

The Site

Pantanello is situated in southern Basilicata between the Bradano and Basento rivers, approximately two kilometers north-west of the ancient city center (or *asty*) of Metaponto. Its importance within the Metapontine chora is attested by its almost continuous inhabitation from the Archaic through Late Roman periods. The major focus of excavations at the site have focused on an Archaic sanctuary (Carter 2006; Carter and Prieto, forthcoming) and a fourth century BC necropolis (Carter 1998), but excavations by Joseph Carter in the 1970s revealed a substantial Roman ceramic manufactory occupying the hillside approximately 60 meters northwest of the sanctuary (see plan). These early excavations defined the limits of the complex and exposed the extant architectural features, including two well preserved kilns. During the summer of 2008, limited excavations were renewed at the manufactory in order to address unresolved questions of chronology and to digitally record the site in preparation for its forthcoming publication.



The main objectives of the 2008 campaign were to define the relationships between the different architectural structures of the kiln complex, develop a fine-tuned chronology for its phases of occupation, and to document the site using GIS and a web-based database. The architectural features were redrawn, georeferenced and digitized within the site GIS.

Over the course of six weeks (late June to early August), seven trenches were excavated by an international team of students and experienced archaeologists from the US, Italy, and - in an exciting new program of exchange with the Kyiv-Mohyla Academy in Ukraine - three Ukrainians. The team had an exceptional mix of talents and gave the season a real sense of international and interdisciplinary collaboration.

The Manufactory

The construction of the ceramic manufactory represents a major transformation in the development of this site. Chosen primarily for its proximity to the spring and nearby clay sources, the large kiln was built into the hillside near the bottom of the slope. The associated building complex consisted of three wings, arranged around a central courtyard, and was connected to the kiln enclosure by a doorway at the southern end of the west wing (see phase plan and overhead photo). The total enclosed area of the building measures approximately 590 square meters.



Excavations from 1974 to 1976 had previously exposed the architectural foundations and removed most of the topsoil within the east and west wings to reveal an extensive tile fall. The foundation walls are constructed of medium to large river cobbles and intermittent fieldstones, sometimes laid between leveling courses of broken roof tiles. In the few instances where a second course of stones is preserved, plow marks are visible on the upper surfaces, illustrating the damage caused to the site by modern agriculture.





The tile fall represents a consistent sealed layer across the site, representative of the destruction of the first phase of the kiln complex. The 2008 excavation revealed a hard-packed earthen floor with sporadic patches of plaster preserved approximately 15cm beneath the tile fall. Finds associated with this floor layer were largely limited to two crushed cookware jars and several bronze nails deposited during the roof collapse. No datable diagnostics were recovered from this layer, and no evidence of industrial activity was preserved within the building. However, its industrial nature is demonstrated by its connection to the kiln, the general absence of pottery, the lack of interior division, and the shallow foundation walls. Most likely Room 1 served as a drying shed where unfired ceramics were left to dry before being placed in the kiln. The lack of clay deposits between the floor layer and tile fall and the even distribution of tile across the site suggest the building was empty of unfired ceramics at the time of the roof collapse.

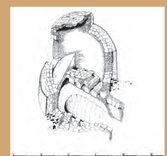
Beneath the floor layer lay a stratum composed of densely packed stones and earth, ranging in depth from 5-15 cm. Finds include two fragments of painted plaster, two metal fragments, charcoal, bone, and a much higher concentration of ceramic material (mostly residual). The presence of South Italian Grey Ware and a single sherd of Italian Sigillata Pompeian Red Ware provide a general date of 150 BC to 50 BC. This stratum provided a foundation for the floor surface, and the high levels of residual material and mix of other finds suggest that the gravel layer was a fill used to level the floor surface.

At the south end of Room 1, adjacent to the kiln enclosure, excavations revealed corresponding strata of a hard packed earthen floor supported by a gravel pavement. The presence of Grey Ware ceramics corroborated a date of mid-second BC for the building's construction. A pilaster base fashioned of a reused architectural block (probably fourth century BC) was uncovered, suggesting that the design of Room 1 mirrored that of Room 3. However, excavations revealed no other pilaster bases in Room 1, or evidence of disturbance indicating that other such pilaster bases had been removed. A vitrified ceramic heat shield was excavated in situ in front of the doorway from Room 1 into the kiln enclosure.





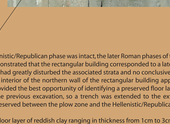
The fact that the kiln enclosure was attached to the end of Room 1, connected by a permanent threshold and protected by a heat shield, suggests that the firing chamber of the large kiln was a permanent structure. No new excavation was undertaken on the kilns themselves. Preservation work is currently underway, including the construction of permanent roofs to protect the kilns from weathering.



The Rectangular Building

The rectangular building, built on an east/west orientation and partially truncating Room 1 of the manufactory, represents a new phase of occupation dating to the Imperial period. The building itself consists of two rooms and occupies a total enclosed area of 105 m². The foundation walls, of which two courses survive, are constructed of large, squared fieldstones. The interior dividing wall is built upon the cobble and tile foundation of the earlier building.





Although the stratagraphic record for the Hellenistic/Republican phase was intact, the later Roman phases of the site were not as well preserved. Previous excavations demonstrated that the rectangular building corresponded to a later phase, but erosion of the hillside and plowing of this area had greatly disturbed the associated strata and no conclusive chronology was achieved. A rubble fall running along the interior of the northern wall of the rectangular building appeared to be associated with the building's collapse, and provided the best opportunity of identifying a preserved floor layer. The area north of this wall had been untouched by the previous excavation, so a trench was extended to the exterior of the building in an attempt to identify any strata preserved between the plow zone and the Hellenistic/Republican phase.

Beneath the rubble fall, excavation revealed a floor layer of reddish clay ranging in thickness from 1cm to 3cm overlaying a fill of grayish earth. African Red Slip C dates this floor layer to the early second century AD. Adjacent to the northern exterior of the building approximately 30cm of stratified soil was preserved between the topsoil and the Hellenistic/Republican phase. Ceramics provide a *terminus post quem* of the mid fourth century AD. Several sherds of terracotta, including a fully preserved face, were also recovered from this strata, perhaps suggesting associated terracotta production during this period. Unfortunately here the earlier phases had largely been erased due to the proximity to bedrock.



Conclusions

The construction of this manufactory in the mid second century BC, not long after the Roman conquest of this region, signals a dramatic break with previous Greek phases of occupation. Archaeological survey has demonstrated that from the fourth century BC to the second century BC, the number of sites in the Metapontine chora was reduced by approximately 85% (Carter 2006). Numerous small farms give way to larger farms and villas and the landscape is exploited in new ways. Pantanello is only one of several rural sanctuaries in the region that was abandoned and later replaced with an industrial complex (Carter 2006). Most likely these production sites were associated with large villas, although investigations in the vicinity of Pantanello have revealed no such evidence.

The large manufactory at Pantanello was constructed in the mid second century BC and was in operation until the mid first century BC. The 2008 excavation uncovered numerous minefired ceramics including amphorae, Grey Ware pottery, tiles, and lamp fragments. Evidence suggests production at Pantanello centered on amphorae, with tiles and other ceramics fired on a more limited basis according to demand. Although the large ceramic kiln deposit has yet to be fully studied, preliminary investigations corroborate these conclusions. Production was most likely aimed at fulfilling the needs of the local inhabitants. However, its prominent location along the major coastal road and the limited presence of imported finewares suggest that this site may have also acted as a distribution center for imported goods. The manufactory was eventually abandoned for reasons unknown. It is tempting to link the manufactory's abandonment to the political upheaval brought about by the slave wars, as Metaponto was used as a base by Spartacus from 73 to 71 BC.

At some point after the collapse of the roof, wash from upslope would have covered the site. This tile layer, covered with earth and gravel, provided the floor surface for the western room of the rectangular building constructed in the early second century AD. Ceramics dating to the late first century BC to the late first century AD do occur in very limited quantities indicating some activity at Pantanello between these building phases, however no evidence of structures dating to this period has been identified. The construction of the rectangular building signals renewed production at this site and most likely coincides with repairs made to the large kiln. Stratified ceramic evidence suggests continuous occupation of the site until the mid to late fourth century AD.

An Early Roman Kiln Site in the Metapontine Chora: The New Excavations at Pizzica Pantanello

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Pottery Assemblages from Pantanello

The excavations and survey of the Institute of Classical Archaeology in the Metapontine chora have yielded substantial pottery assemblages from a diverse range archaeological sites and contexts (Carter 2006; Carter and Prieto, forthcoming). Through their breadth and variety, these assemblages have provided a wider and more comprehensive regional perspective - of ceramics in the Metapontine chora as a whole - than can be encompassed by material from excavations of single sites. Alongside the ICA excavations of the necropolises and farmhouses, and the plethora of sites identified in survey of the Metapontine chora, the late Archaic to late Roman pottery assemblages from Pantanello constitute an important component of this regional perspective. Comprising a corpus of around 5500 sherds dating from the late archaic to late Roman periods, the assemblages from excavations in 2008 have also provided a framework within which to re-evaluate a further corpus of ca. 8500 sherds from the extensive 1974-1976 excavations of the hill top structures.

Late Archaic pottery and the Pantanello Sanctuary

Located upslope from the archaic to Hellenistic-period Greek sanctuary, a significant quantity of residual material attests to these earlier phases, now lost in the area of the extant late Republican and Roman-period structures.

The earliest pieces in the excavations of the manufactory date to the archaic period; a few fragments from the early 6th century BC with most dating from the second half of the 6th to the very early 5th centuries BC. The ubiquitous markers for this period, banded and semi-slipped finewares make up the late Archaic repertoire in southern Italy in the century prior to the adoption of Classical-period Black Gloss senso stricto – a process which appears to have taken place piecemeal through the last quarter of the 5th and the first quarter of the 5th century BC, a period which saw the selective production of Black Gloss forms adopted and adapted from the typical Greek repertoire (attested by imports from mainland Greece), whilst regional production continued very much in the Archaic tradition at least as late as the early 5th century BC. Straddling this period, the substantial assemblages from the Pantanello sanctuary provide an unparalleled resource for examining the nature of this transition in southern Italy during this economically vibrant period in the Metapontine chora (Carter 2006).

Residual Pottery of the Classical Period

The 5th and early 4th century BC phases at Pantanello are well-represented by residual Black Gloss and southern Italian Red Figure fragments. Although there is sporadic material from the area of the sanctuary dating to this period, there is little direct evidence for significant activity – the 4th century BC structure represents the next significant phase of construction after those associated with the late archaic sanctuary. Continuation in the area of the sanctuary from the mid 5th to mid 4th century BC, utilizing structures with their foundations in the late archaic period seems likely - the spring and collecting basin related to the earlier sanctuary would have provided a focus for local activity during this period as it had done in the preceding century.

On the hill top, the relatively high frequency of kraters in the corpus of residual Black Gloss and Red Figure finewares compared to skyphoi and other shapes is perhaps indicative of the presence of tombs disturbed by the construction of the manufactory in the late Republican period. As with the succeeding period, the pottery from the Pantanello sanctuary is closely paralleled by the tomb assemblages from the nearby Pantanello necropolis (Carter 1998). With its many well-preserved vessels these assemblages have provided the foundation for the survey typologies and for the study of survey and excavated sites in the chora, and for the Pantanello sanctuary in particular.



Mold-made mortarium waster from Pantanello. The form dates to around the second half of the 4th century BC and was found together with a small corpus of related forms, regularly-fired, in a fabric consistent with the range of locally-produced plain wares. Scale 10mm.

Pottery from the late 4th century BC phase

Material from this phase is residual in late Republican and Roman-period contexts on the hill top. Downslope, pottery from a sequence of 4th-century BC floors in structures overlying the Archaic sanctuary provides a chronological framework for the late Classical and early Hellenistic phases at Pantanello - a period which represented the post-Archaic florut of settlement activity previously identified through the ICA survey in the Metapontine chora (Carter and Prieto, forthcoming).

Although residual in late Republican and Roman-period deposits, ceramic production is attested at Pantanello during the late 4th century phase. A small corpus of annular kiln spacers, relatively standardized in shape, and a campaniform firing cover point to the production of Black Gloss fineware and are closely paralleled in the Metapontine keramikos, where similar examples are dated in the second half of the fourth century BC (Cracolici 2004). Further evidence for pottery production includes an overfired, semi-vitrified mold-made 'mortarium' from the 1975 excavations in the area of the late Republican kiln (see illustration). Although consisting of a few key pieces, this new evidence for pottery production during the late 4th century BC phase at Pantanello has done much to alter our understanding of the economic character of the 4th century BC sanctuary – a more explicitly 'economic' role for the sanctuary may be envisaged, perhaps part of a process of economic diversification blurring any clear-cut dichotomy between sanctuaries and farmhouses/estates during this period, at least as far as the production and consumption of ceramics is concerned.

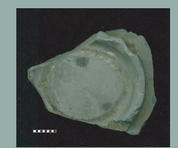
Pottery from the late Republican/Hellenistic phase

The late Hellenistic/Republican Roman phase at Pantanello, dating from ca. 150BC, represents substantive changes in economic activities at the site, not least in terms of the production of Metapontine amphorae (see illustration), fine 'Grey Wares' and roof tiles associated with the excavated structures.

Grey Wares are the main source of dating the late Republican period. They were produced at Pantanello and, presumably, at other sites in the Metapontine chora during the later 2nd and 1st centuries BC and represent the regional version of late 'Campana' Black Gloss wares common in other regions of peninsular Italy. Lacking an oxidizing phase typical of Classical and Hellenistic Black Gloss fineware, they are technologically more closely related to Sicilian 'Campana C' wares (see illustration). The stimulus for the transition to grey-fired fine wares was probably a result of the influence of late Hellenistic mould-made grey wares, relatively well-attested at Pantanello. The repertoire of regional Grey Ware forms represents the continuation and development of Black

Gloss finewares of the 3rd and early 2nd centuries BC, with the main period of production at Pantanello falling in the second half of the 2nd and the first half of the 1st centuries BC, attested by the substantial corpus of Grey Wares from the kiln deposit to the SE of the manufactory (Burgers 1991), consisting of production waste filling a clay pit.

A waster from the 1975 excavations in the manufactory also indicates that mold-made Grey Ware lamps were also produced at Pantanello, suggesting a potential use for the very small kiln adjacent to the larger pottery kiln associated with the hill top structure. A pyramidal loomweight waster from 2008 (see illustration) is supplemental to the Grey Wares, Metapontine amphorae, coarsewares and tiles to which ceramic production at Pantanello appears to have been geared.



Grey Ware Production - Compared to regional Black Gloss wares of the 4th and 3rd centuries BC, a general lowering in standard of production is evident, not least in terms of firing in a single phase of reduction without an oxidizing phase, but also in terms of forming techniques, perhaps a result of attempts to increase production. Scale 10mm.



Pyramidal loomweight waster attesting to supplemental ceramic production in addition to Grey Wares, Metapontine amphorae, coarsewares and tiles. Scale 10mm.

Pottery from the early Roman phase – late 1st century BC to late 1st century AD

Italian terra sigillata (ITS) is represented in the excavated assemblages from the hilltop. Although few forms are extant, those that are indicate that the main phase of importation of these wares was from the mid to late Augustan period, probably until the late 1st century AD, at which point they were 'replaced' by African Red Slip wares. To judge from the fabrics the majority of the sigillatas are western Italian in origin, many perhaps from the Tiber Valley. A handful of fragments may be northeastern Italian (Po Valley). The quantity of ITS is not large, reflecting perhaps a relatively restricted supply, but significant enough to infer substantial and/or sustained activities at Pantanello during the 1st century AD.

Internally red-slipped cooking wares ('Pompeian Red Ware') may also belong to this period or perhaps slightly earlier, with examples including the typical Campanian 'black sand' fabric and a biotite-rich fabric which may be eastern Mediterranean in origin (with other eastern Mediterranean imports attested by Eastern terra sigillata A and B in the early 1st century BC and later 1st century AD respectively), and locally-produced internally-slipped cooking wares no doubt imitating these better-quality imports.

A small corpus extra-regional amphorae points to continued access to amphora-borne commodities in the Metapontine chora well into the Roman period – a trend not obvious in the survey assemblages, where the number of sites dating to this period are relatively sparse (Carter 2006; Carter and Prieto, forthcoming).

Pottery from the mid Roman phase – the 2nd and 3rd centuries AD

It is extremely difficult to assess the relative intensity of activity at Pantanello between the 1st and 2nd centuries AD since these depend largely on the supply of extra-regional fine wares – ITS for the 1st century and African Red Slip for the 2nd and 3rd centuries AD - rather than simply intensity of activity at the site. Different distribution patterns for these wares in the central Mediterranean no doubt affected supply, with most of the ITS distributed from western Italy, the Metaponto was some way along the peninsular trading circuit.

African Red Slip wares are well-represented in deposits associated with the rectangular structure and provide a date for construction in or slightly after the 2nd century AD. The majority of earlier forms dating to the 2nd and 3rd centuries AD are in ARS A fabrics, with many likely to have come from the area around Carthage. The repertoire of African Red Slip wares appears to vary from those typical of sites in western Italy which may indicate a separate eastward flow of trade to southern Italy, perhaps as part of onward distribution networks involving the Adriatic and/or further east to Greece and the regions of northeastern Mediterranean (Leitch, pers. obs.). Sporadic Eastern terra sigillata B wares point to distribution eastwards during the late 1st and early 2nd centuries AD. African cooking wares are also represented, with a reportoire close to that of western Italy.

Pottery from the late Roman phase – 4th to 6th centuries AD

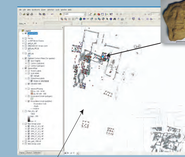
A late Roman phase at Pantanello, apparently unrelated to extant structures, is evidenced by the sporadic but significant presence of African Red Slip ware post-dating the mid 4th century BC in surface deposits in the area of the manufactory. Their frequency in general points to relatively intense and/or sustained activity in the vicinity in the late Roman period, and these imports are accompanied by late Roman red-painted wares, apparently of local or regional origin. Phocaean Red Slip is also represented by a single body fragment, identified through its fabric, which nevertheless demonstrates that extra-regional imports from the eastern Mediterranean penetrated beyond the littoral during this period, as they had in the Hellenistic and early Roman periods.



Metapontine amphorae developed from regionally-produced late 'Corinthian' Type B and late Greco-Italic amphorae in the 2nd century BC, attested at another production site for these amphorae which has been located further inland on the marine terraces through survey in the Metapontine chora. Metapontine amphorae with distinctive 'collared' rims of the 2nd and early 1st centuries BC are well-attested in the kiln deposit. Local and imported pottery fabrics have been characterized petrologically as part of a wider regional study, integrating examples from production sites such as Pantanello with field survey sites. Profiles at 1:4, fabrics scale 10 mm, thin section width of field ca. 30mm.

Excavation Recording System

One of the main challenges in recording the re-excavation of a site like Pantanello is integrating the old information (mostly in paper form) with the new (now largely digital). Not only is it necessary to digitize and/or update the old datasets so that they are compatible with the digital data we are collecting now, but also to combine the varying levels of detail. In the 1970s the main form of recording was a running interpretive narrative, with special attention paid to architecture and artifacts and less of an emphasis on stratigraphy. In the previous campaigns the main unit of excavation was the grid square, based on an arbitrary 5 by 5 meter grid laid over the site, and the "level," which corresponded, more or less, to stratigraphic layers or arbitrary spits. Now our main unit of excavation is the stratigraphic unit, or context. While these two basic units of recording cannot be perfectly meshed, combining the spatial data (grid squares and the extent of contexts) within a GIS, we are able to assess the relative location of material from previous and current excavations and view the site as a whole.



Data Collection

As this was a re-examination of a structures initially excavated in the 1970s, the first step was to move the old plans to digital format. They were scanned prior to the field season and then georeferenced (tied to spatial coordinates) using a combination of GPS and total station survey conducted at the beginning of the season. These plans provided the spatial framework for an intra-site GIS, which was used to manage, display and query the spatial data collected throughout the season.





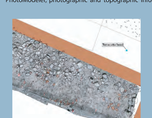


New spatial data were collected during the excavation using a traditional hand-planning, again tied to the site's coordinates with a total station and GPS units (which provided real-world locations for a number of fixed datum points). The location of individual finds and samples were also recorded with the total station and immediately uploaded into the GIS.





For some of the more complex tile and rubble collapses (which would have taken days to plan by hand), we applied a technique that we had earlier experimented with on excavations at Chersonesos in Crimea, Ukraine using photogrammetry (Rabinowitz, Eve, Trelogan 2007). Using a standard digital camera and the program PhotoModeler, photographic and topographic information were collected at the same time for producing

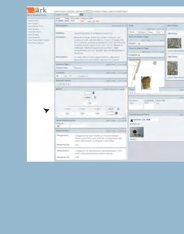


planimetric quality orthophotos and – in special cases where topography was important for interpretation – three-dimensional models. These, like the hand-planned drawings, were then georeferenced with total station survey points and ingested into the GIS to create both a photographic mosaic and for generating plans.

Using a GIS (we used ESRI's ArcGIS 9.2 this season), all the spatial data were easily combined together in a common scale and coordinate system and material from the previous excavations can now be easily overlaid and queried to help answer questions about the relative stratigraphy and chronology of the site.

Non-spatial Data

The non-spatial information (including running narratives and interpretations as well as direct observations about soil composition and construction materials) were recorded on paper and the data entered daily into a database that has a direct connection to the site GIS. The database we chose to use is a new open-source, web-based system that we have been helping develop together with L – P : Archaeology, a commercial unit based in the UK, called ARK (the Archaeological Recording Kit). This system runs on a web-server, which we installed on a portable server at Pantanello, using a combination of MySQL and PHP. Because its front-end is web-based, users who wish to access the data can do so through a web browser without installing (or learning to use) proprietary software on his or her own computer. Though the database is currently only available to the ICA team and its specialist collaborators, our eventual goal is to make it available publicly as a companion to the site publication. Scholars and researchers will then be able to explore the evidence for our interpretations and ask their own questions.



The standard "toolkit" ICA uses for excavation recording is something we have paid special attention to developing and improving over the last decade of excavations. The basic methods and tools we use are not unlike those of most archaeological projects today. Single-context recording assisted by total stations, GPS, GIS, databases, 3D image capture and ground-based remote sensing are fairly standard features of the 21st century excavation, but ICA has made it a particular part of its research agenda to develop a way of working in the field that can remain practical, flexible, and sustainable under future unforeseen budget constraints while meeting the needs of a large, interdisciplinary team scattered over several continents. We aim to use technology, not for its own sake, but to make our own work in the field (and later at the desk) easier and quicker in terms of producing final publications and to facilitate the communication between our team as it studies the material. We are also concerned with making the primary data accessible after the final publication (by us or whoever else might be interested – reexamine our interpretations later by looking back at the data (in as raw a form as possible) and the process by which we collected it.

Excavation, as we all know, is a destructive process. The bulk of what we dig up to answer the questions that interest us at a given point is lost to future interrogation as soon as it hits the back-dirt pile. This fact makes it especially important to record what we are, in essence, destroying as we go. Even coming close to total collection and complete documentation is a practical impossibility – even at the relatively slow pace of a research excavation (as opposed to rescue operations that sometimes have to happen literally over night) – ICA's recording system tries to balance speed and efficacy with completeness and accessibility.

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