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Eastern Korinthia Archaeological Survey Mid-Season Field Report, 1999

Edited by Thomas F. Tartaron

July 31, 1999

by Thomas F. Tartaron, with contributions by Naomi Levin, Gina Michl, Jay Noller, Daniel Pullen, Richard Rothaus, Robert Schon, Andrew Smith II, and Carol Stein.

Introduction

The Eastern Korinthia Archaeological Survey (EKAS) is a major research initiative that is unique in many ways among survey projects in Greece. The innovations of EKAS include:

- one of few surveys in Greece focusing explicitly on the "sub-urban" area of a major ancient city;
- construction of fully functional geomorphological characterization and Geographical Information System (GIS) *in advance* of the fieldwork, thus making a vast amount of information available to inform our survey work;
- the inclusion with each survey team of a geomorphologist, who will work with the team to make choices about survey units based on an understanding of the depositional processes affecting the appearance of artifacts on the landscape.

Areal coverage in 1999

In 1999, we have had to revise our total coverage estimates in light of delays in our permit and other constraints that are beyond our control. Our revised objective is to cover approximately 3 km^2 in a *systematic* and *intensive* way. By systematic, we mean that the places that we walk in the countryside are chosen according to a deliberate strategy, with more or less uniform (and therefore internally comparable) techniques of coverage. Because we cannot hope to inspect every square meter of the Eastern Korinthia in a few field seasons, we must attempt to draw meaningful conclusions about the entire region from a carefully selected sample of survey units. In the survey units that we generate by our sampling scheme, walkers normally walk in parallel lines at a standard spacing, and observe in a standard swath of the surface. For these reasons, we may call our survey *systematic*. In the past, many surveys in Greece have been unsystematic; for example, those that involved one or more persons simply walking around the countryside, or that involved searching specific locations (e.g., defensible hills) or manifestations (e.g., standing monuments) at the expense of others. This is not to suggest that such undertakings have been useless; far from it. But it has been shown conclusively that surveys that are systematic, particularly those that are also *intensive*, have far greater success in capturing a relatively complete picture of life in the past for a given region.

Our survey is also *intensive*, which means that we will walk at close spacing, normally 10 meters between walkers. At this interval, most concentrations of artifacts that are exposed on the surface may hypothetically be detected. Whether we will detect them depends, of course, on their exact position (do they fall in the eight meters between field walkers that goes uninspected?) and on our performance. A survey using a walking interval of 50 meters would not be considered intensive, though it could be considered systematic if that interval was uniformly applied. For purposes of interpreting surface information, the data generated by intensive surveys have been considered superior to those obtained by non-intensive surveys.

The area we are walking in 1999 comprises a broad north–south *transect* that crosses the gently sloping basin that trends east to west between Isthmia and Ancient Korinth, and two smaller transects extending roughly east to west near the village of Kyras Vrysi. A transect is simply a broad swath of land, in our case either 0.5 or 1 km wide, in which a large number of survey units will be placed. The north–south transect begins from its southern terminus SE of the village of Xylokeriza, at the base of the Oneion mountain range, and continues north across the basin for three km to the northern slopes of the Rachi Boska ridge, known as Perdikaria. From there, two further transects extend the survey area to the north, on the terraces beneath Perdiakaria, and in the low-lying area between the ridges of Boska/Perdikaria, Ayios Dimitrios, and that on which the ancient settlement of Kromna is presumed to be located. These narrow transects aim to capture the area that must have been an important crossroads, with routes from both Isthmia and Kenchreai intersecting as they proceed west toward Korinth and elsewhere.

Field Methods: Discovery Phase

Members of field walking teams are asked to carry out a number of data collection activities. The most obvious of these involves walking survey units in which walkers discover, count, and attempt to identify artifacts and other evidence of human activity. In addition, there will be several ancillary procedures that supplement the primary data.

Our permit specifically forbids us to move artifacts from the exact spot at which they are discovered, except in certain unusual circumstances. This unexpected development has forced us to quickly develop alternative survey strategies that preserve the rigor that we carefully built into our field methodology. Although the methods that we have put into place (and are still developing) are not what we had hoped to implement, we believe they will do a similarly excellent job of characterizing human activity in the Eastern Korinthia.

DISCOVERY UNIT (DU): The DU is the basic spatial unit of survey by which we attempt to assess the presence of material evidence of past human activity, and in which we seek to characterize this activity in certain meaningful ways. It is worth emphasizing that these units are exploratory. We may speak of the DU as the methodological unit of the *discovery phase* of the survey. In this phase, our principal aims are (1) to detect broad patterns of the presence and absence of human activity; (2) to address the varying density of material remains and its meaning; (3) to characterize where possible the chronology and function of the material remains; (4) to collect environmental information as a contextual framework for the archaeological material; and (5) to detect anomalous concentrations of material that correspond to what are traditionally called "sites," but for which we have created the less judgmental term "Localized Cultural Anomaly (LOCA)." The purpose of the discovery phase is *not* to examine or analyze in great detail the remains within the DU, but rather to collect basic data over a very broad swath of the landscape. When anomalous concentrations of material remains are discovered, a LOCA is typically declared and a second phase of more detailed and precise analysis is initiated (see below).

In 1999, our method of DU walking is as follows. The crew is arrayed at a spacing of 10 meters between walkers. Each walker is equipped with two tally counters (clickers), a compass, and a number of pin flags or flagging tape. At the Team Leader's signal, walkers proceed in parallel lines from one end of the DU to the other. Each walker observes the ground surface *in a two-meter swath only*. That is, the range of surface observation is one meter to the walker's right and one meter to the left. It is important that the walker resist the temptation to observe or wander beyond this swath, as it wastes time and alters our estimates of area viewed in non-measurable ways.

All artifacts are to be counted or accounted for in other ways. Under normal circumstances, one tally counter should be used for pottery and the other for rooftiles. Every piece of pottery or tile larger than a thumbnail that appears in the two-meter swath should be counted. Occasionally, this procedure may be altered to fit the range of materials present in the DU. For example, a DU in which the primary cultural material is flaked stone may necessitate the use of a tally counter to record counts of this material. In addition to counting, certain objects should be flagged using a pin flag. The items one should flag include: pottery fragments that are considered "feature sherds" (rim, base, handle, neck/shoulder, surface treatments such as burnishing, painting, incisions, impressions, stamps, etc.); tiles with finished edges; all lithics; and ancient objects of all other materials (metals such as coins, etc.). The Team Leader provides advice on all questions of flagging.

At the conclusion of walking the unit, the team fills out a DU form, on which many attributes of the DU are documented. This activity involves the Team Leader meting out a variety of tasks to members of the crew. The exact organization of this work is determined by the Team Leader, but the main tasks may be summarized. Each DU form has four pages: Page 1, general information, location, and survey procedure; Page 2, land cover, visibility, and land use; Page 3, features and course of action; Page 4, modern sweep. The pages may be separated and given to individual crew members to complete, if desired. The Team Leader trains field walkers to collect these data, and resolves questions or issues that arise.

Data processing

Because we are unable to remove artifacts from the field for processing and analysis in the laboratory, the laboratory must essentially come to the field. Daniel Pullen has assembled a team for the purpose of recording, photographing, and drawing objects that are flagged by the survey teams. Not all of the flagged objects will receive this full treatment; in many cases the Processing Team will simply record as much basic information as can be discerned about them. Along with records kept by the Team Leader, the Processing Team's work forms the basis for inferences about chronology and function of activity in our survey area.

Geomorphology and the survey

From the outset, geomorphology has been integrated into the project design on all levels, from the selection of the survey area, to the methods adopted for field walking, to the eventual analysis and interpretation of data obtained in the survey. The area subjected to geomorphological analysis comprises approximately 360 sq km, encompassing the survey area in a broad series of basins. The definition of the survey area in terms of those basins has allowed the geomorphological and archaeological work to proceed hand-in-hand. A geomorphological survey of the area, which has already commenced and will continue alongside the archaeological survey, provides maps of landforms and soils that influences the selection of survey tracts, the way tracts are treated in the field, and the interpretation of data obtained there.

The modern surface, especially in a region that has experienced considerable natural (e.g., tectonic) and anthropogenic (e.g., modern development) change, may reflect complex processes that obscure the relationships that we may perceive between artifact distributions and the surfaces upon which they are found. For example, the widespread practice of grading fields by bulldozing might confound our efforts by cutting away ancient surfaces and deposits, mixing soils and sediments and their contents, and burying the modern surface in unrelated fill. Another common practice is the transport of soil from one place to another, along with whatever cultural material the soil might contain.

How, then, might we preserve the relationship between artifacts and surfaces, and avoid egregious errors in interpretation? A basic principle of placing our survey tracts on the landscape is that they be defined by *landforms*, for reasons of depositional context, rather than according to other criteria that are typically used in survey. Among the traditional methods is the long transect (without subunits within it) stretched out over the landscape without regard for topography, terrain, or depositional history. Designed to avoid judgmental placement and to provide a statistically valid sample, this method would certainly fail to avoid the problem of artifact mixing in the Korinthia. Even tracts defined according to units of modern land use (e.g., the agricultural field), apparently homogeneous in terms of topography, visibility, and modern land use, have been observed to often comprise several landform units, and are by no means immune to the effects of bulldozing, soil transport, and other processes.

An important innovation of EKAS is the attachment of a trained geomorphologist to each survey team. The survey geomorphologist's most important tasks are to map the landforms within the survey area, and to work directly with Team Leaders to lay out discovery units that respect the landform principle. On a day-to-day basis, the geomorphologist is present in the field to consult with the survey team and to alert the Team Leader to processes that may profoundly affect the interpretation of artifact scatters, or the lack of them. With the benefit of this collaboration, the teams avoid creating units from which artifacts from unrelated contexts are collected together, and thus a meaningful basis for interpretation of the survey results will be preserved.

Afternoon tasks (4:00–6:00 PM)
In the afternoon, the survey teams reassemble at 4:00 PM to perform a number of tasks related to the survey units walked on that day.

The plotting of the units on the aerial photographs is checked, and the DU forms are checked for completeness and accuracy. Once these data are deemed to be satisfactory, they are entered into the project database. The units plotted on the paper version of the aerial photos are plotted in the GIS. The Team Leader may assign a crew member to carry out these tasks.

Digital photographs from the survey units are downloaded, and the photo log is checked for accuracy. All digital photos must be assigned individual file names as .jpg files, according to very specific naming conventions, and placed in the proper folder on the computer. The Team Leaders provide instruction in these matters if they choose to delegate this task.

This is also the time for general discussion about what was found and in a preliminary way about what the data might mean. Concerns about any aspect of the fieldwork may be raised. Finally, the Team Leaders may define other tasks they deem suitable or necessary.

Field Methods: LOCAs

In the course of walking the countryside, survey teams frequently encounter anomalously dense scatters of archaeological material, or isolated but recognizable architectural features, such as sections of wall or agricultural installations. The recognition, investigation, and classification of these concentrations are a reflection of a project's theoretical orientation toward the spatial aspects of human behavior, and the ways in which behavior is preserved in surface deposits. The traditional concept of the "site," easily recognizable by a dense clustering of artifacts and definable spatial limits, has been found inadequate to encompass the full range of human activity. A great achievement of intensive survey has been the development of approaches to the study of the kinds of activities that leave less clustered or less dense remains, among them hunting, pastoralism, agriculture, and tool manufacture.

Because "site" is really such a loaded term, and archaeologists seem unable to agree on what it means, more neutral terms have been created to deal with anomalous, non-random scatters of cultural materials. We are no exception; our term is *Localized Cultural Anomaly (LOCA)*. The elements of this term help explain the concept: (1) localized, thus having some spatial integrity by which it may be distinguished from the material and/or the landscape around it; (2) cultural, thus a product of human agency of manufacture or manipulation; and (3) anomaly, thus qualitatively and/or quantitatively different from the surrounding material and/or landscape.

The treatment of LOCAs for 1999 remains at this moment an unresolved issue that will be settled in the week of 26 July as we run our first LOCA experiments at Perdikaria. Our original method may be summarized in outline form, with the disclaimer that our ultimate treatment of LOCAs in 1999 may look very different.

Field Procedures: Localized Cultural Anomaly (LOCA)

- the initial discovery and designation of a LOCA should be accomplished as described above.
- once discovered, a LOCA should be investigated within a day or two, if not on the same day as its discovery.
- in principle, a grid will be superimposed over the entire LOCA, within which a number of sampling circles will be established.
- the LOCA is enveloped in a grid of 10m × 10m squares (100 sq m). Within each of the grid squares, a circle is placed in the middle of the square. This circle should have an area of 5 sq m, giving a 5% sample. Thus the diameter should be approximately 1.26 m. Strings will be prepared for measuring the circle.
- within the sample circle, all artifacts larger than the thumbnail should be collected. Common sense should be used to make exceptions to the size rule: if a person finds a small coin or a Classical black-slipped sherd, these should be collected as well.
- the grid size and/or sample circle placement may change under certain circumstances: (1) if the LOCA is so small that there is little hope of getting a representative sample of material using a 100 sq m grid square and a 5 sq m sample circle, the grid may be subdivided, or an alternative

collection scheme, such as total pickup of the LOCA, may be contemplated; (2) if the placement of the circle within a grid square happens to fall on a tree trunk or some other obstruction, the circle can be moved to a location with maximum visibility; (3) if the placement of the circle within the 100 sq m grid square is seen to completely miss obvious clustering within the grid square, the square may be subdivided into four 25 sq m squares, in which case the circles must be scaled down as well to preserve the 5% areal sample size.

- sample circle placement may not be altered so that circles fall on a concentration of "goodies" within a given grid square.
- documentation procedures for LOCAs include GPS reading at center, plotting, laying out of grid and sample circles, collection from sample circles, photography, forms, etc.
- more precise mapping and drawing of features within a LOCA may be arranged.

Mid-Season Summary of Activities

Two archaeological survey teams have thus far (in 13 field days up to Friday, 23 July) walked 222 survey units covering approximately 1.32 square kilometers. The first (and main) survey transect, extending from the slopes above Xylokeriza to the northern slopes of Rachi Boska/Perdikaria will be finished on Monday, 26 July. On 27 July, a LOCA investigation will be conducted on Rachi Boska to experiment with our methods of documentation, collection, and analysis. The remainder of the week of 26 July will be devoted to walking the two narrow swaths extending toward the Ayios Dimitrios and Kromna ridges. The archaeological survey teams will conclude their work on Friday, 30 July. The following week will be devoted to data entry and verification, field verification, consultation, and the production of final reports for the season.

A. Archaeological Survey Teams

Survey Team 1
Carol A. Stein, Team Leader
Team Members: Jody Clauter, Alexandra Retzleff, Daniel Sarefield, Jack Wells

Week 1: 7/7/99 to 7/9/99
Field activities began on Wednesday, July 7, 1999, at the southern end of our first transect, east of Xylokeriza. Survey Team 1 (Jody A. Clauter, Allison A. Hicks, Alexandra G. Retzleff, Daniel C. Sarefield, and Jack C. Wells) began on the western side of the transect, while Survey Team 2, led by Andrew Smith, took the eastern side. A total of fourteen discovery units were walked (DU 2–15), covering roughly xx sq. km.

The upper slopes of Mt. Oneion (DU 2–10) were characterized by extremely low artifact densities, no doubt influenced by poor visibility. Most of these units were blanketed with cobble-size chunks of limestone that obscured the ground surface and considerably slowed the pace of fieldwalking. A scattering of Roman–Late Roman material was identified, primarily amphora with a few fineware fragments and one possible lamp. In one unit with better visibility, a plowed olive grove (DU 8), a small concentration of Roman cookware and amphora was noted along the eastern edge. Two possible Medieval sherds were noted near the western edge of the survey area— a rim in DU 6 and a base from DU 8.

Even lower artifact densities were recorded on the slopes below (DU 11–15). Despite the low artifact counts, we began to encounter material from earlier periods. Of note are the three coarse handles found in DU 13, all of which have been tentatively dated to the Archaic–Classical period.

Non-ceramic finds were limited to three lithics: two obsidian blade fragments from DU 2 and a flake of yellow chert in DU 8.

Week 2: 7/12/99 to 7/16/99
Survey work continued this week on the half-kilometer wide transect east of Xylokeriza. Survey team 1 continued to work along the western side of the transect, north and east of the slaughterhouse, and east of the north-south paved road that marks the western boundary of the transect. The number of fieldwalkers on team 1 was reduced to four after Monday, July 12, when Allison Hicks left the field to take up photographic duties. An additional staff change occurred on Wednesday, July 14, when Greg Gibbs replaced Naomi Levin as the team geomorphologist. A total of 33 discovery units were walked, with an additional six recorded but left unsurveyed (DU 27, 33, 48, 49, 50, 51) due to poor visibility or mature crops.

A number of geomorphological features in this area, including two east-west trending water channels and an inset terrace, forced the creation of a series of small discovery units and consequently slowed the pace of survey. An orange grove was walked in two separate units (DUs 25 and 26) to define the southern E-W water channel. An attempt was made to isolate the northern E-W water channel by walking an olive grove (DU 32) in an E-W direction and recording the walker counts. To define the inset terrace, a hayfield was walked in two separate units (DUs 28 and 29), and a young olive grove and vineyard were each divided into three units (DUs 35, 36, and 37 and DUs 38, 39, and 40, respectively). Consultation with Jay Noller in the field on Wednesday resulted in a policy shift whereby some geomorphological features could be combined in a single discovery unit if they could be isolated along the lines of particular walkers or incorporated within a "second pass." This should help balance the needs of the archaeological and geomorphological sides of the project.

Week 3: 7/19/99 to 7/23/99 (DUs 61−100)
Team 1 continued to survey in the western half of the Xylokeriza transect this week, completing 36 discovery units, and recording an additional four units (DUs 61, 65, 93, 94) that were not surveyed. DU 100, the last of the day on Friday afternoon, lies just S of the training units walked on top of Rachi Boska (DUs 500, 1, 1000), and there are only a handful of units remaining before this transect is complete. I anticipate that by mid-morning on Monday (7/26), Team 1 will move to the northern slopes of Rachi Boska where we will begin to explore a series of terraces.

<u>DU 74</u> Xylokeriza

On Monday morning, closer examination of DU 61, a narrow thistle-covered strip of land south of the road to Kenchreai, revealed that a portion of this unsurveyed unit was indeed walkable. A small olive grove at the eastern end of the unit had gone unnoticed on Friday afternoon, and we walked the grove as DU 74. The finds were similar to those encountered in the other units along the western edge of the transect: amphora fragments, cookware fragments, a fineware rim, and a green-glazed body sherd, possibly Ottoman in date.

<u>DUs 62–73, 75–80</u> Marougka

The remainder of the Marougka area was surveyed this week before we headed north to the crest of Rachi Boska. The majority of the fields in this area are long and narrow, oriented N–S, many of which are devoted to either grapes or vegetable crops. Visibility was, in general, quite high. The patterns observed at the end of last week—higher artifact densities closer to the road to Kenchreai, with a high percentage of fineware, and increased numbers of lithics—continued to hold.

<u>DUs 81, 85, and 88</u> The Linear Feature

Prior to commencing survey in this area, Jay Noller identified a linear feature, running NW–SE and ca. 20 m wide, which cuts across the Xylokeriza transect. The feature is visible for much of its length in the aerial photographs and is marked most often by a change in field orientation. The feature runs from the quarries E of Hexamilia to the port of Kenchreai and is, in all likelihood, a road, although its period of use remains uncertain. To obtain as much information as possible about this feature, we decided to walk it separately from the surrounding fields. In the area covered by Team 1, the feature comprises all or part of DUs 81, 85, and 88. Details about the finds from these units are not yet available, but artifact counts from within the area covered by the feature were uniformly low.

<u>DUs 82–84, 86, 87, 89–100</u> Rachi Boska

The southern slopes of Rachi Boska are covered by predominantly citrus and olive groves, and the visibility in these units was highly variable. In one of the few vineyards in this area (DU 86), just north of the linear feature, we encountered anomalously high artifact counts, and the unit has been identified as a possible LOCA (see below).

<u>DU 86</u> Possible LOCA

DU 86 is a vineyard (ca. 80 x 80 m), located just north of the intersection of two paved roads; it lies just north of the point where the linear feature crosses the paved road leading (NE) to the Ayios Dimitrios ridge. Team members had noted a high density of artifacts in this field on Tuesday afternoon, but we weren't able to begin surveying the unit until after noontime on Wednesday. Good visibility (90%) and high artifact counts slowed our progress and we were able to complete only two passes within the vineyard before the end of the day; we returned to finish the unit on Thursday morning. Relatively uniform artifact counts across the field suggest that the edges of the LOCA continue on past the boundaries of the vineyard, but it is difficult to determine where those edges might be. The fields adjacent to the vineyard on the E and W (DUs 87 and 88) have significantly poorer visibility (10%) and, not surprisingly, much lower artifact counts. To the north, in DUs 89 and 95 (visibility = 60–70%), we recorded more modest artifact counts, but a similar range of material to that found in DU 86. To the south, poor visibility again prevented us from assessing the potential for continuation of the LOCA. Clearly, more work needs to be done in defining the extents of this scatter.

The finds from DU 86 include fragments from numerous BG vessels (some possibly Archaic), various buff tableware fragments, and a bronze coin (illegible, but probably Greek in date). Some red-slipped tableware and mold-made lamp and amphora fragments indicate a strong Roman component to the site as well. In addition, the presence of at least twelve obsidian bladelets, all of uniform size, suggests that lithics were being produced nearby.

Survey Team 2
Andrew Smith II, Team Leader
Team Members: Bill Caraher, Emily Johnson, Stacey McGarity, Dimitri Nakassis, David Pettegrew.

Week 1: 7/7/99 to 7/9/99
Fieldwork began on Wednesday, July 7, 1999 and continued for the first week until Friday, July 9, 1999. Survey Team 2 began along the east side of the general transect that extends from the upper slopes of Mt. Oneion northward to the low-lying ridge of Rachi Boska. Within the confines of a 0.25 km wide corridor of the general transect, a total of 22 discovery units (DUs 501-522) were outlined and investigated during the first week. The total area covered may be derived directly from the GIS.

The DUs surveyed during the first week were all situated along an alluvial fan system, characterized by steep slopes and fairly dense vegetation. Mostly the DUs were set within open fields of dense vegetation (phrygana) with occasional olive groves present (DUs 501, 503, 506, 507, 508, 512, 516, 522). Visibility was generally poor, which ranged from 10-80 percent with an average of 35 percent.

The first fairly dense concentration of artifacts derived from DU 502 high up the alluvial fan. A number of Lakonian tiles were found along with a single threshing sled flint. Predominately, the pottery from DU 502 consisted of cooking wares and jars/juglets. Some table/fine wares were present including ARS Form 10 and ARS Form 99. Amphora sherds were also found in fair amounts, which included spirally grooved sherds and some LR2 amphora sherds. DU 503, just above DU 502, also produced some LR2 Amphora sherds, but the densities were far less. No decision was made on whether to treat DU 502 as a LOCA, although it may be noted that the sherd concentration was fairly well contained to that particular DU.

The remaining DUs largely reflected the same pattern of coarse wares and amphoras, with few fine wares. Another ARS Form 10 was found in DU 519, which is an apricot grove with phrygana. For the most part, the pottery flagged from DUs 501-522 was Roman to Late Roman, which included Early Roman pithos fragments from DU 522.s

Non-pottery evidence, in addition to the sickle blade flint from DU 502, included two bladelets from DU 504 near the apex of the alluvial fan.

Week 2: 7/12/99 to 7/16/99

Fieldwork began on Wednesday, July 12, 1999 and continued for the second week until Friday, July 16, 1999. Survey Team 2 continued along the east side of the general transect just below the upper slopes of Mt. Oneion northward to the low-lying ridge of Rachi Boska. Within the confines of a 0.25 km wide corridor of the general transect, a total of 46 discovery units (DUs 523-569) were outlined and investigated during the second week. Again, the total area covered may be derived directly from the GIS.

The DUs surveyed during the first week were all situated along the bottom slopes of the same alluvial fan system investigated during the prior week. Olive and citrus groves, with occasional vineyard, predominated, and visibility increased significantly since the fields were far better tended. Visibility averaged roughly 50-60 percent across the entire area surveyed during the second week.

Throughout the DUs covered, Medium Coarse wares predominated and generally in the forms of jar fragments or amphoras. With few exceptions, these were all Late Roman. Large pithos fragments were found in DU 525, perhaps associated with localized dumping of debris.

Across the paved road just south of the slaughterhouse, the first high concentration of artifactual material was encountered in DU 527. The pottery was mostly Medium coarse wares (jars) and Kitchen wares/cooking pots. Generous quantities of amphoras and pithos fragments were also found. Again, these mostly dated to the Late Roman period, although a Corinthian pan tile was found that may be Archaic to Classical-Hellenistic (another Corinthian pan tile was found in DU 535 just to the north). Hardly any Fine Wares were found in DU 527. Similar finds were made in all the DUs to the N, S, E, and W of DU 527, although the artifact densities were generally smaller and visibility less than favorable for artifact recovery.

No decisions have been made to determine the best method for LOCA identification or documentation. DU 527 may be considered a LOCA and ought to be recorded appropriately. It may be feasible to determine the extent of the LOCA directly from the GIS once all the data has been entered.

The pattern of mostly Late Roman wares persisted for most of the week until Team 2 approached the second of the paved roads that crosses the general transect. Here, just south of the road and further to the north, Archaic to Classical materials were found among Later Roman materials in DUs 550, 551. The latter is an extensive olive ground with 80 percent visibility and high artifact concentrations. Among the pottery finds were a number of Fine wares, Medium-Coarse wares, amphoras, and pithoi. It is noteworthy that the percentage of Fine wares in this area increased significantly in number.

Across the road, the same pattern of artifact distribution in terms of Type and date of artifacts continued (cf. Archaic-Classical materials in DUs 552, 556, 557, 558, 560, 561, 563, 564, 565, 566). Here also, the number of non-pottery artifacts increased, which included obsidian flakes and bladelets from DUs 552, 557, 560.

Week 3: 7/19/99 to 7/23/99

A continuation of the general transect to the east will be the target of Team 2 during week 3.

B. Object Processing Team
Daniel J. Pullen, Processing Co-ordinator
Team members: Jonathan Stevens, Erin Musil, Karen McPherson

The Processing Team has the duty of assessing in the field the materials discovered by the two Survey Teams. The Survey Teams flag items in each Discovery Unit using the "ChronoType System" of distinguishing any item that might be different from another and items of significance such as diagnostics. The Processing team then goes into the Discovery Unit, identifies the items and documents those, which might help in functional, chronological, or other analyses. The Survey Unit Item Registry sheet is filled out for those items, approximately 18% of the items are drawn, and approximately 7% are photographed with a digital camera. The photographs are downloaded daily onto the laptop "Tito." The drawings are now being scanned into the desktop computer "Jorgé." The SUIR sheets are entered into the EKAS Finds database (in FileMaker Pro), the most up-to-date copy of which lives on both the desktop computer at Isthmia and the desktop "El Guapo." The Processing Team has been able to keep up with the Survey Teams for the most part; those DUs surveyed at the end of the day are assessed by the Processing Team at the beginning of the next day, and indeed this gives the Processing Team work to do at the beginning of the day.

Data entry for the SUIR sheets is complete through part of Tuesday, 7/20/99 (another two days' worth will most likely be entered by the end of today), yielding over 1200 items. The photo database is up-to-date through Friday 7/23/99. The drawing database has not yet been started. Richard Rothaus has taken a copy of the file structure to integrate the finds database into the GIS system, but at this time this has not yet been accomplished. Based on a daily average assessment of 135 items with 26 drawings and 15 photographs, I predict that the database will contain by the end of the season close to 2350 items, 300 photographs, and 500 drawings.

Little analysis of finds beyond the identification and documentation has been done, mainly due to time constraints. A few observations are possible, though. Roman, and especially Late Roman, is nearly everywhere in the survey transect. Late Roman seems to be more prevalent in the south, on the slopes of Mt Oneion, while earlier Roman material is showing up on the Rachi Boska. Archaic-Classical material has been increasing in quantity the further north we go, with more in the western portion (Team 1/Carol Stein's team) than in the eastern. There were a number of mediæval (Frankish and Ottoman) sherds in the area of DUs 51/34/47/61 and

565/554. Very little in the way of prehistoric has been noted; only two or three widely scattered (in time and space) sherds.

C. Experimental Survey Team

Robert Schon, Team Leader
Team Members: Marti Brown, Jon Crews, Tom Peterson

The EKAS experimental team (Team X) spent the last 3 weeks conducting sherd seeding experiments in order to assess the effects of various visibility conditions on ceramic artifact discovery. What follows is a general schedule and outline of our procedures.

Sherd preparation at Isthmia. For the experiments, a total of 1,180 pottery sherds were prepared and processed as "seeds." Flowerpots and modern tiles were smashed up into sherds of various sizes. These sherds were arranged into groups: 1-300 and 1,001-1,180 are small sherds whose longest dimension (LD)[1] is between 20 and 50 mm. 301-700 are between 60 and 99 mm in LD. 701-850 consist of small tile fragments with a minimum length of 50 cm and a maximum LD of 123 mm. 851-900 are white glazed porcelain bits. 901 -1,000 are large tiles with a minimum length of 100 mm and a maximum LD of 175 mm. Processing of each sherd consisted of: 1) Numbering 1 side with a sharpie and coating the number with clear nail polish in order to keep it from running. 2) Measurement of LD and classification into the groups above. 3) Munsell color readings for each sherd (facilitated by the fact that the pottery represents only a few different vessels). 4) Digital and color slide photography.

Once prepared, the sherds were organized into equivalent sets. A random number table was generated using Microsoft Excel and an equal number of sherds from each size class was selected. A total of 6 sets with 184 sherds in each were produced. Each set was divided into 3 subsets which correspond to the tenth's digit in the field experiment classification. (So, field 1 has 3 subsets of sherds- 1.1, 1.2, 1.3) Set 1 for each field consists of 100 sherds- 50 from the small category, 30 of the medium sherds, 10 small tiles, 6 large tiles, and 4 porcelain pieces. Set 2 consists of 30 sherds- 14 small, 7 medium, 3 small tile, 4 large tile, and 2 porcelain. Set 3 consists of 54 sherds- 16 small, 20 medium, 12 small tile, 4 large tile, 2 porcelain.

The next step was field selection. This season 4 fields with differing surface visibility patterns were selected for the seeding experiments. Field 1 is an olive grove with relatively high surface visibility (80% according to most walkers) but also high background scatter.[2] Field 2 consists of trampled wheat stubble (Visibility assessment 10%, in most cases) with light to moderate background scatter. Field 3 is a well tilled field with little or no background scatter and reported 90-100% visibility. Filed 4 is another olive groves with weedy soil (40-60% visibility) and very light background scatter).

[1] Longest dimension (LD) measurements were used in order for us to avoid 2 measurements per sherd. LD will be used as an index of obtrusiveness. Ultimately, Surface area of each sherd will also be calculated.
[2] Background scatter consists of clasts in the soil matrix (primarily rocks) that may distract a fieldwalker's attention away from artifacts.

Field seeding: 3 passes 50 m long (45 in the case of field 3) were seeded in each field. Pass 1 is a high density unit with 100 sherds placed in a 50 by 2 meter swath. Pass 2 consists of a low density scatter with 30 sherds strewn in the 50 x 2 meter pass. In pass 3, we widened the swath to 4 meters (also low density) to test recovery rates of artifacts outside the 2 meter swaths we normally use at EKAS.

Sherds were strewn randomly for the most part, their locations measured, and noted as X and Y coordinates. 0,0 being the starting point of each walker's pass. Sherds were placed on the ground with some attempt to make them look like typical surface artifacts. A viscous dirt-water solution was prepared in the field prior to seeding and this solution was applied to each sherd to make it look authentically dirty. Extra attention was paid to the edges of the sherds to help disguise their "fresh breaks" which Lisa Wells pointed out may attract extra visual attention in the field.

The experiments: Fieldwalkers and Team Leaders from teams 1 and 2 each took a turn to walk all 12 passes. They were instructed to treat each pass as a normal DU. As they walked, they flagged all the artifacts they saw.[3] Members of Team X then collected the flags and recorded the serial number of the discovered sherds. For each pass secondary data were recorded: Field, Walker, Time of Day, Elapsed Time of Walk, Direction of Pass, Weather (sunny/cloudy) and the walker's assessment of Visibility and Background Scatter.

Following the completion of each field's testing. Team X returned to the field to recover the seeded artifacts- this is essential to ensure that each field walker had the potential to find the same sherds. Thus far, we have achieved 100% recovery of artifacts seeded in fields 1 and 2.

As of today, July 24,1999, all that remains is for team 1 to walk field 4 and for Team X to recover fields 3 and 4.

I have not yet been able to analyze or draw any conclusions from the data generated by the experiments, but will attempt to do so starting this week.

D. Geomorphology Teams
Jay Noller and Lisa Wells, Geomorphology Directors
Geomorphology Interns: Greg Gibbs, Naomi Levin, Gina Michl

One of the most critical survey operations is the definition of geomorphological units, and within them the archaeological Discovery Units. The process of defining geomorphological units, taking into account the requirements of landform integrity while accommodating the needs of the survey teams if possible, has allowed us to establish certain guidelines that work well in the field.

Geomorphological Units (GUs). The GU is a continuous spatial entity defined by a single dominant process, natural or anthropogenic, that is affecting artifact movement and location on the landscape.

[3] Tally counts were taken of actual ancient artifacts but these figures will not be used for analysis.

Minimum size of a Geomorphological Unit. We have adopted the United States Geological Service (USGS) standard that the smallest unit on a map is that which is large enough to appear on a 1:5,000 scale map. In essence, this is greater than the width of two contact lines (i.e., enough space to hold the end of a lead line attached to a map unit symbol). The lower limit of this standard (e.g., a feature 15 m × 200 m) can be scarcely drawn on a map, and is thus of little practical value. Instead, the lower limit is determined by the importance of the landscape unit in terms of its value to understanding the context of artifacts and environmental history. Units that are essential from this perspective are mapped, even if they push the limits of what is mappable. An example of this is a check dam that impounds sediment within a gulley.

Size of Geomorphological Units in EKAS. In EKAS, the Discovery Units do not cross the boundaries of GUs, except in unusual circumstances, and thus are contained with them. In the field, parcels of land that would make natural and convenient DUs (such as agricultural fields) often cross GU boundaries. Some of the conditions under which a prospective DU might cross GU boundaries include: 1) areas of active geological processes, such as rivers, beaches, or fault scarps, where the areal extent of a rapid erosion and/or deposition is likely to be small compared to the enclosing field boundaries; 2) logistical issues related to limited time, team size, and field resources. In the latter situation, field methods have been developed that preserve the integrity of the geomorphological boundaries in cases where a small portion of a DU has crossed into another GU. These methods permit information from the portion crossing into another GU to be isolated and collected separately, without the need for an entire new DU and its accompanying paperwork and other documentation.

Bounds of a GU. Morphostratigraphic mapping unit contacts are defined by geomorphological criteria independent of, and oblivious to, the cultural boundaries that in large part define the DUs. GUs are morphostratigraphic units that are defined to aid the archaeological survey. As such, GUs should be defined with potential or known DUs in mind. In practice, this means that GU boundaries may be given orthogonal contacts where a simple shift and/or rotation of a morphostratigraphic unit contact conforms to field boundaries. A shift on the order of 10–20 m is not a problem; if larger, the archaeological survey Team Leader is asked to create more than one DU to accommodate the morphostratigraphic units, or to put into operation the special field methods described above to collect information from the two or more GUs separately within the single DU. If the GU cannot be conformed to the DU or information from the GUs cannot be isolated within the DU, the DU must conform to the GU. This is the essence of our methodology and cannot be violated.

The Geomorphology Interns report the following activities:

Week 1

The survey began at the base of Mount Oneion along Korinth Fault, southeast of Xylokeriza. A series of lobe-shaped alluvial fans are separated by deep gullies that originate from gorges cutting through the limestone cliffs above and to the south. The fans are indicative of alluvial processes (driven by water flow) whereas colluvial processes (driven by gravity) would have a sheet-like linear form. The slopes have a high concentration of limestone gravel.

The area is depositional rather than erosional. From the shallow depth and vegetation on the side walls we see that the deeper gullies are not actively incising. In addition, sediment is accumulating so quickly that soils have little time to form. Soils of the units we examined are poorly developed and lack the calcium carbonate which accumulates with time in this climatic region. Although all of the features are Holocene in age, dating to the last 10,000 years, the lobes themselves have a relative chronology. Since the newer lobes are deposited on top the older ones, perhaps more artifacts can be expected on the older lobes whereas artifacts might be buried underneath the younger lobes. It will be interesting to compare artifact density with alluvial fan age.

The interface between the geomorphologists and the team went well this week. There have been some frustrations in plotting units on older aerial photographs that do not mark many recent features such as roads and field boundaries. Closely measuring both DUs and the geomorphology units has proved useful. Since geomorphology units need not be limited by changes in land use, they can be bigger. This will enable a number of DUs to fit within one geomorphology unit and give the team leaders more flexibility in transect layout.

Week 2
As we continued to move north this week, we descended to flatter areas at the toes of alluvial fan lobes and moved into an active floodplain. Water and sediment are transported from the west and southwest, draining near Kenchreai. Very fine reddish clayey sediments accumulate in this valley, washed in from marine terraces to the north and alluvial fans to the south as well as from upstream. We found two channels in our field area, apparently a main and a tributary channel.

The new geomorphologic setting this week brought about much discussion and a change in procedure. River terrace sequences record changing depositional and erosional processes over time due to both natural and anthropogenic factors (sea level, climate, agriculture, etc.). Because different terraces are formed at different times, artifact distributions and ages on them are expected to differ. Thus, they are very important for deciphering changes in the river and human land use over time. Yet these geomorphological features are narrow and often much smaller than would be practical for DUs. Keeping in mind the time constraints of the survey, the group agreed to modify constraints on DUs. Formerly, a single DU could not include several geomorphology units. Now, a DU can contain different geomorphology units and cross their boundaries if artifact density data can be teased out in other ways (a record of which walkers pass where or artifact count subtotals within the DU). A few well situated DUs will conform to geomorphological boundaries, allowing for extrapolation across many other units. In addition, because no artifacts are moved in the course of the survey, it will be possible to return to problematic or interesting areas in future seasons if needed.

Following survey in the active floodplain, the teams began to move up onto the gentle slope leading up Rachi Boska.

Week 3
The survey teams moved uphill onto rockier, steeper colluvial deposits this week. A topic of much discussion was a long linear feature that is well-defined on aerial photographs. This 15- to 30-m-wide feature crosses the field area from WNW to ESE and continues beyond on either side.

It is defined by changes in soil color and topography: it is generally a flat area cut into the hillslope and exposes the whiter, more calcium carbonate rich subsurface soil. Whereas the feature is easily picked out on aerial photographs, its boundaries on the ground are locally less clearly defined.