

# CONTEXT

## In Search of the Stone Age in Southern Ireland: Bally Lough Archaeological Project

by Marek Zvelebil

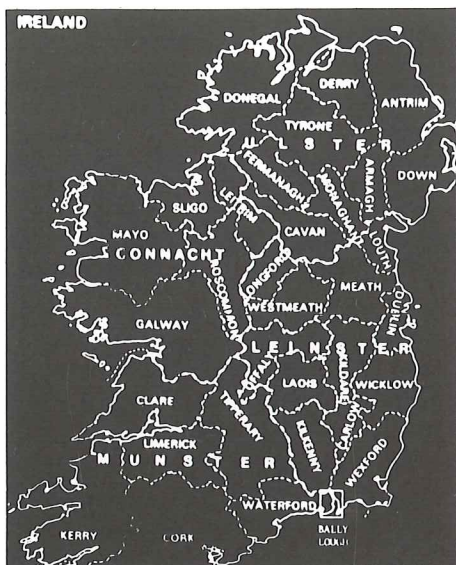


Figure 1. Location of Bally Lough Archaeological Project in Ireland.

The Waterford area of SE Ireland is characterized by a gently rolling landscape of sandstone and volcanic hills not exceeding an elevation of 140 m. The coastline is cut by small fjords with sandy beaches at their heads, and by the broad expanse of Waterford Harbour, which forms an estuary of two major rivers, the Barrow and the Suir. The predominantly pastoral landscape, green even during the winter, is dotted by strands of deciduous woodland, tiny hamlets consisting of four to five houses, and by the ruins of Ireland's former glory: medieval castles and abbeys. Since 1983, we have been exploring this region for the earliest traces of human presence in southern Ireland.

The principal aim of our project is to locate mesolithic and early neolithic settlement and to use these data in the study of the colonization of Ireland, the development of foraging economies, and of the transition to farming. The project is jointly sponsored by the University of Sheffield and the University of South Carolina, and Queen's College (CUNY) in coordination with University College (Cork). It forms a part of a comprehensive program developed by Professor Peter C. Woodman (UCC) to investigate the early settlement of southern Ireland.

The Bally Lough project area incorporates some 600 sq km, surrounding the Waterford estuary (Fig. 1), of which some 380 sq km have now been sampled. The project

is being carried out in several stages, a procedure allowing for maximum flexibility in research design and survey strategies. These stages are outlined in Table 1. The current fieldwork includes sub-area site discovery and systematic, stratified survey, using surface collection methods (stages 2 and 4); geophysical testing, using mainly the soil resistivity technique (stage 3); and sub-surface testing (stage 5), normally carried out by digging test pits and test trenches over selected areas of multicomponent sites where sub-surface features are indicated.

To date, some 20,000 artifacts were recovered through surface collection and sub-surface testing (Fig. 2). Artifacts collected by fieldwalking during 1983-1985 have now been analyzed. The picture that is emerging shows a development of a complex pattern of settlement in the course of the Stone Age (Fig. 3), with what we regard as residential sites being clustered in the elevated coastal areas. In all, the area, which until our arrival had only two or three known Stone Age sites, now has more than 300, including fourteen localities with mesolithic artifacts (6000-3000 BC), twenty-five with neolithic finds (3500-2000 BC), and four with bronze age finds (Fig. 4). Not all of these, of course, are settlement sites. Rather, as our investigations indicate, we are recovering a whole range of activity locations, ranging from low-density "background scatter" to more circumscribed areas of activity (Fig. 3). The latter include a rhyolite quarry, and manufacturing sites as well as residential sites.

In summary, an area that has hitherto been regarded as devoid of mesolithic settlement and only  
*continued on next page.*

### INSIDE THIS ISSUE:

Marek Zvelebil Visiting Scholar	3
W.M. Keck Foundation Awards \$400,000 to Center for Remote Sensing	4
Backlots of Lowell	5
The Center for Remote Sensing, 1986-1987	9
Boston University in the North Jezirah, Iraq	10
Archaeology in War-torn Iraq	12
Archaeology, Classics, and Interactive Databases	15
Lynn Woods and the Development of Land Policies in Essex County	16
AIA Re-elects President	20

Table 1, Bally Lough Archaeological Project Research Design.

Stage	Research Objectives	Timing
1. Archaeological reconnaissance and land use survey	<ul style="list-style-type: none"> <li>● Establish presence of mesolithic and neolithic settlement in project area</li> <li>● Map-out contemporary land-use</li> </ul>	Completed 1983
2. Sub-area site discovery	<ul style="list-style-type: none"> <li>● Collect lithic assemblages in each of three ecological sub-areas (coastal, interior, and estuarine)</li> </ul>	In progress; due for completion 1987
3. Geophysical feasibility testing	<ul style="list-style-type: none"> <li>● Establish the presence of sub-surface features and chart out the extent of sites</li> </ul>	In progress; due for completion 1987
4. Systematic, stratified, nonrandom survey	<ul style="list-style-type: none"> <li>● Systematically explore range of spatial and ecological variability throughout project area</li> </ul>	In progress; due for completion 1987
5. Sub-surface testing	<ul style="list-style-type: none"> <li>● Examine multicomponent sites to develop chronological and stratigraphic control</li> </ul>	In progress; due for completion 1987
6. Stratified, random survey	<ul style="list-style-type: none"> <li>● Test models of mesolithic and neolithic settlement</li> </ul>	Planned for 1989
7. Site excavation for hypothesis testing	<ul style="list-style-type: none"> <li>● Test settlement models against inter- and intra-site excavation data</li> </ul>	Planned for 1989

sparsely settled in neolithic times has now been shown to have been extensively settled in both periods. Moreover, the emphasis on the recovery of the entire archaeological landscape, including the background scatter, helps us considerably in our reconstruction of Stone Age land-use patterns and resource-use strategies.

The two major problems we are facing in developing our research program is the lack of chronologically sensitive, diagnostic artifacts (a result of poor lithic sources and consequently atypical, expedient industries) and the poor preservation of organic materials on all sites located to date. Consequently, the field-work in the summer of 1987 will concentrate on the completion of the systematic stratified survey, the intensive survey of the microenvironments likely to contain Stone Age sites with good preservation of organic materials, and sub-surface testing of those sites that can help us to establish a chronologically sensitive regional typology for the area.

The theoretical rationale for carrying out this research can be found in our two major longer-term objectives: the study of the colonization of Ireland and the transition to farming. Early Irish prehistory is

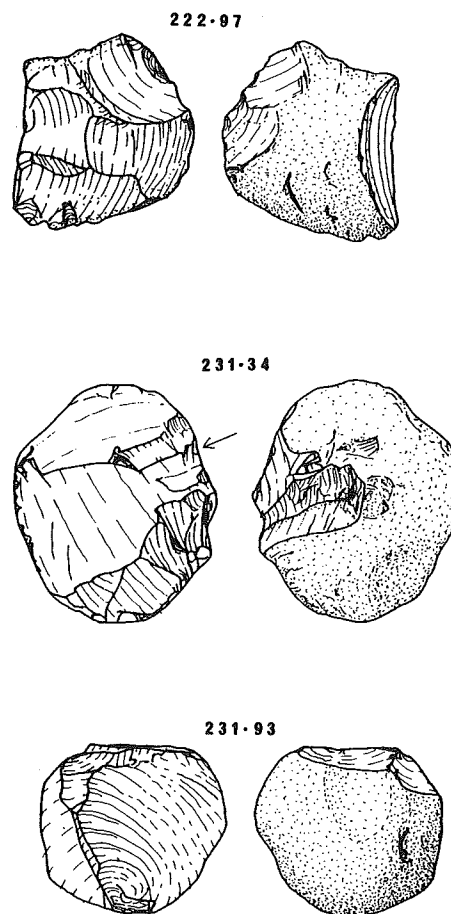


Figure 2. Some of the artifacts recovered by fieldwalking in Ireland.

marked by two episodes of immigration: hunter-gatherers penetrated Ireland about 7000 BC, and farmers are thought to have arrived about 3500 BC. There is no evidence of migrations intervening between these two times, making it possible to study demographic and cultural development in Ireland and in relative isolation and without outside influence. Our reconstruction of the extent of early post glacial settlement in the research area provides a database for a model of the growth of hunter-gatherer populations in an ecologically simplified situation and in an island (i.e., geographically isolated) context.

Our second major objective is to evaluate the relative contributions of the indigenous populations as well as outside elements in the development of agricultural society in Ireland. The question of ethnic continuity between mesolithic and neolithic populations and the role played by the local foraging groups in the transition to farming poses one of the major problems in European prehistory. Traditionally, it has been assumed that neolithic farmers displaced mesolithic groups to the margins of the European continent where they eked out a miserable existence as "mesolithic survivals"

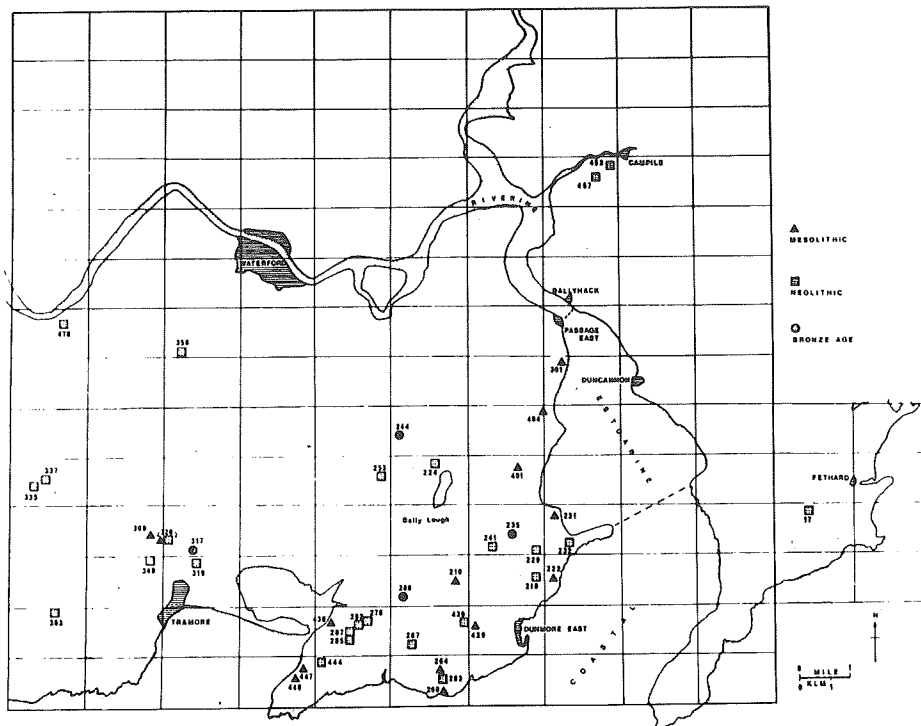


Figure 3. Archaeological reconstruction of the settlement pattern during the Stone Age.

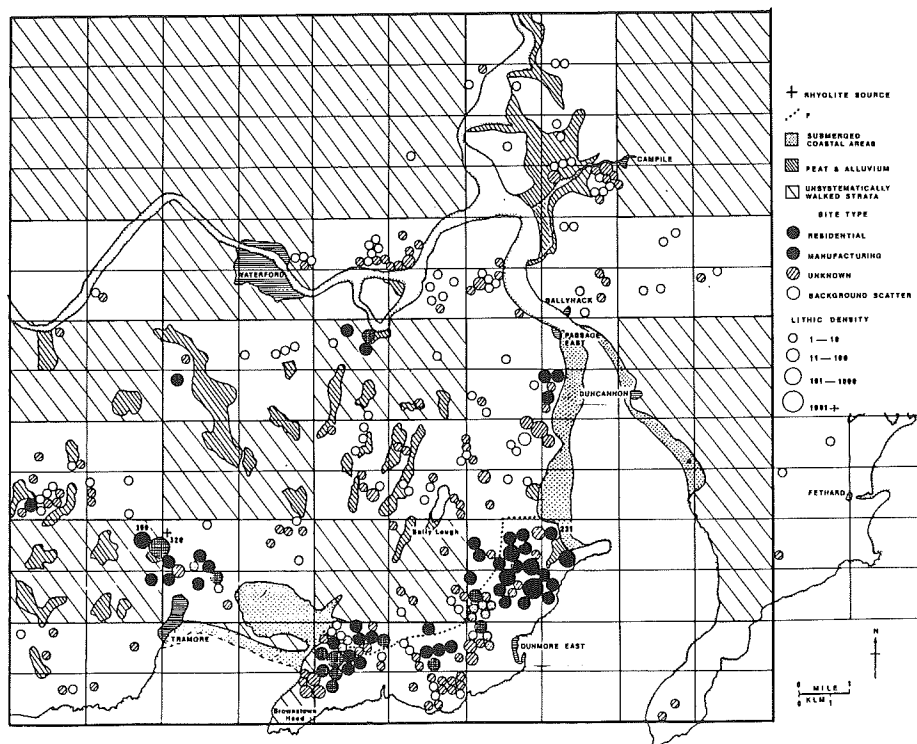


Figure 4. Location of sites with diagnostic artifacts.

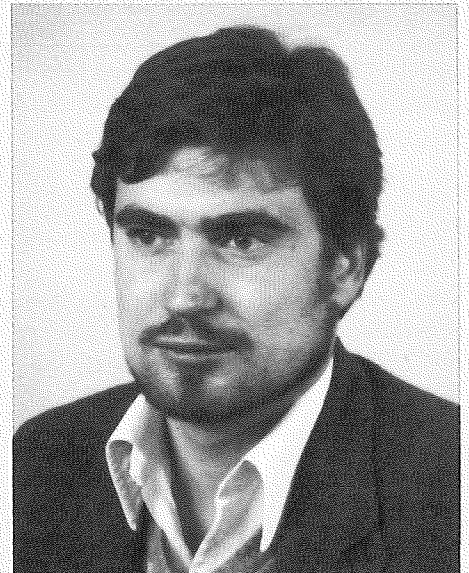
until their assimilation a few centuries later. This traditional model has been recently challenged. As an alternative hypothesis, an "adjustment model" has been put forward, which accords mesolithic populations a much greater role in the transition to farming. Whether as a response to the decrease in the foraging territory, or as a response to the opportunities offered by sea-

sonally aggregated coastal resources, there was a shift to sedentism in many parts of Europe towards the end of the Mesolithic period (6000-3000 BC). Decrease in settlement mobility and closer packing of foraging groups can in turn be expected to generate social and economic developments, as well as

*continued on next page.*

## Marek Zvelebil Visiting Scholar

Dr. Marek Zvelebil was a Visiting Assistant Professor of Archaeology at Boston University during the spring term in 1987. Funds for his appointment were provided by a grant to the Department of Archaeology by the Humanities Foundation of the College of Liberal Arts.



Dr. Zvelebil received his Bachelor's degree from the University of Sheffield and his Ph.D. from Cambridge University. He is a Lecturer at the University of Sheffield, and specializes in Hunter-Gatherer archaeology. He became interested in Hunter-Gatherer archaeology for many reasons, but, in particular, because he feels it represents the most crucial period in the human biological and cultural transformation that begins in the Mousterian and continues into the transition to farming.

Dr. Zvelebil is the author of several papers and monographs, and is the editor of *Hunters in Transition: Mesolithic Societies of Temperate Eurasia and Their Transition to Farming*, published in 1986 by Cambridge University Press. Since 1983, he has been working on the Bally Lough Archaeological Project in Ireland, which he discusses in an article in this issue of *Context*.

## W. M. Keck Foundation Awards \$400,000 to Center for Remote Sensing

The W. M. Keck Foundation of Los Angeles has awarded a \$400,000 grant to the Boston University Center for Remote Sensing. This is the second major grant given by the foundation to the University to support the work of the interdisciplinary Center, which is the first in the world to place an emphasis on the use of remote sensing for archaeological research. Under the direction of Dr. Farouk El-Baz, one of the world's leading experts on remote sensing, in conjunction with Archaeology Department Chairman James Wiseman, who serves as chairman of the Center's Executive Committee and coordinator for the W. M. Keck Foundation Grant, the Center has begun to conduct research and training in the field utilizing the resources of the University's Departments of Archaeology, Geography, and Geology.

The Center's three primary objectives are interdisciplinary research that uses remotely sensed data, undergraduate and graduate education in remote sensing, and training for professionals from several fields in the application of remote sensing techniques. Researchers at the Center are especially concerned with remote sensing from space and aircraft, related computer-aided analysis, and observations from the

ground to verify or enhance the remotely sensed data.

According to Dr. Wiseman, "This new grant is making possible the immediate enlargement of our research and training facilities for the analysis of remote sensing data, and will enable the acquisition of a whole new range of remote sensing equipment."

Over the next two years, the Center will be working on archaeological research projects in Portugal, Greece, and Egypt; geographic research on population estimation and forest remote sensing; geology projects in Buttermilk Bay and Horseneck Beach, both in Massachusetts, and Popham Beach on the Maine Coast; and sand dune mapping in the Sahel region of West Africa.



Dr. Farouk El-Baz (right), Director of the Boston University Center for Remote Sensing, and Archaeology Chairman Dr. James Wiseman examine a satellite image of the region of Corinth, Greece, where an archaeological team from the Center conducted research last year.

The W. M. Keck Foundation, one of the nation's largest foundations in terms of total annual grants, was established in 1954 by the late William M. Keck, founder of the Superior Oil Company. The foundation's primary grant-giving focus is on universities and colleges throughout the United States, with particular emphasis in the fields of science, engineering, and medical research. It also provides limited support, focused on programs serving southern California, in the areas of community services, health care, precollegiate education, and the arts.

*For recent archaeological investigations involving remote sensing, see the article by Fritz Hemans in this issue of Context.*

*continued from previous page.*

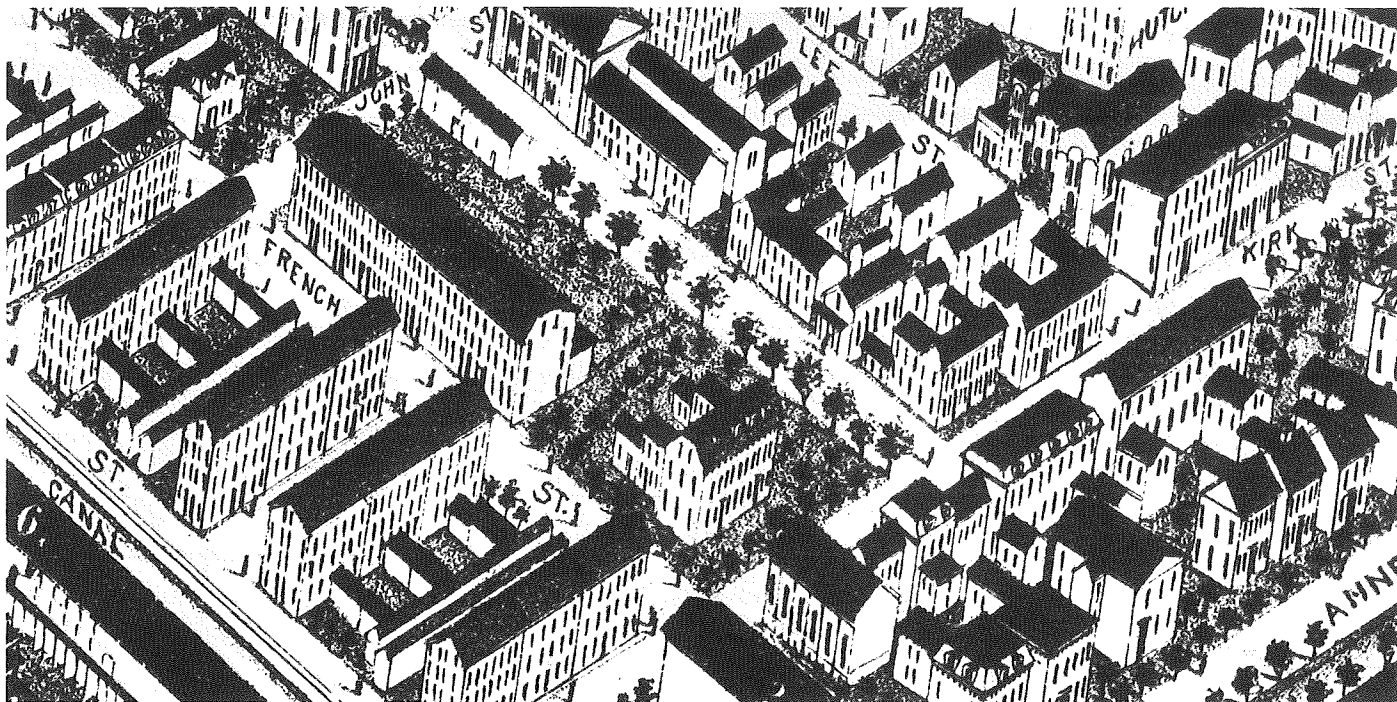
demographic growth, which would allow selective adoption of farming practices by the foragers. The situation in Ireland again presents a simplified case for the testing of these hypotheses.

In a broader perspective, our presence has generated keen interest among local amateurs and societies. Members of the Old Waterford Society regularly participate in the field collection survey and test excavation, and we have contributed to their program by a number of lec-

tures, seminars, and practical demonstrations. The importance of this development cannot be overestimated, for it is the local people upon whom the preservation of less spectacular prehistoric remains depend. The greater awareness of archaeological resources in the area has already led to the rediscovery and return of artifacts collected earlier, and to the discovery of several important sites.

Finally, we like to think that the heterogeneous and international make-up of our project helps us to

create a better understanding across nationalities and generation groups. We have students from England, Ireland, and the United States (NYC and South Carolina: two quite different groups!) participating, as well as Earthwatch volunteers, local people, and visiting scholars and specialists. It sets the scene for some interesting, and often amusing, cross-cultural interaction, itself a good subject of study for an anthropologist. But we feel that at the end everyone leaves enriched and educated by the experience!



A detail of the 1876 bird's-eye view of Lowell showing the Boott Mills boardinghouse blocks lying between the canal (left) and French Street. The Kirk Street Agents' House is in the center of the photograph. Courtesy of the Lowell Historical Society.

## Backlots of Lowell

by Mary C. Beaudry

The second year of interdisciplinary investigations of the Boott Cotton Mills (*Context* 5[1-2]: 11-12), conducted under a cooperative agreement between the Center for Archaeological Studies and the North Atlantic Regional Office of the National Park Service (which is funding the work), has brought us closer to our goal of interpreting the material lives of working people in nineteenth- and early twentieth-century Lowell, Massachusetts. The Lowell project is a long-term investigation of industrial and residential areas of the Boott Mills complex through an interdisciplinary framework that incorporates archaeological excavation with architectural history, extensive documentary research, oral history, and a variety of specialized analytical procedures (e.g., palynology, parasitology, soils chemistry, etc.). Mary C. Beaudry, the writer of this paper, is Director of Research, Ricardo J. Elia is Project Manager, and Stephen A. Mrozowski is the NPS Supervisory Archaeologist for the Lowell project. Work to date has focused on

residential issues through research into life under the boardinghouse system, worker health and hygiene, and examination of the lifestyle of mill agents and their families. In July 1986 we excavated behind the Kirk Street Agents' House, and we returned to the backlots of the Boott boardinghouses in fall 1986 for over a month of large-scale excavation. Edward L. Bell served as Assistant Archaeologist for the excavations at the Agents' House, and Nancy Seasholes served as Project Archaeologist on the boardinghouse project. The Boott Mills case study may serve as a microcosm for understanding on a broader scale the lives of working people in industrialized urban communities in nineteenth-century America.

### The Kirk Street Agents' House Backlot

Although Lowell was a city of multiple corporations, many textile companies had close ties through common stockholders and interlocking directorates. The Boott Cotton Mills Corporation was closely allied to the Massachusetts Corporation, and one of the ways in which this relationship was demonstrated was

in the construction of a duplex that housed the agents for both mills. Mill agents were, next to the treasurer, the most important and powerful managers within the corporation system; their status was reflected in the housing that the mills constructed for them. The dwelling erected on Kirk Street in 1845 as a home for the agents of the Massachusetts and the Boott Mills was similar to contemporary townhouses in Boston's South End. While far from luxurious, it was roomier and far more elegant than any boardinghouse.

The Agents' House was constructed on an artificial terrace that raised it above the level of the nearby boardinghouses and overseers' block; cut stone blocks served as revetments for the terrace, and a wrought-iron fence was set into the top row of stones. The fence enclosed the front and rear yards of each duplex; the fact that the agents' families had separate yards made it possible for them to have gardens as well as private areas where domestic servants could perform a variety of service tasks.

Our excavations in the rear of the

*continued on next page.*

duplex that had been assigned to the agent for the Massachusetts Corporation were prompted by the fact that the Lowell City Magnet School planned to construct a small park in this spot; it seemed likely that significant archaeological deposits might be disturbed by the construction. Because the area in question would have once been at the very back of the lot behind the house, we hoped to find the remains of a privy or some other feature that would have been filled with refuse from the agent's household. We were anxious to have data to compare with the materials excavated from behind the boardinghouses so that we could compare the living standards and diets of agents and millworkers.

Our work failed to uncover the hoped-for privy, although we did find a very rich deposit of household refuse. This deposit occurred not as the fill of a sealed feature but was distributed evenly across the site in a stratum of organically-enriched sandy loam. We are analyzing this dark soil layer and the materials in it to learn if it can be interpreted as evidence of a garden at the back of the lot.

While we were unable to define boundaries for the possible garden bed, our interpretation seems sup-

ported by research carried out by Mrozowski, who is also the archaeobotanist for the Boott Mills project. His investigation of gardening practices in contemporary and historical settings indicates that it was common practice to dispose of household garbage in gardens. This included ceramics and glass in addition to bone and other perishable materials. For example, recent excavations of colonial planting beds at the Peyton Randolph House in Williamsburg, Virginia, revealed carefully arranged layers of wine bottle bases and animal bone as drainage for an asparagus garden. The Agents' House deposit was not so formal, but it was remarkable for the density of artifacts within it. The vast majority of artifacts were ceramic sherds, many of which were quite large in size, and all were sharp-edged, indicating that they were deposited soon after breaking. If the sherds had been thrown out initially as sheet refuse, they would have been more finely broken up and would show signs of wear.

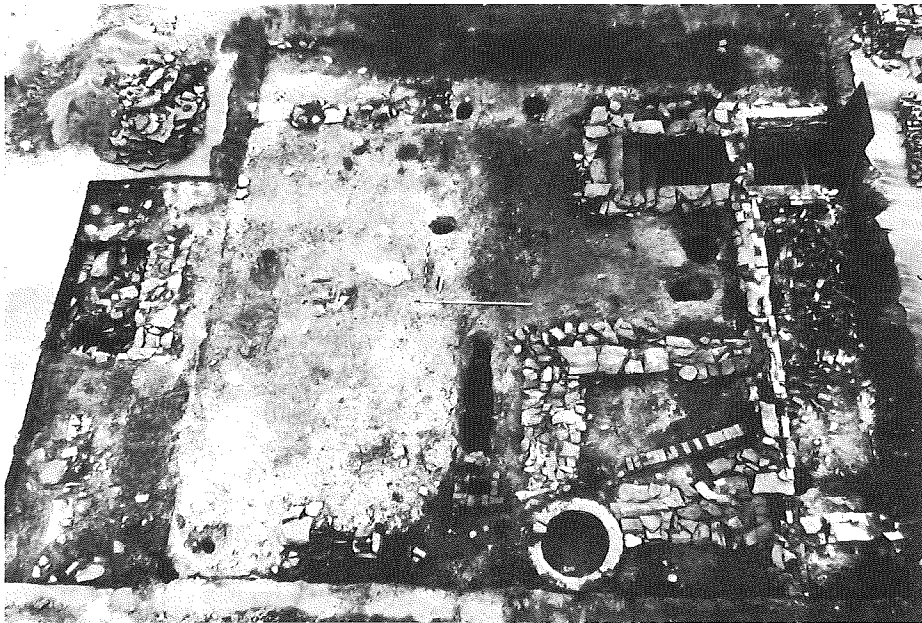
Detailed analyses of the materials from this deposit have been carried out in the laboratory at Boston University. Ed Bell, Lorinda Rodenhiser, and Alicia House catalogued all the artifacts from the site and prepared a minimum vessel count for the

ceramic fragments. The majority of the ceramics are relatively expensive transfer-printed wares, and many are serving vessels—not surprising for the household of a prosperous mill agent who would have regularly entertained guests to cement his business and political alliances. Ed and Lorinda have also tabulated date ranges for the manufacture of all of the ceramics; the results of the temporal analysis have proved that the materials were deposited after about 1850 and could not have been included in the original fill layers used to create the terrace on which the house sits.

David Landon, a Ph.D. student in the Department of Archaeology at Boston University, has identified the faunal remains from the site. These do not reflect the higher status of the mill agent as clearly as do the ceramics, although there is evidence that the agent's family and guests generally ate far better cuts of meat than did boardinghouse residents. Soils from the Agents' House are also being subjected to soil chemistry analysis and palynological study, and samples have been floated so that seeds and other macrofloral remains can be studied. Gerald Kelso (NPS), palynologist for the project, reports high preliminary counts of grass rather than flower pollen in the samples he has analyzed, results that call the garden interpretation into question. The archaeobotanical analysis by Mrozowski is partially complete and at present seems to bear out Kelso's findings. William Fisher, a Ph.D. student in the Department of Archaeology at Boston University, will experiment with phytolith extraction from a soil sample taken from the possible garden. We are hopeful that the results of these analyses, when considered in combination, will aid us in defining the nature of the deposit.

### **The Boott Mills Boardinghouse Backlots**

Preliminary test excavations behind two blocks of Boott Mills workers' housing in the late fall of 1985 revealed that deposits and features

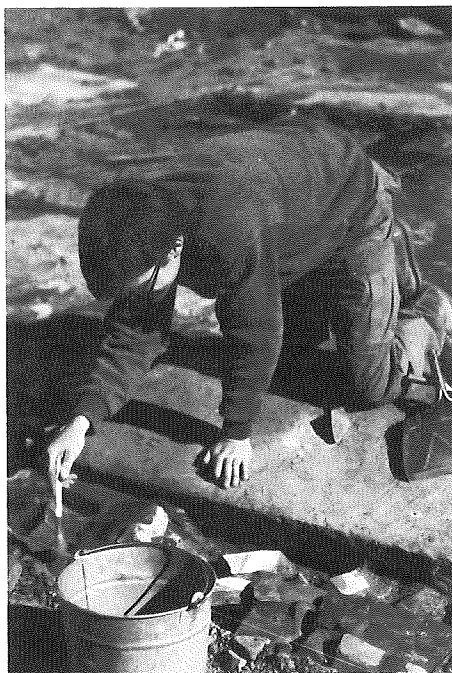


*An overall view of an exposed boardinghouse backlot. To the right, the back wall of the boardinghouse has an ell and a bulkhead entry projecting from it into the open yard. At the rear of the yard, to the left, a stone-lined privy lies inside what was once a woodshed. The yard also contains various drainage features.*

in the boardinghouse backlots lay just a few centimeters below the surface of what is now a paved parking lot; they were also well preserved and rich in artifact content. Mrozowski and I consulted the series of fire insurance maps that were made of this area at intervals throughout the nineteenth and twentieth centuries in order to determine where we should conduct large-scale excavations. In the fall of 1986, in cooperation with the Lowell Historic Preservation Commission, we returned to the parking lot across French Street from the Lowell City Magnet School for a five-week field season.

Our work aimed at complete exposure of the backlots behind two distinct units within one boardinghouse block. Each of the original Boott housing blocks consisted of four boardinghouse units flanked at either end by two tenements or apartments for supervisory personnel and their families. Census and Lowell City Directory data aided us in choosing the units behind which to dig: Number 45 was a boardinghouse run by Mrs. Amanda Fox, a widow, for over fifty years; Number 48 was a tenement inhabited throughout its history by overseers and their families. The insurance maps mentioned above gave us exact measurements that enabled us to open excavation units that coincided almost exactly with the dimensions of the former backlots. The parking lot surface and bedding was removed with the aid of jackhammers, a backhoe, and a bobcat, although all subsequent excavation was accomplished by hand with shovels and trowels.

Both backlots were alike in their overall configuration. Each was fully enclosed and contained a woodshed housing a privy, a well, various drainage features, an ell extending from the rear of the kitchen, and open yard space for laundering and clothes drying. The differences were chiefly in the treatment of the open space; the yard behind the supervisor's tenement contained little in the way of broadcast household refuse. It was apparently kept in a fairly tidy state, and a planting hole



*John Fox, a Boston University Department of Archaeology graduate student, cleans bricks along the back wall of Boott Mills boardinghouse Number 45.*

against the back wall of the building indicates that some sort of decorative plant, perhaps ivy, softened somewhat the appearance of the backlot. The yard behind Number 45, however, was densely packed with household refuse—ceramics, glass, beads, costume jewelry, and so forth. Naturally, the boardinghouses were occupied by far greater numbers of people than were the supervisors' tenements, which may help to explain the greater buildup of refuse in the backlots of the former. Municipal refuse collection was the norm throughout Lowell in the nineteenth century, however, and Boott company regulations prohibited refuse disposal in the backlots. The presence of so much trash behind Mrs. Fox's boardinghouse, therefore, represents aberrant or unacceptable practice, even if it does provide a goldmine of information for the archaeologist.

Documentary research carried out by Kathleen Bond reveals that Mrs. Fox's boarders were, with few exceptions, all female and almost all New England natives. Thus Mrs. Fox's establishment represents a "typical" Yankee mill girl boarding-

house that lasted well beyond the middle of the nineteenth century, when New England-born operatives were largely replaced by immigrant workers. We found many artifacts that were personal objects owned by women—hair combs, costume jewelry, dress buttons, beads, etc.—a reflection of the fact that for much of its history, Boott unit Number 45 was a female-headed, female-occupied household. When Enoch Hutchins took over Number 45 after Amanda Fox's death in 1886, however, the situation changed. Hutchins had formerly run a hotel and oyster saloon. It seems that his style of running a boardinghouse was a direct outgrowth of his earlier source of livelihood, for he was frequently at odds with the mill officials over the drinking and carousing that took place in his house. The Boott Mill Agent repeatedly notified Hutchins in writing of his displeasure over the goings-on in Number 45.

Hutchins' difficulties with the Boott management is an example of how the policy of corporate paternalism, a system of "moral police" aimed at creating an environment that parents of Yankee mill girls would deem appropriate and safe for their daughters, survived the change in the labor force from native-born to immigrant operatives. Bond's research indicates that the corporation never relaxed its rules against drinking at work or anywhere on the Boott property. In fact, company officials influenced the passage of local ordinances that prohibited the licensing of any saloon within eight blocks of the Boott complex. Temperance became an issue linked to the notion of reform, and attitudes about alcohol consumption by workers often were colored by racial and ethnic prejudice.

Efforts to enforce temperance regulations may have been energetic, but they seem to have met with little success. Archaeological deposits behind both the boardinghouse and tenement backlots contain large numbers of fragments of alcoholic beverage containers, *continued on next page.*

revealing that a great deal of on-site drinking took place. The artifact analysis is still underway, so final conclusions cannot be drawn. But the presence of liquor, beer, ale, and wine bottles (including a champagne bottle behind the overseer's tenement), beer mugs, wine glasses, as well as patent medicine bottles (some specifically for female complaints) provides an intriguing glimpse into behavior that was directly contrary to company rules. It may be stretching the point to see this as a form of resistance to authority, but it is a phenomenon that merits the detailed consideration it will receive in Bond's master's thesis.

An area in which paternalism did falter, however, was in the upkeep of the physical environment. Pollen and archaeobotanical data point to increasing neglect of the backlots, which appear initially to have been planted with grass but were muddy plots ringed by weeds by about 1900. Utilities such as drains fell into disrepair, and despite hookup to city water in the 1880s, in 1910 some boardinghouse residents still had no sanitary facilities other than the backyard privy and a chamberpot kept in the room. The fact that the Boott began to divest itself of its housing by the late 1890s was a harbinger of the shift in corporate concern—the company could no longer afford to maintain high standards of upkeep for its workers' housing and chose to rid itself of this unprofitable burden.

The perception of the close link between the physical and moral environment was at first a strong element in promoting corporate paternalism as a positive feature of industrial capitalism. By the end of the nineteenth century, however, corporate interest in preserving this relationship had eroded to the point that demands of Progressive Reform-era activists to improve workers' surroundings were seen as inimical to the profitability of the Boott Corporation and to the New England textile industry in general. In the case of the Boott, after ca. 1910 the boardinghouses were torn down, sold to private landlords, or



Kirk Street Agents' House site. Mary Beaudry, Lorinda Rodenhiser, Sara Mascia, and Katie Bond excavating.



This rare photograph of a boardinghouse dining room taken about 1910 shows the Croteau family about to serve a meal to their boarders. Courtesy of the Lowell National Historical Park.

used as warehouses. The boardinghouse block containing units 45 and 48, behind which we excavated, was vacant by 1918; it was a warehouse until 1921, at which time it was torn down. The area was used as a coal storage yard until the 1950s, when it was paved to serve as a parking lot.

Our efforts to recover details of the domestic lives of working-class people from beneath their asphalt seal have been rewarding in that the archaeological record does indeed expose much of the texture of daily living at the boardinghouses; not all of it is cheering to discover. Yet the most striking result of our excavation and analysis to date is the evidence of the ways in which workers made efforts to retain control over their own lives as well as to embel-

lish the monotony of life in corporation boardinghouses through small yet poignant touches such as potted plants, amusements, and personal dress. The material record of Lowell's boardinghouse era is a vibrant reminder not simply of hardships that working people had to endure but also of their aspirations, joys, and bravery.

*This report was accomplished with assistance from the National Park Service, U.S. Department of the Interior. The statements, findings, conclusions, recommendations, and other data in this report are solely those of the author and do not necessarily reflect the views of the U.S. Department of the Interior, National Park Service.*

*Mary C. Beaudry is an Assistant Professor in the Department of Archaeology, and has published numerous articles on the archaeology of North America in historical times.*



# The Center for Remote Sensing, 1986—1987

by Fritz Hemans

When the activities of the Center for Remote Sensing (CRS) were last described in *Context*, Farouk El-Baz had just been appointed Director of the Center, Judson Harward had just been appointed System Manager, and we were in the process of purchasing a variety of new equipment and remodeling space to house the Center on the fourth floor of the School of Management. In short, we were just beginning the slow process of translating a plan into reality; creating a facility with the equipment and, more importantly, the expertise necessary for multidisciplinary archaeological research using the tools of remote sensing, geographical information systems, and data-base management. Since that time, a number of activities have begun to bear fruit.

## Field Work

One of the most important activities of the Center is a series of field experiments being conducted to test various kinds of imagers and geophysical prospecting equipment for their usefulness in archaeological research. The first experiment was carried out over the spring and summer of 1986 when a multi-spectral video camera system was designed to be flown suspended from a blimp for low-level aerial reconnaissance, and a field test was conducted at Corinth, Greece. James Wiseman, Chairman of the Executive Committee of the Center; J. Wilson Myers, Research Professor of Archaeology; and Fritz Hemans were the principal investigators.

Multispectral image analysis (the comparison of images from different ranges of the electromagnetic spectrum) has been used primarily for studies of very-large-scale phenomena, for example, in studies of plant communities, geology, and urbanization. The lack of application to smaller-scale phenomena is the result of the way sensors have been

designed rather than any technological limitation. NASA's Landsat sensors were designed to collect imagery at resolutions in which even houses and small roads are undiscernable. By developing an economical system capable of collecting imagery with far greater resolution, the Center hopes to make multi-spectral image analysis an everyday tool in archaeology.

The field test in Greece was successfully conducted over three areas of the ancient town of Corinth: the Roman Forum of ancient Corinth, Acrocorinth, and Lechaem, the harbor town. Not only was the feasibility of the system proven but analysis of the imagery is providing valuable information on the archaeological remains at all of these locations. A report on the experiment has just been published by the Center, entitled: "Remote Sensing from a Tethered Blimp in Greece," Technical Paper Number 2, 1987.

In February, 1987 another experiment in the application of multi-spectral imaging was conducted in the Tomb of Nefertari near Luxor, Egypt. The Center has joined the Getty Conservation Institute and the Egyptian Antiquities Organization in a study to determine the causes of the deterioration of the tomb's wall paintings. Studies of the geologic structure of the region have already been completed and described by Farouk El-Baz in the Center's Technical Paper Number 1.

Peter von Thuna, of the Arthur D. Little Corporation, and Fritz Hemans joined the Nefertari team to conduct spectral analysis of the paintings, using ultraviolet, visible, and near-infrared sensors to map damaged and undamaged areas of the paintings. Most of the destruction appears to be caused by the leaching of salt deposits from the bedrock surrounding the tomb, and the experiment was carried out to determine if the underlying concentrations of salt could be detected from variations in surface reflectance. Analysis of the imagery since returning from Egypt has barely begun, but already a number of interesting phenomena have

appeared, including: the detection of overpainting by modern restorers; and the detection of the underlying sketches drawn on the wall to guide the painters in their work.

The use of geophysical prospecting equipment on archaeological sites has already proven capable of detecting many kinds of sub-surface features. This spring the Center is purchasing sub-surface radar, a proton magnetometer, and an electromagnetic conductivity meter. Initial tests will be made this summer at the Sanctuary of Poseidon at Isthmia in Greece and the Minoan town of Kommos, Crete. At Isthmia the radar and electromagnetic meter will be used in an attempt to map deposits and bedrock in several areas of the site. In particular, we hope to map deposits of the Geometric Period (about 900-700 BC) that were discovered last year in the area of the archaic altar. At Kommos, the Minoan structures buried beneath several meters of sand are an ideal situation for testing the capabilities of the sub-surface radar. We hope that the radar profiles will permit a three-dimensional reconstruction of the still-buried town.

## Laboratory Projects

The largest new project at the Center is the *Perseus* Project, which is described in this issue of *Context* by Jud Harward. This interactive database project on Classical Greece is indicative of the breadth of the Center and also of the wide range of computer tools that will aid the archaeologist of the future.

A number of new software packages have recently been installed that will aid in the development of archaeological applications. Perhaps most important is a program called GRASS. This is a raster-based geographic information system (GIS) that allows data sets to be displayed and compared in image form. To test the package and to train users, George Cowgill of Brandeis University has kindly lent us a portion of his data set from Teotihuacan. That survey is one of the largest yet attempted, and should prove ideal

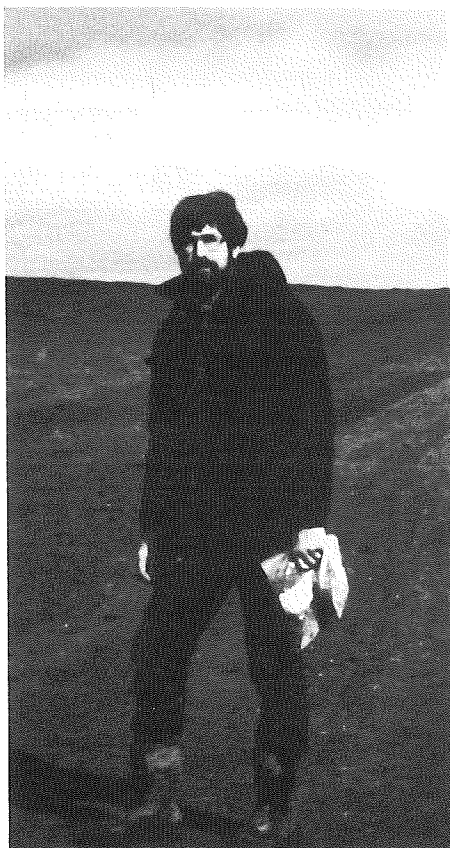
*continued on next page.*

# Boston University in the North Jezirah, Iraq

by Paul Zimansky

By the time this article appears in print, Boston University's expedition to the North Jezirah, Iraq, should be well into its first field season. What one reads about Iraq in American newspapers hardly gives the impression that it is currently an inviting area for archaeological research. Yet, despite the tragedy of the war, huge dam and irrigation projects have been undertaken in recent years and each has entailed rescue projects for large numbers of threatened sites. The government of Iraq has a deep-seated and long-standing commitment to archaeology, for it is a source of national pride that this land, Mesopotamia, was the place where the first great civilization on earth emerged and where the written record extends two millennia farther back than it does in Greece and China.

In the triangle marked out by the Tigris River, the Jebel Sinjar, and the Syrian border the landscape is dotted with hundreds of tells, each marking the locus of an ancient settlement. The North Jezirah Salvage Project has been mandated by the Iraqi government because a recently completed dam on the upper Tigris now provides water to open up this



Paul Zimansky on Hassunan mound.

area to large-scale irrigation. It is not inundation, but agricultural development that threatens the sites here. Foreign archaeologists have been invited to apply for permits to excavate in this hitherto unexplored area, and the Iraqi government promises to supply the housing and skilled labor to facilitate their work. Elizabeth Stone (my wife) and I had been hoping to use the opportunity provided by her

Fulbright Fellowship to initiate a new field project, and our arrival in the North Jezirah last winter was timely (see "Archaeology in War-torn Iraq" by Elizabeth C. Stone in this issue of *Context*). Only the British had staked out a claim before us, and we were free to choose virtually any of the sites we surveyed for excavation.

It is puzzling that such an incentive was needed to attract the attention of archaeologists to this area, since it was by no means obscure or out-of-the way in terms of key developments in the Mesopotamian past. On our survey we noted several low mounds covered with sherds of painted hand-made pottery of the Hassuna, Halaf and 'Ubaid assemblages—in short, the remains of villages going back to the first settlement in Iraq in the sixth millennium BC and good selection of sites for tracking the cultural developments of the fifth and fourth millennia that presaged the rise of urban civilization in the south. There were also mounds containing the long mysterious "Ninevite 5" pottery, which is now assigned to the early third millennium, and others with sherds contemporary with the Akkadian rulers Sargon of Akkad and Naram Sin, whose empire presumably included this area.

It was the second millennium that held the greatest attraction for us, however, since our research inter-

*continued from previous page.*

for exploring the capabilities of a GIS for archaeological research. Hann-Bin Chuang, of the Astronomy Department, is setting up the program and data set.

The Center is also compiling a data set of historical maps of downtown Boston for the Central Artery Project being conducted by the Office of Public Archaeology. Several historical maps are being digitized to allow the study of changes in the urban fabric since the eighteenth century. By overlaying images of these data, areas of the city with the greatest likelihood of holding

important archaeological remains can be located. Yong Gao, a graduate student in the Department of Computer Science, is digitizing the maps and working with Nancy Seasholes and Mac Goodwin, Historian and Project Archaeologist for the project, respectively, to compile the completed images of the study area.

Finally, we are happy to report the progress of Nuno Santos, who is doing a regional study of Chalcolithic remains in Estremadura, Portugal. Santos has just completed a study using Landsat Multispectral Scanner data and digitized land-use,

geologic, hydrologic, and other data that will guide the conduct of his ground survey in the coming months. The remote sensing data is proving particularly useful for determining the relationship of environmental variables to the distribution of sites.

*Fritz Hemans, Visiting Assistant Professor of Archaeology, is Director of Archaeological Applications at the Center for Remote Sensing. The Center is a facility founded by the Departments of Archaeology, Geography, and Geology for research in the Earth Sciences. Major funding for establishing the Center has been provided by the W.M. Keck Foundation, of Los Angeles, California, which we gratefully acknowledge.*

ests focus on socio-economic developments in literate societies. This area presents an opportunity to clear up some historical mysteries that have long troubled Mesopotamian historians. For example, in the nineteenth and eighteenth centuries BC there was an extensive long-distance trade in metals and textiles between the city of Assur and a site called Kanesh in central Anatolia. It is one of the best-documented systems of mercantile activity known from the Bronze Age, but so far that documentation comes largely from the Anatolian end. Some of the tablets found there give information that can be used to reconstruct the itineraries of the donkey caravans that were the basic means of transport. While some have theorized that the main route ran south of the Jebel Sinjar, recent scholarship has suggested that the route went through precisely the area of our survey. If so, the city-states mentioned in those documents are about to receive archaeological attention, and the trading network will come into even sharper focus. Our survey, which identified a fair number of substan-

tial second-millennium sites in the area, has already done something to support the new theories.

There is also the question of the Hurrians—an enigmatic but important people in Near Eastern history. Their language is now reasonably well understood from documents found at such sites as Amarna in Egypt and Boghazkoy in Anatolia, and much has been written about their influence on other cultures, but archaeological and textual evidence from their home territory has not yet made a contribution to illuminating their civilization. The capital of the most powerful Hurrian kingdom, Mitanni, has not yet been discovered despite the fact that it was a major center in the time that the Egyptians and Hittites were beginning to flex their imperial muscles at the dawn of the Late Bronze Age.

When we arrived in the area in late December our path was greatly smoothed by the hospitality of the Iraqis and the British Archaeological Expedition to Iraq. A field team of the latter, led by Warwick Ball, was housed in the restored citadel of Tell 'Afar for a winter study season

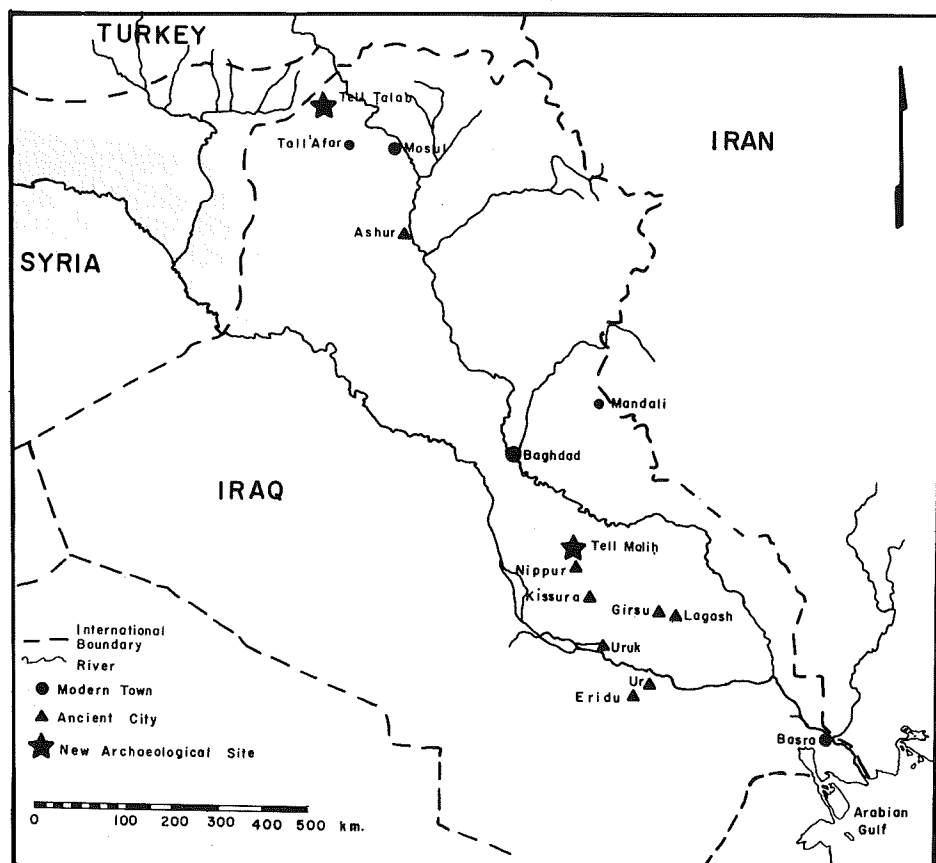
of materials they had excavated at a site on the Tigris that had been part of an earlier salvage project. They were also preparing to start work on by far the largest tell in the North Jezirah, Tell al-Hawa—a massive 160-hectare site that dominates the area like a small mountain. Without the logistic support, technical expertise, and convivial atmosphere of the British camp, we could not possibly have worked as efficiently or comfortably as we did.

Each morning we would drive north from Tell 'Afar across the Sinjar, and then head west into the salvage area. The weather was generally horrible—cold, foggy, and frequently drizzling. Our vehicle could not leave the few paved roads in the area because of the mud, so the basic tactic was to get as close as we could to a given tell and start walking.

Finding second-millennium sites was no problem at all—one hardly needed to look at sherds to identify them as such. The structures created in the second millennium were so solid and massive that the mounds they now leave have a very distinctive profile—high and steep in contrast to the lower, smaller mounds of the prehistoric period. In selecting one for excavation, we were in the fortunate position of merely having to eliminate ones that had undesirable features, such as later occupation or a modern cemetery on top.

On one foggy January morning we left our car on the road that runs parallel to the Berlin to Baghdad railroad and set off in search of a village called Tell Talab on our map. The name was certainly promising—"Talab" means "order, requisition" in Arabic—but we were not at all sure the mud road we were following was the right one because the odometer on the Landrover did not work and there were no landmarks in sight. After a few more hundred feet an approaching figure loomed up out of the mist and we asked him if we were on the road to Tell Talab. He looked very puzzled and asked if we wanted to visit his house. Thanking

*continued on next page.*



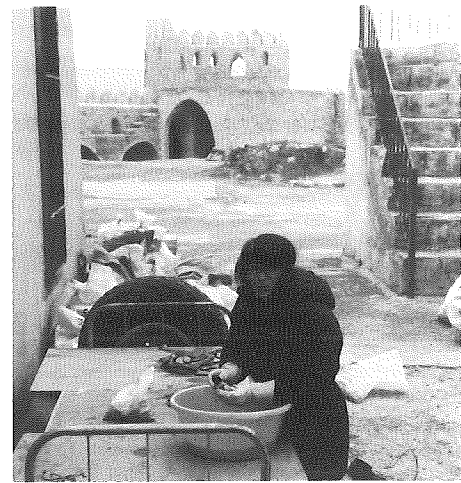
*Map of Iraq.*

him we declined and continued on our way. After a few paces it was clear why he thought we were such fools; Talab became visible only a few hundred feet in front of us, a high tell with a broad lower mound and a scattering of modern houses.

The site was everything we were looking for. It was covered with Habur ware, the distinctive ceramic indicator of the second millennium, in a density we had not found at the other sites we surveyed. It promised to have both public buildings and private houses, to judge by the division between the high citadel mound and the lower habitation area. There was also some variation in the ceramics of various parts of the site, which suggested there might be functional differences

between sectors of the settlement. There was no cemetery on the citadel and there was ample open space between the modern houses. Even the dogs—normally the curse of those who try to do archaeological survey—were friendly.

At the time of this writing, our expedition to Iraq is preparing to set out. We have applied for a permit and received encouraging indications from the State Organization of Antiquities and Heritage. There are many uncertainties in this business, however, not the least of which is the war. We may suddenly find ourselves excavating some other site, or not excavating at all. The North Jezirah is a promising area, however, and it deserves more study than it has so far received.



*Sherd washing in Tell 'Afar Castle.*

*Paul Zimansky is an Assistant Professor of Archaeology at Boston University where he teaches primarily Near Eastern archaeology. He has excavated previously at Nippur (Iraq), Bastam (Iran), and 'Ain Dara (Syria).*



*Elizabeth Stone inspects baked brick foundations at Tell Malih.*



*Tell Malih surface sherd scatter.*

## Archaeology in War-torn Iraq

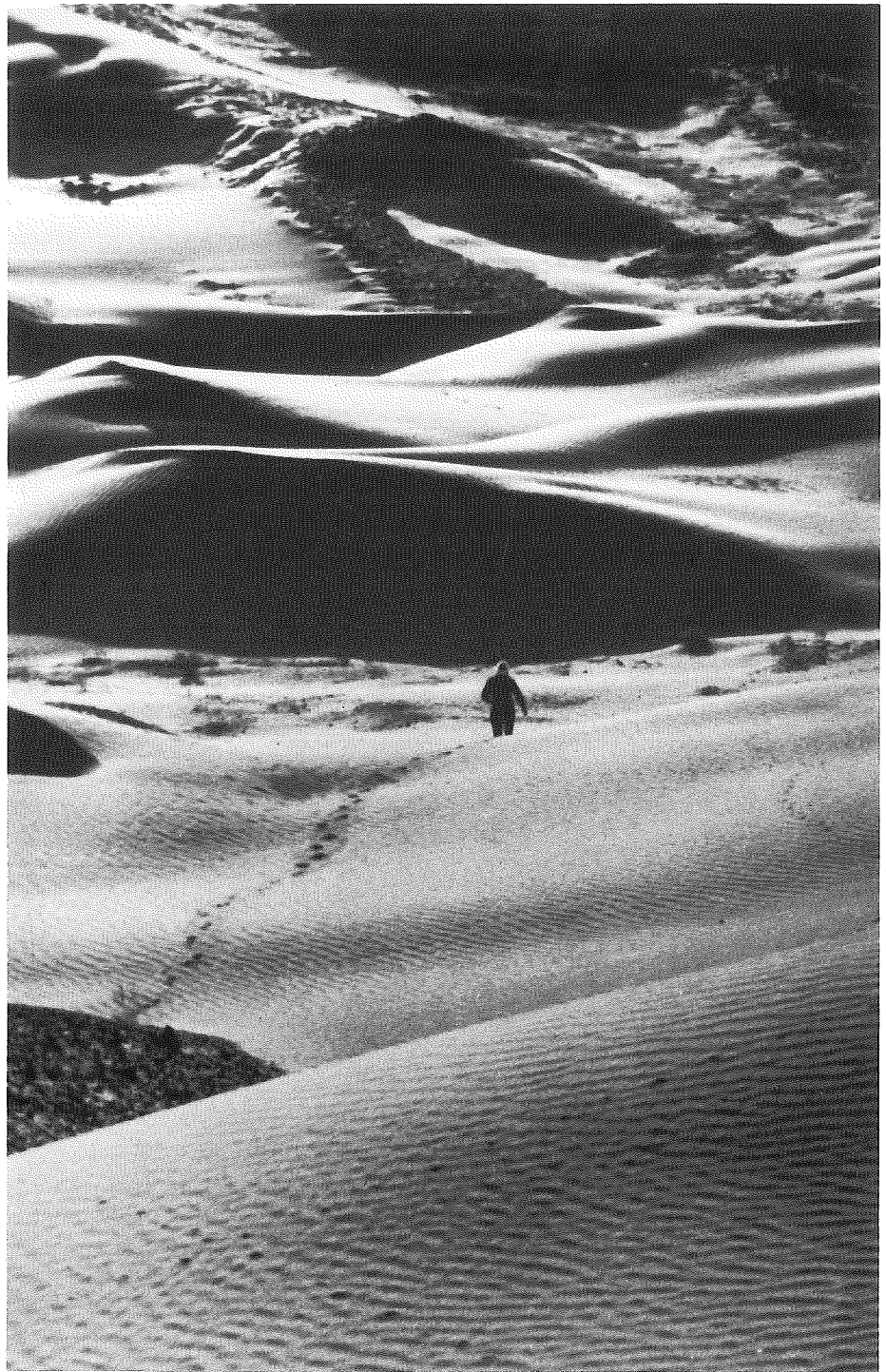
by Elizabeth C. Stone

As I was being driven from the airport on arriving in Baghdad, I was told that a missile was due any day now. Iran had been sending them in every four weeks, on Thursday nights; I arrived on a Wednesday. I slept through that first rocket, but soon they became common-place, as the Iranians abandoned their schedule, attacking Baghdad every three days or so, and stepped up their shelling of Basra, far to the south. For the first time in my life I had first-hand experience of war. As a child of the sixties I had watched all of the men that I knew have their lives completely disrupted by the Vietnam War; but no one that I knew at my Ivy League school actually got drafted. War, therefore, was seen on television, and although intellectually we knew that horrible things were happening half a world away, it was very different from being there; it is not the sight and sound of a rocket attack that are memorable, but the shock waves that continue to rattle doors and windows for several minutes after the impact. Television can do no justice to that effect.

But what was I doing in Iraq? For the past ten years I had been working to try to understand the nature and organization of ancient Mesopotamian cities, the first cities that the world had ever known. We knew that they were large, with populations in the tens of thousands, but how were they organized? Although excavations have been conducted on Mesopotamian sites for the last century, most of the work has been concentrated on the large public buildings, and the nearly one million cuneiform tablets stored in museums around the world only provide a view of that society as seen by the state. My interest had always been with the common people, in how they were organized and how they interacted with and were influenced by the larger state apparatus.

In the course of a long period spent studying such archaeological and textual remains as were available on the social organization of Mesopotamian cities, I began to doubt the standard models that had been put forward to explain early states. Early states were described as stratified, but there was no evidence for the existence of a hereditary aristocracy. People were supposed to be organized in territorial units, but kinship seemed to be the basis of neighborhood organization in many cases. Wealthy and poor areas were supposed to be located in different parts of the city, yet archaeological remains of houses show the small, poorly appointed buildings tucked in between the larger ones. And Piotr Steinkeller from Harvard University tells me that texts indicate that a general could live next to a carpenter, an important priest next to a fisherman.

If this standard model of the stratified, centralized state was to be abandoned, what could be put in its place? I believe that the basic building blocks of Mesopotamian cities were closed neighborhoods, occupied by rich and poor, elites and commoners, tied together by links of kinship, clientage, and/or common association with one of the large institutions of the city. I had



*Elizabeth Stone crossing ancient canal in Central Nippur.*

come to Iraq to try to get an excavation permit to work on a site that might help me test my theory.

Most of southern Iraq has been surveyed; thousands of sites have been visited, dated, and described. What I was looking for was a large site, urban in scale, that had been abandoned suddenly, preferably in the Old Babylonian period when both private and public documents were common, and which had been

sufficiently eroded that surface remains existed which could serve as a guide to the organization of the city.

An examination of the survey data had yielded only two good candidates, one in the south, near the ancient city of Ur, and a second a little to the north of Nippur, the great religious center. It was difficult to decide between the two. Each site

*continued on next page.*

had its good and bad points. The site in the south had the richest surface remains of the two, but that in the north was probably occupied longer and thus with excavation should prove to be the richer site. What is more, the latter could be expected to have tablets with people identified by their patronymics, making genealogical reconstruction possible, but this feature could not be expected in tablets from the site near Ur. On the other hand the southern site would probably have intramural burial, making studies of differences in health and nutrition possible, while this was less likely to be found in the site near Nippur. It was thus impossible to choose between the two possibilities on empirical grounds, so I opted to let pragmatics make the decision. I would apply for a permit to dig whichever site would be the easier to get to.

With this research behind me, I had come to Iraq to visit these two sites and to apply for permission to work at one of them. This project had been planned several years earlier, but I had been waiting in vain for the war to end. Two things prompted me to forget, to the extent possible, about the war and to forge ahead. One was the visit to the United States by a high-ranking member of the Iraqi Antiquities Department, Behnam Abu el-Soof, who was encouraging archaeologists to initiate projects in Iraq; the second was the solution to the problem of how to get there. Normally it was impossible to obtain an excavation permit without visiting Iraq, yet grant money to pay for such a visit was always dependent on holding such a permit. The solution to this Catch-22 came as the newly opened American Embassy in Baghdad began planning to begin a Fulbright program there. I thought that perhaps an application indicating that there were scholars interested in working in Iraq might speed up the implementation of such a program. Little did I think that the response would be to give me the grant and send me to Baghdad as the first American Fulbright Scholar there since the 1967 war.



*A polished stone object from Tell Malih's surface—an obvious import since southern Mesopotamia is a land without stone.*

Soon after my arrival in Baghdad, I found people who would take me to look for the two selected sites. I first went with two British archaeologists to look for the site in the north. To find it we had to head off into uncharted terrain with only a 25-year-old map to guide us. First we were turned back by impassable sand dunes; next we found ourselves in the middle of a marsh with no way out except the way we had come. But finally we discovered that an excellent desert track dropped south from a paved road and went right over our objective. The site consisted of a series of low mounds stretching as far as the eye could see, with baked brick foundations, the remains of kilns, etc. lying on the surface. This was the site where I could begin to test my ideas. A passing driver of a pickup truck indicated that the site might be called Tell Malih, meaning "salty mound". Although the site and the area around them seemed more salt

free than most parts of southern Iraq, I decided this name would do; I knew of no other Tell Malih.

But I reserved judgement until I could look at the site further south, so a few days later I set off with some employees of the American Embassy, with the plan of visiting some of the major southern Mesopotamian sites, Uruk, Ur, Eridu, Lagash, Girsu, Kissura, Nippur—names to conjure with—together with a little desert exploration for my sake. But I never reached my objective. Heavy rains had flooded the surrounding area and not even a four-wheel-drive vehicle could penetrate the desert. Since such flooding was likely to be a recurrent feature, pragmatics made me settle on Tell Malih.

The next step was to request permission from the Director-General of Antiquities, Dr. Muayad Said Damerji. He indicated that he was encouraging long-term projects that stressed horizontal exposure; luckily for me that was just what I had in mind. But he also said that the "tax" which he charges was that I should do some salvage archaeology in the north. This was no more than I had expected, and since he would pay for housing and labor, it could hardly be considered a great burden. Moreover, the current salvage area is in the heartland of Hurrians, an area in which my husband, Paul Zimansky, was interested. What is more, some scholars had suggested that the organization of cities differed between the south and the north, so here was an opportunity for me to see if this were true. It was agreed, therefore, that we should select a site in the salvage zone, and then return in the spring for two weeks of mapping at Tell Malih, before spending the rest of the summer excavating in the salvage zone. This map would allow me to apply for funds to begin what I hope will be a long-term project.

And what of the war? By the time that I left in January, the Iranian offensive was in full swing. I became used to the sound of rockets falling in the city, and became habituated to reading the dates on the black memorial flags commemorat-

# Archaeology, Classics, and Interactive Databases

by Judson Harward

Fritz Hemans and the author of this article, both of the Department of Archaeology and Center for Remote Sensing, will start work this summer on a major new program to investigate interactive databases.

The project, entitled *Perseus*, is in the final stages of contract-negotiation for the first year's funding with the Annenberg/CPB Project. The Principal Investigators expect the research eventually to run for four to five years. It will be the target of a joint effort by a team from Boston University and colleagues, led by Greg Crane, from Harvard University's Department of the Classics.

The goal of the project is to produce a computer database of ancient texts and of archaeological illustrations that can be used as a reference and research tool by undergraduates, graduate students, and scholars. Project members hope to provide a first-year major in archaeology or Classics with the same ability to ferret out evidence that normally comes only with several years of graduate work. The new technologies of compact disk (CD-ROM), advanced workstations with bit-mapped screens, and powerful programming techniques involving relational databases and object-oriented languages have combined to make multimedia computer databases available to scholars.

Those collaborating on the *Perseus* Project see it as one of the first such projects, and perhaps the very first to create a multimedia scholarly reference work in electronic form.

Project members expect that *Perseus* will furnish students with a unique resource and set of tools, an intellectual workshop and laboratory where they can test their ideas against the primary evidence of how the ancient Greek world functioned. Thus, a student confronted with the seemingly innocent question, "Why was the Parthenon built?", will quickly be able to call up plans and drawings of the building and its neighbors on the Athenian Acropolis, along with photographs of the preserved architecture and sculpture, and the ancient literary sources that discuss the building, both in ancient Greek and in translation. Students will be able to investigate how the construction of the Parthenon was financed, what its sculptural decoration depicts, what evidence there is for ancient cults connected with the building, and what other administrative functions were carried out within the temple. Students, by selecting increasingly detailed drawings on the workstation screens, will be able to explore the curious combination of Doric and Ionic elements in the building, and will be able to compare

it to other contemporary temples built both in the territory of Athens and elsewhere in Greece. The goal of *Perseus* will not be to argue for one interpretation of the Athenian building program or another, but to help train the student to examine more carefully and more critically what evidence has survived.

It is this very impartiality that will also make *Perseus* a powerful aid to research. All scholars commencing a research project are forced to survey topics about which they are unfamiliar. They often exclude what might be promising lines of inquiry because they do not recognize the variety of evidence that bears on their topic of interest. The ability that *Perseus* will provide to move among different categories of data, e.g., from inscriptions to the stratigraphy of deposits against foundations, to pottery chronology, will help broaden and yet focus the early stages of scholarly research. Then traditional scholarly techniques will have to take over.

The Harvard team will assemble the textual portion of the database and will develop the software tools to search it. Project members Crane and Harward have already had considerable experience in writing text search software for the *Thesaurus Linguae Graecae* database. The TLG, as it is known, is an enormous (> 500 million characters) library of machine-readable versions of ancient Greek texts assembled at the University of California of

*continued on next page.*

---

*continued from previous page.*

ing the war dead to see how many had died in the most recent offensive. But I was still personally untouched by the war.

One night in the British School where I was staying, the house was shaken by a bang, but it was not a rocket. Instead of being over after a minute or two, a low rumbling originating somewhere east of Baghdad continued throughout the night, occasionally punctuated by a sharper impact. The next day I was working in the museum library

when the loudspeakers outside broadcast a bulletin. Watching the faces of the Iraqi women as they returned to work when it was over, I read nothing but depression. It seemed logical to suppose that a major defeat had been inflicted on the Iraqis at the front due east of Baghdad, a distinctly uncomfortable thought. But when at lunchtime we began the difficult process of tuning in the BBC, we found that a major Iraq victory at Mandali had been announced, though at the cost of many lives on both sides. It was this

experience that taught me a lesson that our generation, brought up insulated from war, is ignorant of. War is not the victories and defeats of generals, it is husbands, sons, and brothers, and perhaps some wives, daughters, and sisters, dying.

*Elizabeth C. Stone, Research Associate in the Center for Archaeological Studies, is an Associate Professor of Anthropology at the State University of New York at Stony Brook. She has excavated extensively in the Near East and her book, Nippur Neighborhoods, will be published by the Oriental Institute Press this summer.*



Stone walls, familiar features of the New England landscape, were constructed for a variety of reasons. This wall marks the town line between Lynn and Lynnfield as well as the northwest boundary of Lynn Woods.

## Common Land to Public Park: Lynn Woods and the Development of Land Policies in Essex County

by Donald G. Jones

The Office of Public Archaeology at Boston University recently conducted an archaeological survey of Lynn Woods, a 2,200-acre park-reservation located just north of Boston in Lynn, Massachusetts. The project is of particular interest because Lynn Woods is one of several parks associated with Frederick Law Olmsted, the premier landscape architect of the nineteenth century. The Massachusetts Department of Environmental Management (DEM) has initiated a program to restore many of these parks to the state that Olmsted had originally proposed. Towards that end the OPA undertook in the summer and fall of 1986 to identify for the DEM archaeological sites in Lynn Woods to ensure their protection during

the rehabilitation and subsequent management of the park. The project has made it possible to trace the use of Lynn Woods both in prehistoric and historical times. This article provides an account of its development over 350 years in order to illuminate the changing attitudes towards natural resources and land management, and to register other examples of the interaction between a changing society and its neighboring woodlands.

### Lynn Woods as Common Land

When the city of Lynn was founded in 1629, the nucleus of the town was located near the coast. The large expanse of rugged upland woods to the west provided the settlers with an abundance of natural resources. The Lynn selectmen designated Lynn Woods as common

*continued from previous page.*

Irvine under the direction of Professor Ted Brunner.

At Boston University, Hemans and Harward will focus on the problems of visual databases, which are far less well understood than the corresponding issues for their textual cousins. *Perseus* will include many different kinds of images, ranging from architectural plans and elevations to object photographs and Landsat images. These images have very different characteristics. Some are black and white (an architectural plan), some in a limited number of shades of color (a topographic map), and some in full color (an image drawn from a 35mm slide of a sculpture). Certain images can be reduced to line drawings (e.g., an architectural plan) but others are really formed of a very large number of small color-valued points or pixels (e.g., a Landsat image or color slide). A common format or formats must be found to enter all the *Perseus* images, and then a system must be designed for their rapid display.

The user will want to browse from image to image. A preliminary design calls for tools to allow users to roam spatially across a plan and then to designate buildings to zoom in on. The user will also be able to view earlier and later phases of the same structure. Other tools will identify objects that a user points to using the workstation's mouse. It seems natural that users should browse images that are spatially related, but they will also want to browse objects or buildings that are typologically related. A student viewing a house plan from Olynthus, an ancient Greek city, might well want to compare the plans of other houses of the fourth century BC. The project plans to build on the technology of programs called relational databases to support these more arbitrary typological queries.

Project members will also generate three-dimensional views of a limited number of Classical buildings. These views will give students and scholars alike a far better idea of ancient urban spaces than plans

and elevations alone, as well as offer interesting answers to archaeological questions. Careful reconstruction and the generation of computer views will make clear, for example, just how much of the famous Parthenon frieze a fifth-century Athenian would have seen. Architects will be able to try out different roofing schemes for the Artemision at Ephesus to determine their aesthetic effectiveness as well as their structural requirements.

These programs will be designed as generic tools and should prove useful in other research projects. The investigators hope that the database itself will become a new kind of scholarly reference work, one that may point the way to an entirely new kind of scholarly publication particularly suited to the needs of archaeology.

*Judson Harward is Research Assistant Professor in the Department of Archaeology and System Manager of the Center for Remote Sensing.*



land to be used by all of the town's inhabitants as pasture land and as a source of timber both for building and for fuel. Remnants of these activities in the Woods survive as cart paths, stone walls, place names and other features.

Several early paths through the woods, which may have followed earlier Indian trails, now serve as park roads largely because they follow the easiest and most direct routes through the woods. Great Woods Road, Penny Brook Road, and Ox Pasture Road have been retained to form the backbone of the park road system today. A system of dirt roads and footpaths criss-crosses the Woods, giving access to some of the most scenic vistas in eastern Massachusetts.

Penny Brook and Penny Brook Road evidently derive their names from a small bridge that carried the road over the brook. Tradition holds that each person driving a cartload of firewood over the bridge in the seventeenth century paid a toll of one penny for its upkeep. Landings, such as Needhams', Blood Swamp, and Dungeon or Burrill's Landings, were used as places to season cut firewood over the summer for use in the winter. Blood Swamp and Dungeon Landings today serve as the two major entrances to the park.

The Woods were used as a source of timber for building as well as a source of firewood. For example, Meeting-house Swamp, which is located in the northern part of the Woods near Ox Pasture, is so named because it was the source of the large cedar that was cut down to serve as the center post of the meeting house constructed in Lynn in 1682.

Pasturing activities are similarly reflected in Lynn Woods. Lynn Woods was divided into several different pastures by long stone walls so that the stock could be divided and like animals could graze together. Middle Pasture wall remains today and runs the entire width of the park. Most of Dungeon Pasture wall, however, was destroyed by the creation of Breed's Pond in the 19th century.

Throughout the seventeenth century a constant problem for settlers was presented by wolves that attacked and killed livestock. Tradition records that one method the settlers employed to deal with the problem was to trap the wolves in stone-lined pits and kill them. Two such wolf pits are preserved in Ox Pasture today, and there were at least two others in the lower section of the Woods that are now flooded by Breed's Pond. These pits measure

about 2 feet by 5 feet in plan and are about 8 feet deep. When used as traps, they were presumably either baited with meat or covered with branches and leaves.

#### Land Division

A major change in land policies came around the turn of the eighteenth century as population growth began to place demands on the available land. In 1706, after many

*continued on next page.*



*In Ox Pasture, Dan Finamore excavates one of the stone-lined wolf pits which allegedly were used to trap wolves during the 17th century.*



*Several farmsteads were partially flooded by the creation of the Breed's Pond Reservoir in the 1870s. Remnants of the stone walls that enclosed these farmsteads become visible each fall when the water level is lowered for maintenance of the reservoir.*

years of debate, the town voted to assign for private use all remaining common lands, reserving only the military training field and one common pasture. The new land divisions were laid out in ranges that were 40 rods (660 feet) wide, and each range was divided into lots varying in size from about 1/8 of an acre to 8 acres. Lots were apportioned on the basis of tax rates for the town.

Because the rugged terrain was not suited for farmsteads, the woods continued to be used mostly as a source of timber and firewood and for pasturing of livestock throughout the eighteenth century. By the nineteenth century, however, several families chose to dwell in the Woods, either to escape the developing urban scene, or because the Woods contained the only available or affordable land. Their presence is marked by several stone-lined cellar holes located near the eastern edge of the woods closest to town.

### Dungeon Rock

Probably the most fascinating site in Lynn Woods is Dungeon Rock. A history of Lynn published in 1829 tells the story of a seventeenth-century pirate, named Tom Veal, who hid out in a cave in Lynn Woods. In 1658, according to that account, an earthquake caused the cave to collapse, burying the pirate and his treasure beneath the fallen rock. The site subsequently became known as Dungeon Rock.

In 1851 a man named Hiram Marble moved to Lynn and petitioned the town for permission to dig into the rock. The following year, Marble purchased the land containing Dungeon Rock and relocated his family to the site. Marble and his son, Edwin, spent the next twenty years tunnelling down 200 feet through solid rock in an attempt to recover the buried treasure. One of the most interesting aspects of this whole venture was that Marble was a spiritualist who claimed that his digging was guided by the dead pirate with whom he communicated through seances. Marble died in 1868 and his son,



*Dan Finamore surveys the remains of the camp of the Boulder Club at Weetamoo Cliff, one of several camps established in Lynn Woods by naturalist groups in the 19th century. The camps were torn down when the Water Board took possession of the property in the 1870s.*

Edwin, continued digging for about four more years, but no treasure was ever located. When Edwin died in 1880 the town buried him on a ledge next to the cave.

The site of Dungeon Rock today contains the cellar hole of the Marble house, remnants of garden walls, a stone-lined well, and the octagonal foundation of a hotel that was to be used for seances, but was never completed. The most striking features of the complex, however, are the 200-foot tunnel down through the rock, which is still accessible to tourists, and the mountain of rock debris outside of the cave that resulted from Marble's excavations.

### The Return to Nature

By the middle of the nineteenth century, the establishment of several shoe factories in Lynn transformed the town into a vibrant urban industrial center. There was a growing awareness among a group of rather forward-looking men that the natural beauty of the area was rapidly being destroyed by commercial enterprises. Because of their common interest in the natural environment, they founded in Lynn

in 1850 the Exploring Circle, which sponsored field trips and conducted surveys to record all aspects of the natural environment of Essex County. Because Lynn Woods had largely escaped the development that was taking place in the rest of Lynn, it became a natural laboratory for their activities. The papers of the Exploring Circle, which have been preserved by the Lynn Historical Society, contain excellent descriptions of the geology, flora, and fauna of the Woods as it existed during the second half of the nineteenth century.

Other evidence of the interest in the natural wonders of Lynn Woods can be found in a variety of camps for naturalist groups that were constructed among the hills and swamps of Lynn Woods during the second half of the nineteenth century. The camp of the Boulder Club was located at Weetamoo Cliff in the northern part of the Woods, and Bassett Camp was located at the base of Mt. Gilead in the center of the Woods.

### Beginnings of Public Acquisition

At the same time the naturalists were rediscovering the natural resources of the woods, urban engineers were doing the same, but for different reasons. The increased need for water resulted in the establishment of water-supply systems that connected both natural and man-made reservoirs to the town centers by a system of pipes and pumps. Several of the major swamps and streams in Lynn Woods were dammed to create three large reservoirs. In this manner, Bennett Swamp was converted to Breed's Pond in 1870, Birch Pond was formed in 1873 by damming Birch Brook, and Blood Swamp became Walden Pond in 1889.

Although these activities by the Water Board represented the return of portions of Lynn Woods to the public domain after 150 years of private ownership, this was not the effect that the naturalists were after when they spoke of the preservation of the natural resources. In 1882, the Massachusetts State Leg-

islature passed the Park Act which gave individual towns and cities the rights to purchase and obtain lands for the establishment of public parks. The members of the Exploring Circle immediately saw this as an opportunity to preserve the natural beauty of Lynn Woods before it, too, was engulfed by urban development. In 1889, the city of Lynn established the Trustees of the Free Public Forest as the organization to oversee the acquisition of the lands that were to comprise the Lynn Woods Park. The Trustees were comprised mostly of former members of the Exploring Circle.

Because most of these parcels had simply passed down from generation to generation as woodlots with few or no improvements, the Trustees had little difficulty in persuading the owners to sell their property for the creation of a public park.

Acquisition of the 2,200 acres that comprise the park today took about ten years.

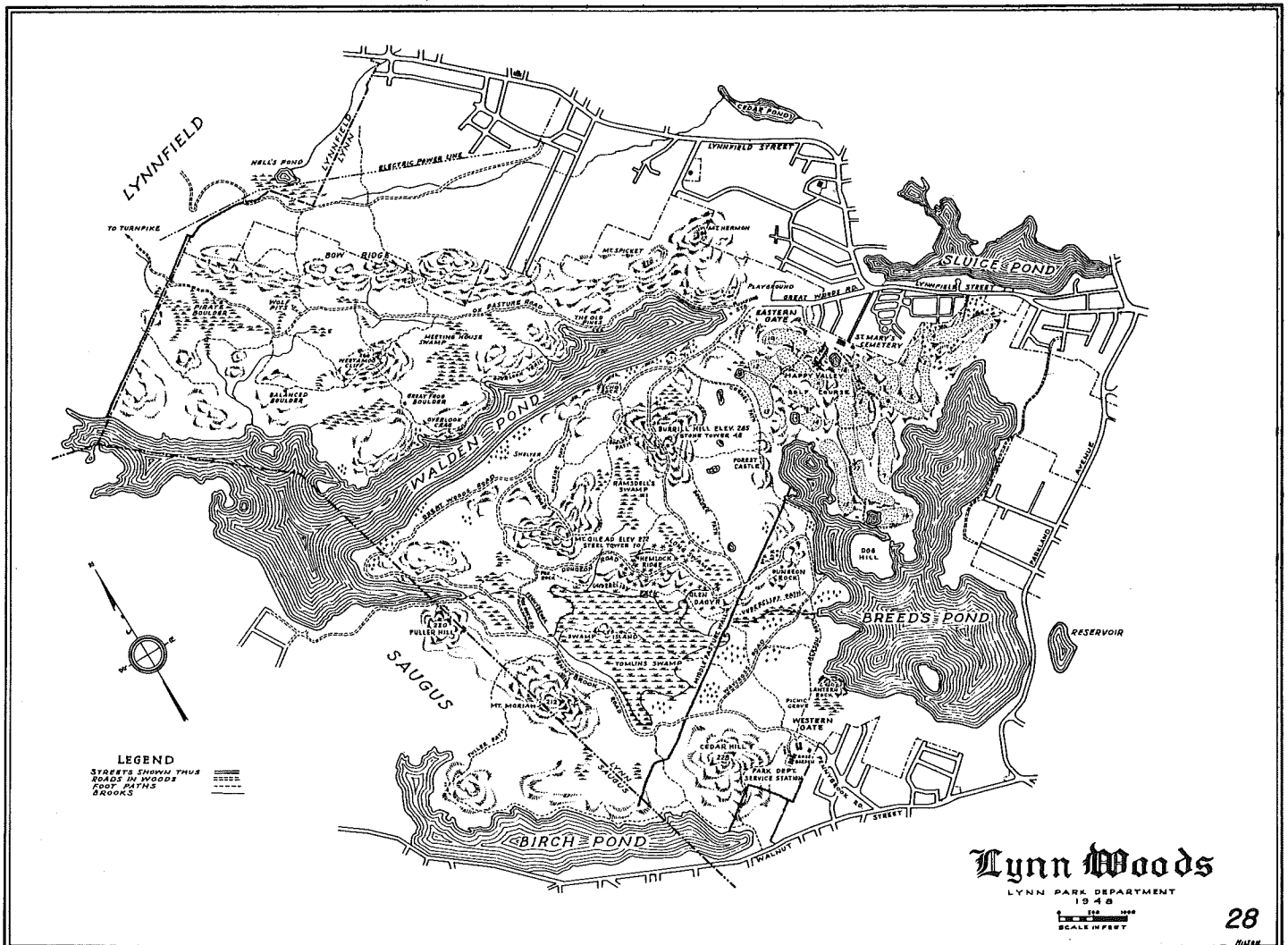
It was at this time that the Trustees consulted with the landscape architecture firm of Olmsted, Olmsted, and Eliot, located in Brookline, Massachusetts, on how best to manage and maintain Lynn Woods. Frederick Law Olmsted was much impressed with the great expanse of the reservation. What other cities had to reclaim from the urban environment, Lynn had reserved from the start. The advice Olmsted gave to the Lynn Parks Commission reflects his admiration for Lynn's preservation of their natural resources. Rather than proposing large-scale land alterations to create a city park, Olmsted proposed a plan of vegetation control that would enhance the natural beauty of the Woods. His advice was closely

followed by the Lynn Parks Commission.

Lynn Woods' existence as a public park has had a rather checkered history. Although the Lynn Parks Commission subsequently made improvements to make the Woods more attractive to visitors, the immensity of the park and the lack of funds have made it virtually impossible to police and protect effectively. One of the primary uses of the park today is as a cemetery for the burned-out skeletons of stolen cars.

The program developed by the Department of Environmental Management seeking to restore these parks may be taken as a sign of new respect for the Commonwealth's natural and cultural resources.

*Donald G. Jones is Assistant Director of the Office of Public Archaeology and a Ph.D. candidate in the Department of Archaeology.*



The cultural features located in Lynn Woods reflect over 300 years of changes in attitudes toward natural resources and land management policies, from its use as common land in the 17th century to its incorporation as a public park in the 1890s.

The Center for Archaeological Studies, which was founded at Boston University in 1980, has as its chief aim the development and coordination of interdisciplinary archaeological programs in education and research on local, national, and international levels. The Center also seeks to increase national and international awareness of the importance of understanding other cultures, and of preserving the world's cultural heritage, by involving professional archaeologists, scholars in other fields, and the general public in the activities of the Center.

*Context* is the newsletter of the Center for Archaeological Studies and is published quarterly. Institutions and individuals may subscribe separately to *Context* at a cost of \$10 per year. Membership to the Center is open to the public; annual dues are \$20 (\$10 for students); benefits include a subscription to *Context*, invitations to attend our fall and spring lecture series and other events, and the use of our library facilities. The Center also offers special seminars for the public during the academic year and summer field schools here in the Boston area and abroad. Other categories of membership are: Contributing Member, \$50; Institutional, \$50; Patron, \$100; Benefactor, \$500; Corporate, \$1000; and Life Member, \$400. These categories

## AIA Re-elects President

Professor James Wiseman, Chairman of Boston University's Department of Archaeology and Director of the Center for Archaeological Studies, was re-elected in January 1987 for a second two-year term as President of the Archaeological Institute of America.

Founded in 1879 by Charles Eliot Norton, the AIA is a nonprofit scientific and educational organization chartered through the Smithsonian Institution by the U.S. Congress. It is the oldest archaeological organization in North America and, with some 9,000 members and 85 local societies, is the largest in the

world. Since its inception, the AIA has been a leading proponent of archaeology worldwide, both for professional archaeologists and non-professionals. It publishes the *American Journal of Archaeology*, the most widely distributed scholarly journal devoted to archaeology in the world, and *Archaeology* magazine, which is written by professionals for the public, with a circulation of over 90,000. The AIA also sponsors over 200 lectures annually in the United States and Canada. Its national headquarters is located at Boston University.

ries include a subscription to the *Journal of Field Archaeology*. Please make checks payable to the Center for Archaeological Studies and send to the Center office at Boston University, 675 Commonwealth Avenue, Boston, MA 02215. Gifts to the Center are tax-deductible.

**Editorial Board:** James R. Wiseman, Editor-in-Chief; Lucy Wiseman, Managing Editor; Ricardo J. Elia, Creighton Gabel, Frederick P. Hemans, Fred S. Kleiner.

**Faculty of the Department of Archaeology (1986-1987):** Mary C. Beaudry, Ricardo J. Elia (adjunct), Mikhailis Fotiadis, Creighton Gabel, Julie Hansen, Frederick P. Hemans, Howard Kee (adjunct), Fred S. Kleiner, Richard MacNeish, J. Wilson Myers, Karl M. Petruso, James Purvis (adjunct), Edwin Wilmsen, James R. Wiseman, Paul E. Zimansky, Marek Zvelebil (visiting).

Copyright 1987, Boston University,  
Center for Archaeological Studies

Boston University  
Center for Archaeological Studies  
232 Bay State Road  
Boston, MA 02215

Nonprofit Organization  
U.S. Postage  
PAID  
Boston University

Address Correction Requested