Abstract

The Late Neolithic and Early Chalcolithic (LNEC) in Portugal (circa 3000-1000 BCE) was a period of significant social, ideological, and economic reorganization. The small, mobile farming communities of the Early Neolithic transformed into large, sedentary societies with monumental tombs, hilltop fortifications, and intensified agricultural economies. These communities created heavily modified agricultural landscapes and developed interdependent economic systems. Archaeological research on LNEC communities has focused on the most visible sites, namely monuments and large population centers. Yet, knowledge of small hamlets, hunting/gathering locations, pastures, and mines, is essential for understanding the changes that took place during this important period of transition. This proposal seeks funding for a full pedestrian survey of the Vale de Pedreirinha, southern Portugal, an area with known LNEC occupation. This survey would document LNEC sites of all types to map a complete LNEC landscape and fill a gap in our knowledge of this period in southern Portugal. [Word count: 150]
Category Justification

This proposal falls under category 1. I am a new member of the faculty starting a tenure-track position during the 2008-09 academic year. I was a non-tenure-track faculty member for the 2007-08 academic year. I do not have any start-up funds available to finance a research project. [World count: 47]

Present Status of Knowledge

Although the Late Neolithic and Early Chalcolithic (LNEC) (3000-1000 BCE) was a formative period of cultural development in Portugal, our understanding of the prehistoric social, economic, and ideological system is limited. Most archaeological research on LNEC communities has focused on the excavation of large sites. LNEC communities did create large villages with monumental architecture, but they also transformed the entire landscape in which they lived through farmsteads and fields, mines, quarries, and foraging locations. A focus on highly visible sites distorts our picture of LNEC prehistory. This proposal seeks funding to situate LNEC community development within the larger socioeconomic system through a complete survey of the Vale de Pedreirinha in Algarve, Portugal.

Early agriculture transformed societies throughout the world, creating an economic base for sedentism, increased wealth, inequality, and rapid population growth. In much of southern Europe, the introduction of agriculture was a rapid process characterized by the transition to an economy dominated by domestic plants and animals, the founding of large, sedentary villages, the use of new technology, and the complete replacement or assimilation of local hunting and gathering societies by immigrant farmers. In contrast, the introduction of agriculture into the area that today is Portugal was a slow process. Although the first Portuguese farming communities are over 6,000 years old, they coexisted with hunting and gathering societies for well over a thousand years. The first agricultural sites, dating to the Early Neolithic period (4500-3000 BCE), are small and ephemeral, with little evidence for sedentary villages or intensive reliance on domestic food sources. In fact, little more than small amounts of pottery and variations in technology differentiate archaeological sites created by farmers from those made by contemporary hunters and gatherers (Arias 1999; Zilhão 1993).

Although the introduction of agriculture into Portugal in the Early Neolithic had little immediate impact on prehistoric lifeways, it laid the foundation for extremely rapid changes at the end of the Neolithic and beginning of the Chalcolithic (copper age), over 1,000 years later. The LNEC in Portugal was a period of significant social, ideological, and economic reorganization. This is seen in the emergence of large and sometimes fortified villages, the increasing importance of monumental architecture, and the intensification of agricultural production (Cardoso 2002; Gonçalves 1989; Jorge 1990; Senna-Martinez 1995).

Unlike the Early Neolithic agricultural sites, LNEC sites are often quite large, with abundant evidence for highly sedentary populations. These changes suggest higher population densities, leading to settlements that are more concentrated. The meaning of walled hilltop sites has been a contentious issue in LNEC archaeology. Some have argued that their emergence at this time of demographic flux may suggest these were fortified sites built in response to increasing violence associated with larger populations contending for agricultural land (Gonçalves 1989; Jorge 2002). Others have suggested that the walled hilltop sites are
expressions of prehistoric beliefs and that these architecturally impressive and highly visible communities were not fortifications but ritual centers (S. Jorge 1990; V. Jorge 2002; see Figure 1).

Regardless of their interpretation, these walled settlements, as well as monumental tombs, standing stones, and other forms of monumental architecture, are clear evidence that social organization was undergoing significant changes during the LNEC. The mobilization of labor for community projects required a degree of institutionalized leadership well beyond what we have evidence for in the Early Neolithic. The tombs and standing stones themselves also reflect changing ideology, or at least expressions of ideology, during the LNEC.

The social and ideological changes that occurred during the LNEC were accompanied by an economic shift toward heavy reliance on domestic plants and animals, as well as the intensification of agriculture. Domesticated animals became important not only for their primary product of meat, but also for their secondary products of milk, wool, and traction for plowing, a phenomenon known as the "secondary products revolution." The use of animals for traction, in particular, was critical for increasing food yields by allowing more land to be opened for crops (Cardoso 2002; Senna-Martinez 1995).

These social and economic changes were interwoven with changes in the relationship between prehistoric communities and their landscapes. Early Neolithic settlements in Portugal are frequently found near marine resources. In fact, one of the primary theories used to explain the slow adoption of agriculture in this region is that Atlantic and estuary resources were so rich that agriculture would have been less productive than continuing a traditional way of life (Arias 1999). During the LNEC, the focus of settlement shifted inland. Landscape use became more complex. Larger habitation sites, multiple small villages, and a variety of special-use sites, like mines, quarries, and agricultural fields, were integrated into a larger economic system. These rapid and momentous changes may have been the result of failing marine resources, or increasing populations that could no longer support themselves on marine resources alone. The result was a push toward the use of terrestrial resources, particularly domestic plants and animals, with their higher yields.

Archaeological research on LNEC communities has focused on the most visible and durable sites, particularly monuments and large population centers (e.g., Cardoso 1982, 1989; Sangmesiter and Schubart 1981; Silva and Soares 1987). Yet, LNEC communities consisted of more than just villages, cemeteries, and monumental architecture. Agricultural fields, copper
mines, small hamlets, large centers, hunting and gathering grounds, pastures, and tombs together constituted a social, economic, and ideological whole. To focus research on only a small portion of the economic or social system ignores the importance of production and special-use sites that supported the larger community.

Furthermore, the outstanding questions of LNEC archaeology will never be answered by looking only at the largest sites. For example, testing the theory that a failure of marine resources and/or an increase in population density led to many of the economic and social changes of the LNEC periods requires an understanding of how prehistoric people used their entire landscape, both coastal and interior. Changes in over-all site density and evidence for generalized resource intensification and stress cannot be inferred from the major villages alone. Similarly, the function of walled hilltop sites has not been clarified by excavations at only those sites. Outlying sites, however, promise to provide more evidence for violence or for a shifting ideological focus on the highly visible monuments.

A thorough understanding, therefore, of the changes that took place during this important period of transition requires placing individual LNEC sites within their larger context. I propose just such an approach to LNEC landscape use in the Vale da Pedreirinha, near São Bartolomeu de Messines, Algarve (Figure 2). Most research on the LNEC in Portugal has been conducted in Estremadura, a province in the south-central part of the country, with the result that little is known about the LNEC of the southern-most and coastal regions. The Messines area is a strong candidate to fill that gap. Reconnaissance survey by Jorge Correia, the city archaeologist of Messines, has already identified an anta (burial mound) at the head of the valley (Figure 3).
Several standing stones have also been excavated on the surrounding hills, including the sites of Pedreirinha 2, Velarinhã 2, and Gregórios, excavated by Varela Gomes. The presence of these monuments suggests LNEC communities had a strong symbolic tie to the landscape of the Vale da Pedreirinha.

The valley would also have provided for the more mundane concerns of its prehistoric inhabitants. Initial survey by Jorge Correia has identified copper mines in the nearby hills, and the valley is prime agricultural land today. The name "Pedreirinha" means "little quarry" in Portuguese. The valley itself is in the interior of the Algarve, within the foothills of the mountains, but with visible access to the coast at Portimão, only 25 km away. The region served, therefore, as an important environmental contact point between the coastal flats and the Estremaduran plateau, controlling one point of access to the interior. The Vale da Pedreirinha provides a case study in how local and regional resources were integrated into a cohesive community economy as part of the larger changes that mark the LNEC in Portugal. [Word count: 1,334]

Plan of Work

This grant would support three weeks of full-coverage pedestrian (walking) survey in the Vale da Pedreirinha. The survey would take place during the summer of 2009, at the end of May or early June. I would be joined in this survey by two collaborating archaeologists, Jorge Correia, the city archaeologist of Messines, and Dr. Joseph Beaver, our GIS (Geographic Information System) and mapping specialist. Jorge Correia is currently finishing his Master's Degree at the Universidade do Algarve, and has been a professional archaeologist for five years. Dr. Beaver has twelve years of experience with archaeological excavations and finished his dissertation last year on the use of computer applications in archaeology, with a special focus on the Mediterranean region. In addition to the professional crew, we would be joined by five or six students from the University of Minnesota-Morris or the Universidade do Algarve. The students would pay their own way to the field, but the proposed budget includes money to pay for their in-field expenses, including food and lodging.

We would follow standard methods of archaeological survey, which consist of the crew walking in a line at five-meter intervals to search for surface evidence of prehistoric occupation. Most of the survey would be a surface search for artifacts and human-created landscape features, but a soil sampling auger may be used in areas of high potential to look for subterranean changes associated with human occupation.

All sites, features (built structures, such as terraces, dams, and walls) and artifact concentrations would be mapped using a survey-grade GPS (Global Positioning System). This data can create a detailed, 3-dimension map of the LNEC landscape, which can be integrated into
maps of water availability, view shed, and soil type. Prehistoric landscape use can therefore be compared to resources of potential economic use, such as soil for agriculture, or of potential social meaning, such as the visibility of monumental architecture throughout the valley.

The initial focus of research would be the area surrounding the anta, at the head of the valley. Our first aim would be to identify the habitation and special-use sites associated with the tomb, as well as to map the known archaeological sites in the area. A high density of artifacts in a field near the anta suggests that the habitation site is nearby, possibly on an adjoining rise. We would continue the survey down the valley, covering it from head to mouth. We expect to finish the entire survey within the three week period.

The data collected in the field would be analyzed in the UMM GIS lab. We expect to analyze and to publish the initial survey results before the summer of 2010, which would allow us to apply for external funding to continue the research. This survey is the first step in what will be a larger project, including extensive excavation at the anta, habitation, and special-use sites within the valley. Funding for a larger project, however, is dependent upon demonstrating the archaeological potential of the Vale de Pedreirinha, which can only be done through a systematic survey such as the one proposed here.

I foresee no difficulties in gaining permission for the survey at Vale de Pedreirinha, although it is not possible to apply for the permits until January 2009. The owner of the land where the anta stands is willing to allow survey, as well as future excavation.

This research is the outgrowth of a postdoctoral fellowship at the Universidade do Algarve, from 2004-2006. As part of the project "O Neolítico do Portugal", headed by Dr. Nuno Bicho, I undertook research on the use of coastal and terrestrial resources by Early Neolithic farmers (Carvalho et al. in press; Dean and Carvalho in review). This proposed research continues my collaboration with the Universidade do Algarve, as well as my research focus, carried over from my dissertation, on the development of agricultural, human-created environments (Dean 2007a,b, 2005).

[Word count: 647]

Budget Justification

Operating supplies: $1285

Given the distances we will travel and the diesel prices last summer, we expect to spend around €25/day on diesel, or around $735 total for the three weeks, assuming prices and the exchange rate stay the same. Although we will rent a furnished apartment, they generally have no household supplies, such as dishes, utensils, pots and pans, hand towels, bed linens, or propane for cooking and heating water. Past experience suggests that $500 is sufficient to provide adequate living supplies for three weeks. In addition, we will need first aid supplies for the field. I am budgeting an additional $50 for bandages, hot water bottles, ice packs, and basic medicines.

Travel: $7904

Airfare is the single largest travel expense for this project. Airfares have been rising in the last couple of years, and the survey will be taking place during the height of the tourist season. Therefore, I am budgeting $1600 each for plane tickets for myself and Dr. Beaver. The critical role of GIS in this project makes the presence of Dr. Beaver essential to the success of the survey.
The foreign per diem rates for Portugal, as of 9/01/2008, are a maximum of $213/day. We will be renting a house and eating frugally, so we expect to spend significantly less than that. I am budgeting €20/day/person to cover the meals for the field and a large dinner. This translates into a total of $4704 for the daily food for myself, Dr. Beaver, and a six-student crew for a period of three weeks.

Equipment or Rents and Leases: $10,910

One of the biggest expenses for field work is transportation. We will rent a 9-seater diesel vehicle in the city of Faro. The average rental for such a vehicle is €1675, or around $2345, for a three week period.

In addition to transportation, we have two equipment needs – a soil auger at the relatively modest price of $425, and, most critically, a handheld, survey-grade (subfoot accuracy) GPS unit. From personal experience and on advice from other archaeologists, I have chosen the Trimble GeoXH handheld 2008, for $5695, plus $450 for a two-year warranty. The GPS unit is quite expensive, but it will continue to be used for future fieldwork as well as for teaching archaeological field methods to advanced archaeology and Environmental Studies students back in Morris. With subfoot accuracy, this GPS unit can be used for the detailed mapping of features and artifact clusters, as well as recording the location of soil samples and landscape characteristics. Although I have access to the GIS lab here in Morris, with a site license for ArcGIS software, the Trimble GeoXH also has software needs. I have budgeted an additional $1295 for the Trimble TerraSync 3.21 software.

We will rent a house or apartment in Messines. Jorge Correia estimates we can rent an appropriate house for eight people for €500 ($700).

Other – Professional Services: $882

Jorge Correia, the city of Messines archaeologist, is an important collaborator in this project. His help in logistic aspects of the project is invaluable. As the local city archaeologist, he has an in-depth knowledge of the region and extensive contacts within the community. His fluency in English and Portuguese augments my Portuguese proficiency. I am asking for money to cover his in-field meals and his transportation costs for the duration of the survey.

Need Justification

This project will create a new perspective on the development of LNEC communities in southern Portugal. The Vale de Pedreirinha survey presents the opportunity to contextualize the development of complex farming societies in southern Europe, outside of previous excavations at large population centers. It represents a new approach to LNEC archaeology, one that emphasizes the role of the integrated community and landscape in the social and economic transformations that took place during this time. I believe that the initial survey proposed here will lead to funding from outside agencies, such as the National Science Foundation and Wenner-Gren, for further fieldwork in the region. As a new tenure-track faculty member, this grant furthers my career through the publication of the survey results, but also by helping me to develop a history of research that will make me a more viable candidate for external funding.
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