ARCHAEOLOGICAL RECONNAISSANCE OF UNINVESTIGATED REMAINS OF AGRICULTURE (AROURA): "STUDY SEASON" REPORT, 2013

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Introduction

Between 11 and 23 July 2013, UMBC and the IX EPCA, in official collaboration, undertook further to organize their finds from the AROURA survey around the Late Helladic stronghold of Glas, which had taken place between 2010 and 2012, and to carry out preliminary descriptive and chronological studies of them in the laboratories of the Archaeological Museum of Thebes. It also conducted soil augering and measurement of the magnetic susceptibility of soil cores under the terms of a permit from the Hellenic Institute of Geology and Mineral Exploration (IGME). Participants included Dr. Michael F. Lane and Mr. Weston S. Bittner of UMBC, and Ms. Evelyn Iliopoulou, graduate in History and Archaeology of the Aristotle University of Thessaloniki. Ms. Athina Papadaki was the designated project Collaborator on the part of the IX EPCA, acting as the chief liaison between the American partners and authorities of the Hellenic Ministry of Culture and Sports.

Laboratory Studies

Re-bagging, Labeling, and Revision of the Catalogue

The first task of AROURA was to remove the finds from its surface collections of the previous three years from their polythene storage bags in order to:

1) double-check that the contents matched the descriptive label (the first check having been done during initial processing in the year of collection), and if they did not, to refer to completed field forms in order to correct the error
2) to determine whether the finds required any further cleaning or drying
3) to determine whether the containing bag needed to be replaced, and
4) to replace the temporary paper labels, drawn up during initial processing in each season of fieldwork, with permanent markings on the bags.

Accordingly, the bags, already containing finds sorted by major material class, were marked in the following order with

- "AROURA" followed by the year of investigation (e.g. AROURA 2010, AROURA 2012)
- the grid square in which the discovery was made (e.g. AMP2a1, Pla1, L2a–b)
- the collection unit within the grid square (e.g. 0104 [in the case of AMP], Transect 15)
- the complete code, ending with that for the material class (e.g. 2011AMP2c2-0315-02)
- a brief description of the contents (e.g. "2 × dec. ware, — 1 × rim"; "3 × coarse ware")
- the initials of the person who re-bagged the finds and the date of re-bagging, and
- the initials of the person who first bagged and recorded the finds, and the date on which she or he did so (given on the temporary paper tag), thereby beginning to record a chain of responsibility (Figure 1).

(A list of the material classes, along with a detailed description of the labeling and marking methods is appended to the present report.) The bags representing each individual material class were put together into a single bag representing a collection unit, and this bag was marked with

- "AROURA" plus the year of investigation
- the grid square
- the collection unit
- the codes for the material classes represented in the bag (e.g. 2012P1a1-13-01, -02)
- the initials of the person who re-bagged the finds and the date of re-bagging, and
- The initials of the person who initially collected the finds (given on the temporary paper labels), followed by relevant date and the field bag number (assigned on site), thereby extending the chain of responsibility.

The bags containing finds from every separate collection unit were then placed in exterior bags. In the case of collections from Aghía Marína Pýrghos (AMP), all 2-meter collection units of a single northing (i.e. all collection units lying on a single grid east–west transect) were put in a single bag. In all other cases, all bags of finds from a single 30-meter grid square were placed in a single exterior bag. The exterior bags were simply marked with "AROURA" and the year of investigation, followed on a separate line with the grid square represented and, in the case of AMP only, the northings represented (01–15). All bags, whether interior or exterior, were perforated on the sides and corners to allow easily packing and to insure that they would "breathe," thereby diminishing the chance of damage to finds by moisture or biotic culture growing therein. All highest-order bags were placed in serial order within plastic crates, to each of which was affixed a plastic-laminated printed label describing the grid squares and collection units contained.

Very few errors of labeling were discovered, and all were easily corrected from the written AROURA records. Likewise, very few corrections had to be made to the preliminary catalogue, and all of these were easily corrected. Most of them resulted from over-counting or undercounting the number of finds of one class, or from wrong classification of a find (e.g. "ceramic" that proved to be mortar or plaster). The original of the catalogue was left with other original paperwork (e.g. completed field forms) in plastic bags with the crated finds in the Archaeological Museum of Thebes. The American participants retained photocopies and scanned PDF copies of the revised catalogue.

Setting Aside Pottery Lots for Analysis, and Photography

AROURA began a list of probable chronologically diagnostic decorated and undecorated pottery, basing judgments on surface treatment (painting, burnishing, incision, design motifs, applied elements (e.g. handles, bases), and occasionally fabric, in order to facilitate the analyses of specialists later in the year. This preliminary list comprised 42 lots, all from AMP. The great majority of artifacts in every one of these lots was photographed against a 1-cm interval crosshair-pattern background alongside a 5 cm-long black and white scale bar.

Preliminary Conclusions about Date and Function of Pottery and Other Finds

Dr. K. Sarri and Dr. S. Vitale confirmed Dr. Lane's tentative identification of the majority of the Mycenaean decorated pottery as dating to the acme of the palace era, the Late Helladic IIIA2–C1 period. Dr. Vitale in particular has noted some peculiarly LH IIIA2/B1 forms and decorations (e.g. FS 264 monochrome kylix and FS 257/258 kylikes with whorl-shell and stylized flower), as well as some peculiarly LH IIIB2–C1 transition designs (e.g. Type B deep bowls with 2 cm-thick rim band). Dr. Sarri has noted that LH I–IIA Mainland Polychrome Ware, usually associated with cemeteries and memorialized settlements, is also well represented (Figure 2). In summary, Late Bronze Age inhabitation of AMP could be as early as 18th or 17th century BCE—consistent with the median radiocarbon and optically stimulated luminescence dates obtained from archeological features in the polder (see below)—and could be as late as 1190/80 BCE, a decade or more after the final destruction of Glas (see reports of 2011 and 2012 for scientific dates and photographs of pottery of other periods).

Although previous visitors and gazetteer writers have recorded typically MH III – LH I "Minyan" wares at AMP, AROURA has not yet confirmed the existence of Middle Helladic or earlier Bronze Age pottery, although there are a few small potsherds of brown fabric and burnished slip, corrugated in profile, which are possible candidates for the Middle Helladic. There are equally few pieces that may be either earlier (e.g. possible Middle Neolithic decorated Urfirnis) or much later (e.g. Roman or Byzantine red wares and yellow-green, lead-glazed Frankish or Ottoman wares).

Several finds have provisionally been identified as fragments and eroded lumps of calcareous mortar or plaster (none, however, obviously painted or otherwise decorated). Among fragments of building material, the most interesting are joinable fragments of two nearly whole ceramic tiles, appearing to be decorated with finger-impressed waves and swirls (Figure 3). Tiles that are similar in manufacture and design, if not exact finger-impressed decoration, have been found at Midea in the Argolid, where they have been identified with the Roman component of that settlement site.

Chipped stone primary and secondary waste flakes and blades—some apparently retouched and others presumably expedient—have been found in chocolate brown chert, whose source has yet to be identified, and local laterite. The latter represents a peculiar use of the material, and it is not known

to be paralleled in any local industry. The laterite flakes and identified end scraper cannot be illusory, because the stone is not found at the summit of AMP but only in the facies in the saddle to the south, between it and the hill of Nisí, which consists of a different limestone formation.

Fieldwork Conducted under the Terms of a Permit from IGME

Again in 2013, with the blessing of the IX EPCA, IGME granted AROURA a permit to remove cores of soil from above geomagnetic anomalies and background areas, as it had done in 2010, 2011, and 2012. AROURA was also granted permission to take measurements of magnetic susceptibility (χ) of sediments at 10-cm intervals along these cores, in order more precisely to correlate natural soil horizons or possible cultural unconformities with background areas and magnetic anomalies. The 2013 crew also intended to measure χ at regular intervals vertically along the ditch sections which had been exposed and profiled in 2011, in which features corresponding to magnetic anomalies had been discovered and from which optically stimulated luminescence (OSL) dates with a median value in the late 17th century BCE had been obtained in 2012. However, water levels raised by pumping water in from Lake Hylike (Likéri) prohibited such measurement, the ditches being between about 1.4 and 2.2 meters deep. Dr. N. Zacharias of the University of the Peloponnese, who had carried out the OSL dating, has informed Dr. Lane that exposure of the sediments to water over a short duration (summer) within a short period (late 20th to early 21st century) should have negligible effect on measurement of dates, and that even in extreme circumstances, the effect is slight (c. 10 to 30 years per millennium).

Cores were removed from above negative magnetic anomalies adjacent to Transect I2, Transect J1 ("reticulate" and "bounding" anomalies), and Transect D1 (between the retaining walls of the previously known Late Helladic revetted canal), and from above the positive anomaly in Transect C1 corresponding to the previously identified peripheral canal (see AROURA reports of 2010, 2011, and 2012 for terminology; Figure 4). In the profiles of soil cores 2013I2-01 and 2013J1-01, horizons were detected that corresponded in depth and description to the features previously observed in ditch sections 2011I2-01 and 2011J1-01. In core 2013D1-01, a profile was described that resembled in several respects that recorded in core 2010D1-01, which was located a few meters to the northwest of the northwest retaining wall of the revetted canal. In 2013C1-01, a profile was described very much like that of core 2010C1-01, which was also taken from above the positive anomaly corresponding to the peripheral canal. A sample of the material from each horizon thought to correspond to an archaeologically interesting magnetic anomaly was taken for carbon isotope analysis and derivative radiocarbon dating.

The measurement of χ along the cores was revealing in several respects.

1. It verified that the generally extreme weakness of the anomalies detected by magnetometry during the first three years of fieldwork was due to very slight differences in χ through a depth of two meters or more—very rarely in excess of 0.01×10^{-3} SI
2. There was a demonstrable correlation between a low χ value and a feature corresponding to a negative magnetic anomaly and a high χ value and a feature corresponding to a positive magnetic anomaly.
3. In cores 2013I2-01 and 2013J1-01, the χ values of the identified features were more like those of the subsoil horizons corresponding to ancient lake bottom sediments than they were like the those of the horizons above them (less the unconformant feature), which, together with similar soil profiles, seems to confirm that the features are built of lake bottom material.

Further Toward Reconstruction of the Hydraulic System

In 2011 and 2012 of a weak negative magnetic anomaly passing through Transect A1 and Transect O1 was detected, which appears to correspond to a spectral anomaly running from the north face of the outcropping of Glas northward to at least the modern course of the Melas (Mavropótamos) River. This led investigators to wonder whether it might correspond to a conduit feeding an irrigation system corresponding to the reticulate pattern of anomalies to the west of Glas, as presumably distinct from the overflow channels represented by the revetted canal and a peripheral canal (see above). Unfortunately, no visible or tangible remains of any corresponding feature could be observed because of dense, high vegetation in the current river bed, which could not be removed under the terms of the

current permit. There were some small limestone boulders at the point of intersection of the anomaly with the river. However, plowing could have dragged these from the retaining walls of the Late Helladic channel of the Melas.

Nevertheless, it became very clear upon investigation that there was a considerable difference in elevation between the remains of the Late Helladic channel and the land to its south. The channel lies over two meters higher than the nearest point in the bed of the current river. The remains of the ancient canalized river served as the occasionally flooded "Frankish" or "Turkish" road according to 19th-century Western explorers, which provided away between Topólia (Kástro) and Kardhítsa (Akraífnio) via Kókkino. It seems increasingly likely that the Bronze Age engineers took advantage of a natural rise in the relief just north of the course of the river in spate, reflecting a gentle rise in the substrate in the direction of the mountains marking the southern boundary of Phthiotis, by diverting the river onto it, allowing it to feed a hydraulic system around Glas by gravity.

Other Work

As planned but not accomplished in 2012, the field team made a six-part rubbing with tracing paper and caran d'âche of the rupestral boundary inscription at the west end of Mt. Fteliá, first recorded by Paul Jamot in the *Bulletin de correspondence hellénique* 13 (1889: 407–8). The inscription has been damaged since this time by a modern raised concrete irrigation channel, and it is in danger of further damage. Pending further examination, there is no reason to amend the reading given in *SIG* 933:

ΟΡΙΑ Κ[Ω]ΠΗΩΝ	Borders of Kopai
ΠΟΤ ΑΚΡΗΦΕΙΑ[Σ	with Akraiphia
ΟΡΙΤΤ[Α]ΝΤΩΝ ΒΟΙΩ[ΤΩΝ]	As the Boiotians bounded them

The letters have been identified as 4th-century BCE in form, and the dialect represented is distinctly Boiotian, rather than koine, so the inscription is certainly of Late Classical date. In 2014, permits and materials provided, AROURA will make a blotter or mulberry paper (*washi*) "squeeze" of the inscription in the hope of obtaining a more nuanced facsimile of its pitted surface.

Prospects

The 2013 "study season" achieved all the aims that prevailing conditions allowed, and it laid a firm foundation for further work in the laboratory and field. In 2014, should another study permit be granted, further high-quality photographs will be taken, including representative finds of various material classes from both the intensive surface collection at AMP and from field walking in transects on the plain around Glas, which had also been subject to magnetometry from 2010 through 2012. The next step in insuring a permanent record of the finds will be to mark each of them with a provenience code, an abbreviated version of that on the interior bags (see Appendix), written in water-soluble ink protected with clear, conservation-quality acrylic. Furthermore, in the summer of 2014, AROURA hopes to obtain another permit from IGME, with the approval of its Greek partners, in order to profile and take χ readings of cores from magnetic background areas, so as to provide control data for these conclusions. Dr. Lane, with the fiat of the IX EPCA, will also apply for a new archaeological fieldwork program through any vacancy that may be available through an institution accredited to the Greek state.

LIST OF FIGURES