstones. The existence of mills does not necessarily preclude miller-bakers, but the two together would strongly suggest vertical specialization was occurring if not complete.

Specialization of commercial bakers happened in the eastern Mediterranean much earlier than in the west. There is evidence for commercial bakers in Linear B tablets[34] and throughout Mesopotamia, Egypt, and the Levant during the Bronze Age. Commercial bakers are attested

[30] Venticinque 2016, 32.
[31] The need not only to collect appropriate proxy-data, but also to interpret it within a framework, is discussed frequently in recent scholarship. See: Greene 2005, 43; Lo Cascio 2008; Scheidel 2009; Van Oyen and Pitts 2017, 4.
[32] Bernard 2016, 73-75; Bowman and Wilson 2009, 27.
[33] Ruffing 2016, 117.
[34] *ar-to-po-qo*. *Arto-* (bread) *-poqos* (maker). See Chadwick (2014, 91) and Ventris and Chadwick (1959, 130).

Figure 2: Bakery at VII.ii.22 in Pompeii, viewed from the vicolo Storto. (Photograph by J. Benton)

in Greece in a number of honorific inscriptions during the Iron Age. The earliest evidence for commercial baking in Italy and in the western Mediterranean, resembling the form of later Roman bakeries, are in Sicily at Morgantina and at Megara Hyblaea. The University of Texas excavations of a third-century BC house at Morgantina revealed two rotary millstones of the type typically found in Morgantina and an oven domed with broken fragments of tile, brick, and pottery.[35] Excavators were unsure of whether the oven and the millstones dated to the same period, but the mere presence of the two technologies in the same building during the 3rd century BC suggests a point of departure for specialization within the industry and indicates where commercial baking might have headed in the subsequent centuries. At Megara Hyblaea, excavators found a domed oven with more formal construction and masonry integrated into the surrounding walls, dating to only a century later than that at Morgantina.[36] Despite no millstone being found in the bakery, excavators identified several masonry circles which they interpreted as platforms for millstones. If true, milling and baking were linked early, adhering to a model of horizontal specialization but not vertical.

In general, baking and milling occurred in the same workshops throughout the Roman world. The bakeries of Pompeii and Herculaneum have been the subject of several intensive studies, first by Mayeske in 1973 and recently by Monteix.[37] Their work revealed that over three-quarters of the 31 or so bakeries in Pompeii contained both millstones and ovens, such as the so-called bakery of Popidius Priscus at VII.ii.22 (Figure 2). At Herculaneum, both of the two extant bakeries contained ovens and millstones. At Ostia near Rome, ovens were found in eight workshops, but only three of the eight had millstones.[38] There were, however, paving stones and evidence for robbed out millstones in another three bakeries.[39] There is even evidence for a water mill at Ostia inside one of the bakeries.[40] The two bakeries found at Augusta Emerita in Spain both had evidence for milling: in one, a millstone was found in the

[35] Walthall *et al.* 2018, 8. For millstones at Morgantina see Santi *et al.* (2015).
[36] Tréziny 2018, 264-66.
[37] Mayeske 1973; Monteix 2009, 2010, 2011, 2016; Monteix *et al.* 2012, 2013, 2014.
[38] Ostia I 2, 2 and 6; I 3, 1; I 3, 5; I 9, 2; I 12, 4; I 13, 4; I 17, 1; II 6, 7.
[39] Calza 1923, tav. 5, fig. 1.; Bakker 1999, 90-100.
[40] Bakker 1999, 98 and 110-11.

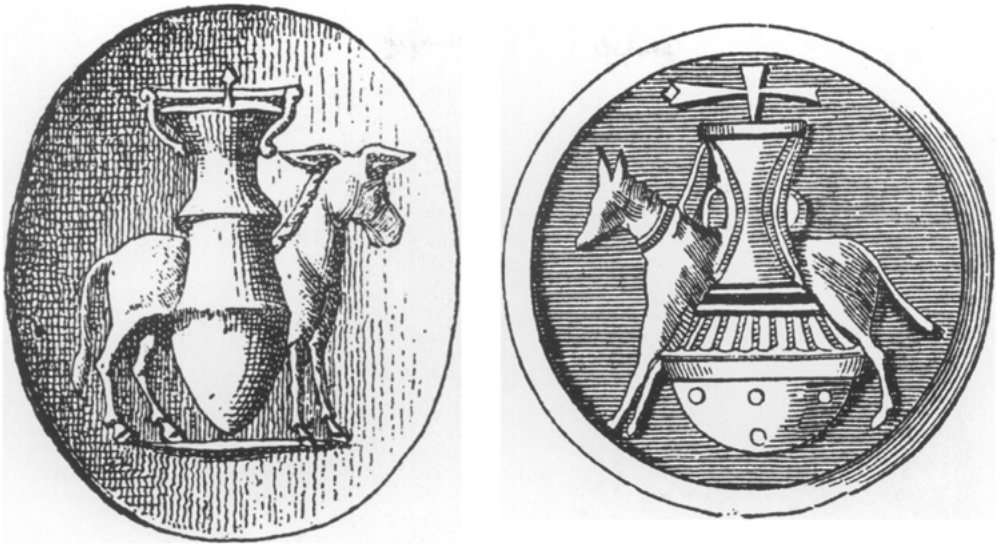

Figure 3: Millstone iconography, which show a donkey-driven mill on a gem (left) and an animal-driven mill on a circular marble plaque that acted as a shop sign (right). Both from Pompeii, and both are now lost. (After Blümmer 1912, figs. 20 and 21)

House of the Amphitheater and in the other, from an excavation on Calle Almendralejo, a neat platform that once clearly supported a millstone was brought to light.[41] Of the eight bakeries at Volubilis in Morocco with fixed masonry ovens, only two lacked millstones when they were excavated.[42] This correspondence is not only true of the bakeries in first-, second-, and third-century contexts, it is also evident in bakeries in operation after the 3rd century. The three late fourth- or early fifth-century bakeries found at Djemila in Algeria each contained a millstone.[43] At the one bakery at Thibilis, also in Algeria, of a similar date, a millstone was found nearby.[44]

The persistence of milling in Roman-era bakeries should probably not come as a surprise, given what little we know about bakers, particularly those of the empire's smaller urban centers. Although we tend to turn to the famous Tomb of the Baker Eurysaces, in Rome, that monument is unique in almost every regard.[45] There are, however, a number of other funerary monuments of bakers from around the western Mediterranean dating to the 1st, 2nd, and 3rd centuries AD. Like the tombs of many ancient craftspeople, these bakers' tombs tended to show technologies from their occupation, but specifically images that highlighted the quality of the bakers' products and their skill in producing them. Tran has convincingly demonstrated that the iconographic habit of such craftspeople highlighted their *artificium*, or

[41] Bustamante Álvarez *et al*. 2014, 38-44, figs. 22 and 27.
[42] The bakery on insula with the Maison au Bassin Tréflé and the bakery on insula with the Maison aux Colonnes. For Tréflé, see Étienne (1960, 74, pl. 18). For Colonnes, see Euzennat (1957, 210), Thouvenot (1945, 137), and Thouvenot (1949, 58).
[43] Allais 1954, 352; Amraoui 2017, 113-14; Ballu 1909, 77; Leschi 1953, 260.
[44] Gsell 1918, 90.
[45] See, for example, Petersen (2003).

Figure 4: Bakeries without millstones on the via degli Augustali in Pompeii (VII.12.1-2, 37, VII.12.7, VII.12.11, and VII.12.13). (Plan by J. Benton)

skill.[46] For commercial baking, certain technologies, including the oven, the kneader, the sift, and the millstone, might showcase the *artificium* and quality product of the baker. Schörle and Wilson, publishing a previously unpublished travertine relief depicting a scene of commercial baking, survey the known iconography from bakers' tombs, professional advertisement, and personal accoutrement.[47] Of the technologies present on artistic media, millstones appear on almost all of them, ranging from sarcophagi and cenotaphs to shop signs and signet rings. The millstone is often the only technology depicted and the image may well have served as a visual shorthand for both the production of bread and the occupation of the deceased or inhabitant (Figure 3). The *quinquennales* of the *collegium pistorum*, Marcus Caerellius Zmaragdo and Lucius Salvius Epictetus, flanked their names on their second-century monument with freestanding millstones.[48] With so much symbolic capital wrapped up in the millstone, it is perhaps not surprising that ancient bakers were loath to abandon milling as part of their repertoire.

Despite the presence of millstones in bakeries after the 3rd century AD and the seemingly symbolic capital of millstones to bakers, there is some evidence that bakers who did not mill their own flour may have existed at a fairly early time in the Roman world. In fact, there are a number of bakeries from the 1st century AD onwards that had no millstones in them and no real indications of milling, such as platforms or pavers. Many of the bakeries, such as the bakery at I.iii.1 in Pompeii, the bakery in the insula that also contained the House of the

[46] Tran 2016, 246-61.
[47] Wilson and Schörle 2009.
[48] *CIL* 6.1002.

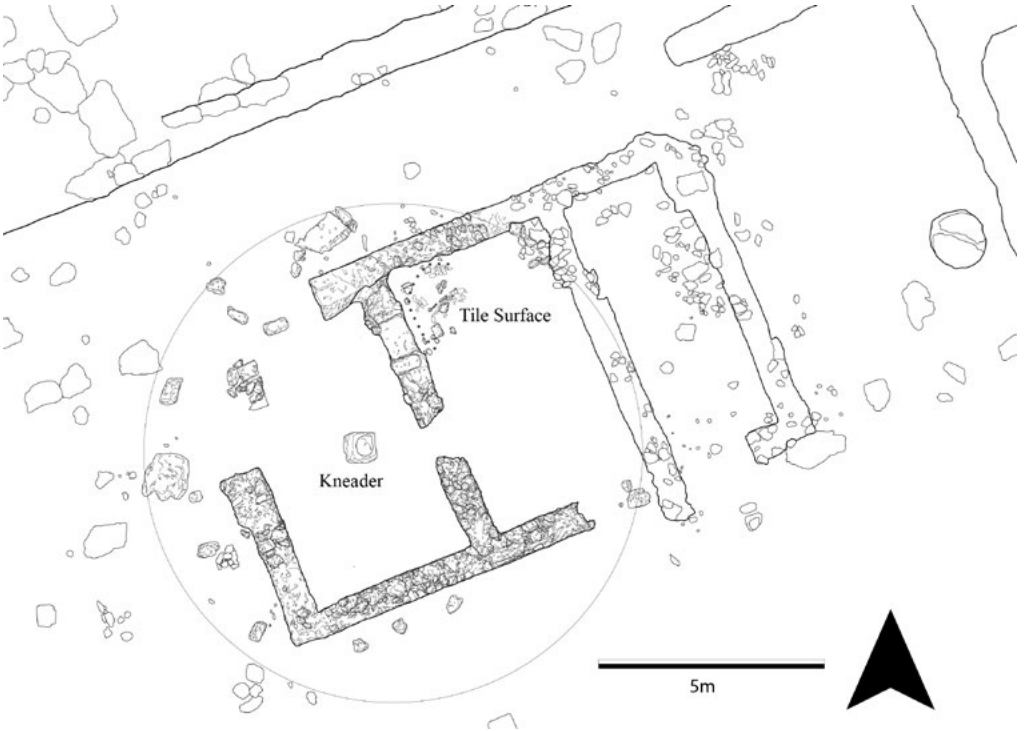

Figure 5: Maison aux Basin Tréflé at Volubilis. (Plan by J. Huemoeller)

Planetarium in Italica, or the bakery next to the Maison aux les Colonnes in Volubilis, had no millstones, but they had space for them and one suspects the millstones were removed when the workshops ceased to function as bakeries. There are, however, bakeries at Pompeii, Ostia, Italica, and Volubilis in which milling may never have occurred. Millstones were not found in these bakeries, but there was also little room for fixed masonry millstones. On the via degli Augustali in Pompeii, a series of purpose-built shops within insula VII.xii included four bakeries, none of which contained millstones (Figure 4).[49] These shops have garnered a great deal of speculation. Fiorelli suspected that the millstones may have been present at some point, but that they were removed shortly before the eruption of Vesuvius.[50] Mayeske suggests—in an effort to reconcile the material remains with the ancient literature—that such bakeries may have been pastry-shops run by *pistores dulcarii,* 'pastry chefs', and that these four bakeries may have bought their grain from other nearby bakers.[51] The bakery within the insula that contained the Maison au Bassin Tréflé at Volubilis provides a similar example: a bakery without a millstone in what appears to be a purpose-built shop, not linked with elite housing with little space for milling in addition to the mixer and oven (Figure 5).[52] One must concede that milling could have occurred in these spaces, especially in Volubilis, where the

[49] Pompeii VII.xii.1, 7, 11, 13.
[50] Fiorelli 1875, 283.
[51] Mayeske 1973, 120-24; Robinson 2005, 96. Monteix acknowledges this old interpretation in his early work (2009, 325), but in his subsequent work (2016) he takes a less textual based and more process-driven approach to interpreting the spaces.
[52] One caveat here: almost all commercial space in Volubilis seems to be purpose built; it is one of the defining traits of the city's urban character. See Es-Sadra (2010).

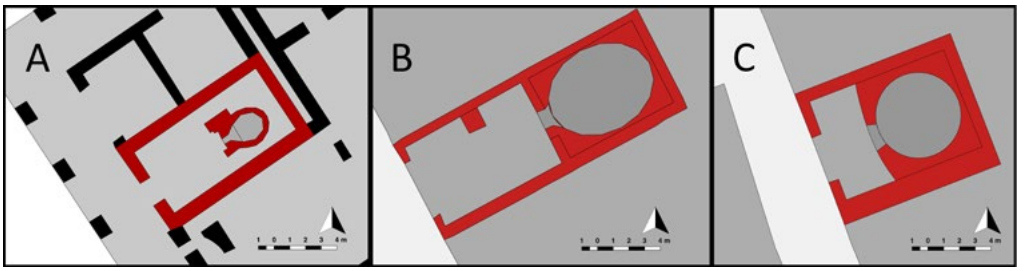

Figure 6: One-room bakeries: (A) bakery near the House of the Birds in Italica; (B) I 3, 5 at Ostia; (C) I 17, 1 at Ostia. (Plans by J. Benton)

annular lightweight millstone in use there could easily have been removed. But the bakeries on the via degli Augustali, and to a lesser extent that of the Maison au Bassin Tréflé, had all the other features of commercial bakeries in a shop that was purpose built. It seems unlikely that such resources were invested and technologies installed, such as hot water pipes through the oven, but milling was performed with small portable technologies and not the fixed millstones known throughout the rest of Pompeii.

There was a third strain of millstone-less bakery at Italica and Ostia that was definitely not just a bakery that lost its millstones. These bakeries were also in purpose-built shops, but they consisted of a single room with a solitary, centrally located oven (Figure 6). They had wide doors, similar to single-stall shops throughout the Roman empire. The second bakery at Italica, for example, on the same insula as the House of the Birds, was a single room with a large doorway and an oven right in the center.[53] Similar structures are found also at Ostia. The shops at I 3, 5 and I 17, 1 were each a single room accessed from a wide door.[54] The ovens were much larger than their contemporaneous counterparts at Italica, as wide as 5m. The single-room bakery at I 3, 5 was on the same insula with the Caseggiato dei Molini, one of Ostia's massive bread factories; the two may even have communicated at one point in the building's history. This might suggest that the single-room bakeries did produce bread, but the purpose of these single-room oven shops remains to be seen. For our discussion here, they definitely did not host the full range of processes in the production of bread and whatever was baked in their ovens consisted of goods processed at other locations.

Vertically integrated strategies as a catalyst for specialization

The archaeological evidence seems to suggest that specialized bakers who did not mill their own flour may have been a phenomenon that existed as early as the 1st century AD and may well have had its roots at the very moment of horizontal specialization, even if the dominant habit was for bakers to both mill flour and bake bread. In some cases, flour may have been the final product for consumers who wanted to make their own loaves. As such, specialization in the ancient Roman baking industry could then be recast in these terms: horizontal specialization existed in the ancient baking industry with *pistores* focused on the final product (i.e., bread), but vertical specialization did not occur until Late Antiquity and the Middle Ages. But it

[53] Caballos Rufino *et al.* 1999, 70; Caballos Rufino and León Alonso 2010, 90, fig. 7.7.
[54] On property I 3, 5, see: Bakker 1999, 34; Calza 1917, 180; Oome 2004, 12-21; Oome 2007, 233-46. For property I 17, 1, see Calza *et al.* (1953, tav. XIV, no. 4) and Heres (1982, 428, fig. 77).

also seems like specialization, which is sometimes treated as an all-or-nothing and sudden phenomenon, may have occurred over centuries informed by a number of variables, including technological innovation, local traditions, and tastes. Moreover, vertical specialization coincided with—and was probably coeval with—increasing social stratification within the industry. One of the interesting aspects of the bakeries that clearly had no milling occurring in them is that they tend to be in planned, purpose-built workshops, often clustered near other industries. These two facts suggest that the emergence of businessmen, participants in the baking industry who were not directly involved in the production process, may have played a role in facilitating or causing the eventual vertical specialization of two separate professions: millers and bakers. The causes of specialization have obviously been studied before. Ruffing notes that specialization in general has traditionally been thought, since the work of Smith, to have been incentivized by market competition. That is to say, having competitors drove producers to increase their productivity through the adoption and implementation of new, more advanced technologies and methods. But Ruffing and others have also noted that there is a close correlation between population size and levels of specialization; greater levels of specialization exist in communities with larger populations.[55] Indeed, Hawkins notes that the very nature of associations of craftsmen in large cities with 'thick markets' (those with high numbers of customers and vendors) differs from those of smaller towns with less commercial exchange.[56]

Part of the difficulty in understanding the nature of specialization in the late Roman baking industry is that we have been conflating specialization of the sort described above with another economic phenomenon: vertical integration of production. Silver describes the two forms of vertical integration, forward and backward, as well as vertical disintegration:

> Sometimes entrepreneurs interested in producing a given product undertake operations/processes upstream (backward) or downstream (forward) from that product. Economists refer to enterprises carrying out successive operations/processes as 'vertically integrated'. Thus, for example, a merchant interested in marketing wine produces the wine himself and transports it to the market in his own ships (backward integration). Or a producer of pots extracts clay (backward integration) and sells the pots in his own shops (forward integration). [...] On the other hand, entrepreneurs sometimes focus on a single operation/process. The wine merchant purchases wine from the farmer and pays a shipper to transport it; the pot-manufacturer purchases clay and sells his pots to itinerant merchants. When upstream and downstream operations/processes are integrated by means of a market interface, economists say that enterprises are 'vertically disintegrated'. It should be noted, however, that enterprises are rarely if ever completely integrated or disintegrated.[57]

If we conceive of the workshop, not as an independent, autonomous unit, but rather as a piece in a larger system, then a workshop without evidence for one or more of the processes related to the full operation sequence need not be considered vertical specialization, at least not in the way it is often framed. For example, the bakeries without millstones in purpose-built shops (Figure 6) might be better understood as cogs in a larger production line that encompassed

[55] Loomis 1998, 251-54; North 1992, 141; Ruffing 2016, 118-19; Temin 2001; Wilson 2008.
[56] Hawkins 2016.
[57] Silver 2009, 171.

Figure 7: One of two sixth-century ovens. Church Complex, Cosa. (Courtesy E. Fentress; appears in Fentress 2004, pl. 18).

a number of different workshops. This would have required, however, a participant in the commercial activity who would be adequately removed from the workshop and its operation to have the means and the incentive to acquire workshops as assets and craft a forwardly and/or backwardly integrated strategy for the commercial line.

Broekaert has shown that our evidence for vertical integration is more plentiful than is often understood.[58] Furthermore, he identifies the case of Iazemis as an example of backward vertical integration. First, Iazemis secured his own shipping rather than using others. Second, he obtained his own supply of grain as *mercator frumentarius*. With a vertically integrated strategy, bakeries without millstones and mills without ovens could still have been vertically integrated, albeit dislocated from another. Such bakeshops and millhouses could have been part of a coherent economic system consisting of assets belonging to the same owner or owners whose interest lay in enacting a production strategy that might have been forwardly or backwardly integrated, or both. It is easy to imagine someone such as Iazemis forming a backward integration strategy which would have included securing grain, milling it at one location, and finally baking the bread at an altogether separate location. For indirect participants, such as Iazemis, the financial benefits of compartmentalized production and implementation of innovative technologies may have trumped the symbolic capital of milling and millstones, which was so important to the craftsman miller-baker operating small workshops. Moreover, in thick markets such as those described by Hawkins, profitable strategies were grounded in quantity, not quality. As such, businessmen would have been incentivized to adopt technologies with higher productivity, such as the water mill. It is perhaps no coincidence that the adoption of the water mill in Rome, so many years after its invention, the emergence of stand-alone bakeshops, and evidence for vertically integrated economic strategies all coincided. As such, it might be almost impossible for us to delineate vertical specialization and the implementation of vertically integrated economic strategies.

[58] Broekaert 2012.

There can be no doubt, however, that during the Middle Ages in Europe, baking and milling were performed by separate commercial specialists. As the thick markets and large cities of the Roman world evolved or dissolved, the driving force of vertical specialization in the baking industry may have been the emergence of the church and monasteries as centers of administration and–by extension–commercial activity. The sixth-century contract for the rental of a bakery was between two bakers of Oxyrhynchus and a wealthy heiress named Serena, daughter of Peter, whose property was on a monastery. The seventh-century ovens found by excavators at Cosa, in which no millstones were found, was also on church grounds (Figure 7).[59] The ninth-century Plan of Saint Gall clearly shows that mills and bakeries were separate spaces. Perhaps the relocation of commercial baking from small workshops scattered throughout ancient urban centers to fixed spaces on church grounds and monasteries offered the ideological break necessary to allow economic concerns to outweigh the symbolic capital of milling and millstones to Roman pistores, thereby opening the door for vertical specialization within the industry. In fact, the Rule of Benedict shows that economic strategies that were being considered were within church leadership; the rule advises that a monastery should be self-sustaining, including mills and bakeries, among other on-site resources and workspaces.[60] Wikander has repeatedly noted that water mills were viewed as one of the main ways to fulfil such a milling requirement, particularly evinced in the hagiographies of Late Antiquity and the early Middle Ages.[61] The church may well have acted in much the same capacity as the businessmen of Rome of an earlier period, such as Iazemis; they too were implementing a vertically integrated economic strategy.

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Abbreviations

CIL *Corpus Inscriptionum Latinarum*. 1853-present. Berlin: Akademie der Wissenschaften.
ILAlg *Inscriptions latines de l'Algérie*. 1922-present. Paris: Éditions Champion.
POxy *Oxyrhynchus Papyri*. 1898-present. London: British Academy.
SEG *Supplementum epigraphicum graecum*. 1923-present. Leiden: Brill.

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[59] Fentress 2004, 72-78.
[60] Benedictus of Nursia, *Rule of Saint Benedict* 66.6-7.
[61] Wikander 2014, 213-14.

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The Fralin Numismatic Collection: Ten Years Later

Ethan Gruber

Abstract

This paper provides a history of the numismatic collection database at the Fralin Museum of Art at the University of Virginia, from its inception as a graduate research project in 2007 to its current iteration. The development of this database contributed to later work at the American Numismatic Society (2011-present), and the Fralin digital collection continued to adapt as numismatic data standards have evolved, spearheaded by the American Numismatic Society and its partners at other major collections through the Nomisma.org *community. Today, the Fralin contributes data and images to a wide variety of large-scale aggregation projects, both numismatic in scope and more broadly related to ancient geography.*

Keywords

NUMISMATICS, LINKED OPEN DATA, SEMANTIC WEB

Introduction

In December 2018, the digital numismatic collection (http://coins.lib.virginia.edu) of the Fralin Museum of Art at the University of Virginia (UVa) transitioned to its third technical platform. As a long-time collaboration between John Dobbins and several of his graduate students, the University of Virginia Library, and the Fralin, the project had resided since 2008 on the servers of the Scholars' Lab, a library-based Digital Humanities center. The database platform evolved considerably over the decade since its initial publication, ultimately migrating onto a server managed by the Institute for Advanced Technology in the Humanities (IATH) in the current version of the open source framework, Numishare, which has been developed nearly continuously by the author since the inception of the project during the Fall 2007 semester. This paper charts the technical evolution of the project over the last decade, particularly since my 2013 MA thesis, *Recent Advancements in Roman Numismatics*, which served as a state-of-the-field study.[1] While there have been numerous subsequent articles for varying levels of technical audiences authored by myself and/or numismatics colleagues at the American Numismatic Society, the British Museum, the German Archaeological Institute, and other organizations, my intention here is to discuss one museum's broader role in contributing to the collective knowledge of a discipline. The Fralin is just one node in a larger network of interconnected museum and archaeological databases, both large and small, forming a clearer view of Greek and Roman numismatics as a whole.

[1] Gruber 2013.

The Fralin Museum's numismatics collection

The Fralin Museum's numismatic collection is a small one: there are just over 500 objects in total.[2] Roman coinage comprises the bulk, but there are several dozen Greek coins and a small handful of Medieval or Byzantine specimens. The largest portion of the collection is Crisis of the Third Century Roman and Gallic Empire coinage (*c.* AD 250–270) from two English coin hoards excavated during the 1980s: Normanby and Oliver's Orchard Hoards. There is a selection of Roman Republican and early-mid Imperial era coins, encompassing most of the emperors through Caracalla. There are ten gold coins in total, nine of which are Roman, and one Syracusan decadrachm minted under the authority of Hicetas. Other notable specimens include a small handful of Hellenistic tetradrachms from the Ptolemaic, Seleucid, and Antigonid dynasties. Useful for teaching numismatics, the Fralin collection is similar in size and scope to numerous other university collections. Although it is not as large as those collections from Princeton or Yale, it is nevertheless available to students of the University of Virginia and the general Charlottesville community for hands-on research, and it has been accessible online since the launch of the web database in 2008.

A brief history of the digital collection at UVa

The database was the culmination of a collaborative project undertaken by students, including myself, in a Roman Numismatics graduate seminar taught by Professor John Dobbins in Fall 2007. At the time, I worked for the UVa Library, in Digital Library Production Services, the department that was primarily responsible for digitization of Special Collections and rare books materials and a variety of software development and maintenance projects. In October, the Library offered a program of small 'Innovation Grants' to its employees to conduct research projects tangentially related to current Library activities. I requested and received $5,000 to begin the digital photography of the collection, in collaboration with the Mary and David Harrison Institute for American History, Literature, and Culture, the Albert and Shirley Small Special Collections Library (particularly with Andrew Curley, who conducted most of the photography himself), and the Art Museum curatorial staff, Jean Lancaster and Nicole Anastasi.

In addition to coordinating the digital photography, I developed a standalone database for the collection with special query features specific to numismatics, separated from the Fralin's own, incomplete public database of notable artworks. I developed the database in languages and platforms I had recently learned working in a half-time staff share with librarian and software developer Bess Sadler in the department that would eventually become the UVa Library Scholars' Lab. Additionally, I had just completed a contract programming job in July-August 2007 with Orbis Cascade on the Northwest Digital Archives, a consortium of libraries, archives, and historical societies in the Pacific Northwest.[3] Combining these new experiences

[2] There are 575 records in the database, but nearly 50 Republican coins were sold to the Virginia Museum of Fine Arts in 2012. The VMFA lacks a comprehensive public database, and so these records persist in the University of Virginia digital numismatic collection.
[3] The Northwest Digital Archives, now Archives West, is available at https://archiveswest.orbiscascade.org/.

with Encoded Archival Description (EAD), a standard Extensible Markup Language (XML) schema for archival finding aids, eXtensible Stylesheet Language Transformations (XSLT), a web-standard functional language, and a handful of open source web server applications that were used in similar library web development projects, I began the process of adapting the EAD standard for numismatic description and built a rudimentary database system for querying and displaying numismatic information and digital photographs. I demonstrated the initial prototype by the end of the semester, and the skeleton of this site remains available in a 2008 cache by the Internet Archive.[4]

The remaining photography took place in batches of 50–100 coins through May 2008, and then-PhD student Carrie Sulosky Weaver identified most of the collection in the relevant type corpora (primarily through the *Roman Imperial Coinage* (*RIC*) and the *Cunetio Treasure* for 3rd century Gallic Empire coinage) as digitization progressed. I instructed Sulosky Weaver in the basic editing skills of EAD XML, and she performed most of the data entry for the project. Having spent roughly 60% of the total grant funds for digitization and identification, including data entry of the collection, I had the opportunity to present a paper on the technical aspect of image capture (with little emphasis on the underlying database) for coins at the annual Archiving Conference for the Society for Imaging Science and Technology, held in Bern, Switzerland in June of that year.[5] Later that December, the full collection was launched into production on a web server for UVa faculty projects managed by Bess Sadler and her colleagues in the Scholars' Lab, which had coalesced under the new direction of Bethany Nowviskie.

I presented a more comprehensive paper on the underlying application of EAD to numismatic collections and related software architecture at the 2009 Computer Applications in Archaeology (CAA) conference, held in Williamsburg, Virginia.[6] The paper included an analysis of the fledgling Numismatic Database Standard (NUDS), a list of discipline-specific field names that might be applied across a broad array of periods and cultures of monetary production (coins, tokens, paper money, etc.), with an eye to creating a crosswalk between the two models. Published by the 'Digital Coins Network', this was the output of a meeting organized by Charlotte Rouché in 2008 at King's College London held in order to lay the groundwork for a standard means of data exchange, attended by Sebastian Heath and Andrew Meadows, both of whom were at the American Numismatic Society (ANS) at the time.

The next significant moment in the development of the Fralin database came in late 2009 when the code was released with an open source license in order to be reused for a private collection of German talers cataloged in collaboration with ANS curatorial associate, Sylvia Karges. I developed an administrative back-end in order to enable the direct editing of XML data within web forms, using the World Wide Web Consortium (W3C) specification, XForms, and the open source XForms processor, Orbeon.[7] Initially published as 'Numishare' to Google Code, it was later migrated to Github in January 2013, where it receives regular revision.[8]

[4] The University of Virginia Numismatic Collection (as cached on 18 November 2008) is available at https://web.archive.org/web/20081118015850/http://coins.lib.virginia.edu/. Unfortunately, as was the programming fashion at the time, significant portions of the site's content were loaded asynchronously with a technique called Ajax, making it impossible for web crawlers to index the pages.
[5] Gruber 2009.
[6] Gruber 2010.
[7] Orbeon is still continually developed, available freely at http://www.orbeon.com.
[8] Numishare on Github: https://github.com/ewg118/numishare.

I joined the American Numismatic Society in January 2011 with the title, 'Web and Database Developer'. I continued to work on Numishare in a more sustained capacity, and the application would serve as the primary user interface for the Society's collection of some 600,000 coins, medals, and other monetary instruments. The first iteration of the new ANS online database was released into production in April 2011, entitled Mantis: A Numismatic Technologies Integration Service by Sebastian Heath.[9] Numishare has evolved considerably at the ANS since 2011 and some of these changes would trickle back into the Fralin collection over the years. These changes can generally be categorized in two ways. First, revisions to the Fralin codebase were to remain apace of updates in functionality that had been implemented in the ANS collection: the introduction of maps, standardized exports conforming to Linked Open Data (LOD, but also referred to as the 'Semantic Web') standards (more on this later), etc. Second, modifications to the underlying data models in the Fralin database were to conform to new standards, such as thesaurus concepts defined by Nomisma.org, and updated cataloging for *RIC*, *Roman Republican Coinage* (*RRC*), and several Hellenistic type corpora that have been published online following LOD principles by the American Numismatic Society since 2012. The latter point is dependent upon adaptations made to the Numishare platform by late 2011.

Expanding numishare from specimens to types

Following the publication of Mantis, my colleagues and I endeavored to work on several more ambitious projects. The first iteration of Nomisma.org, 'collaborative project to provide stable digital representations of numismatic concepts according to the principles of Linked Open Data', had been published by Heath and Meadows in 2010, and we began to expand and evolve this prototype into a functional application that would provide our collection, and eventually the Fralin's, with geographic coordinates of mints to allow for dynamic map generation.[10] Other types of entities, such as denominations, Roman emperors, materials, etc., would similarly be defined in LOD: uniform resource identifiers (URIs) represent intellectual concepts, and these URIs deliver both human- or machine-readable data conforming to the W3C specification, Resource Description Framework (RDF).[11] My colleagues and I published our first paper about Linked Open Data for numismatics in the CAA 2012 conference volume.[12]

Simultaneously, work began on Online Coins of the Roman Empire (OCRE), in collaboration with Gilles Bransbourg, then a researcher at the Institute for the Study of the Ancient World (ISAW) at New York University.[13] OCRE is an online cataloging and research tool, based on *RIC*, comprising 43,000 distinct types from Augustus to Zeno (31 BC-AD 491). The OCRE information system aggregates data for representative specimens of these typologies from a wide variety of museums and archaeological datasets, including the largest collections, such as the ANS and Berlin Münzkabinett, to smaller university or civic museums like the Fralin or the Museo Arqueológico de Llíria in Spain.

The very first proof of concept was demonstrated at an informal meeting at the British Museum in October 2011, which included Roger Bland and Dan Pett of the British Museum/

[9] Mantis: http://numismatics.org/search/.
[10] Nomisma: http://nomisma.org.
[11] Berners-Lee 2006.
[12] Gruber *et al.* 2013a.
[13] Online Coins of the Roman Empire: http://numismatics.org/ocre.

Portable Antiquities Scheme, Meadows and I representing the ANS, and David Wigg-Wolf from the Römisch-Germanische Kommission of the Deutsches Archäologisches Institut. The early prototype included one Augustan coin type and one representative specimen in the ANS collection. It was extraordinarily simple, but the seed for a much more significant project had been planted.

Numishare was modified and expanded for a wider range of numismatic description during the first year of my tenure at the ANS (e.g., to encode collections provenance and physical characteristics not represented in the Fralin collection). By late 2012, Numishare was overhauled to facilitate the publication of coin types in addition specimen catalogs. Part of this process included the migration of my initial EAD model for numismatics to a new purpose-built XML schema based on the NUDS definitions devised by Heath and Meadows, which, at the time, had been presented in the documentation for Nomisma.org.[14] This new model would be more LOD-aware, embedded with URIs that express Nomisma.org-defined numismatic concepts, discussed in 'Numismatic Data as a Knowledge Graph', below.

The beta version of OCRE was the subject of a paper I and my colleagues presented at CAA in 2012.[15] In this phase, OCRE included all types from the first volume of *RIC*, Augustus to Vitellius (31 BC-AD 69). When the ANS and its collaborators formally launched the project in July, it included the imperial types through Hadrian (vol. 2). By December, I began to experiment with the introduction of a significant new piece in numismatic Linked Data architecture, a server application for storing and querying Linked Data called a SPARQL Protocol and RDF Query Language (SPARQL) endpoint. SPARQL is a W3C standard query language and series of web protocols for RDF. This infrastructure was migrated into production in the Spring of 2013 and remains the backbone of digital numismatics today.[16] Simultaneous to developments in Numishare at the American Numismatic Society, I deployed an upgrade to the previous version of Numishare for the Fralin collection on the Scholars' Lab server. The data were migrated to the current version of NUDS and linked to OCRE-defined coin type URIs that had been published up to that point. This project is documented in my MA thesis as a culmination of the advancements the Nomisma.org-aligned projects had made in digital numismatics at the ANS since 2011, reapplied to the Fralin collection.

Although there have been substantial revisions to our initial numismatic RDF data model, notably with the introduction of a formal ontology developed by University of Frankfurt computer scientist, Karsten Tolle,[17] and iterative development in Numishare to introduce new functionality, the server architecture has remained relatively unchanged since 2013, except for one notable detail: Apache Cocoon, the original Java application for serving XML data in Numishare since 2007, became dormant within the open source community, necessitating the migration of the front-end user interface to Orbeon, which already powered the administrative back-end. Additionally, the user interface was migrated to a responsive stylistic framework called Bootstrap, which enabled Numishare to scale its user interface to

[14] The original NUDS database field documentation has been revised and is published by Meadows at https://www.greekcoinage.org/nuds.html. For the current XML schema, see Gruber (2019).
[15] Gruber *et al.* 2013b.
[16] See Gruber (2013), Meadows and Gruber (2014) for more technical information about this system.
[17] Tolle *et al.* 2018.

smaller mobile devices, such as smartphones and tablets, which is especially important for cataloging archaeological finds in the field.

By 2014, Numishare's development in Orbeon diverged from the version that remained in Cocoon on the Scholars' Lab server, making it impossible for the Fralin collection to remain current to contemporary features developed in other ANS Numishare-based projects. However, the Fralin collection data would see occasional updates, as new volumes of the *RIC* were published to OCRE, and batches of the Fralin's coins continued to be made available in OCRE and the Pelagios Project, an aggregation of ancient cultural heritage materials based on interoperability with the Pleiades Gazetteer of Ancient Places, particularly as the OCRE project team worked through the Third Century coinage (*RIC* vol. 5).[18]

The year 2014 was a watershed moment for the ANS for another reason: the Society received a $300,000 grant from the National Endowment for the Humanities (NEH) to finish OCRE over three years. The design of the Numishare software framework was generalizable, and the ANS has since published similar corpora for Republican coinage,[19] along with the Hellenistic series PELLA, based on Martin Price's *The Coinage in the Name of Alexander the Great and Philip Arrhidaeus*,[20] Seleucid Coins Online, following the type numbering system of the eponymous volumes by Arthur Houghton, Catherine Lorber, and Oliver Hoover,[21] and Ptolemaic Coins Online, published in late 2018, with a numbering system derived from Lorber's *Coins of the Ptolemaic Empire*, which had been published earlier in the year.[22] These latter three groups comprise another broader NEH-funded project, Hellenistic Royal Coinages, which will also integrate archival research materials and a new Numishare database for *An Inventory of Greek Coin Hoards*, to replace the 2010 proof-of-concept published on Nomisma.org with support from Stanford University, and moved to http://coinhoards.org/ in 2015. In 2020, the ANS and Oxford University received a joint National Endowment for the Humanities – Arts and Humanities Research Council (UK) grant to extend Hellenistic Royal Coinages to include Bactrian and Indo-Greek materials.

Of all of these projects, OCRE remains the most popular, now averaging about 400 users per day from all over the world. The project is used for cataloging both internally at the ANS and externally for teaching numismatics and art history, and for research by scholars and hobbyists alike.[23] As of March 2019, 35 museum and archaeological databases have contributed data for more than 125,000 Roman imperial coins. Nearly half of these are small German university museums published through the NUMiD network, a consortium spearheaded by the Berlin Münzkabinett.[24] There are more than 211,000 total physical specimens linked to these Roman and Hellenistic type catalogs from about 40 collections. The study of Roman Republican coinage was significantly enhanced by the entry of the Bibliothèque nationale de France (BnF) into the Nomisma.org, with the BnF contributing more than 20,000 coins

[18] Pelagios (http://commons.pelagios.org/) is a project spearheaded by (among others) Elton Barker at the Open University in the UK, and Pleiades (https://pleiades.stoa.org/) is a project managed by Tom Elliott at ISAW.
[19] CRRO: Coinage of the Roman Republic Online, in collaboration with Eleanor Ghey and Ian Leins of the British Museum (http://numismatics.org/crro).
[20] PELLA: http://numismatics.org/pella. Price 1991.
[21] Seleucid Coins Online: http://numismatics.org/sco.
[22] Ptolemaic Coins Online: http://numismatics.org/pco. Houghton *et al.* 2008; Lorber 2018.
[23] Reinhard *et al.* 2017.
[24] NUMiD, Netzwerk universitärer Münzsammlungen in Deutschland: http://www.numid-verbund.de/.

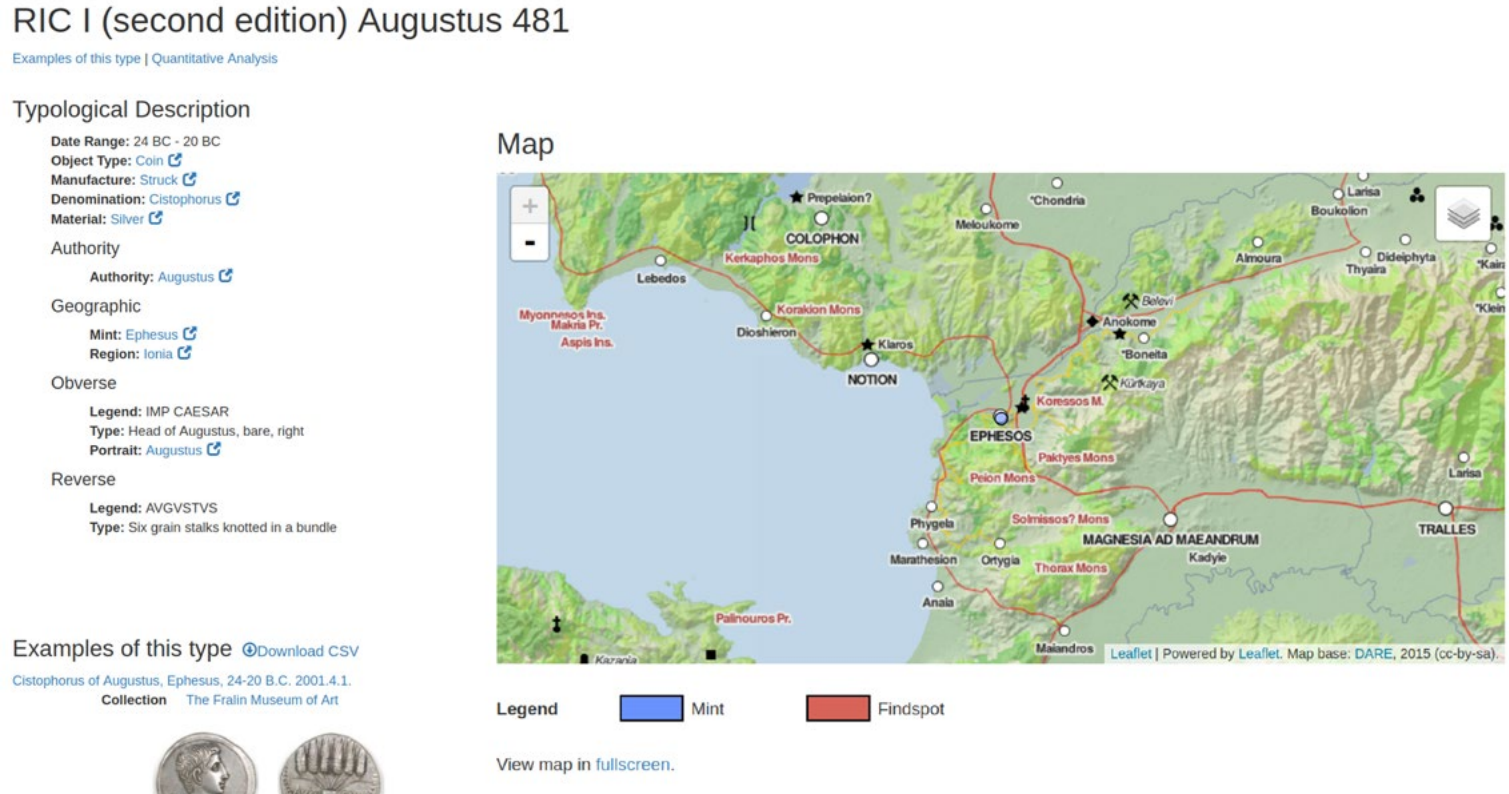

Figure 1: Augustus 481 in OCRE, illustrated with one coin from the Fralin Museum of Art. (Courtesy http://numismatics.org/ocre/id/ric.1(2).aug.481*)*

to CRRO in late 2017. More than 90% of its 2295 coin types are now illustrated with at least one photographic example, making this the most comprehensive research platform for Republican numismatics.[25]

Integrating the Fralin into the broader research ecosystem

Numismatic data as a knowledge graph

At the risk of becoming too technical, I think it best to summarize the philosophical underpinnings of Linked Open Data principles. LOD is a more accurate reflection of how humans themselves organize information, as a field of artificial intelligence called Knowledge Representation, which applies semantic ontologies and logical reasoning to complex mental models. Setting aside the complexities of RDF and SPARQL, which are more thoroughly addressed in the bibliography, this is how LOD functions: fundamentally, an intellectual statement has three parts: a subject, a predicate, and an object. In Linked Data, each statement is called a 'triple', and a database of triples is often called a 'triplestore'.

To illustrate, let us take as an example a *cistophorus* of Augustus in the Fralin. This coin has a unique identifier on the web, a URI, http://coins.lib.virginia.edu/id/2001.4.1. This URI is a subject in a triple about the coin, and many triples may be used to encode all of the factual statements about this coin. The coin has an accession number (predicate), 2001.4.1 (object). The coin is referenced by the *RIC* type (has a type: predicate), *RIC* volume 1, second edition, Augustus 481 (object). In OCRE, all coin types are also assigned unique identifiers (URIs). Augustus 481 is accessible at http://numismatics.org/ocre/id/ric.1(2).aug.481 (Figure 1).

Augustus 481 was minted (predicate) in Ephesus (object: http://nomisma.org/id/ephesus). The authority is Augustus (http://nomisma.org/id/augustus). The subject http://nomisma.org/id/ephesus has an English label of Ephesus and a French label of Ephèse. It has a latitude and longitude. It is a close match to the URI of https://pleiades.stoa.org/places/599612, the identifier for Ephesus in ISAW's Pleiades Gazetteer of Ancient Places.

It is not necessary to explicitly declare the mint of Ephesus for the coin of http://coins.lib.virginia.edu/id/2001.4.1. The mint can be inferred by means of its link to the *RIC* type. Likewise, these relationships in the network graph can be traversed in the opposite direction. Since the coin, http://coins.lib.virginia.edu/id/1991.17.10, an *antoninianus* of Gordian III (*RIC* Gordian III.35: http://numismatics.org/ocre/id/ric.4.gor_iii.35), was found in the Oliver's Orchard Hoards, it can therefore be inferred that *RIC* Gordian III.35 circulated to Britain. Furthermore, this enables us to map the circulation of Gordian III's coins as a whole, or coins from Rome, or *antoniniani*, or any other attribute of *RIC* Gordian III.35 (Figure 2). Findspot data is presently incomplete, for only the Fralin's coins provide findspot data for Roman Imperial coin hoards. Individual finds are provided by partner databases in Germany and Poland. So far, fewer than 1,000 of more than 250,000 Roman coins in the UK's Portable Antiquities Scheme have been linked to OCRE URIs, but the OCRE project expects an enormous influx of data following the publication of the Oxford Coin Hoards of the Roman Empire project into the numismatic LOD cloud, as well as integration of other national coin finds databases through the European Coin

[25] 'More than 20,000 Roman Republican coins from the BnF added to CRRO' (http://numishare.blogspot.com/2017/12/more-than-20000-roman-republican-coins.html). See also Yarrow 2021.

Figure 2: A depiction of the circulation of antoniniani: blue illustrates the mints that produced the denomination, with green and red representing individual finds and hoards, respectively.
(Courtesy http://nomisma.org/id/antoninianus*)*

Find Network.[26] Scholars have only just begun to realize the potential of these systems for advanced economic, social, and art historical research questions.

OCRE and related digital numismatic projects can also rely on Nomisma to provide translations in other languages (if available), geographic coordinates for mints and findspots. Importantly, the implicit relationship between a Fralin coin → OCRE type→ Nomisma mint → Pleiades URI makes it possible to export Linked Data from Numishare to Pelagios. In early 2013, the Fralin became the third collection to make its materials available through Semantic Web principles, after the ANS itself and Berlin, providing data both to OCRE and the Pelagios Project.

Building a whole that is greater than the sum of its parts

Following the publication of each of the ANS' online corpora, I updated the Fralin collection database to link to newly-minted coin type URIs. Although there are hundreds of UVa's coins available in OCRE, only ten are accessible through the Hellenistic projects. Regardless of the size of the Fralin's contribution to each project, these coins are nevertheless accessible to researchers through these corpora as well as through Pelagios, providing users with high resolution digital images, weights and diameters for quantitative analyses, and findspot information for those coins from the Normanby and Oliver's Orchard Hoards, in order to paint a more accurate picture of the circulation of ancient coinage. Of the 575 total coins in the

[26] Coin Hoards of the Roman Empire: http://chre.ashmus.ox.ac.uk/. European Coin Find Network: http://ecfn.fundmuenzen.eu/.

Fralin database, 434 have been integrated into the broader numismatic LOD cloud through aggregation into Nomisma.org's SPARQL endpoint.

As a university art museum, the Fralin's primary focus is to serve as a hands-on teaching museum for the University of Virginia community. Many of these collections, however, remain locked away from public view, and the data inherent in these collections are siloed and inaccessible to external researchers. Few scholars would seek out the Fralin digital collection to conduct research on Roman numismatics, let alone travel to Charlottesville to handle one or two coins personally. Yet scholars interact, directly or indirectly, with the Fralin collection daily through OCRE, CRRO, etc. Any time a map is dynamically generated to display a point for the Normanby or Oliver's Orchard Hoards or for any chart a scholar generates for the average weight of an *antoninianus* of Postumus, University of Virginia coins contribute to enhancing this collective knowledge. There are more than 125,000 specimens accessible through OCRE, but the Fralin's http://coins.lib.virginia.edu/id/1987.46.46 is the only representation of *RIC* Claudius Gothicus 96. Other examples of coins from the Fralin, particularly *aurei*, are similarly among the few examples of types gathered from some of the larger collections, e.g., Domitian 776 (http://numismatics.org/ocre/id/ric.2_1(2).dom.776), featuring only one other British Museum specimen.

The Fralin Numismatic Collection in 2018 and the future

Despite occasional data updates from the last major software upgrade in 2013 until 2017, by the close of 2017, discussions began to lay the groundwork for a significant overhaul of the Fralin database system. With a growing number of Nomisma.org contributors publishing their images according to the International Image Interoperability Framework (IIIF: https://iiif.io/), I reached out to the University of Virginia Library regarding the long-term

Figure 3: An example of a zoomable image according to the IIIF standard. (Courtesy http://numismatics.org/pco/id/cpe.1_1.59*)*

Figure 4: A Ptolemaic coin from the Fralin as seen in the modern Numishare interface. (Courtesy http://coins.lib.

maintenance of the Fralin data and images. The Library itself employs IIIF in the presentation of its own high resolution, zoomable images, and therefore the Library's technical infrastructure would be able to support this new feature for the Fralin. Moreover, the ANS itself implemented IIIF in 2017, placing all relevant images into the Public Domain, so the zoomable images and other IIIF specifications were already natively supported within the Numishare platform.

Reestablishing a partnership with the UVa Library was important for another reason: the Library is the primary memory institution of the University, responsible for the long-term care and maintenance of both analog and digital materials pertaining to the history and function of the organization at large. The Library, then, is the guarantor of the images and data of the Fralin digital numismatic collection, especially since the museum itself lacks the technical infrastructure to maintain its own digital content in perpetuity. In collaboration with Mike Durbin, a developer of the Library's digital repository, I worked in November–December 2017 to migrate the Fralin's digital content into the institutional repository, and made minor code updates to the Fralin's version of Numishare in order to display zoomable images and export image metadata to Nomisma.org to facilitate zooming within OCRE and other corpora (Figure 3).

The year 2018 saw the Scholars' Lab Sustaining Digital Scholarship server cluster enter its second decade of service. The server, relatively out of date and full of inactive faculty projects developed by the Scholars' Lab, needed to be decommissioned. Many projects were running in Apache Cocoon, which had not seen any significant revision since 2013. The Fralin collection was among the only projects located on the server to see any recent activity, and Scholars' Lab staff and Worthy Martin of IATH agreed to migrate the collection into the current version of Numishare, hosted on an IATH server which is also home to the recent NEH-funded Kerameikos.org, a joint project between Tyler Jo Smith, Renee Gondek, and myself that is effectively a 'Nomisma.org' for Greek pottery.

This migration took place in December 2018, coinciding with the release of Ptolemaic Coins Online at the American Numismatic Society, into which two of the Fralin's coins have been integrated (Figure 4). It is now possible to keep the Fralin collection up to date with advances made in Numishare, and the administrative back-end allows, for the first time, editing of numismatic data through a web form by any person that has been given permission to do so. I hope in the future that museum curatorial staff, in collaboration with faculty and students in the Program in Mediterranean Art and Archaeology, will be able to maintain the collection and to link the Fralin's specimens to new online type corpora as they are published. A significant portion of the UVa collection is linked to existing coin type URIs, but several Hellenistic coins must be integrated in yet-to-be published corpora. A handful of Byzantine coins might be linked to a corpus being developed by Dumbarton Oaks, and several Roman provincial coins might one day be made accessible through Oxford's RPC Online.

Conclusions

In many ways, the successes of these projects and the tremendous transformation that has occurred within numismatics over the last decade are seemingly accidental. Although I did author a traditional research paper on the coinage of Postumus during the 2007 Roman Numismatics seminar, I am grateful that Prof. Dobbins granted me the opportunity to do

something a bit different in the development of the Fralin database and that the University of Virginia Library provided resources to facilitate the project. It would have been impossible to predict at the time that within four years, I would be implementing a similar database at a much larger scale at one of the preeminent research institutions and collections of numismatic materials. A major revolution is occurring in numismatics, and the advances we have made as a community have moved a once-esoteric discipline further into the mainstream of Classical Studies, and archaeologists have cited OCRE and Nomisma.org as leading examples of archaeologically-oriented Linked Open Data projects.[27]

Yet, there is still more work to be done. Nomisma.org, once primarily focused on Greco-Roman numismatics, has new working groups for Medieval European numismatics and modern German and Swiss coinage. The first concepts relevant to Islamic numismatics were created to facilitate a dual English-Arabic database of the Egyptian National Library (http://enl.numismatics.org). A steering committee for hoard data is working on shared data standards that will make the Coin Hoards of the Roman Empire project available as LOD, which will provide an enormous body of geographic data to OCRE. The Fralin collection will see further revision as the ANS publishes a comprehensive catalog of Hellenistic monograms and begin image annotation following IIIF standards.[28] Like any Digital Humanities project, the Fralin Numismatic Collection is never truly finished.

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[27] Debole *et al.* 2017.
[28] Gruber 2018.

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Dynamic Identity: Dynamis on the *Ara Pacis Augustae*

R. Benjamin Gorham

Abstract

The Ara Pacis Augustae (13-9 BC), known as the Altar of Augustan Peace, is one of the most extensively studied monuments of Ancient Rome. A visual res gestae of Augustus' vision for the nascent empire, it proclaims an era of peace while situated on Rome's Campus Martius, the Plains of War. Densely and intricately decorated, the Ara Pacis lends itself to numerous avenues of interpretation, among them the potential identities of figures on the altar, both mythical and historical. Among its mythological hosts are representations of Roma, Romulus, Tellus, and some of Rome's legendary founders, and its historical cast includes Augustus and much of his extended family. These figures serve to advance the themes of the altar, namely peace, prosperity, and an Augustan golden age. The figure of a woman standing near Agrippa on the south processional frieze, often ignored, holds striking significance for the overarching themes of the altar. This woman should be identified as Queen Dynamis of the Bosporus, granddaughter of Mithridates VI, participating in the processional ceremony with her son. Small details of her appearance, including her long-overlooked earring, help identify her as Dynamis, and this identification helps emphasize the meaning of peace on the Ara Pacis. The presence of Dynamis and her son, together with Agrippa, recall Rome's conflicts and bloody history with the Bosporus and Mithridates, but frames them as wars successfully concluded. Contrary to an idyllic peace of serene fecundity, the peace that these figures communicate is a peace through victory, a peace that is built on and requires the participation of peoples throughout Rome's expanding borders. In much the same way that the location of the altar plants the flag of peace in a place of war, Dynamis' presence in the procession commemorating this peace stamps Rome's bloody history with an emblem of concord and unity, of generational betterment and vision for a powerful future.

Keywords

ARA PACIS, AUGUSTUS, DYNAMIS, BOSPORUS, PEACE, ROME, JULIO-CLAUDIAN, SCULPTURE

Introduction

The *Ara Pacis Augustae*, decreed by the senate of Rome in 13 BC and dedicated upon its completion four years later, is often viewed as the culminating monument of Augustus' reign, the *summa* of his programmatic and governing ideals. Its thematic overtures and dense iconographic decoration encapsulate and glorify ideas of rebirth, fertility, and peace – the pillars of the *Pax Augusta* that Augustus bestowed upon an inchoate empire. Its full name often shortened to Ara Pacis, it is not a monument that is always interpreted with ease or clarity. Though its name would seem to leave little room for doubt regarding its subject, the moniker 'Altar of Peace' falls short of the breadth and nuance of the monument's program, and scholars have discussed divergent interpretations of the altar for decades. Such interpretations have ranged from the idea that the altar is dedicated to and solely concerned with the Roman goddess Pax, to the untenable – and thoroughly discounted – position that the extant monument is not in fact the Ara Pacis recorded in Augustus' *Res Gestae*.[1] The question of the altar's identity (and

[1] Weinstock 1960, 44. This curious argument draws on the lack of ancient sources specifically naming the monument in question as the Ara Pacis. Though largely disproven by the abundance of iconographic evidence, it is nonetheless

Figure 1: Drawing of the south processional frieze of the Ara Pacis. Individuals include: (1) Augustus; (2) Agrippa; (3) 'eastern child'; (4) Dynamis; (5) Antonia; (6) Germanicus; (7) Drusus. (Drawing by C.J. Weiss and D. Weiss)

thus its message) is complicated by the lack of secure identifications for many of the figures on the friezes wrapping the structure's walls. These figures, both historical and mythical, along with their attendant religious, civic, and political connections, have encouraged a broad spectrum of academic reinvention that draws upon traditions of artistic convention and the political realities of the period to understand better the messages and function of the altar. The present essay advances one particular identification of one particular woman on the south frieze and demonstrates its value for elucidating the meaning of the peace evoked by the Ara Pacis.

The processional friezes that span the exterior of the north and south walls of the altar are noteworthy in part for being one of the earliest Roman representations of real persons participating in a known historical event.[2] Likely envisioning either the dedication or the founding of the very altar on which they are carved, the figures in this procession include Augustus and his family, members of the priestly colleges and aristocracy, as well as members of foreign nations. Along the south wall (Figure 1), Augustus is visible (no. 1). Although highly fragmentary, his figure is near the front of the procession, commanding the attention of the figures on the altar and viewers alike. Preceded by lictors carved nearest the altar's entrance, he is followed by a group of flamines, identifiable by their distinctive apex headdresses. Behind the flamines, Marcus Agrippa (no. 2) leads a small boy (no. 3), who clutches his toga ahead of a series of familial groupings depicting members of the Roman aristocracy. The figures in the procession overlap in a crowd, with those in the foreground carved in higher relief and with more detail than those in the middle and background.[3]

One woman (Figure 1, no. 4; Figure 2) in the middle ground on the south frieze has sometimes been identified as Julia the Elder, daughter of Augustus and wife of Agrippa, or ignored completely, despite her intimate connection with the figures of the child and Agrippa.[4] Some scholars have acknowledged theories regarding the woman's identity, but most ultimately dismiss her as another background bystander, unimportant to the meaning of the altar.[5] Her relegation to the middle ground of the procession seems to be taken as an indication of her obscurity and lack of importance. However, I suggest that because the figure reaches through

useful for close engagement with the altar.

[2] Ryberg 1949, 81.

[3] Hölscher 2018, 226-27. Augustus and Agrippa both are marked out by attention from figures in the background and foreground alike, heightening their importance in the frieze.

[4] For various identifications, see Pollini (1986, 458) and Ryberg (1949, 84).

[5] Stern 2006, 289. Stern's doctoral dissertation briefly considers the woman's identity as a means to confirm that of the boy she is depicted touching, but ultimately decides a lack of solid evidence surrounding Dynamis' historically attested descendants means that scholarship cannot make a definitive claim.

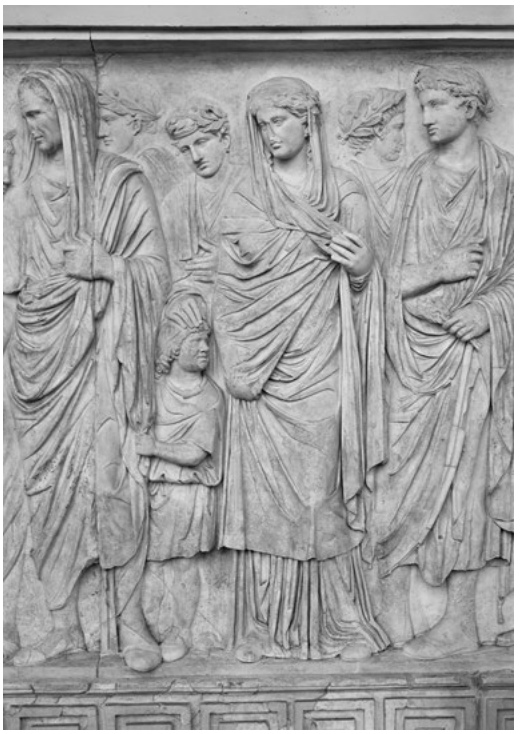

Figure 2: Detail of Agrippa, Dynamis, and the 'eastern child', amongst other individuals. South processional frieze, Ara Pacis. (Courtesy Cologne Digital Archaeology Laboratory, photograph by B. Malter; https://arachne.dainst.org/entity/6580610*)*

the crowd, towards the viewer, to touch the head of the child who looks back at her while clinging to the cloak of Agrippa, she is not just a background figure that serves only to fill out the crowd with textured bodies. Her action is a clear statement of involvement in a prominent group of notable figures, and her importance to the altar must be more carefully examined.

The child whom the woman touches (Figure 1, no. 3; Figure 2) is often identified either as a 'Gallic boy' or Gaius Caesar, the adopted son of Augustus. The latter misidentification has been attributed to numerous influential scholars, among them Zanker, La Rocca, Torelli, and Moretti.[6] This identification may have satisfied researchers and dissuaded them from closer examination of the features of the boy, which would have cast doubt on his identity – because his portrait does not agree with depictions of young Gaius – and helped identify the woman with whom he is shown. Young Gaius Caesar is depicted on the north side of the altar in his usual form as a miniature Augustus, with shorter hair carefully arranged in locks across his forehead and a straight, narrow nose (Figure 3). The child here on the south frieze, by contrast, has long curling hair, a chubby face with a broad nose and a thick chin and neck.[7] The 'eastern queen', as she is sometimes called, behind him should be identified as Queen Dynamis of the Bosporus, a claim first advanced by Rose in 1990 that has yet to receive due attention. Indeed, this identification helps identify the figures around her, bolsters the programmatic themes generally attributed to the altar's iconography, and sheds light on the best interpretation of the identity of the altar itself. To best understand the question that the discussion of her identity will answer and to clarify the meaning of the word *pax* in the Ara Pacis, it must first be considered what the possible interpretations of the altar are.

[6] La Rocca 1983; Moretti 1948; Pollini 1986, 453; Rose 1990, 455; Torelli 1982; Zanker 1988. Viewing the figure as a 'barbarian' child is not too far a cry from the argument favored in the current paper, though the boy's role as a foreigner should be as a visitor from the East, not the West. Rose notes that the erroneous identification of the child as Gaius is easy to understand, considering Agrippa's position as biological father of Gaius and the close placement of the two figures on the Ara Pacis.

[7] For a description of Gaius' portrait type, see Rose (1997, 62). Schneider (2012, 126) makes a convincing argument that the actual historical identity of the child may not matter as much as his inclusion on the frieze as an indicator of eastern participation, whether he is a Roman child in foreign garb or an actual foreigner is less important than the choice to include such eastern elements.

Figure 3: Detail of Gaius Caesar. North processional frieze, Ara Pacis. (Photograph by R.B. Gorham)

Identifying Dynamis on the south frieze

Scholarly debate on the monument argues that it is either an altar of deified Peace, namely the idyllic peace of the Augustan regime, or that the *pax* in the name invokes an older meaning of the word, that of a pact between peoples, usually following or ending a war.[8] Viewing the figure as Dynamis of the Bosporus would support the theory that the Ara Pacis commemorates a specific type of difficult peace achieved through war and political concord, not simply an iconic projection of the generic bucolic tranquility that Augustus advertised as a consequence of his policies and rule.[9] As we shall see, such wars and pacts that define this type of hard-won peace were key components in the history and identity of Dynamis and help bolster her identification as the figure depicted on the altar.

Dynamis was a queen of the Bosporus around the period of the commemoration of the Ara Pacis, most securely in the years shortly before 13 BC, when the altar was commissioned. Although the exact date of her birth is unknown, she is attested as the daughter of Pharnaces and granddaughter of Mithridates VI Eupator, one of Rome's fiercest enemies and author of some of the bloodiest events in Roman history.[10] Her time in the Bosporus was marked by a series of political marriages of varying degrees of success.[11] Dynamis ruled the Bosporus with her first husband Asandros until *c.* 27 BC, was then married to one Scribonius and afterward briefly to a man named Polemon, with each husband serving as king during their respective marriages.[12] A year after her marriage to Polemon, Dynamis disappeared from all documents and material records of the Bosporus for a handful of years.[13] Later, in 8 BC, a monogram

[8] See Crane (2014) for an extensive discussion of interpretations of and attitudes towards peace in late republican and early imperial Rome.
[9] See Pollini (2012) for a thorough discussion of the idea of peace through victory.
[10] Appian, *Mithridatic Wars* 4.22-23. The Mithridatic wars, fought between 88 and 63 BC, were instigated by Mithridates following the Asiatic Vespers during his annexation of the Roman province of Asia. What follows is a brief accounting of her history as recorded in Rostovtzeff (1919), though his narrative does take some liberties of invention regarding the murkier aspects of her life. Mayor (2010) details the events of Mithridates VI Eupator's life and conflicts with Rome.
[11] Strabo (*Geography* 12.3.29) describes the tumultuous political landscape of the period and region. Appian (*Civil Wars* 2.91) notes that Dynamis was even offered in marriage to Caesar by Pharnaces. Sullivan (1980, 915-30) delves deeply into the complex dynastic situation of the period.
[12] Macurdy 1937, 2-3; Rostovtzeff 1919, 99. Macurdy especially notes that Dynamis would have been superior to her multiple husbands in political authority, despite her position being used as a bargaining chip for men who wished to marry into power and share in the bloodline of Mithridates.
[13] Strabo (*Geography* 11.2) documents a series of struggles between Polemon and neighboring tribes during these

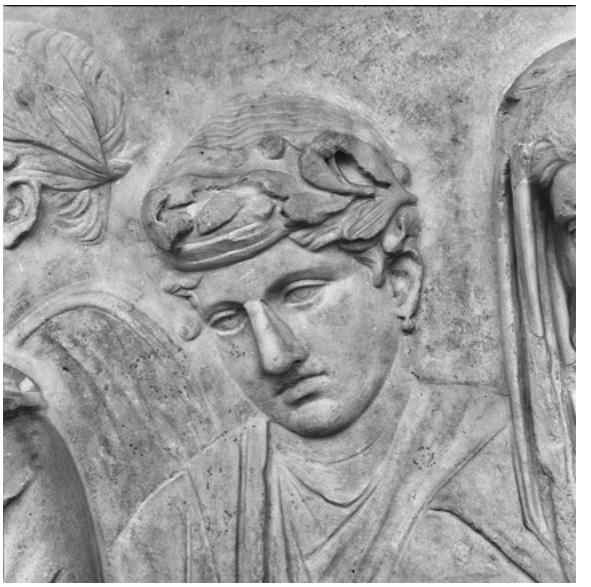

Figure 4: Detail of the 'eastern queen' (Dynamis of Bosporus). South processional frieze, Ara Pacis. (Courtesy Cologne Digital Archaeology Laboratory, photograph by B. Malter; https://arachne.dainst.org/entity/3099605*)*

consisting of the letters of her name appeared on multiple series of coins minted in the Bosporan cities of Agrippia and Caesarea, suggesting her return to ruling her kingdom.[14] Some evidence for her having a male heir, called either Aspurgos or Mithridates, has been convincingly put forth.[15]

Although only fragmentary, Dynamis' biography highlights some important characteristics that encourage her identification on the Ara Pacis. Notably, it should be remembered that Dynamis was a descendant of Mithridates VI and was herself a royal figure in the period contemporary with the construction of the altar. Further, it is significant that upon her return to the material record of her kingdom between 9 and 8 BC, she minted coins with the heads of Augustus and Agrippa in cities renamed in their honor. This action could only have been undertaken after she was reestablished as ruler, made possible through the agency or aid of the Roman elites she chose to honor through her coinage, a seemingly common practice for the rulers of such client-kingdoms. Thus, Dynamis can be seen as a figure capable of simultaneously evoking some of the most devastating conflicts in Roman history through association with her grandfather's lineage, and also ushering in their conclusion: the pacts that brought peace and concord between two peoples, establishing a mutually beneficial political relationship.[16]

Examining how some of these defining historical characteristics are communicated on the relief sculpture helps to identify the figure as Dynamis. Firstly, her placement on the Ara Pacis frieze is pivotal. She stands just behind, both in line and in depth, the figure commonly identified as Agrippa. Suggestions that this figure might represent Lepidus have been largely refuted; the portrait type is most similar to that of Agrippa, and his importance in establishing the *Pax Augusta* through campaigns and political maneuvering is sufficient to solidify his

years. Rostovtzeff (1919) takes these events as indication that Dynamis was sheltering with said tribes and engaging in the hostilities. Rose (1990, 458) suggests Rome as the most likely location to which Dynamis traveled during her absence from the material record in the Bosporus. Sullivan (1980, 215-30) admirably records the tumultuous circumstances of political unions in Pontus during this period within and around the family of Polemon and Dynamis.

[14] Ivantchik and Tokhtas'ev 2011; Rostovtzeff 1919, 101. The monogram ⏃ contains the letters of Dynamis' name and appeared throughout the Bosporus from 8 BC-AD 7.

[15] Rostovtzeff 1919, 101. Uncertainty surrounds the name of Dynamis' son due to the generational repetition of names and lack of clear historical records in the history of Bosporan royalty during this period. Sullivan (1980) details her likely children from her various marriages.

[16] Mayor 2010, 9. Mayor notes the ability of Mithridates to loom large in the mind of contemporary Romans as highly antagonistic figure.

Figure 5: Bronze bust of Dynamis. Found at the Panticapaeum Necropolis (Crimea, in the environs of Kerch). Second quarter of the first century AD. State Hermitage Museum, Inv. ΠΑΗ.*-1726a. (Image is used from* www.hermitagemuseum.org*, courtesy The State Hermitage Museum, St. Petersburg, Russia)*

claim to the figure's identity.[17] Moreover, this identification is strengthened by the presence of Dynamis behind him, as will be shown below.

The woman's face is hardly typical or generalized (Figure 4). It is the face of a real woman. She is shown with a straight, bold nose, broad, fleshy chin, and tight lips. In addition, it should be noted that she wears a diadem or a circlet wrapped about her forehead. All of these are features shared with a bronze bust found in the Bosporus in 1898 that has been identified as Dynamis (Figure 5).[18] The bust seems to be that of a historical, mortal woman belonging to the royal family in the Bosporus, and she possesses a hairstyle that was only prevalent during Livia's lifetime. These features identify the bronze bust rather firmly as Dynamis, as she is the only extant historical figure who fits the above criteria. Other candidates would have been problematically anachronistic, or otherwise did not have the physical similarities that Dynamis had.[19]

On the Ara Pacis, the corresponding figure's diadem in particular is worth specific consideration. This diadem, or fillet, wrapped about the forehead of the woman on the Ara Pacis and its companion piece, the Phrygian cap adorning the bust from the Bosporus, are both articles of clothing used frequently in depictions of eastern figures connected closely with Dionysus.[20] Dynamis was directly descended from Mithridates VI, who was himself particularly concerned with establishing his descent from and divine connection to Dionysus.[21] The inclusion on the bust of the leather helmet, the sign of eastern royalty, stamped with emblems of Dionysus (the crescent moon and eight-rayed sun), therefore, marks the figure rather securely as Dynamis, in her role as the only contemporary Bosporan queen descended

[17] Ryberg 1949, 84. Evidence supporting Lepidus is scarce, and hinges on his role as Pontifex Maximus, suggesting (erroneously) the figure on the Ara Pacis had the accoutrements of the office. Agrippa's portrait type and role as mediator between priestly class and imperial family strengthen his claim over Lepidus.
[18] See Rostovtzeff (1919, 94) for a thorough description of the bust and the circumstances of its discovery.
[19] Parlasca 2009; Rostovtzeff 1919, 94. Other candidates include Gepaepyris, Pythodoris, and Antonia Tryphaena, but only Dynamis is tied closely enough to the Bosporus throughout her life and only she is a direct descendent of Mithridates. See Parlasca (2009) for the opinion that the bust may represent Gepaepyris.
[20] Rose 1990, 456; Rostovtzeff 1919, 91. The same cap is present on coins minted under the rule of Mithridates.
[21] Macurdy 1937, 2; Rostovtzeff 1919, 90-91. Notably through iconography present on coins minted by Mithridates and his successors.

Figure 6: Gold stater, with diademed and draped bust of Dynamis (obverse), and star and crescent and the legend ΒΑΣΙΛΙΣΣΗ[Σ] ΔΥΝΑΜΕΩΣ *(reverse). State Historical Museum, Inv.* ГИМ *91639/13880 KP OH 447462 A-I-393. (Courtesy The State Historical Museum, Moscow, Russia)*

from Mithridates.[22] The fillet around the head of the woman on the Ara Pacis performs the same function, especially when viewed alongside the facial features that are similar to those of the bust. Not only is there a rather pronounced sculptural connection between the features on the bust and the figure on the Ara Pacis, but both heads resemble a likeness on a series of coins bearing Dynamis' portrait on the obverse, namely in that, on the surviving example of the series (Figure 6), 'the fleshy, uplifted chin, the tightly pressed lips, the general shape of the nose, the forehead, and the eyes clearly coincide with the features of the bust' and therefore also with those of the woman on the Ara Pacis.[23]

In addition to these physical features, there is another marked similarity between the characteristics of the contested figure of the Ara Pacis' eastern queen and those of the bust commonly accepted as a portrayal of Queen Dynamis. Oddly enough, this feature has yet to play an important role in the figure's identification, though it seems one of the more powerful links in her identity. The woman on the Ara Pacis is shown wearing small, spherical, stylized earrings. Even on a marble monument such as this, tall enough to preclude easily detailed viewing of the heads of figures at that height, care was taken to render this delicate accessory. The small object seems roughly spherical, but preserves notable details in its faint lines of lobing or faceting. The earring must have been considered to be an important feature for it to have earned inclusion in the frieze, and it is certainly a means of identifying the figure, as it is a unique attribute on the altar. Despite the presence of other notable women in the processions on the north and south sides of the Ara Pacis, it is Dynamis alone who is represented with this type of jewelry. The bronze bust of Queen Dynamis wears the same earrings.

This connection alone is a powerful argument for the identity of the eastern queen on the altar, as the earrings match well and are not readily evident elsewhere on other identified busts, and certainly not on those of Julia the Elder, one of the primary competitors for the identity of the figure on the altar.[24] The earring may also be visible on the coin issued by Dynamis

[22] Mayor 2010, 362-63. Rose, who in 1990 first proposed Dynamis as a possible identification for the woman on the Ara Pacis, suggests that the bronze bust bears a close resemblance to her female relatives in subsequent years based on numismatic portraiture. But the size, detail, and quality of the coins are only enough to provide a general resemblance to the family line.

[23] *RPC* I.1864; Rostovtzeff 1919, 94.

[24] Ryberg 1949, 85. This suggestion is based on her earlier marriage to Agrippa, an episode which took place before the Ara Pacis was carved. By the time the altar was completed, Julia had been married to Tiberius instead. Rose (1997, 61) observes that the iconic *nodus* hairstyle that would have marked this figure as Julia is notably missing.

herself, and the choice to include such a miniscule attribute in exacting detail on miniature representations such as coins lends weight to the idea that the earring should be seen as an identifying feature for images of Dynamis. It is worth noting that the depictions of Dynamis in bronze and on the Ara Pacis are both somewhat idealized, and thus the appearances are not perfectly congruent with the images on the coins, which are more veristic in nature.[25] Thus, it follows that there are numerous physical attributes—the shape of the face, the headgear, and the earrings—that identify the figure in question as Dynamis of the Bosporus. This identification, if accepted, both strengthens and is strengthened by the identification of the figures with whom she is grouped on the monument.

Eastern connections: Agrippa, Dynamis, and family groups on the Ara Pacis

That Dynamis should be shown together with Agrippa on a monument erected by and largely for the Roman aristocracy is strengthened by the political situation of the time. Agrippa had been sent to the East to resolve certain issues present in the Bosporus around 16 BC.[26] His mission is attested in Cassius Dio (54.24), where the actions of Agrippa's intervention are described in detail. Agrippa helped install Polemon as the ruler of the kingdom and, with the sanction of Augustus, established Dynamis as Polemon's wife and co-ruler, though their cohabitation did not last for more than a year.[27] It is here that Dynamis' absence from the Bosporan record for the years 12–8 BC must be explained. Some argue that she died, though her death seems to be unlikely considering the appearance of her monogram on coins and dedicatory inscriptions later. Rostovtzeff argues that she took refuge with a neighboring tribe or army.[28] But the hypothesis posed by Rose is the most convincing: Dynamis may have returned to Rome with Agrippa after her marriage to Polemon ended.[29] Josephus records that the son of Herod the Great also came back to Rome with Agrippa following this eastern deployment. It would not be hard to infer from Josephus' account that other notable aristocratic figures could have done the same, perhaps also with the intention of fostering a mutually beneficial relationship with Augustus and his family.[30] Thus, Dynamis may also have come back to Rome with Agrippa in 13 BC after his mission to her kingdom, either as political hostage or refugee. The practice of political hostage-taking had a long history both before and after Augustus, and during this period it was typical for hostages to be treated well and to build a reciprocally beneficial relationship with Rome.[31] In turn, such figures often served as agents of positive change in the regions from which they were plucked, following a treaty or some other intercession by a Roman agent.[32] The presence of Dynamis just behind, and therefore in close association with, the *capite velato* figure thus strengthens his own identification as Agrippa and follows naturally from the actions of his mission to the East.

[25] Rostovtzeff 1919, 94. Rostovtzeff notes the problem of equating veristic and idealized presentations, but nonetheless agrees that the faces bear strong resemblance, especially when considering their adornments.
[26] Rose 1990, 458; Rostovtzeff 1919, 100. Among these issues, it is thought, were the arrangement of agreeable marriages for the royal members of the courts, as well as the procurement of political 'hostages' to return to Rome.
[27] Macurdy 1937, 3; Rose 1990, 458. It would seem that Polemon was married to a new woman, Pythodoris, around 12 BC.
[28] Rostovtzeff 1919, 104. See footnote 6 above.
[29] Rose 1990, 458. See also Kearsley (2005, 100-01).
[30] Josephus, *Jewish Antiquities* 16.3.3. Such political hostages could serve to strengthen the relationship between nations and encourage cooperation and good behavior in the family of the guest during his or her time abroad.
[31] Allen 2006; Elbern 1990; Walker 1980. The practice was undeniably complex and multivariate, depending on the type of hostage (or ward), the relationship between Rome and their home, and the attitudes of the host authority.
[32] Allen 2006, 251.

Figure 7: Figural groupings of biological family units. South processional frieze, Ara Pacis. (Photograph by R.B. Gorham)

This line of reasoning also raises the question of the identity of the boy clutching Agrippa's toga, with Dynamis' hand on his head. It has been often assumed that this child is Gaius, adopted son of Augustus and biological son of Agrippa, while more cautious readings of the child see him as a generalized foreigner due to his clothing and features.[33] Viewing the woman behind him as Dynamis makes his identification as Gaius very unlikely. Not only does the portrait of the boy not resemble Gaius as he is presented in other sculpture, but he is dressed in foreign garb more suited to an eastern or western 'barbarian' than a prince of Rome.[34] It would seem a logical choice to place a child next to his parent, but, as mentioned above, Gaius is more easily recognized in the features of a youth on the north frieze.[35]

Indeed, the child on the south frieze probably *is* shown with his parent: Dynamis. Ryberg calls attention to how the 'woman in the background leans slightly forward to place her hand on the head of a child and thereby seems to claim a place in the family group', and indeed she does claim such a place, but not in the family of Agrippa.[36] Instead, her claim is as the mother of the boy. It has been noted that Dynamis may have had a son by one of her numerous marriages, though his name is disputed.[37] It seems probable that such a child, fathered by a

[33] Pollini 1986, 458; Ryberg 1949, 84. Despite his attention to such groupings, Pollini largely ignores the woman that rests her hand on the child's head. Ryberg calls the male figure the 'velatus', and notes that there is some argument that he might represent Lepidus instead of Agrippa. Agrippa's claim—as Augustus' right hand man and agent in the political affairs in the East—is far stronger, and the resemblance to other portraits of Agrippa makes his identification clear and widely accepted.

[34] Rose 1990, 456. The torc especially seems appropriate for Gallic youths, though we should be cautions regarding overuse of the term 'barbarian'. Here, as in Rose's article, it should only be taken to mean 'non-Roman'. Rose (2008, 100-02) emphasizes the garb as more distinctly eastern, noting its positive and negative connotations on a Roman monument. Such figures serve to connect contemporary *romanitas* with Trojan ancestry while also alluding to recent enemies and conflicts such as those with Mithridates.

[35] Holliday 1990, 548; Pollini 1986, 453. Holliday assumes the youth here must be Gaius Caesar, claiming he displays the same features as Agrippa's biological son. This is obviously untrue, but the penchant for grouping a child with a parent is difficult to resist. The age of the child on the north frieze is somewhat incongruous with a perfectly realistic representation of the historical Gaius at this time, but considering the Julio-Claudian propensity for idealizing features and ages, it is easy to understand why he was represented in this fashion.

[36] Ryberg 1949, 82.

[37] Ivantchik and Tokhtas'ev 2011; Rostovtzeff 1919, 92, 106; Sullivan 1980, 930.

husband before Polemon, as indicated by the boy's age on the altar, would have had reason to accompany his mother to Rome, away from the court of the new king with whom they evidently could not, or would not, live.[38] Indeed, the child looks back up at his mother as if seeking reassurance or safety, all the while grasping the drapery of Agrippa, the man who may have provided their salvation from an unhappy existence back in the Bosporus.

The pairing of adult and clinging child is a common motif on the Ara Pacis and elsewhere. On the south frieze alone, there are at least two other instances of the same motif (Figure 7). An important distinction can be drawn from these other examples to highlight the likelihood that, while the group in question is clearly an image of a child depending on an adult figure for support or guidance, it is not a familial connection between Agrippa and the child. The parent-son relationship is preserved in figures a little farther down the frieze, where Antonia (Figure 1, no. 5) grasps the hand of her son Germanicus (no. 6), with the boy's father Drusus (no. 7) standing by. This identification is attested by Fabbrini and Pollini, and the true familial relationship is seen in the physical contact of parent and child: flesh to flesh, not hand to hem.[39] Here we see the parent actually grasping the child's hand, rather than allowing it to simply clutch a toga. Indeed, Dynamis establishes this same physical contact with her son's body in the same manner: she actually places her hand on his head, whereas Agrippa passively allows the boy to touch his clothing. The fact that Dynamis here rests her hand on the child and looks down on him with fond eyes speaks to a close relationship, the kind mirrored by Germanicus and his mother on the same frieze. Since the child here does not look like Gaius, has the clothes of an eastern prince, and is shown being touched by a mother-figure wearing a headband associated with the family of Mithridates, it would seem that his identification as the son of Dynamis can be firmly established. Thus, the identity of the clearly eastern child confirms the identity of the woman behind him, and both are bolstered by the identification of the cloaked figure as Agrippa.

Thus far it should be well enough established that the figure of the eastern woman on the south processional frieze is Queen Dynamis of the Bosporus, the child with her is her son, and the figure leading them is none other than Marcus Agrippa. What role these figures and their identification play in the overall program of the altar remains to be seen. A mutually contingent reading of the identities of these figures and the thematic messages of peace bolsters the credibility of each. It is a common conception that one of the ideas that the Ara Pacis attempts to communicate is the message of continuity, of past-present-future relationships, and the glory of the past being brought forth and strengthened by future generations.[40] In places other than the processional frieze, the Ara Pacis alludes to this theme through a panel displaying the figure of either Aeneas or Numa performing a ritual sacrifice and marking a turning point for the prosperity of the Roman people (Figure 8). This figure is either Aeneas, sacrificing upon his advent to Lavinium, or Numa performing a sacrificial ritual with a neighboring king to bring an end to warfare between the two peoples.[41] Rehak's work on the panel makes a convincing argument that the bearded sacrificant should be Numa,

[38] Rose 1990, 459

[39] Fabbrini 1964; Pollini 1986, 453. The military cloak worn by Germanicus' father Drusus is seen as a crucial accoutrement in recognizing his identity, in addition to the features of his portrait.

[40] Holliday 1990; Kleiner and Buxton 2008, 64-65; Laurence 2000; Pollini 2012, 220, 228, 241; Rehak 2001, 201; Ryberg 1949, 80; Zanker 1988, 315.

[41] For arguments in favor of Aeneas, see Pollini (2012, 242-47) and Schneider (2012).

Figure 8: Mythological sacrifice panel on the west side of the Ara Pacis, showing either Aeneas or Numa. (© Miguel Hermoso Cuesta, Wikimedia Commons, CC BY-SA 3.0)

based in part on the tiny details of the enshrined figures in the background and the fact that his presence on the altar speaks more clearly to its themes of peace, treaties, and concluded wars.[42] The two enshrined figures, seated males identified by some as the Penates and by others as Jupiter and Dis, bear witness to a sacrifice marking the transition into a new period of Roman prosperity.[43]

Whether the figure is Numa or Aeneas, the panel serves as a parallel to the depiction of Augustus in the procession performing ritual sacrifice upon his *adventus* to Rome after his campaign in the West. Holliday argues that 'the pious ritual act of Augustus at the *constitutio* [of the altar] reproduced the primordial act of Aeneas *ab origine*', and it has been said of the Roman people that 'they found a kind of solace...in [this] cyclical conception of cosmic and human history'.[44] This cyclical trend of continuation is well outlined by Holliday when he discusses a 'conception of continual regeneration through infinitely repetitive readings [that] helps explain the deliberate stylistic choice for the figural reliefs decorating the exterior walls'.[45] The figures on the altar and their placement are intended to provide a sense of continuity of lineage, an idea that the past will live on and become better in the future. This message is achieved in part through the portrayal of important family units of multiple generations. Rather than weakening this theme by breaking up the assumed family of Agrippa, the identity of Dynamis fits perfectly into that goal. Her location in the middle ground, paired with her son in the front, speaks to this very familial continuation by foregrounding the younger generation. This arrangement of figures allows for a visual succession of generations in which the new one is better, or has the potential to be better, than the last, at least from the Roman perspective. The mother Dynamis, now a friend to Rome where her infamous grandfather was a bitter enemy, looks down towards her son, the hope for the future, as he is in turn led forward into Roman practice by Agrippa, the man who may have been a deliverance for them both.[46] Thus,

[42] Rehak 2001.
[43] Pollini 2012, 242-47; Rehak 2001, 197; Sumi 2009, 177.
[44] Holliday 1990, 554-56.
[45] Holliday 1990, 552. The family of Augustus on the altar is considered to be a visual metaphor for the maintenance of peace, one that finds a nuanced parallel in the family of Dynamis.
[46] See Rose (2008, 100-02) for discussion of the power of such figures to evoke eastern enemies while also promoting the Romans' own connection to the heroic past of Troy.

not only is the cycle shown physically, through the progression of depth towards the viewer, with the more recent in sharper focus and higher relief, but is also alluded to metaphorically in the embodiment of mother and son with their progression guided by Agrippa.

Some may object that this theme of continuation and strengthening rebirth would have been communicated better if the family in question retained its customary identification as Agrippa with his own wife and child. Yet, this is not the case. The inclusion of Dynamis and her son instead of Julia and Gaius here not only continues the generational theme of the altar, but does so by employing influential, foreign, contemporary figures in Rome's history. At a time when Rome was becoming an empire, when neighboring kingdoms were falling under Roman hegemony, the immediate family of Agrippa would be a far less potent portrayal than the converted granddaughter of Rome's great enemy and her son, now participating in Roman life as friends, subjects, and contributors. This was a period in which Rome's borders were expanding, drawing more and more peoples into the budding empire, and including those subjects in the affairs of state speaks to the more powerful consequences of the Augustan Peace.[47] In addition, were this to be the family of Agrippa, it would raise uncomfortable and unavoidable questions of parentage that would weaken Augustus' potent iconography, for he himself was the adoptive, not biological, father of Gaius.[48] And again, as argued above, the connection between parent and child is better seen elsewhere on the altar, between Germanicus and his mother, a more physically direct and emotionally intense connection than that between Agrippa and the child of Dynamis. This interpretation still allows for Agrippa to be a symbolic mover, an *auctor* of the peace that was the focus of this altar, as he leads this process forward. Understanding the group as Dynamis, her child, and Agrippa better achieves the sentiment with which the Ara Pacis seems concerned.

Pax, peace, and pacts

The identification of Dynamis on the south frieze focuses the thematic aims of the monument and makes one interpretation of the altar's themes of peace more likely than others. To understand how, the possible interpretations of peace should be examined. First, the idea of an idyllic peace deserves consideration.[49] The floral friezes on the interior of the altar and wrapping its lower portions on the outside faces are often cited as alluding to an idyllic, peaceful existence supposedly ushered in by the age of Augustus. These decorative elements, paired with the Tellus/Pax/Venus panel (Figure 9) on one side of the altar's exit have time and again been taken to indicate that the *pax* of the Ara Pacis is primarily such a blissful, quiet, restful period birthed under Augustus' principate.[50]

The Tellus/Pax/Venus panel alone contains many images that could allude to such an interpretation. There is an abundance of fruits and grains present, implying a fecund and ripe age. The central figure hosts two children on her lap, invoking the theme of generational continuity while suggesting the peaceful nature of the time that would allow for such

[47] Pollini 2012, 209. It was not just the ruling classes of Rome itself that are bound to Augustus through these symbols, but participants such as Dynamis as well, due to her presence and role on the altar.
[48] See Rose (1997, 13, 51) for the persistent difficulties of representing biological and adoptive family units on Roman monuments, especially those intended to project dynastic messages.
[49] Momigliano 1942, 228-29. Momigliano in fact dismisses the idea that a truce could be seen as true peace, since it lacks the infinite, unchanging serenity he considers fundamental to the message of the altar.
[50] De Grummond 1990, 665.

Figure 9: Panel from east side of the Ara Pacis, showing a figure possibly representing Tellus, Pax, or Venus. (© Miguel Hermoso Cuesta, Wikimedia Commons, CC BY-SA 3.0)

a situation. However, this panel of gentle harmony is balanced on the opposite side of the doorway by a frieze of Roma, the personification of the state, commonly restored to show her bedecked with armor and bristling with weapons. These depictions are mutually antagonistic: the one cannot establish this as an altar of idyllic peace while the other speaks to the repeated conquests and warlike nature of the state. Indeed, the inclusion of Dynamis and her son on the altar makes this a very unattractive interpretation. Her presence alludes to past wars. Granted, hers were wars successfully concluded, but wars nonetheless. Dynamis was the heir of her grandfather and his fierce hostilities, and, in her own era, the Bosporus was beset with uprisings, conflicts, and rebellions. It therefore seems unlikely that an altar including such a figure could represent a purely serene, tranquil reading of *pax*.

The next interpretation of *pax* is more simply Pax, the Roman goddess of peace. It has been argued that the altar was dedicated to and therefore primarily concerned with the goddess of deified peace.[51] The primary challenge to this interpretation is that Pax herself is not readily apparent on the altar. The only place she might be visible is on the east façade panel mentioned above, showing three divine female figures sometimes called Horae, Aurae, or taken to represent a hybrid Tellus/Pax/Venus.[52] Weinstock argues that even if the goddess could be identified in this panel, it would still be insufficient to make the altar dedicated primarily to Pax, for her location is not in any way central or primary, nor is she represented with the traditional accoutrements that define her identity.[53] Theories have also been presented that would connect her to the horoscope of Augustus by seeing the figure as Virgo, tying into ambitious assessments of the entire Augustan building campaign in the Campus Martius.[54] Nonetheless, the central divinity on the east panel has often been argued to be

[51] De Grummond 1990.
[52] De Grummond 1990, 663. Theories about exactly which goddess this female figure represents are wide ranging, but the point of her presence is generally the same: quiet, fruitful fecundity in a world rich with the bounty of nature untouched by the ravages of war.
[53] *LIMC* 7.1, 'Pax', 204-12; Pollini 2012, 238; Weinstock 1960, 53. Chief among the absent attributes is the caduceus, the presence of which would mark this figure as Pax. Weinstock terms this the 'Terra Mater' panel and notes that it, and a sister relief in Carthage, are both drawn from the Graeco-Roman tradition representing the fertility of the countryside more so than any named peace divinity.
[54] Lewis 2008, 331.

some embodiment of Pax by marshalling evidence of her identifiable characteristics.[55] But even if the interpretation of this goddess as Pax were accepted, it would not be sufficient evidence to attribute the whole altar to her, for just as much attention is given to Roma, and much more to the procession that wraps the north and south walls of the monument.

It is precisely this procession that points to the third, and most likely, interpretation of the *pax* invoked in the name Ara Pacis. The idea of *pax* as a pact, a treaty or agreement between peoples that ends war and allows for growth and concord, seems the most plausible interpretation of the altar's name. Indeed, Dynamis' presence on the south processional frieze helps confirm this view. Some of the challenge in identification arises from the frequent shortening of the name of the altar, leaving out the crucial qualifier '*Augustae*'. Were it just the Altar of Peace, then these divergent interpretations might all deserve equal merit, but it is the altar of august, or Augustan, peace, not just peace itself or Peace herself. The peace of Augustus was a peace won through pacts with Rome's neighbors and subjects, through war and conquest successfully wrought, ushered in on the backs of citizens and soldiers at the conclusion of civil wars as well as contests abroad.[56] This claim has been argued against by Momigliano in his theory that 'the altar is not concerned with the subjects of Rome'.[57] Nevertheless, it would seem the presence of 'barbarian' princes on the north and south processional friezes and Dynamis herself make it clear that the altar was, in fact, concerned with Rome's subjects, at least insofar as their presence lends strength to the altar's iconographical objectives. Furthermore, if we accept Rehak's identification of the bearded sacrifant on the western panel as Numa, then a parallel depiction of Romans and neighbors or allies engaging in state ceremonies together becomes clear, ranging chronologically from the earliest days of the monarchy to the period of the nascent empire.

In fact, recent scholarship has begun to accept the presence of foreigners on the Ara Pacis and acknowledge that the children represented are integral to Augustus' presentation of a unified empire and his 'cosmocratic aims'.[58] Rome was no longer just a city, nor a territory on the peninsula, and to exclude the people who helped forge the international peace of the altar would have weakened the message it was erected to deliver. Furthermore, the Altar of Peace was built on the Plains of War, the Campus Martius. It was with good reason; as Holliday argued, 'the overt iconography of an altar of peace, prominently situated on the fields dedicated to the war-god Mars, would be understood by the Roman masses'.[59] By placing the altar here,

[55] *LIMC* 7.1, 'Pax', 204-12; De Grummond 1990, 667-68. Poppies, ears of grain, a cornucopia, the twin babes, and the sacrificial animals at her feet relate her to the Greek Eirene and connect the figure to the ritual taking place on the inner altar, making her identification as *Pax* an attractive option. It should be noted, however, that she is missing the caduceus that would most strongly denote the figure as Pax.

[56] Pollini 2012, 239. Throughout this work, Pollini documents the Augustan program promoting ideas of peace through victory, making it clear that victory can only come in the wake of conflict.

[57] Momigliano 1942, 230.

[58] Kleiner and Buxton 2008, 61. The foreign children are not generic 'barbarian' types, but must represent real, political hostages or wards whose presence advanced Augustus' goals and helped promote the relationship between Rome and their home nations.

[59] Holliday 1990, 557. This impact is especially resonant when considered alongside the Numa panel. His role as a mediator, effecting peace between Rome and her neighbors at the conclusion of a war, was precisely the idea alluded to by the presence of Dynamis on the altar; see Pollini (2012, 207). Though Pollini argues it is not Numa, but Aeneas on the panel, he nonetheless agrees that Romans, especially members of the elite class, would have easily recognized and responded to the iconographic messages of the altar.

where traffic going in and out of the city would pass very close by, Augustus visually applied his peace to war itself, stamping martial territory with an emblem of the end of unrest for all to see. The very location of the altar thus pointed towards this less idyllic, more realistic interpretation of its aims, an argument strengthened by the presence of Dynamis.

The inclusion of Dynamis and the 'barbarians' on the altar recall the two primary military expeditions of Rome's leaders in the period immediately before the altar's dedication. Augustus was in the West pacifying its local populations, and Agrippa was doing likewise in the East.[60] The inclusion of members of these subdued peoples underlines the idea of *pax* as a pact, especially in the case of Dynamis. This was an altar that, despite its name, commemorated the waging of wars and the peace achieved through them. Dynamis shows that even the most violent of events, such as those waged by and against her grandfather Mithridates VI in the preceding decades, could be soundly resolved and lead to a pact, a *pax*, between nations formerly at odds. Here Agrippa, a bringer of this pact in the East, leads the royal family of the Bosporus, now a client-kingdom of Rome, in a procession commemorating the peace of the Augustan age, one that closes wars and heralds union between nations. This union served as the foundation from which future generations would grow and prosper, a foundation established from the actions of ancestors and their wars. This concept is conveyed simply, elegantly, and specifically through Dynamis, with her son, led by Agrippa on the south frieze.

Conclusions

In closing, one final area of evidence should be noted. Upon her return to the Bosporus in 8 BC, attested by coins and inscriptions, Dynamis erected in her name a series of dedications to Augustus and Livia. In these statuary dedications, Dynamis signed herself the *basilissa* of the kingdom and called herself *philoromaios*, or Rome-lover, a friend of Rome, implying that Rome was to thank for her return to rule.[61] In one such dedication, Dynamis consecrated a statue to Livia in a temple to Aphrodite. A dedication to Augustus is almost a given for a contemporary client-queen of Rome, but the statue to Livia on which Dynamis specifically addresses her as benefactor emphasizes gratitude and submission on the part of Dynamis towards Livia herself, not just Rome or Augustus.[62] If this were not enough to denote a pact between Rome and Dynamis and to suggest the likelihood of her figuring in such an iconic Augustan monument, Dynamis left one last piece of evidence. The cities Phanagoria and Panticapaeum were renamed Agrippia and Caesarea, and these cities then minted coins with the faces of their eponymous Roman officials upon Dynamis' return to the Bosporus.[63] This gesture denotes an event of great magnanimity towards Dynamis on the part of Rome's leaders and heightens the validity of the claim that she may have taken asylum in Rome during the rule of Polemon and

[60] Rose 1990, 461; Ryberg 1949, 87.

[61] *IOSPE* 2.354, 4.201, 4.420; Rostovtzeff 1919, 100. Rostovtzeff suggests that these inscriptions speak to 'acts of bounty' by Augustus and Livia for Dynamis, noting that the language refers to her salvation from some very great danger. Yet, despite acknowledging the role of Rome as a savior for Dynamis, he does not consider that she may have sheltered in Rome during one of her husbands' kingships.

[62] Rostovtzeff 1919, 100-02.

[63] Rostovtzeff 1919, 101. Ivantchik and Tokhtas'ev (2011) detail other evidence of her euergetism as well. The name of Agrippia at least indicates that this inscription should be dated to after Agrippa's intervention in the affairs of the East.

founding of the Ara Pacis, and that she subsequently returned to her kingdom as ruler with Rome's assistance or intervention.[64]

From all of these observations, it can be seen how the identification of the eastern queen on the Ara Pacis as Dynamis is the most probable one. The figure shares the attributes, both in face and decoration, of the bronze bust identified as that of Queen Dynamis of the Bosporus. Her unique and stylized earring and adornment mark the woman as a figure of eastern royalty attested in other sculpture and connected to Mithridates VI, and Dynamis is the only female royalty of this period able to claim his blood.[65] Her placement on the altar confirms the identity of Agrippa near her and that of her son in the primary register of the frieze. These identifications function together as an instructive unit that helps convey some of the primary sentiment of the altar, most importantly that of generational succession and betterment, encouraged by the activities of Augustus and Agrippa. Dynamis' presence in the middle ground marks out the absence of her ancestor in the background, while still alluding to the wars which for so long plagued the Roman people. Her hand placed on the head of the boy closest to the viewer links her inextricably with the future generation, here a generation that is being introduced into Roman custom and observance by Marcus Agrippa, the man who intervened in the affairs of Dynamis' home kingdom and may have provided her with passage to Rome for the duration of Polemon's rule in her stead. Dynamis is known to have had significant pacts with Rome; her marriages to rulers of the Bosporus and Pontus were undoubtedly part of Rome's plan for the region, just as her installment as *basilissa* upon her return likely was.[66] When seen in light of her later dedications to Augustus and Livia and the renaming of her own cities Agrippia and Caesarea, such actions point to her marked importance in the Roman political sphere and make her inclusion on the Ara Pacis more than just likely. These identifications help to better clarify the meaning of the 'peace' of the altar. This was a peace of treaties, of agreements between nations, though not between equals, a peace that replaced war and allowed for concord and harmony. This was not an altar to the idyllic peace of bounty and harvest, but to peace hard won through battle, an august peace wrought from the pacts between Rome and foreign rulers just like Queen Dynamis of the Bosporus.

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[64] Kearsley 2005, 100-01; Sullivan 1980, 915-30.
[65] Rostovtzeff 1919, 94.
[66] Kearsley 2005, 100-01; Rose 1990, 458; Rostovtzeff 1919, 102.

Abbreviations:

IOSPE *Inscriptiones Antiquae Orae Septentrionalis Ponti Euxini Graecae et Latinae*, 1890-present. Hildesheim: Georg Olms.
LIMC *Lexicon Iconographicum Mythologiae Classicae*. 1981-present. Zurich: Artemis.
RPC *Roman Provincial Coinage*. 1992-present. London: British Museum Press.

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The Mosaics of the House of the Boat of Psyches: Reexamining Identity in Antioch

Elizabeth M. Molacek and Dylan K. Rogers

Abstract

The House of the Boat of Psyches was a third-century-CE Roman house located in Daphne, a suburb of Antioch-on-the-Orontes (modern Antakya, Turkey). The house has eight excavated rooms, each paved with polychrome mosaics in vibrant figural and geometric panels, including a number of images referencing Antioch's geography, culture, or past. Moving beyond iconographic analysis, this paper applies recent research methodologies on identity in the Roman and the broader ancient world to understand how Antioch's complex local identities may be visualized in its material culture. The 'poly-ethnic' identity of Antioch's inhabitants, who could have had Greek, Roman, or indigenous Syrian backgrounds, meant that individuals and families had the ability to present specific expressions of identity, dependent on context or situation. Through a reexamination of the house and its mosaics, we suggest that the complex iconography, unusual mythological references, and strong local themes are evidence of a uniquely embedded identity—not strictly 'Roman' or 'Greek', but Antiochene.

Keywords

IDENTITY, MOSAICS, ANTIOCH, ROMAN EAST, ARCHAEOLOGICAL ARCHIVES

Introduction

Recent research on Roman identity, especially in the eastern half of the Mediterranean, has begun to highlight how members of the local elite classes had the ability, not only to claim membership in the imperial machine, but also to express their ties to the surrounding landscape and place. At Antioch-on-the-Orontes (province of Roman Syria), especially, the city and surrounding region were home to Macedonians, Greeks, Syrians, Jews, and Romans, thus providing for a rich and robust cultural nexus of expression, particularly through visual culture. Numerous individuals throughout the empire could subscribe to a poly-ethnic identity, one that encompassed the diverse and global milieu of the Roman Empire.

Given Antioch's privileged position in the Roman East, we can turn to its available archaeological evidence to understand better how personal identities were expressed. Beginning in the 1930s, the Committee for the Excavation of Antioch and its Vicinity started to reveal elements of the ancient city center.[1] The Committee's attention quickly turned, however, to excavating extraordinary mosaic pavements, especially in the domestic contexts of the ancient suburb of Daphne, southwest of Antioch. The unique mosaics captured the attention of the wider

[1] The Committee was formed in 1930 under the chairmanship of Charles Rufus Morey of Princeton University. Member institutions included Princeton University, the Musées Nationaux de France, the Worcester Art Museum, and the Baltimore Museum of Art. In 1936, Dumbarton Oaks and the Fogg Museum of Art (now the Harvard Art Museums) joined the Committee. Records of the excavations can be found in the Antioch Expedition Archives in the Department of Art and Archaeology at Princeton University, and on their website: http://vrc.princeton.edu/researchphotographs/s/antioch/page/introduction

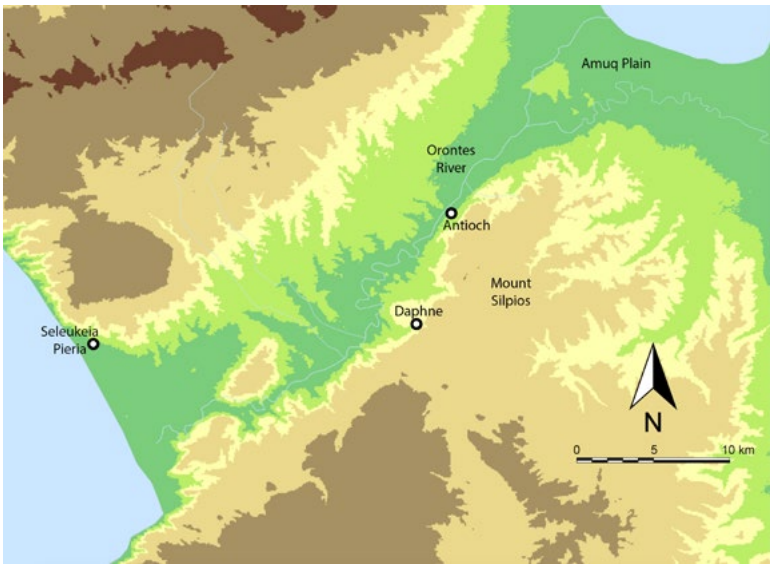

Figure 1: Map of Antioch and surrounding region. (CC BY-SA 4.0; generated in Antiquity À-la-carte application, Ancient World Mapping Center)

archaeological community. As was customary at the time, the pavements were each lifted in several sections and divided among the excavation participants—in the case of this house, the Louvre, the Princeton University Art Museum, the Baltimore Museum of Art, and the Hatay Archaeological Museum.[2] The Antioch mosaic pavements have never been physically reunited in their entirety, and it was only with the 2000 exhibition, *Antioch: The Lost Ancient City*, that they began to be considered again as a group.[3] In the catalogue that accompanied the exhibition, Kondoleon brought together a large number of the pavements in an illustrated plan, prompting the question, 'what did the ancient viewer see?'[4] The argument that ancient mosaics should be considered, not only as art objects in the museum space where they could be studied up close, but also as elements of a larger physical environment that was inhabited and experienced by people, Antiochenes, became part of a wider discussion surrounding the mosaics of Antioch. Our objective here is to take this idea one step further and to understand better the artifacts, namely the mosaics of one house, within the much broader physical and cultural context of the region.

The House of the Boat of Psyches, excavated in 1934 and 1935 by the Committee, provides an important case study in identity expression through visual culture, particularly through the complex iconographies found within the mosaic pavements. While there is limited ancient evidence for mosaic workshops, the process of production, or the experience of those who may have lived in the spaces these surfaces adorned, one can scrutinize the physical evidence that remains—the mosaics themselves—along with the information available regarding their context—documentation and notes from the excavations—to help form a better understanding of these panels within their original spaces. The owner of the House of the Boat of Psyches was likely a member of the local elite who tapped into the trappings of Roman material and visual cultures while also promoting his own ties to the local community, especially the

[2] Barsanti (2012) provides a concise review of many mosaics and their current locations, including the House of the Boat of Psyches (35).
[3] Kondoleon 2000a.
[4] Kondoleon 2000b, 67.

vibrant cultural and economic center of Antioch. Rather than searching for 'Greek' or 'Roman' features throughout the visual or architectural program of this house, we instead suggest that the House of the Boat of Psyches reflects Antioch, the place—a unique expression of identity in the Roman world.

Antioch and its inhabitants

Ancient Antioch (modern Antakya, Turkey) was a nodal point between the Mediterranean Sea and the Middle East. Situated along the Orontes River, the city was surrounded by sloping hillsides, capped by Mount Silpios (Figure 1). Antioch was about 25km from its harbor, Seleukeia Pieria, which would take only a day to reach by sailing.[5] The Amuq Plain that enveloped Antioch formed the *chora* (countryside) of the city, providing a fertile area for the cultivation of grain, grape vines, olives, and other foodstuffs, plus livestock. In addition to the Orontes, the whole area was well watered, thanks in part to an abundant network of springs. Arguably, the most celebrated of these springs came from the suburb of Daphne, which was located about 6km southwest of the city.[6] Thus, the city and its surrounding countryside were in a unique position to create an urban network that would one day rival Rome itself.

The city was famously founded by Seleukos Nikator in 300 BC with a number of other *de novo* city foundations, as the Seleukid kingdom began to take root in this region. Before Seleukos, the area was inhabited by indigenous Syrians, and evidence of a Parthian temple found in the area provides a pre-Macedonian heritage for the city.[7] After 300 BC, the urban settlement grew over time, as the army and court of Seleukos brought new inhabitants of Macedonian, Athenian, Argive, Cretan, and Euboean origin, while also incorporating native Jews and Syrians.[8] Thus, while the city can be considered heavily influenced by Greek peoples, there was an indigenous element of the population, creating a blended culture in the area. Indeed, while past scholarship has touted the cosmopolitan Greco-Roman nature of Antioch, scholars have begun to highlight the Syrian *ethos* of the city.[9] Herodian, writing in the third century AD, in fact, promoted the Syrian *ethos* of Antioch, often referring to the Romans that lived there as 'them' and not 'us'.[10] While we cannot reconstruct with certainty the exact makeup of Antioch's population, suffice it to say that from the start, there was a mingling of different groups of Greek- and Syriac-speaking people in the city and in the *chora*.[11]

The city of Seleukos and his successors flourished for nearly 250 years. Local fame began to grow after Seleukos, especially with the founding of the Sanctuary of Apollo at Daphne, which, reportedly, Seleukos himself established after discovering Apollo's gold-tipped arrowhead on the site. The sanctuary's reputation grew over time thanks to its oracle, prompting celebrities from throughout the ancient world (including Roman emperors) to make their own pilgrimages.[12] From 300-130 BC, the city saw four successive building campaigns to

[5] Kondoleon 2000c, 3.
[6] Libanios, *Oration* 11.240; De Giorgi 2016, 151.
[7] Ball 2016, 177.
[8] De Giorgi 2016, 36.
[9] See especially Andrade (2013, 148-51), Ball (2016, 173-79), and De Giorgi (2016). For earlier discussions of the makeup of Antioch, see Maas (2000).
[10] Herodian 2.7.8-10, 3.14.6-9, 4.2.1, 6.7.4; Ball 2016, 177.
[11] Naturally, Antioch was not unique in the fact that different populations interacted with each other, especially in the East. For example, the site of Tel Dor in modern Israel shared a similar mix of groups of people. See Motta (2015, 1-22).
[12] De Giorgi 2016, 152-54. On the myth of Seleukos finding the arrowhead, see Libanios, *Oration* (11.94-100).

expand the city from its initial foundations at the foothills of Mount Silpios to stretch farther north and south, along with the settlement of the island in the Orontes River.[13] While much of the Seleukid city was either incorporated into the later Roman transformation of the city or has not been uncovered archaeologically, it is clear that there was a Greek imprint on the urban environment of Antioch. For example, Greek civic administration was established that continued under the Romans, given the activities of the local *boule* (council) through the Imperial period.[14] In 64 BC, Antioch was annexed by Pompey the Great to become the capital of the new province of Syria, as he recognized the city's strategic importance as a gateway to the East.[15]

Under Roman rule, Antioch continued to flourish, becoming one of the most important cities in the Mediterranean world. First and foremost, Antioch was an administrative center, the seat of the provincial governor, and the headquarters for any eastern military activities that the Romans undertook.[16] As such, a number of emperors, including Trajan, Lucius Verus, and Septimius Severus, spent a great deal of time in Antioch for their eastern campaigns.[17] Second, there were significant imperial benefactions from Julius Caesar to Diocletian in and around Antioch, providing the trappings of a Roman city, including temples, an amphitheater, aqueducts, and baths.[18] Under Tiberius, for example, a large colonnaded street was constructed, complete with a central oval plaza, including a statue of Trajan and a *nymphaeum*. In the same period, the East Gate was outfitted with a statue of Romulus and Remus with the she-wolf, the symbol *par excellence* of the Roman imperial regime.[19] It was also in the Imperial period that the suburb of Daphne saw increased attention, turning into a posh Antiochene neighborhood with direct access to the city by a colonnaded road connected to the Daphne Gate. Daphne's higher altitude, with access to cool summer breezes, along with idyllic orchards and groves, made it a perfect place for elite Antiochenes to construct domestic structures near the famed Sanctuary of Apollo.[20] While the present state of the archaeological record does not allow for a complete understanding of the layout of the neighborhood, the scattered remains of houses (with their celebrated mosaics) provide a glimpse of domestic structures that included eastern and western architectural idioms.[21] Antioch's prestige continued into the Late Antique period, when it rivalled Constantinople, yet it began to decline in the sixth century, after a series of fires and earthquakes.[22]

Excavating mosaics at Antioch

Although in antiquity Antioch was a significant cultural and political capital, matching Rome, Alexandria, or Constantinople in importance, it does not typically enjoy this same status in the modern popular imagination. Antioch's low public profile has in some cases earned it the label of 'lost' or 'forgotten', with exhibitions and books framing the city as sophisticated

[13] De Giorgi 2016, 54-56; De Giorgi and Eger 2021, 32-39.
[14] On the relationship between the *boule* and the Romans, see Andrade (2013, 148-51).
[15] Ball 2016, 174; De Giorgi and Eger 2021, 71; Maas 2000, 14-15.
[16] Maas 2000, 15.
[17] Ball 2016, 177-78.
[18] Ball 2016, 174; De Giorgi and Eger 2021, 81-111. On the aqueducts of Antioch, see Brands *et al.* (2009), Pamir and Yamaç (2012). On the baths, see Yegül and Favro (2019, 725).
[19] Ball 2016, 175-76; Yegül and Favro 2019, 710.
[20] De Giorgi 2016, 151.
[21] Dobbins 2000; De Giorgi 2016; Hales 2003, 158; Stillwell 1961.
[22] The discussion on Late Antique Antioch is vast, but see De Giorgi and Eger (2021, 127-276) for previous bibliography.

and cosmopolitan, in some instances calling it an ancient 'mirror for the cities of today'.[23] While such descriptions rely heavily on Late Antique textual sources, they do not account for the city's lifespan, providing only a snapshot for a place that was constantly changing for generations. Initial excavations occurred from 1932-1939 under the direction of the Committee for the Excavation of Antioch and its Vicinity, a cohort of American and European museums and universities.[24] Despite the site's historical importance, the expedition never earned the public interest enjoyed by some other sites explored during the same period.[25] Excavations were halted just prior to the start of World War II, and no further organized archaeological investigation took place until the 1990s.[26] Scholarship during this interim period focused largely on documenting the work already completed, writing histories, and understanding the hundreds of sensational mosaics unearthed at the site.

From the start, mosaics played a pivotal role in the modern perception of ancient Antioch and the East. The initial team's mandate was to locate public buildings and monuments known from classical and early Christian texts that would illuminate the urban landscape and provide exciting connections with the textual sources.[27] Unfortunately, none of these features was discovered and with funding tied to results, the future of the expedition was constantly in jeopardy. It was only the discovery of mosaics that brought in funds to pay local workers and keep the project running. The discovery of the House of the Boat of Psyches pavements in 1934, for example, was itself the impetus for supplemental funds.[28] Thus, what had started as a search for an ancient city became instead a hunt for mosaics, resulting in a shift in the mission that would set a course for our understanding of ancient Antioch for decades to come.

To keep up with the number of mosaics being discovered, the team assembled the 'Mosaic Crew' led by Jean Lassus, the representative from the Musées Nationaux de France. Lassus' own notes reflect the inner tension he felt about the focus of excavations in which cultural artifacts had become a commodity:

> At Daphne, the excavation of the mosaics, even if limited to the sites reported by peasants, will give unlimited results, and of considerable importance. A question of archaeological conscience is raised by these digs: can we raise a mosaic without thorough study of the structure to which it belongs. The raising of a mosaic is in fact unavoidable when it is in danger of mutilation or destruction.[29]

Conflicted or not, the reality remained that money flowed in only with tangible outcomes, and mosaics—particularly those that were well-preserved, figural, or bearing inscriptions—were appealing to institutional sponsors, who divided up the best finds at the end of each season, satisfied with their return on investment (Figure 2).[30] Many members of the public

[23] Kondoleon 2000c, 11.
[24] For a more complete history of the excavations, see De Giorgi (2016, 27-33), Kenfield (2010, 2014), Kondoleon (2000c, 5-8), Redfield (2014), Welu (2005, 3-15), and n. 1 above.
[25] On the public interest in archaeological digs in this period, see Chi and Azara (2015).
[26] The 1930s excavations were plagued with problems from the start including deep sediment, torrential rain, and a high water table, see: *Antioch* V, 3-12; *Antioch Archives*, 1934 Field Director Reports, 41.
[27] For a discussion of Charles Rufus Morey, the initial Chair of the Committee for the Excavation of Antioch, and his potential motives that drove the excavations, see Di Giorgi (2016, 29-31).
[28] Lassus 1983, 253.
[29] *Antioch Archives*, 1934 Excavation Diaries, 41.
[30] A popular anecdote for this practice involves the Louvre, which agreed to continue sponsorship of the excavation

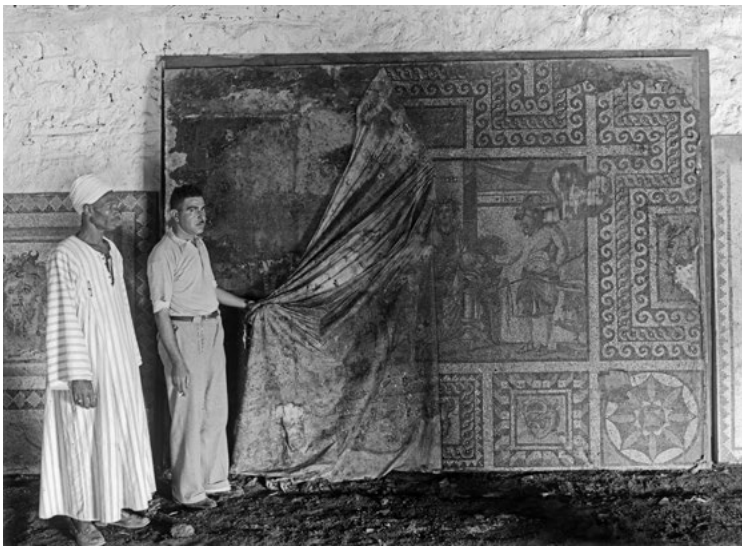

Figure 2: William Gad Gabriel (right, supervisor of the Antioch mosaic crew) peels away the facing material of the Opora, Agora, and Oinos mosaic from room 8 after removal from the house on 24 August 1934. Standing next to Gabriel is Barbari Mahmud Isa, the foreman of the mosaic crew. Princeton image 1651. (Courtesy Antioch Expedition Archives, Department of Art and Archaeology, Princeton University)

today that have heard of Antioch most likely have because they have seen one or several of these pavements in a museum; dozens can now be found in publicly accessible museum collections throughout the U.S. and Europe, with countless others in private collections.[31]

The connection between Antioch and its mosaics has still deeper implications, as this link shifted investigation of the city almost entirely to its pavements and related studies. Levi's seminal 1947 catalogue of the mosaics, compiled during the second World War without access to the mosaics or the site itself, still serves as a solid reference for stylistic and iconographic descriptions. After the 1950s, the mosaics of Antioch would receive sporadic attention and slowly began to be incorporated into more corpora of Roman mosaics.[32] Dunbabin and others situated the mosaics of Antioch and Syria into the wider context of Roman mosaics, especially in terms of iconography and style, helping us to understand better this artistic medium in the Roman East.[33] Gradually, scholarly attention began to shift collective opinion of the meaning behind these mosaics. Marked by the 2000 exhibition at Worcester, the study of Antioch and particularly its mosaics took a sharp turn away from purely visual and stylistic analyses toward methods that acknowledged spatial context and especially embraced the human experience in the ancient past. Notably, the exhibition reunited a number of pavements and other objects from domestic contexts and the accompanying exhibition catalogue initiated a trajectory of scholarly dialogue focused on the Antiochenes, not just their mosaics.[34] Indeed,

only after the discovery and promise of the Judgment of Paris mosaics from the Atrium House. See *Antioch Archives*, 1933 Correspondence, AC33 Morey 0128.

[31] Barsanti 2012.

[32] On early attention, see Dobbins (1982a, 1982b). See also Rogers and Weiss in this volume for a discussion of Dobbins' early interest and subsequent work and impact on the study of the mosaics of Antioch. See Campbell's 1988 catalogue of Antiochene mosaics, which provided a plethora of information about the city's mosaics, including dating criteria. Cimok (2000) provides one of the best color reproductions of Antioch's mosaics to-date.

[33] Dunbabin 1999, 160-86. On mosaics in the Roman East, see Balty (1995) and Dauphin (1980). Recently, new corpora and syntheses of mosaics from across the Roman East have begun to shed light on patterns of style, iconography, production, and workshops. For example, on an inscription of a mosaicist from Daphne found at Chania, Crete, see Sweetman (2013, 118-19, 246).

[34] See especially Dobbins (2000) and Kondoleon (2000c). Following the exhibition, the Worcester Art Museum began to conserve and re-study their Antiochene mosaics, prompting even further research questions about these objects.

Figure 3: Excavation photo from the northeast of the House of the Boat of Psyches, 1934. Princeton image 1540. (Courtesy Antioch Expedition Archives, Department of Art and Archaeology, Princeton University)

numerous studies appeared that elucidated conceptions of 'Greek' and 'Roman' identities of the Antiochians through the mosaics found in the area; most notable are those of Hales, Huskinson, and Newby.[35] Additionally, other scholars have gone further to re-contextualize the mosaics from Antioch that were scattered from Paris to Oklahoma in the 1930s.[36]

The 21st century has seen renewed interest in Antioch and its inhabitants, aided by new archaeological data from the region and the desire to place the city in its larger, eastern context. Archaeological surveys of the surrounding region of the Amuq Plain have provided a clearer understanding of the topography surrounding the city as well as the urban plan.[37] Significantly, De Giorgi has reframed Antiochene studies to encompass the countryside, arguing that the surrounding landscape was continually manipulated to serve the needs of the city, which was itself a complex fabric of individuals.[38] Mosaics continue to be unearthed as part of Turkish excavations but with a nuanced understanding of the city, its context, and the region, it is possible to redirect our attention, especially regarding the mosaics of Antioch, to new avenues of inquiry.[39]

House of the Boat of Psyches and its pavements

Ideally, a thorough study of the House of the Boat of Psyches and its pavements would marry the surviving archaeological finds with their original context. The lifting of the mosaics from the site, however, combined with scant documentation by the excavators, provides challenges, some of which may, in part, be overcome by a thorough reexamination of the what *does* exist. The structure that we today call the House of the Boat of Psyches was first found in June 1934 on the property of Sulieman Hindie in what was the ancient suburb of Daphne (Figure 3). In the excavation diaries, the site is referred to variously as 'Hindie's land' or simply 'Daphne' and only later given its more colorful designation we know today in Levi's 1947 volume.[40]

See Becker and Kondoleon (2005).

[35] Hales 2003; Huskinson 2002-2003, 2004, 2005; Newby 2007. For an exploration of the mosaics found in the Holy Land from the Hellenistic to Early Abbasid periods, especially with a focus on the converging religious identities, see Talgam (2014).

[36] Barsanti 2012. On the Cilicia mosaic from Antioch currently in the Sam Noble Oklahoma Museum of Natural History, see Smith (2011).

[37] Yener *et al.* 2000; Yener 2005.

[38] De Giorgi 2016.

[39] On the recent excavations in Antioch (modern Antayka), see, for example, Pamir (2014).

[40] Levi 1947, 167.

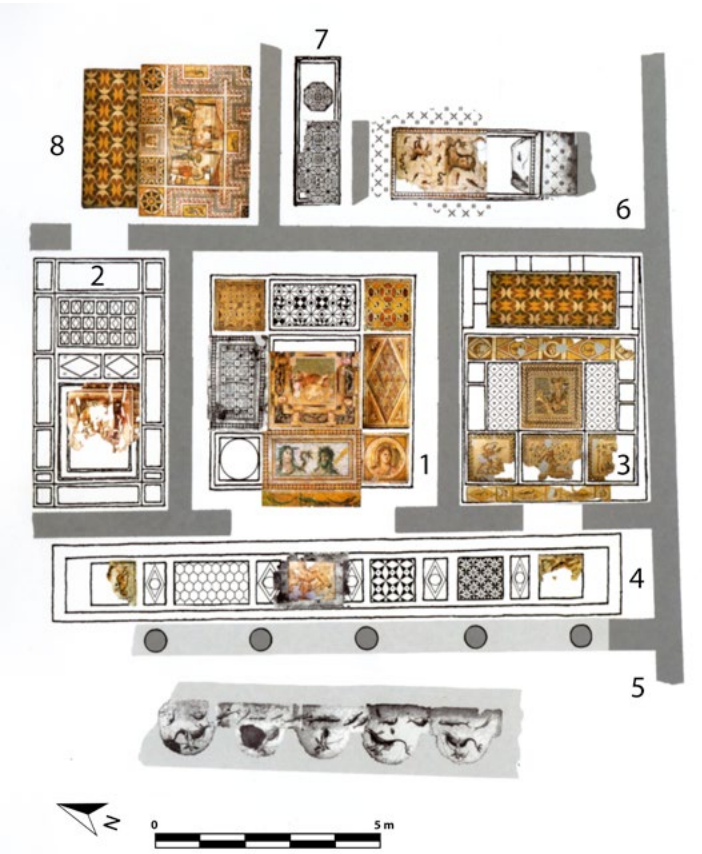

Figure 4: Plan of the House of the Boat of Psyches. (After Kondoleon 2000b, fig. 5)

Initial interest in the site was purely focused on the pavements. A mosaic crew was called to Sulieman Hindie's property to evaluate pavements found close to the surface, but what they found was more than initially expected. Entries in the diaries indicate that the finds were unusual in their state of preservation and scale: 'this is one instance in which the activity of the mosaic crew has necessitated an excavation on a larger scale, and we shall continue with the work of excavating the whole building next season'.[41] Excavations did resume at the site in the spring of 1935, eventually revealing more of the house's plan (Figure 4), complete with an enormous haul of mosaic pavements, which were lifted from their context at the conclusion of the season. Indeed, the number, quality, and variety of mosaics found in the house were extraordinary at the time, and likely would have been astounding to their viewers in antiquity as well. Although the mosaics display familiar mythological scenes, stylistic techniques, and formal qualities, they are combined in unique ways that make the visual program of this house worth considering for what it might tell us about the person (or people) who occupied the space and the environment that informed their choices.

As for the house, excavators identified two phases of construction: an initial phase dated to the 3rd century AD to which belong the figural, polychrome pavements; and a later phase, with a smaller plan and several renovations, dated to the 5th century AD.[42] Finds beneath the mosaics would obviously provide a terminus post quem, however, these are only partially published, and in the reports include 'sherds of vitreous glazed pottery', a molded head of a terracotta figure, and a small, bronze statuette of Apollo holding a quiver and patera.[43] The

[41] *Antioch Archives*, 1934 Excavation Diaries, 181.
[42] *Antioch Archives*, 1934 Field Reports, 14. This second phase included plain white pavements in some areas layered over the earlier polychrome. The excavators attribute this to a change in taste or trends.
[43] *Antioch Archives*, 1934 Field Reports, 14-16; *Antioch Archives*, 1934 Field Diaries, 185-88.

Figure 5: View from the northeast of corridor (4) and nymphaeum (5), House of the Boat of Psyches, 1934. Image 1519. (Courtesy Antioch Expedition Archives, Department of Art and Archaeology, Princeton University)

house was fairly straightforward in plan. The initial, third-century footprint consisted of three large rooms (1, 2, 3) on a horizontal, east-west axis, opening to a southern colonnade (4), which itself opened onto a *nymphaeum* (5). This central trio of rooms was connected by a corridor (7) to a northern suite of rooms (7, 8).[44] Excavations were not completed in the northern area beyond rooms 6, 7, and 8. It is thus impossible to make conclusive statements about the house plan, and, like most buildings at Antioch, the lack of walls required excavators to infer the exact location of certain details such as doorways, thresholds, or windows. For this reason, published plans sometimes differ in their assignment of such features, in some cases ascribing doorways to certain locations based on what is considered 'typical' Roman houses or norms.[45]

What we *can* say conclusively about the house is that each of the excavated rooms was paved with polychrome mosaics and each of these mosaics was unique. Generally, the style of the pavements continued the Hellenistic artistic tradition found throughout many of the mosaics at Antioch and nearby sites such as Zeugma and Palmyra.[46] This style included Greek themes, the illusionistic treatment of patterns, and large, decorative borders. The central figural panels were overwhelmingly naturalistic, often relying on a single viewpoint for perspective, and made use of stone and glass to create painterly-like color modeling—effects that have prompted many scholars to call the mosaics 'paintings in stone'.[47] The sheer quantity and variety of pavements in the house makes it impossible to provide here a detailed description

[44] Levi 1947, 167, fig. 63. Note that the orientation on Levi's published plan is incorrect.
[45] For example, see Kondoleon (2000c, 72, fig. 5), wherein the plan illustrates a doorway located on the northern wall of Room 2, as opposed to Levi (1947, 167), which does not place a doorway in this location.
[46] Dunbabin 1999, 160-86; Huskinson 2004, 135-37.
[47] Becker and Kondoleon 2005, 26.

Figure 6: Nymphaeum basin, with eros riding a dolphin and fish swimming below, House of the Boat of Psyches. Princeton University Art Museum y1940-437a-e. (Photograph by L. Lieberman)

of each scene and its iconography. For that, one can consult Levi's volumes and subsequent scholarship. As has been observed previously, however, the mosaics in general do display an overwhelming reference to local place. Newby describes this characteristic of Antiochene mosaics as conveying a 'message about the delights and history of the local area'.[48]

Rather than analyze each individual scene, we will provide a brief orientation to the mosaics and the experience one may have had when encountering a space. A visitor to the house might enter from the west into the colonnade on the way to one of the three main rooms or the *nymphaeum* to the south (Figure 5). The colonnade was paved with a series of three figural mosaic panels, spaced evenly down the length of the corridor, depicting two *symplegma* (an erotic entanglement) scenes along with the figure of an ithyphallic dwarf.[49] The colonnade opens south onto a *nymphaeum*—a fountain with five semi-circular niches. The basin of the *nymphaeum* was paved with an aquatic mosaic, which showed a series of erotes riding dolphins on a white ground (Figure 6). In perfect symmetry, the erotes are each facing to the viewer's right and left, with the exception of the middle eros, who is in a frontal pose. Four of the cupids hold fishing rods, while one holds a torch. Notably, these erotes and dolphins would have been under water, given their location in the basin of the *nymphaeum*, perhaps creating a visual illusion that they were indeed swimming.

[48] Newby 2007, 187. For previous discussion of local themes in this house see Kondoleon (2000c, 71). For local themes in Antioch mosaics more broadly, see De Giorgi (2016 152-53), Huskinson (2004, 143-44; 2005), and Newby (2007).
[49] As has been noted by Kondoleon (2000b, 71, n. 19) and Levi (1947, 183-85), the hermaphrodite and satyr *symplegma* pavements were very likely derived from sculptural groups of the same subject, often found in gardens of Roman houses. A fragment of a sculptural group of these figures was found in the theater at Daphne, now in the Hatay Archaeological Museum, Antakya (inv. 1327), suggesting a possible local reference. On this group see Retzleff (2007) and Vermeule (2000, 92-93, fig. 2). The ithyphallic dwarf was an apotropaic device, warding off the evil eye, and the hermaphrodite has also been understood this way. See Ajootian (1997, 231-33).

Figure 7: Europa and the bull mosaic, room 1, House of the Boat of Psyches. Baltimore Museum of Art: Antioch Subscription Fund, BMA 1937.129. (Courtesy Baltimore Museum of Art, photograph by M. Hood)

Figure 8: View from northeast of room 1 to corridor (4) and nymphaeum (5). (Courtesy E. Gruber)

Figure 9: Okeanos and Tethys, room 1, House of the Boat of Psyches. Baltimore Museum of Art: Antioch Subscription Fund, BMA 1937.126. (Courtesy Baltimore Museum of Art, photograph by M. Hood)

To the north of the colonnade and *nymphaeum* was the nucleus of the house comprising three central rooms. These spaces are traditionally identified as triclinia due to the arrangement of the pavements, which follow the typical T+U pattern found in many Roman dining spaces.[50] The central and largest of the three rooms (1) was also the most sumptuous, containing a roughly 5m^2 mosaic floor with nine separate panels displaying a rich combination of technical skill, illusionistic techniques, and familiar iconographic tropes used in new ways. The focus of this room was certainly the main figural panel depicting the abduction of Europa by Zeus in the form of a white bull (Figure 7).[51] Although not a direct allusion to Antioch, the Europa scene may have referenced the broader region, given that Europa was a princess of nearby Tyre in Phoenicia.[52] This panel faced away from the wide doorway and toward the back of the room, so a visitor would gaze down at the scene while reclining on a dining couch (Figure 8). Although the choice of scene is notable, more visually appealing is the illusionism created by the *trompe l'oeil* border surrounding the Europa scene, which mimics an ornamental, coffered ceiling. Illusionism also occurred in several of the geometric side panels, further emphasizing the sense of depth, as well as highlighting the workshop's skill and, subsequently, the homeowner's wealth. The same visual techniques were *not* employed in the remaining figural panels in the room, which comprised a series of busts bordering the Europa panel on the

[50] For a discussion of assigning rooms like these as triclinia at Antioch, see Huskinson (2004, 138-40).
[51] *LIMC* 4, 'Europe I', nos 125-45.
[52] Ovid, *Metamorphoses* 2.833-75

Figure 10: Pegasos and the nymphs, room 2, House of the Boat of Psyches. Hatay Archaeological Museum inv. 841. (© Dosseman, Wikimedia Commons, CC BY-SA 4.0)

south. Greeting a visitor at the doorway was a large pavement depicting the busts of Okeanos and his consort Tethys, which was framed on the right by a medallion containing a veiled figure (Figure 9). Okeanos and Tethys, like other watery themes, were common subjects at Antioch, and this scene in particular appeared with frequency.[53] Shown from the shoulders up on a white background, the figures are recognizable from their common iconography. Tethys' two wings rise from her forehead with a serpent coiling around her neck, while Okeanos sports wet, thick locks and a shaggy beard and two lobster claws sprout from his forehead. Although this panel lacks the complex illusionism created by the *trompe l'oeil* border of the Europa scene, it instead suggests the figures of Okeanos and Tethys rising from the water, familiar from the *nymphaeum* mosaic.

Progressing to the smaller, western room (2), a visitor would encounter a familiar, but slightly different scene: mosaics arranged in the T+U shape with a large, figural panel in the center. Given the room's narrower shape, this space likely held less furniture, perhaps one couch on the northernmost geometric panel. Here, the main panel depicted Pegasos standing in a marshy area with a raised hoof being attended by two nymphs or muses, one brushing his mane and the other offering him food (Figure 10).[54] Like the Europa panel, this scene also faces the back of the room (north), meaning a visitor might ponder the scene while seated. The

[53] For Okeanos and Tethys at Antioch, see Wage (1986). For the subject more broadly in the East, including at Zeugma, consult Campbell (1979, 82) and Dunbabin (2013, 155, pl. 42-45).
[54] *Antioch II* 1938, 184; Levi 1947, 172. Excavation photos reveal that the pavements in this room have undergone significant wear; see *Antioch II* 1938, pl. 34.47, for a photograph of the more complete central figural panel.

Figure 11: Boat of Psyches, room 3, House of the Boat of Psyches. Hatay Archaeological Museum inv. 846. Princeton image KS-8043. (Courtesy Antioch Expedition Archives, Department of Art and Archaeology, Princeton University. Photograph by G.E. Kidder Smith)

Pegasos panel is poorly preserved, but it is possible to make out the women's heads and the upper portion of Pegasos, who stands in the center partially obscured by one of the nymphs. Although most of the other panels do not survive, the portions of a wide border surrounding the figural panel remain, which depicted a peacock pattern.

Entering the third and final of the main rooms (3), a visitor would confront the by now familiar arrangement of pavements in the T+U pattern. Once again, the central panel was the focus of the composition, but in this case, it faced towards the southern doorway rather than the dining couch, a difference that could be noted as straying from the what is often considered the norms of Roman spatial decoration.[55] The main figural scene depicted the so-called 'Boat of Psyches', with two nude psyches, identified by their butterfly wings, 'driven' by a winged Eros holding a torch (Figure 11). The psyches are possibly swimming or walking through water, indicated by horizontal, wavy lines, and their wings may be acting as sails.[56] This exact scene is unusual in earlier iconography, particularly mosaics.[57] When Psyche does appear in pavements at Antioch, it is more often as she disarms the sleeping Eros.[58] In other media, Eros

[55] E.g., Dunbabin 1999, 305-307.
[56] *Antioch II* 1938, 184; Levi 1947, 176. Huskinson (2002-2003, 157) argues that images such as the Boat of Psyches were 'theatrical'—partly due to their over-the-top nature—and thus ties them to the sense of theatricality in the mosaics of Antioch.
[57] *LIMC* 7, 'Psyche', nos 69-71.
[58] See, for example, the pavement from the House of the Drinking Contest, now in Hatay Archaeological Museum (inv. 1021); see also Dobbins (2000, 53-57). On the iconography of Psyche at Antioch, see Lauritzen (2020).

Figure 12: Lycurgus, room 3, House of the Boat of Psyches. Hatay Archaeological Museum inv. 844. Princeton image KS-8037. (Courtesy Antioch Expedition Archives, Department of Art and Archaeology, Princeton University. Photograph by G.E. Kidder Smith)

can be found directing chariots of animals, namely dolphins, panthers, or lions, and both Eros and Psyche are sometimes seen commanding and pulling chariots bearing Dionysos.[59] The choice here, to depict swimming psyches in water, seems a local twist on the earlier trope, once again alluding to the natural resource—water—that is so vital to the region and at the same time providing a point of humorous conversation.

A guest to this room, however, might stop before even making it to the central panel. Greeting visitors at the entrance, to the south of the Boat of Psyches scene, was a row of three panels depicting Dionysian themes. In the central panel was Lycurgus, shown nude and bearded, struggling with the enveloping vines, an ax at his feet (Figure 12). Lycurgus, a reported enemy of Dionysian cult, is recognizable by his wild hair, beard, robust body, as well as his active efforts to chop down or fight off the vines.[60] He is flanked on the left by additional Dionysian themes, such as a satyr reaching out to a lion's mane. The right panel depicts Apollo and Daphne, which Kondoleon has identified as a topographical reference to the local springs of Daphne.[61]

[59] For Eros drawing chariots see: *LIMC* 3, 'Eros', nos 878-83; *LIMC* 3, 'Eros/Amor, Cupido', nos 380-86; *LIMC* 7, 'Psyche', no. 70. The closest parallel though is with the Berlin Gem, in which two psyches pull a chariot driven by Eros; see Levi (1947, 176).

[60] *LIMC* 6, 'Lykourgos', nos 75-81. For another instance of Lycurgus, Dionysiac themes, and an Eros/Psyche scene, see Unit A of the villa rustica in the Paphlagonia region (Tülek and Mercan 2016). For more on Dionysiac themes in Antiochene mosaics, see Huskinson (2004, 140-41).

[61] Kondoleon 1995, 170-74; Kondoleon 2000c, 71; Levi 1947, 211-14. For Apollo and Daphne in the region, see De Giorgi (2016, 152-53).

Figure 13: Tethys and marine creatures, room 7, House of the Boat of Psyches. Baltimore Museum of Art: Antioch Subscription Fund, BMA 1937.118. (© Nrswanson, Wikimedia Commons, CC BY-SA 4.0)

Beyond the core rooms of the house and to rear of the plan was the suite of three rooms. The corridor (7) was paved with geometric square and star pattern mosaics while each of the larger rooms had notable figural panels. The narrow, eastern room (6) contained a partially preserved marine mosaic featuring a bust of Tethys surrounded by fish and a *ketos* (sea monster), all on a white background (Figure 13). A starkly different style and composition from the Okeanos and Tethys mosaic encountered in the main portion of the house, this reoccurrence of the subject emphasizes the popularity of watery subjects. Excavation reports suggest that the room may have had a *nymphaeum* on the east wall, unifying the decoration in the room with its purpose.[62]

The larger room to the west (8) contained a unique banqueting scene of Opora, Agros, and Oinos, the personifications of the harvest, the fields, and wine, respectively, who are identified by Greek inscriptions (Figure 14). The composition is familiar from other banqueting scenes found throughout Antioch: the figures of Opora and Agros recline on a *kline*, while Oinos, wearing a satyr suit, approaches from the right.[63] Both Opora and Agros are extremely rare in Greco-Roman art, making this the only known joint appearance, a visual innovation therefore distinctly Antiochene. Here, both figures wear vegetal crowns and Opora holds a harvest bounty in her lap, emphasizing the abundance of the local land.[64] The remainder of the scene further emphasizes abundance and luxury. In front of the *kline* is a three-legged table, decorated with the heads of lions, drinking vessels on top, and a krater in front. Agros holds a drinking vessel in his left hand, and the satyr seems to be offering another vessel (perhaps to Opora?).[65] The overall composition, especially with curtains radiating from a central pilaster, along with the satyr-costumed Oinos, evoke the theater. Indeed, Elderkin argues that this panel was based on a fragment of a Hellenistic comedy, *Opora*.[66] The second panel was a simple

[62] Stillwell 1961, 52.
[63] For other representations of satyr suits in Antioch mosaics (i.e., actors wearing satyr costumes), see Gutzwiller and Çelik (2012, 116) and Huskinson (2002-2003, 147-50).
[64] *LIMC* 1, 'Agros', no. 1; *LIMC* 7, 'Opora', no. 5.
[65] Depth is more fully rendered with indications of trabeation behind the central pillar. It is difficult to identify the space of this particular scene, such as dining room inside of a grander home or a theatrical space. Levi (1947, 187) suggests that this is a tent, the historical *aulaea suspensa*, where this dining is taking place.
[66] Elderkin 1936. On the theatrical nature of the composition, see Huskinson (2002-2003, 145).

Figure 14: Opora, Agora, and Oinos, room 8, House of the Boat of Psyches. Baltimore Museum of Art: Antioch Subscription Fund, BMA 1937.127. (Courtesy Baltimore Museum of Art, photograph by M. Hood)

geometric pattern of peltast shapes, indicative of a panel that would have been underneath dining couches.[67]

Even this brief review of the mosaics, confirms that the mosaics in the House of the Boat of Psyches were complex in subject, style and iconography. While many of the pavements were what Smith terms 'self-referential', alluding specifically to their physical place, culture, or history, they achieved this effect in different ways.[68] Whether juxtaposed with unusual other subjects, executed with intentional illusionistic effects, or found in an unexpected space, the mosaics confirm that even subjects and themes centered on the surrounding locality were not one-size-fits-all, prompting the question: who chose these particular representations and why?

Antiochene identity and the House of the Boat of Psyches

In order to understand better the patron of this house and the decorative program that person made therein, we must consider the issue of identity and, by extension, the region. Notions

[67] This same pattern is found in Room 3 of the house, where a dining couch would have likely been located. For more on dining practice and space, see Dunbabin (2003, 11-35).
[68] Smith 2011, 11. Discussing the mosaics from the House of Cilicia found at Seleukia Pieria that depict the province of Cilicia and personifications of local rivers, Smith argues that such images reflect the desires of the patron, who was proud of their special associations with the surrounding area.

of identity for any individual or group of individuals, however, is a fraught subject, no matter the time or place. This is certainly the case when we consider Roman identity. Over the course of the last three decades in particular, studies of Roman identity have considered notions of cultural change.[69] These modes of cultural transformation have included Romanization, creolization, hybridity, syncretism, globalization, bilingualism, and others. Many of these models have been criticized for a number of reasons, ranging from their narrow emphasis on members of the elite class, to being overtly Eurocentric in in their theoretical framework.[70] While we recognize that there are bound to have been a number of methods of cultural change operating in Antioch, we will not focus on a specific approach here. We do, however, want to think about Roman identity, and how it may or may not have been expressed in Antioch, along with how Antiochene identity might have been conceived in the High Imperial period. As such, we must strive to avoid adopting a dualist approach (i.e., do these mosaics exemplify 'Roman' or 'Greek' identity?), as it will inevitably fall short of really understanding identity, especially in Antioch.[71] Further, it must be remembered that there was no 'ideal' type of 'Roman identity' in the ancient world, given the permutations of identity across the Mediterranean and beyond.[72]

Before examining the identity of the owner of the House of the Boat of Psyches, it might be helpful to consider some important aspects of identity that were seen throughout the Roman world. First and foremost, identity is a discourse and, by its very nature, it is fluid.[73] Indeed, the variability that inevitably occurred in Roman identity led to a 'discourse of Romanness within which a multitude of experiences could be created'.[74] Second, identity is constructed, especially through the personal choice of an individual.[75] Material and visual cultures, as the products of deliberate choice, are thus intimately tied to identity.[76] As we will see, Antiochene visual culture was 'not just [a] passive carrier of meaning but constitute[d] people (and history) as well'.[77] Further, when considering visual and material cultures, there is always a performative aspect to individual identity. A person can make the choice to showcase a particular identity, taking agency over their personal presentation.[78] Third, while there is certainly individual identity grounded in personal choices, there is also a wider collective identity that these individuals and their families are a part of, which ties similar people together through shared qualities.[79] In this vein, one thing that binds a group together, at least spatially, is their connections to place and the community that is formed there. Clarke notes that 'a place, as experienced by people, has a significant past, the stories of which are told about the place and its inhabitants, [which] is what gives it a distinct identity'.[80] Finally, with all of these factors in mind, identity is often aggregative, joining all of the elements

[69] Haeussler and Webster 2020; Kampen 2014; Papaioannou 2016, 31; Revell 2016, 48; Wallace-Hadrill 2008, 3-37; Zuiderhoeck and Vanacker 2017, 2.
[70] On the Eurocentrism of these approaches, see Papaioannou (2016).
[71] On the dualist approach, see Zuiderhoek and Vanacker (2017, 4).
[72] Revell 2009, 193; Revell 2016, 32; Woolf 1998, 245. The same could be said of even Pompeii, especially before the Romans, as the city was a cultural crossroads of Oscans, Samnites, Greeks, and others. See Wallace-Hadrill (2011).
[73] Revell 2016, 16, 41; Zuiderhoek and Vanacker 2017, 5.
[74] Revell 2009, 193.
[75] Kampen 2014, 405; Papaioannou 2016, 32-33; Revell 2016, 12; Wallace-Hadrill 2008, 7-9; Wallace-Hadrill 2015, 177.
[76] Revell 2016, 12, 16.
[77] Versluys 2015, 165.
[78] Hölscher 2004; Versluys 2015, 165. See also Powers (2011) on the choice of wall ornaments in Pompeian houses by their patrons.
[79] Revell 2016, 20; Zuiderhoeck and Vanacker 2017, 4.
[80] Clarke 1999, 18.

related to the choices associated with identity to create what could be considered a unique expression of self and group.[81] For Antioch, there was also a wider cultural *koine* in antiquity, in which there was a common cultural language that was tapped across the Mediterranean, such that commonalities could be recognized, but with inevitable variations along the way.[82] Thus, identity expression, especially in a place such as Antioch, with its various cohabitating ethnic groups, combined various elements of different cultures to create a novel visual culture and built environment (especially domestic structures) that must have set it apart from other parts of the Roman world in the High Imperial period.

Identity in the Roman East has been extensively discussed by scholars over the last few decades, in order to parse out how the inhabitants expressed their notions of individual and collective selves.[83] Some parts of the East are easier to parse than others. For example, identity expression by local elites in Greece during the 2nd and 3rd centuries AD has often been described as 'bicultural', in which an individual could vacillate between outwardly appearing 'Greek' or 'Roman'.[84] One figure that fits this bill is Herodes Atticus, a member of a prominent Athenian family that traced its lineage back to Herakles. Herodes, however, through a number of episodes throughout his life (from marrying a prominent Roman woman from Italy to becoming consul in Rome in 143), was able to straddle the lines between these two identities. Indeed, his villa at Eva-Loukou in Arcadia not only included mosaics that tied him to the local landscape (e.g., depictions of the local Ladon River and Herakles laboring around the Peloponnese), but also incorporated architectural features only seen on the Italian peninsula in the late second century (e.g., large-scale water-displays and vistas employed in maritime villas).[85] Herodes' self-expression through the built environment of his villa signals to us how he viewed himself, how he presented himself to others through his personal choices, and how he fit into the wider imperial apparatus at the time.

While identity expression can be clear cut, as in the case of Herodes, in Antioch we have a much different situation. Due to the confluence of different groups of people living together and drawing on a shared past, we seem to have in Antioch, at least in part, a poly-ethnic identity, a framework proposed by Revell for the populations of the Roman West.[86] In such a conception, 'communities possess multiple levels of ethnicity, that which is dominant is based upon the situation, the one which is appropriate for that particular circumstance'.[87] Further, one only needs to consider ancient Greek identities, which were multivalent, depending on the situation, since Greeks had identities tied to their *polis*, *ethnos*, and federation, along with other intra-Hellenic and pan-Hellenic groups.[88] We could consider a modern parallel, such

[81] Versluys 2015, 165.
[82] Papaioannou 2016, 35; Revell 2016, 36, 79; Woolf 1994, 117.
[83] For example, see Adams and Roy (2007), Alcock (1997), Andrade (2013), Ball (2016), Butcher (2003), Eliav *et al.* (2008), Fisher (2020) Goldhill (2001), Gruen (2011), Heyn (2010), Huskinson (2000), Millar (1993; 2007), Newby (2003), Raja (2013), Sartre (2005), and Whitmarsh (2010). For critiques of Millar and Ball in the region of Syria, see Yegül and Favro (2019, 709-10).
[84] Gleason 2010.
[85] Rogers 2021, 98-108.
[86] Revell 2016, 41-60.
[87] Revell 2016, 48. See also Revell's discussion of Roman ethnicity, especially in the West (2016, 19-40). We can, however, look to other parts of the Roman world for helpful clues to an individual's perception of their own identity. For example, at Pompeii, in the House of the Baker (VII.iii.30), the famous painting of the magistrate doling out bread to three individuals speaks to the importance that this magistrate gave to his public liturgies, enough so that he included a painting of the episode in his home for his friends and family to admire. See Clarke (2003, 259-61).
[88] Luraghi 2014; Malkin 2001; Revell 2016, 48.

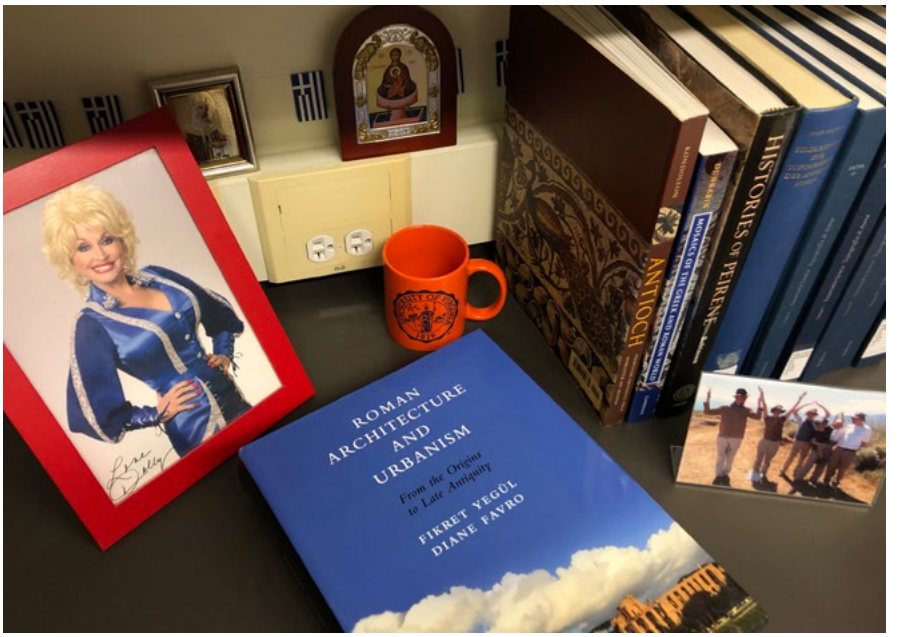

Figure 15: Photograph of the personal office of Dylan K. Rogers. (Photograph by D.K. Rogers)

as someone who identifies today as a Virginian, Southern American, Catholic, in addition to being an American Classical Archaeologist who works throughout the Mediterranean basin, as one of the authors of this chapter does. While he does not outwardly present those identities at any given moment, if you were to go to his office, you would encounter a can of Virginian peanuts, a portrait of Dolly Parton, an icon of the Virgin Mary, and evil eyes, along with countless books on Roman archaeology (Figure 15). One shudders to think of what archaeologists of the future would make of such an assemblage in an attempt to reconstruct his identity. They might conclude that such an identity was complex and nuanced, with many layers that may seem at odd with each other, but speak to this identity's fluidity, personal choice, its collective nature, and that it coalesces to create something unique.

How, therefore, might the patron of the House of the Boat of Psyches have understood his own identity? This is arguably a fraught exercise, attempting to assign identity to an idealized individual in the past, but it is helpful in understanding how Antiochene identity might have manifested itself through one artistic medium.[89] As we saw earlier in our discussion of the mosaics, there were a number of different myths depicted, many of which express personal choices and ties to the specific place and surrounding region. The picture that emerges from examining the mosaics closely and collectively is an image of an elite Antiochene who subscribed to a poly-ethnic identity. While there does not seem to have been an obvious, cohesive iconographic program throughout the house, the patron chose to present something that is familiar on its surface (especially in the recognizable Roman-style mosaics), but layered with polyvalent meanings that help us to understand better how this individual might have conceived of himself.

[89] On the caveats of identifying an idealized individual of the past, see Revell (2016, 9).

Figure 16: Pegasos and nymphs mosaic. Now underneath Museum Hotel Antakya, Antakya, Turkey. (© Dosseman, Wikimedia Commons, CC BY-SA 4.0)

Of particular note in these mosaics are the clear ties to the local area—a common trait in the houses of Daphne. Scholars have previously stressed this element of the mosaics of Antioch, especially for collective identity and finding a sense of belonging in the area through visual culture. The myths of Apollo and Daphne and the Judgment of Paris, which Antiochenes claimed occurred at Antioch, are excellent examples.[90] Scenes tied to the local area were clearly a common *koine* for Antioch writ large, but not for the wider Roman world, which further stresses the different mode of identity expression here. Instead of depicting Pegasos with Bellerophon, as was the norm in other parts of the empire, in room 2, Pegasos was shown with the nymphs, an allusion to the fact that Pegasos would often create springs by striking his hoof to the ground, including the famous Hippokrene spring on Mount Helikon in Boeotia (Greece).[91] Recent excavations in Antakya, the modern town built upon ancient Antioch, have revealed a larger and better-preserved version of the same scene, which also included personifications of Boeotia and Helikon, along with the Muses, who were known to inhabit Helikon (Figure 16).[92] While this recently found mosaic visually references a spring in Greece, images of Pegasos and the nymphs were, in fact, found throughout the Roman

[90] See above, n. 48, as well as Hales (2003, 184-85), Huskinson (2005, 258-59), and Newby (2007, 204).
[91] On the traditional iconography and literary tradition of Bellerophon taming Pegasos, which was reported to have taken place at Corinth at the Peirene fountain, see Robinson (2011, 27-64). For more on Helikon, the Muses, and Pegasus, see Robinson (2012).
[92] The mosaic, found during the construction of the Museum Hotel in 2010, is currently being published by Prof. Hatice Pamir (Mustafa Kemal University). The mosaic, adorning the middle of a triclinium, depicts Pegasos being attended by nymphs at a spring. The threshold of the room includes depictions of three panels that illustrates ties to the Greek mainland: personifications of Boeotia and Helikon; eight Muses; the Muse, Kalliope, presenting a scroll to the poet, Hesiod.

world, emphasizing that Pegasos could create springs on his travels, not only in Boeotia.[93] The House of the Boat of Psyches pavement, therefore, was not a generic depiction of Pegasos and nymphs, but a record of springs created *by* Pegasos right here *in* Antioch. We are told that the nymphs famously inhabited the springs of Daphne, and the Antiochenes believed that their luminous waters were begun by Pegasos himself—a past that is celebrated in this pavement.[94] Further, in room 8, the depiction of Opora, Agros, and Oinos make clear allusions to the fertility of Amuq Plain—which not only supported the inhabitants of ancient Antioch, but presumably also fed into the commercial activity of the city, in effect supporting its important position in the Roman world as an imperial capital.[95] While the ties to local myths and activities inevitably created a sense of social cohesion and pride, the mosaic program might reveal something more. In the House of the Boat of Psyches in particular, we find a situation that was truly unique (and to some eyes perhaps odd) and not seen elsewhere in Daphne and Antioch. As such, the house and its decorative program not only celebrated local pride and a shared past, but also prompted viewers to question and think more fully about why the patron chose such subjects and in such a configuration.

Indeed, there is also be something to be said of personal choice in this house. It is important to note that these mosaics were permanent manifestations of identity, unlike other portable expressions of identity, which means that the deliberate choices on the part of the patron would remain on the floors of this house until the 5th century, when they were covered up with new white mosaics. In terms of the iconography of the mosaics, the marine themes present have elicited discussion in past scholarship has discussed the celebration of the famed streams of Daphne, as most of the rooms have mosaics that depict mythological episodes tied to the sea or water.[96] But perhaps more could be suggested. While Daphne is not Seleukeia Pieria, the harbor of Antioch, we could insinuate that individuals residing at Daphne were tied to commerce connected the sea, such as trade. In fact, there are a number of panels that also referenced mobility, a key component of trade, such as the eponymous Boat of the Psyches, the erotes riding dolphins, or Pegasos, the winged horse that flew across the ancient world. Further, it should be noted that because Daphne was physically far away from the actual shore of the Mediterranean, it is interesting to find so many allusions to the sea (unlike, say, an individual today who lives on a small island, their house awash with marine-themed decoration). As such, it would not be out of place for someone active in a marine-related business, the source of his wealth, to incorporate allusions to the sea in his home, a demonstrable expression of his own identity. His personal choice to include Okeanos and Tethys twice, in addition to Europa and the Boat of Psyches, has the potential to indicate more about his profession. The

[93] On the iconography of Pegasos and the nymphs, see: *LIMC* 7, 'Pegasos', nos 72-80; Blázquez and Cabrero 2012, 48-49. In addition to Helikon, Pegasos was also known to have created a spring at Troizen (Pausanias 2.31.9).

[94] On a number of occasions, Greek myths were reappropriated for Antioch, grafting new meanings on to these episodes for the Antiochenes. For example, the Judgement of Paris was believed by the Antiochenes to have taken place in Daphne and thus appeared in mosaic form in the Atrium House. See Cribore (2007, 26) and De Giorgi (2016, 152-53). Further, there are local versions of toponyms common in the Greek world, such as the Ladon, which is a river known in the Peloponnese, but also in Antioch. Ladon was reported to be the father of Daphne. See Kondoleon (1995, 170-73). Such variants not only stress Antioch's Hellenistic, and thus Greek, origins, but also imbued the place with a localized sense of identity. On the relationship between the waters of Daphne and Antioch to the nymphs, see Libanios (*Oration*, 11.240-43).

[95] On the notions of fertility in this mosaic, see Newby (2007, 191).

[96] Kondoleon 2000b, 71-74; Newby 2007, 189-91. See also Huskinson (2002-2003, 153), who argues that in addition to the important local waters, the marine themes have the ability to evoke aquatic pantomimes that took place in the local theater.

Figure 17: Aristotle Onassis in his office, Athens, Greece, 1960s. (© Elios Patronikolas, Wikimedia Commons, CC BY-SA 4.0)

fertility of the surrounding region is again suggested by the Opora, Agros, and Oinos panel, perhaps furthering this argument. Even today, wealthy merchants often celebrate their line of work in the decorative programs of their homes and offices. One only needs to think of Aristotle Onassis, the famous ship-owning magnate and owner of Olympic Airways, who was often shown in his office with models of ships and airplanes behind him (Figure 17). Visually, this personal choice in decoration immediately offers more information about Onassis as an individual. While we do not have the same type of readily apparent imagery in our Antiochene house, perhaps there is something more to all of these panels celebrating fertility and marine life.

The identity of a home owner, though, is more than just mosaics. Naturally, it is problematical to assign an identity to an individual based solely on the pavements of their house without any other evidence, including small finds, wall decoration, etc. We do, however, have an interesting glimpse into the life of a member of the elite of Antioch in the late 3rd century. The choice in and combinations of iconography point to a uniquely Antiochene example, one to which we should not presume to assign simple 'Greek' or 'Roman' elements of identity, because the mosaics here seem to suggest someone who straddles these cultures. We need to imagine that the patron, active between AD 235-312, even if he was of Macedonian or Syrian decent, was inevitably a Roman citizen, especially after the promulgation of the Antonine Constitution in AD 212. Although he had what we can call an 'Antiochene' style house in terms of its mosaic decorations, just like anyone who exemplifies a poly-ethnic identity, at certain times different identities become more dominant—and thus more outwardly recognizable.[97] Therefore, while our patron clearly identified as Antiochene in the comfort of his own home, might he have been more identifiable as a 'Roman' when he offered sacrifice or incense in honor of the emperor in the civic center of Antioch? In the Roman Empire, it is clear that identities that were not stereotypically 'Roman' were incorporated into the growing imperial machine, 'in effect creating and recreating local identities'.[98] Indeed, the visual culture of Antiochene identity was something not seen anywhere else in the Roman

[97] Revell 2016, 48; Zuiderhoek and Vanacker 2017, 4. A modern parallel today is the fact that a number of indigenous and immigrant groups often have separate identities in the home (where individuals can speak their native language with each other) versus when those people interact with members of other groups outside of the home. For an example of this phenomenon, in addition to other aspects of identity formation and presentation by immigrant groups in modern Israel, see Heilbrunn *et al.* (2016).
[98] Revell 2016, 60.

world—one that celebrated its local history and place, integrating the idioms of indigenous and foreign cultures.

Conclusions

In attempting to reconstruct the identity of the patron of the House of the Boat of Psyches, we have begun to understand better what it meant to be an Antiochene in the 3rd century AD. While previous studies have focused less on any elements of a Syrian or Semitic identity for those commissioning mosaics, we must now, given the current state of Antiochene studies, not discount the fact that there was probably a strong indigenous presence throughout the city and *chora*.[99] As a parallel, Borgia has recently demonstrated through funerary inscriptions in the neighboring province of Cilicia, even after the centuries of trade and contact, no matter if they were indigenous or originally foreign, by the Roman period those living in the region identified themselves as 'Cilicians'.[100] We must, then, imagine a similar mode in our case study: these mosaics and their patron were Antiochene, although the individual could have indigenous, Greek, or Roman origins. But the material evidence left behind celebrates the local place and a shared past.[101] Still, while this anonymous member of the local elite participated in wider and more collective expressions of identity, he also set himself apart from others in the area to create a unique domestic decorative program.

Although we should describe the mosaics of the House of the Boat of Psyches as Antiochene, there is one final point to consider about identity: its ambiguity. In the Roman East, at the literal crossroads of empire, how can the modern scholar effectively evaluate fluid identities, especially when considering that 'so much depends upon the *perception* of background and *belonging* rather than a rigid norm'.[102] The notion of perception is important. One is reminded of a story told by Calvino of two different perspectives while visiting an ancient eastern city: the camel driver coming in from the east will see a foreign Greco-Roman city, while an individual sailing in from Italy would see something altogether alien and exotic, with different architectural forms and camels.[103] What would a Roman from the Italian peninsula, then, make of the mosaics in the House of the Boat of Psyches during their visit to this posh neighborhood in Antioch?[104] Inevitably, they would not immediately make the connections to locality and a shared past of Antioch, in a similar way that an individual not well versed in literary sources of the time might have difficulty reading mosaics in the Roman West.[105] But the familiarity of the artistic form would certainly be familiar to our Roman visitor. As such, Antiochene identity helped to bridge the gap between East and West—creating something not seen anywhere else in the Roman world.

[99] Of note, though, Newby (2007, 199-202) has argued that some mosaics in Antioch portrayed Assyrian elements, considering especially figures known from lost ancient novels.
[100] Borgia 2020, 64. See also Smith (2011), who argues for a similar conclusion through the mosaic program of the House of Cilicia at Seleukia Pieria.
[101] In a similar vein, see also De Giorgi (2019), who argues that the decoration of funerary stelai from this area are inherently Antiochene in their iconographies.
[102] Yegül and Favro 2019, 709.
[103] Calvino 1974, 18; cited by Yegül and Favro 2019, 710.
[104] We should easily imagine that visiting Romans would have visited the houses of Daphne. The neighborhood was a tourist attraction, in part because of the Sanctuary of Apollo, and we know that a number of emperors themselves visited the sanctuary. See Ball (2016, 177-79).
[105] For more about reading mosaics in the Roman West, see Revell (2016, 79). On shared themes between the eastern and western halves of the Mediterranean during the Roman period, see Fowlkes-Childs and Seymour (2019, 6-7) and Parrish (2017).

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Abbreviations

Antioch Archives	1932-1940. Excavation Diaries, Field Reports, Reports of the Field Directors. Antioch Expedition Archives, Department of Art and Archaeology, Princeton University.
Antioch II	Stillwell, R. (ed.) 1938. *Antioch on the Orontes II. The Excavations. 1933-1936*. Princeton: Princeton University Press.
Antioch V	Lassus, J. 1952. *Les Portiques d'Antioche*. Princeton: Princeton University Press.
LIMC	*Lexicon Iconographicum Mythologiae Classicae*. 1981-present. Zurich: Artemis.

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