HESPERIA

JOURNAL OF THE AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS

VOLUME 59: NUMBER 4
OCTOBER–DECEMBER
1990

AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS
1990

HESPERIA (USPS 112-590) VOL. 59, NO. 4.

TABLE OF CONTENTS

HESPERIA. The annual subscription price is $40.00 net in the United States, $46.00 net in Canada and other countries, payable in advance in dollars. Published quarterly. Single fascicules (current and back numbers when available) $11.00 in the United States, $12.50 in Canada and other countries, postpaid. Volumes I–XLI, Index Volume I (*Hesperia* 1–10, and Supplements I–V), and Supplements I–XI should be ordered from Swets and Zeitlinger, B. V., P.O. Box 801, 2160 SZ Lisse, The Netherlands, Volume XLII and following and Supplements XII and following from the American School of Classical Studies at Athens, c/o The Institute for Advanced Study, Princeton, New Jersey 08543-0631, U. S. A.

Single fascicules of *Hesperia* 59.1 available at $40.00 plus postage.

Index to *Hesperia,* Volumes 11–20, Supplements VII–IX. vi + 434 pages quarto, paper, 1968. $15.00.

Supplement XII: *The Athenian Constitution after Sulla.* By DANIEL J. GEAGAN. 1967. $15.00.

Supplement XIII: *Marcus Aurelius, Aspects of Civic and Cultural Policy in the East.* By JAMES H. OLIVER. 1970. $15.00.

Supplement XIV: *The Political Organization of Attica.* By JOHN S. TRAILL. 1975. $15.00.

Supplement XV: *The Lettering of an Athenian Mason.* By STEPHEN V. TRACY. 1975. $15.00.

Supplement XVI: *A Sanctuary of Zeus on Mount Hymettos.* By MERLE K. LANGDON. 1976. $15.00.

Supplement XVII: *Kallias of Sphettos and the Revolt of Athens in 286 B.C.* By T. LESLIE SHEAR, JR. 1978. $15.00.

Supplement XIX: *Studies in Attic Epigraphy, History and Topography.* 1982. $15.00.

Supplement XX: *Studies in Athenian Architecture, Sculpture and Topography.* 1982. $15.00.

Supplement XXI: *Excavations at Pylos in Elis.* By JOHN COLEMAN. 1986. $25.00.

Supplement XXII: *Attic Grave Reliefs that Represent Women in the Dress of Isis.* By ELIZABETH J. WALTERS. 1988. $40.00.

Supplement XXIII: *Hellenstic Relief Molds from the Athenian Agora.* By CLAIRÈVE GRANDJOUAN. 1989. $25.00.

Publication office: c/o The Institute for Advanced Study, Olden Lane, Princeton, New Jersey. Produced at 242 S. Eden Street, Baltimore, Md. 21231. All communications for the Editor should be sent to THE AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS c/o THE INSTITUTE FOR ADVANCED STUDY, Princeton, New Jersey, 08543-0631, U. S. A.

Second-class postage paid at Princeton, New Jersey and at additional mailing offices.

Postmaster: Send address changes to Hesperia, THE AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS c/o THE INSTITUTE FOR ADVANCED STUDY, Princeton, New Jersey, 08543-0631, U. S. A.

ISSN 0018-098X ISBN 87661—500—0

THE NEMEA VALLEY ARCHAEOLOGICAL PROJECT
A PRELIMINARY REPORT

(PLATES 93–97)

INTRODUCTION

THE FOCUS OF ARCHAEOLOGICAL RESEARCH on regions rather than sites has a long history in Greece,[1] beginning around the turn of the century with work in

[1] The Nemea Valley Archaeological Project is sponsored by Bryn Mawr College and has worked under the auspices of the American School of Classical Studies at Athens with permissions from the Ministry of Culture and Sciences from 1984 through 1989.

For advice and support we thank Dr. Ioannis Tzedakis, Director of Prehistoric and Classical Antiquities; Professors Stephen G. Miller and William D. E. Coulson, successive Directors of the American School of Classical Studies; Dr. Phani Pachygianni, Ephor of Prehistoric and Classical Antiquities, Nauplion Museum, and Ms. Eleni Palaeologou, who served in that capacity during the early years of the project. Ms. Zoe Aslamatzidou and Ms. Eleni Korka facilitated our research in the field, while Mr. Andreas Vakrinakis, Head Guard at the Nemea Museum, and his staff of guards extended to us every courtesy in use of the museum. Professor William R. Biers generously facilitated our work at Phlius. Special thanks are due also to the villagers of Ancient Nemea and Ancient Kleonai for their unstinting philoxenia and to successive mayors of Ancient Nemea, Evangelis Zaimis and Nikolaos Papadopoulos, and the Secretary of the village, Andreas Mouschouras.

The project has received major funding from the National Endowment for the Humanities (matching grant RO 20731 and outright grant RO 21715), the Institute for Aegean Prehistory (grants in 1984, 1985, 1986, 1987), and the National Geographic Society (Grants 2971-1984, 3265-1986). Generous private donations were made by Mr. William Broekhuysen in honor of his wife Elizabeth and by Alwyn Carus, Elisabeth Carus, Frances F. Jones, Lucien Levy, Rueben Resnick, James H. and Margaret G. Wright, and Carl Youngdale.

Acknowledgments for assistance are given below under appropriate sections. All illustrations except Figures 4 and 11 were drawn or inked by Julia E. Pfaff. Photographs are by Taylor Dabney except for Plate 94:f and g, which are from the archives of James P. Harland.

The following abbreviations for archaeological phases are used:

A	= Archaic	HL	= Hellenistic
BA	= Bronze Age	L	= Late
Byz	= Byzantine	M	= Middle
C	= Classical	N	= Neolithic
E	= Early	Ott	= Ottoman
F	= Final	P	= Proto
G	= Geometric	R	= Roman
H	= Helladic	T	= Turkish

In discussing phases, an en dash is used for inclusive phases, e.g., A–C, R–Byz, and a solidus when ambiguity in the phase is expressed, e.g., A/C, R/Byz.

Works frequently cited are abbreviated as follows:

Biers, 1969 = W. R. Biers, "Excavations at Phlius, 1924," *Hesperia* 38, 1969, pp. 443–458

Biers, 1971 = W. R. Biers, "Excavations at Phlius, 1924: The Votive Deposit," *Hesperia* 40, 1971, pp. 397–423

Binford = L. R. Binford, "A Consideration of Archaeological Research Design," *American Antiquity* 29, 1964, pp. 425–441

Blegen, 1931 = C. W. Blegen, "Gonia," *Metropolitan Museum Studies* 3, 1931, pp. 55–80

Melos, Lakonia, Thessaly, and elsewhere.[2] These researches established archaeological sequences, defined regional artifact and settlement types, and provided an overview of settlement from prehistoric times on. After World War II a series of extensive, but more systematic, surveys in many areas of the country was conducted by R. Hope Simpson and colleagues.[3] Meanwhile a continuing tradition of geographic studies described natural as

---

Blegen, 1975 = C. W. Blegen, "Neolithic Remains at Nemea," J. L. Caskey, ed., *Hesperia* 44, 1975, pp. 251–279

Cherry *et al.*, 1988 = J. F. Cherry, J. L. Davis, A. Demitrack, E. Mantzourani, T. F. Strasser, and L. Talalay, "Archaeological Survey in an Artifact-Rich Landscape: A Middle Neolithic Example from Nemea, Greece," *AJA* 92, 1988, pp. 159–176

Cherry *et al.*, *Archaeological Landscape* = J. F. Cherry, J. L. Davis, and E. Mantzourani, *The Archaeological Landscape of Northern Keos in the Cyclades, UCLAMon*, forthcoming

Cook = J. M. Cook, "Mycenae 1939–1952, III. The Agamemnoneion," *BSA* 48, 1953, pp. 30–68

Dickinson = O. T. P. K. Dickinson, "Parallels and Contrasts in Mycenaean Civilisation on the Mainland," *Oxford Journal of Archaeology* 1, 1982, pp. 125–137

Edwards = G. R. Edwards, *Corinth*, VII, iii, *Corinthian Hellenistic Pottery*, Princeton 1975

Faraklas = N. Faraklas, *Ancient Greek Cities*, XI, *Phleiasia*, Athens 1972

French = E. French, "The Figures and Figurines," in *The Archaeology of Cult*, A. C. Renfrew, ed. (*BSA* Suppl. 18), London 1985, pp. 209–280

Harland = J. P. Harland, "The Excavations of Tsoungiza, the Prehistoric Site of Nemea," *AJA* 32, 1928, p. 63

Kolodny = E. Kolodny, *La population des îles de la Grèce*, Aix-en-Provence 1974

McGrew = W. W. McGrew, *Land and Revolution in Modern Greece, 1800–1881*, Kent, Ohio 1985

Miller, 1975 = S. G. Miller, "Excavations at Nemea, 1973–1974," *Hesperia* 44, 1975, pp. 143–172

Miller, 1976 = S. G. Miller, "Excavations at Nemea, 1975," *Hesperia* 45, 1976, pp. 174–202

Miller, 1980 = S. G. Miller, "Excavations at Nemea, 1979," *Hesperia* 49, 1980, pp. 178–205

Miller, 1982 = S. G. Miller, "Excavations at Nemea, 1981," *Hesperia* 51, 1982, pp. 19–40

Mouzelis = N. P. Mouzelis, *Modern Greece: Facets of Underdevelopment*, New York 1978

Pritchett = W. K. Pritchett, *Studies in Ancient Topography, Part II (Battlefields)* (University of California Publications in Classical Studies 4), Berkeley 1969

Redman = C. Redman, "Surface Collection, Sampling and Research Design: A Retrospective," *American Antiquity* 52, 1987, pp. 249–265

Russell = A. G. Russell, "The Topography of Phlius and the Phliasian Plain," *University of Liverpool Annals of Archaeology and Anthropology* 11, 1924, pp. 37–47

Rutter = J. B. Rutter, "Pottery Groups from Tsoungiza of the End of the Middle Bronze Age," *Hesperia* 59, 1990, pp. 375–458

Wagstaff = M. Wagstaff, *The Development of Rural Settlements*, London 1982

Wiseman = J. Wiseman, *The Land of the Ancient Corinthians* (*SIMA* 50), Göteborg 1978

Wright *et al.*, "Early Mycenaean Settlement" = J. C. Wright, J. F. Cherry, J. L. Davis, and E. Mantzourani, "Early Mycenaean Settlement in the Nemea Region," in *The Prehistoric Aegean and Its Relations to Adjacent Areas*, Proceedings of the Sixth International Colloquium on Aegean Prehistory, G. Korres, ed., Athens, in press

[2] E.g., D. Mackenzie, "Ancient Sites in Melos," *BSA* 3, 1897, pp. 71–88; R. M. Dawkins *et al.*, "Laconia," *BSA* 13, 1906–1907, pp. 1–284; 14, 1907–1908, pp. 1–182; 15, 1908–1909, pp. 1–213; 16, 1909–1910, pp. 1–75; and A. J. B. Wace and M. Thompson, *Prehistoric Thessaly*, London 1912.

[3] R. Hope Simpson, "Identifying a Mycenaean Site," *BSA* 52, 1957, pp. 231–259; H. Waterhouse and R. Hope Simpson, "Prehistoric Laconia: Part One," *BSA* 55, 1960, pp. 67–107; *eidem*, "———, Part Two,"

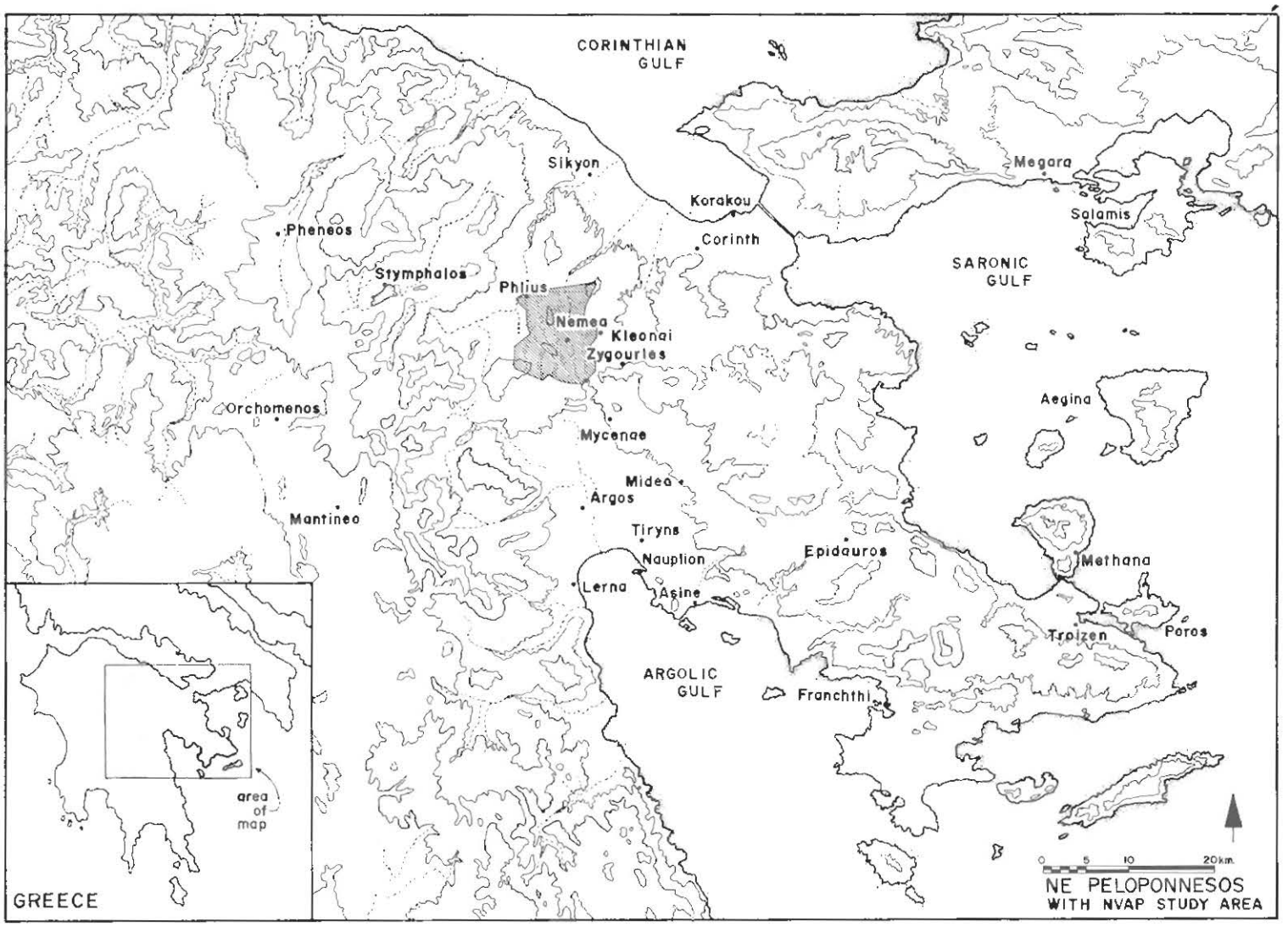

FIG. 1. Map of the northeast Peloponnesos showing location of NVAP study area (Julia E. Pfaff)

well as cultural landscapes and studied the impact of the distribution of resources on the demographic and economic basis of settlement in Greece.[4] Recent work has been strongly influenced by advances in method, theory, and research design made outside Greece during the 1960's and 1970's,[5] and it is now normal to attempt to integrate socio-economic, political, geographical, and ecological variables. Such work assumes that an understanding of human behavior can benefit from looking beyond single settlements and that regional studies enable us to see the wider context of many activities concerned with land use and settlement. The resulting information on variations in long-term exploitation of local resources, the varied relationships of different settlements within a region to one another, and the interaction between the region and the outside world does much to help us disentangle the causal factors of the settlement and land-use patterns which are a primary concern of much archaeological research.

Central to many recent regional studies is the concept of cultural ecology, namely the identification and study of the processes by which a human group adapts to a particular environment, both natural and social.[6] Such an approach to regional studies stresses the study of exploitative and productive technologies and the analysis of behavioral adaptations to the natural environment, as manifest, for example, in patterns of settlement and land use. All natural landscapes have some potential for exploitation, yet the technological means for doing so do not remain constant and are conditioned by an ever-changing social matrix.[7] Archaeologists have thus been challenged to devise research strategies that result in comprehensive explanations of culture change. One consequence of these new approaches to regional archaeology is the need for sensibly and unambiguously delimited study areas, the use of appropriate sampling schemes, and a strong emphasis on recognizing recurrent patterns of archaeological evidence which emerge clearly only over the long duration. The building of models to understand such patterns can often be significantly advanced by the anthropological and ethnohistorical study of more recent adaptations to the same region.[8]

BSA 56, 1961, pp. 114–175; W. A. McDonald and R. Hope Simpson, "Prehistoric Habitation in the Southwestern Peloponnesos," *AJA* 65, 1961, pp. 221–260; *eidem*, "Further Exploration in the Southwestern Peloponnesos," *AJA* 68, 1964, pp. 229–245; and *eidem*, "Further Exploration in the Southwestern Peloponnesos," *AJA* 73, 1969, pp. 123–177; R. Hope Simpson, *A Gazetteer and Atlas of Mycenaean Sites* (*BICS* Suppl. 16), London 1965. For a general discussion, see J. Bintliff, "The History of Archaeo-geographic Studies of Prehistoric Greece, and Recent Fieldwork," in *Mycenaean Geography*, J. Bintliff, ed., Cambridge 1979, pp. 3–16.

[4] E.g., H. Lehmann, *Argolis*, Athens 1937; A. Philippson, *Die griechische Landschaften*, E. Kirsten, ed., vols. 1–5, Frankfurt 1959; Kolodny; J. Bintliff, *Natural Environment and Human Settlement in Prehistoric Greece* (*BAR* Supplementary Series 28), Oxford 1977; Wagstaff.

[5] Binford; C. Redman, "Multistage Fieldwork and Analytical Techniques," *American Antiquity* 28, 1973, pp. 61–79; Redman.

[6] J. Steward, *Theory of Culture Change*, Urbana 1955, pp. 40–42.

[7] L. R. Binford, "Archaeology as Anthropology," *American Antiquity* 28, 1962, pp. 217–225; Binford; A. C. Renfrew and J. Wagstaff, edd., *An Island Polity*, Cambridge 1982.

[8] For research design and sampling, see Binford; Redman; for ethnoarchaeology, see T. W. Jacobsen, "Another Modest Proposal: Ethnoarchaeology in Greece," in *Contributions to Aegean Archaeology. Studies in Honor of William A. McDonald*, N. C. Wilkie and W. D. E. Coulson, edd., Minneapolis 1985, pp. 91–107.

While many projects in the Americas and the Near East have taken this new methodology to heart,[9] archaeology in Greece has been slower to respond to the challenge. The influential Minnesota Messenia Expedition, however, laid the foundations for more scientific and interdisciplinary regional studies in Greece,[10] while the more recent Melos project has squarely met the goals of a cultural ecological approach within a manageable and coherent study area.[11] There a probabilistic sampling strategy for an intensive survey significantly advanced regional studies in Greece,[12] while the attention paid to the systemic nature of inter- and intra-regional activities and to the response of the Melians to economic and political changes both on and beyond the island since its first settlement has strongly influenced our own work at Nemea as well as a number of other large-scale projects that have just been completed or are in progress.[13] In addition to these developments, cooperation with social anthropologists, geoarchaeologists, and historical ecologists has now become a regular feature of such studies.

The primary goal of NVAP has been to document and explain changes in patterns of settlement and land use at all times in the past within a small region of approximately 80 sq.km. in southern Greece, centered on the Nemea Valley.[14] Although best known as the location of the Classical sanctuary of Zeus, Nemea has a long history of occupation, extending far back into prehistoric times. Our decision to explore this area was greatly influenced by previous archaeological and historical research that suggested that the Valley and its surroundings have rarely been the locus of an independent polity but more often were drawn under the domination of neighbors. Nemea appears to have been exploited by a variety of external centers and to have been incorporated into political economies of differing organization and complexity at various times in its history.

It was this demonstrable vulnerability to the powers of the outside world that, in our eyes, made the Nemea Valley an ideal candidate for a study of long-term change in the

[9] E.g., R. McC. Adams, *Heartland of Cities*, Chicago 1981, in southern Mesopotomia; R. E. Blanton, S. A. Kowalcski, G. Feinman, and J. Appel, *Ancient Mesoamerica: A Comparison of Change in Three Regions*, Cambridge 1981, in the Valley of Oaxaca, Mexico; and J. R. Parsons, "The Development of a Prehistoric Complex Society: A Regional Perspective from the Valley of Mexico," *JFA* 1, 1974, pp. 81–108, in the Valley of Mexico.

[10] W. A. McDonald and G. R. Rapp, Jr., edd., *The Minnesota Messenia Expedition*, Minneapolis 1972.

[11] Renfrew and Wagstaff (footnote 7 above).

[12] J. F. Cherry, "A Preliminary Definition of Site Distribution on Melos," in Renfrew and Wagstaff (footnote 7 above), pp. 10–23.

[13] E.g., T. H. Van Andel and C. N. Runnels, *Beyond the Acropolis: A Rural Greek Past*, Stanford 1987; T. H. Van Andel and S. B. Sutton, *Excavations at Franchthi Cave*, Fascicule 2, *Landscape and People of the Franchthi Region*, T. W. Jacobsen, ed., Bloomington 1987 (southern Argolid); D. A. Davidson and C. Tasker, "Geomorphological Evolution during the Late Holocene," in Renfrew and Wagstaff (footnote 7 above), pp. 82–94 (Melos); D. A. Davidson, "Geomorphological Studies," in C. Renfrew, M. Gimbutas, and E. S. Elster, *Excavations at Sitagroi* (*Monumenta Archaeologica* 13), Los Angeles 1986, pp. 25–40 (the Drama Plain); J. L. Bintliff and A. M. Snodgrass, "The Cambridge/Bradford Boeotian Expedition: The First Four Years," *JFA* 12, 1985, pp. 123–161 (Boiotia).

[14] In order to be consistent in the use of place names, we use the term Nemea Valley to refer to the valley of the village of Ancient Nemea (Heraklion) and Phliasian Valley to refer to the valley of modern Nea Nemea.

northeast Peloponnesos. Such an orientation would allow us to describe and compare the changing nature and extent of settlement and land use in the area at many stages of the past. A particular interest was to discover when settlement in the region probably had functioned autonomously and when it had been incorporated within larger social systems. It was further hoped that recognizing recurring patterns in the archaeological record would allow the construction of general models that might shed light on the dynamics of Peloponnesian society in periods of the past as yet poorly understood, both prehistoric and historic, by documenting the archaeological consequences of different types of political and economic organizations in those periods for which historical documentation is relatively ample.

A four-pronged research strategy was adopted by the project. A surface survey would record evidence useful for the reconstruction of past settlement and land use within the designated study area. Concurrent geomorphological investigations would focus on the formation of Holocene land forms and, especially, on the effects of human exploitation on cycles of erosion, deposition, and soil formation. An anthropological study would document patterns of settlement and land use since the Greek Revolution and would concentrate on the local consequences of incorporation of the Nemea area into the modern nation-state of Greece and into the world economy of which Greece is now a part. Finally, re-investigation of the prehistoric settlement on the hill of Tsoungiza at the head of the Nemea Valley, apparently the major prehistoric settlement in the area, would provide, together with the results of the recent excavations of the Sanctuary of Zeus,[15] a detailed sequence of local types of artifacts, spanning most periods since the Neolithic. Excavation of Tsoungiza would permit a more complete reconstruction of the prehistoric settlement system in the Nemea area by uncovering a substantial part of what was apparently its largest settlement. The extent of interaction between the major prehistoric site and external areas could be evaluated independently and conclusions compared to those from the survey. For example, patterns of population growth or decline and trends toward greater or lesser socio-economic complexity at Tsoungiza could be compared with the picture reconstructed from surface finds alone.

Lofty goals of this sort demand clearly structured procedures for the documentation of data, especially to register precisely the location of surface and sub-surface artifacts. At Nemea computerized data storage and handling systems have regularized recording methods and facilitated the efficient retrieval of data, both in and out of the field.[16] In the museum, specialized personnel examined artifacts and organic remains soon after their discovery. Such on-the-spot feedback fueled a constant interchange among members of the project that not infrequently influenced the course of subsequent fieldwork.[17]

[15] S. G. Miller, "Excavations at Nemea, 1984–1986," *Hesperia* 57, 1988, pp. 1–20, with references to earlier work.

[16] M. K. Dabney, "The Computerized Archives of the Nemea Valley Archaeological Project," *AJA* 92, 1988, pp. 249–250 (abstract). The formation of this aspect of the project has largely been the work of Dr. Mary Dabney, who has been responsible for museum studies and record systems. She coordinated the writing of recording formats for object analysis. Professor Robert F. Sutton, Jr. developed in concert with Cherry and Davis the computer files for the survey.

[17] Day-to-day processing of finds in the museum was overseen by Mary Dabney, assisted by Aileen

The report that follows is based on active fieldwork and study of finds in the museum at Nemea between 1984 and 1989. Although preliminary, it is intended to present a fairly comprehensive view of over-all trends in settlement and land use in the Nemea area and to integrate results of studies conducted by all four arms of the project. For several periods of the past, political and economic relationships between the area and more extensive regional systems, both in the northeast Peloponnesos and beyond, are considered in light of available archaeological, historical, and ethnohistorical data. In conclusion, the analysis of these interactions suggests explanations for the changing fortunes both of the Nemea region and of the larger areas that affect it and provides a good illustration of the value of regionally oriented archaeological studies.

THE ENVIRONMENTAL SETTING

Geographical Factors

The Nemea Valley is one of a number of basins in the northeast Peloponnesos which are flanked to the southeast by the massif of Psyli Rachi, which divides the Corinthia from the Argolid, and to the west by the Kyllini range (Mt. Zeria), which borders Arkadia (Figs. 1 and 2). Immediately to the east is the Longopotamos Valley, containing the *polis* of Kleonai and the prehistoric settlement of Zygouries, while to the west the upper reaches of the Asopos river forms the extensive plain of Phliasia, in which lies ancient Phlius and a number of other prehistoric and later sites.[18] Further west is the basin of Lake Stymphalos and the plain of Pheneos, upland regions with which Nemea has had very close connections, at least in recent centuries (see pp. 596–599 below). Access northward along any of these river courses to the Corinthian Gulf is generally steep and difficult, so that the role of passes through the hills and mountains has exerted an important influence on the patterns of settlement in the valleys, which command historically documented routes, particularly into the Argolid. From the Phliasian Plain, for instance, the anciently named Kelossa Pass leads southeast to the upper end of the Argive plain (Xenophon, *Hellenica* 4.7.7), and a steeper route crosses the hills at the west to ancient Stymphalos, whence originates the Roman aqueduct that runs through the area on its way to Corinth.[19] Skirting the Nemea Valley to the southeast is the major route of communication in this area today, the Tretos Pass, now followed by the National Highway and by the railroad from Corinth to Argos. Two other routes lead from it to the Argolid, one above modern Agios Vasilios (and prehistoric

---

Ajootian (1985) and Wendy Thomas (1986–1987); Professor Jeremy Rutter supervised the study of prehistoric finds for both excavation and survey. Taylor Dabney was project photographer; Julia Pfaff supervised the drawing of artifacts, assisted by Julie Perlmutter (1985), Lyla Pinch (1986–1987), and Rosemary Robertson (1987). Finds were conserved by Tamsen Fuller (1984), Helen Alten (1984–1985), Alexandra Trone (1985–1987), and John Maseman (1986).

[18] For studies of ancient topographical accounts of this area, see Russell; G. Roux, *Pausanias en Corinthie*, Paris 1958; M. Sakellariou and N. Faraklas, *Ancient Greek Cities*, III, *Corinthia-Cleonaea*, Athens 1971; Faraklas; Pritchett, pp. 96–111; Wiseman, pp. 110–111; K. Adshead, *Politics of the Archaic Peloponnese: The Transition from Archaic to Classical Politics*, Aldershot 1986, pp. 1–18.

[19] Pausanias, 2.3.5; W. R. Biers, "Water from Stymphalos?" *Hesperia* 47, 1978, pp. 171–184.

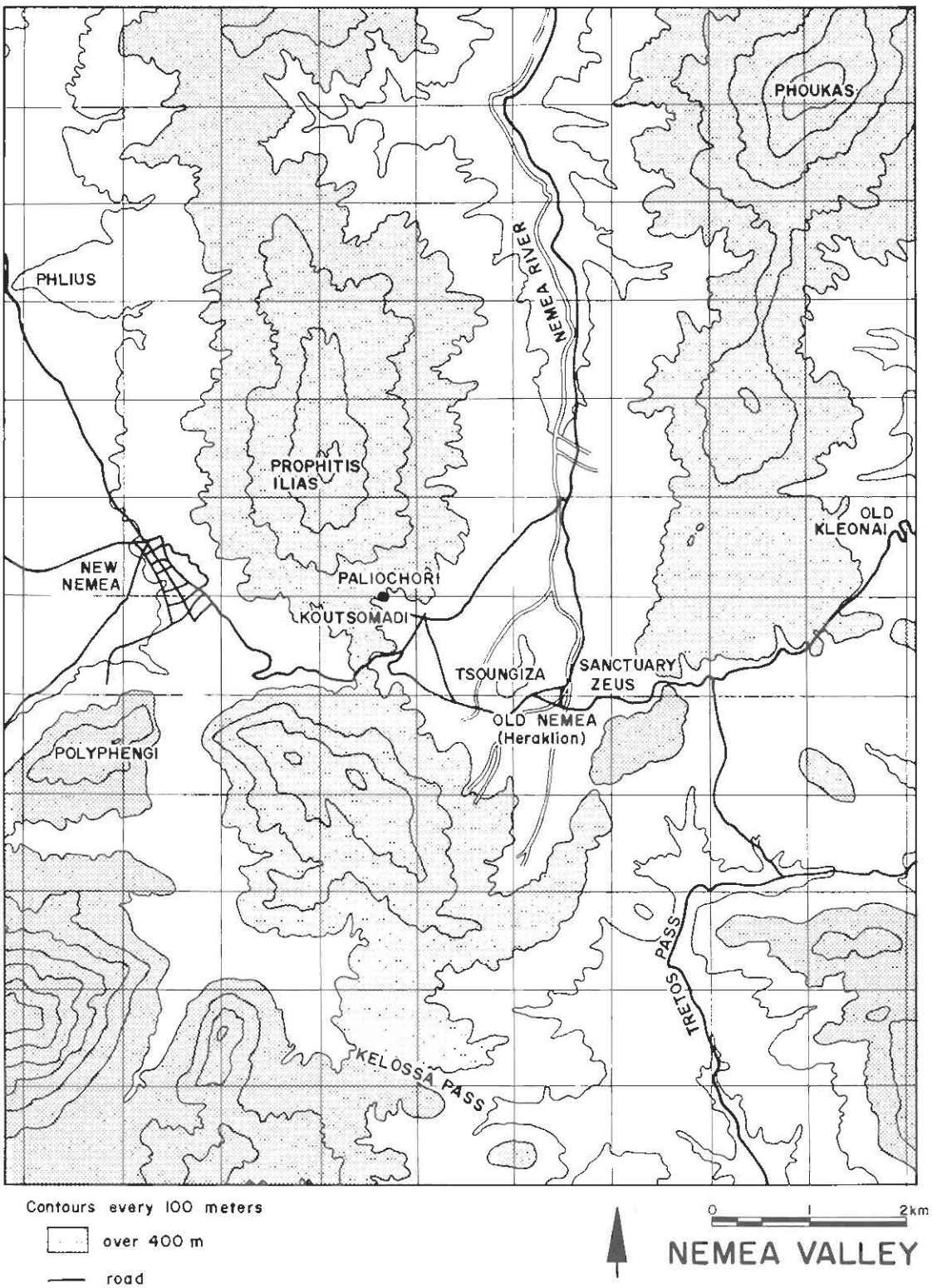

FIG. 2. Topographic map of the Nemea region (Julia E. Pfaff)

Zygouries) to Mycenae, the other over Dervenakia. A yet more easterly road runs through Agion Oron, near modern Chiliomodi (ancient Tenea), down to modern Prosymna.[20]

The Nemea Valley is smaller than its neighbors, and although it lies near these passes, it is not linked directly to them. Rather, it is separated from them by a series of high hills (crossed by low passes) that ring the valley in a horseshoe shape at its southern end; these hills rise northward to Mt. Phoukas (ancient Mt. Apesas) on the east, and to Mt. Prophitis Ilias (ancient Mt. Trikaranon) on the west (Fig. 2, Pl. 93:a). Topographic factors thus serve to give strong definition to the valley proper, while at the same time making possible communication and interaction with regions both immediately adjacent and farther afield (as the existing historical and archaeological information already seemed to indicate). NVAP was formed to take advantage of this unusual geographical circumstance. Such a well-bounded landscape offered the chance of isolating forces acting on it, and its known history of settlement seemed to permit an integrated and detailed study of long-term variations in human occupation in a clearly defined region.

Geological and Geomorphological Studies

The investigation of the history of Late Quaternary alluviation in the NVAP study area is a first step towards understanding the impact man has made on the ancient Nemean landscape and the effects such alterations have had on his use of it.[21] Most of the Nemea Valley and all the adjacent Xerokampos Valley have now been examined; study of the upland area between the Nemea Valley and the Tretos Pass remains to be undertaken. Principles of soil stratigraphy have guided our research. Since soils record hiatuses in deposition as they develop on stable landscape surfaces, which can be exposed to weathering for intervals of hundreds or thousands of years, it is possible to "fingerprint" each soil and then map its distribution throughout a landscape.[22] If, as is often the case, a soil either buries or incorporates chronologically diagnostic cultural material within it, these artifacts can be used for dating. Ultimately it is possible to form a picture of which parts of the present surface of the landscape existed at particular times in the past. Results so far indicate that at least three times since the Early Neolithic period the hill slopes around the main valley became unstable and shed alluvium into a drainage network which was unable to transport all of it, and the result was aggradation on the valley floor. For some time during the Early or Middle Holocene, drainage in the valley was sluggish, and the valley floor may have been flooded for much, or even all, of the year. These events must (and can) be more closely dated, but it is already clear that the landscape of Nemea has been periodically unstable and that the environment has changed considerably since humans first settled there.

[20] Pausanias (2.15.2) describes the Tretos and Agios Sostis passes; Xenophon (*Agesilaos* 2.17) probably refers to the pass through Agion Oron; see Wiseman, pp. 121–125; L. E. Lord, "Watchtowers and Fortresses in Argolis," *AJA* 43, 1939, pp. 80–83.

[21] This section of the report is the work of Dr. Anne Demitrack. Tina Niemi served as general field assistant, and Sriyan Pietersz, Nicholas Ceh, and Elliott Lax helped with augering in the summer of 1986.

[22] P. W. Birkeland, *Soils and Geomorphology*, New York 1984.

The slopes of the Nemea and Xerokampos valleys consist almost exclusively of Pliocene marl, with associated sandy marl, sandstone, and loose pebbly conglomerate. The marl is soft and easily eroded after it has been cleared of vegetation and is thus capable of supplying abundant alluvium to the valleys. A resistant, well-cemented Pliocene conglomerate (forming broad peaks and table platforms) caps the marl association. In the southernmost part of the study area, marly terrain gives way to older Pelagic limestones (upper Cretaceous) and a minor component of shale-chert-silicified limestones (Jurassic) which, even over a small area, vary spectacularly in color from green to purple. Valley bottoms are filled with Quaternary alluvium and are well watered by springs forming where the easily infiltrated, cemented conglomerate meets the more watertight marl. Drainage follows a regional fracture system northward to the Corinthian Gulf.[23] A superficial network channels water from the main valley via a single stream (the Nemea River) which flows for more than 13 km. in a narrow marl canyon. If it is blocked, drainage is impeded.

We have identified four soil-stratigraphic units, between Late Pleistocene and Late Holocene, in the Nemea Valley and five in the adjacent Xerokampos Valley (Fig. 3 and Table 1).[24] The late Pleistocene was mainly a period of fan building (unit Pl). At least three successive fan alluvia were deposited, each followed by a long interval of non-deposition during which a soil formed on the exposed fan surfaces. The oldest alluvium in unit Pl developed a calcic soil with prominent 10-cm. nodules; in contrast, the succeeding alluvia are non-calcic. Climate and the contribution of air-borne calcareous dust govern the presence or absence of calcium carbonate in a soil; a slight change in either of these variables could have created the calcic-noncalcic soil sequence.[25]

During the Holocene (especially in the more recent past), fan building has been less important than stream deposition and colluviation for filling in the valley. At least three phases of stream deposits, separated by long intervals of no deposition and soil formation, occur in the early, late, and latest Holocene (H_1, H_2, and H_3 sets). The H_1 unit contains Early Neolithic pottery, and it is clear that it began to be deposited at some stage after that period. The precise end of H_1 deposition is as yet not fixed, but in the Xerokampos Valley an Early Bronze Age site (Site 512) sits on the H_1 surface. After the H_1 phase ended, there was a period without any deposition, when the streams cut into the valley floor and into the Pleistocene fan surfaces. There followed a period of no deposition which lasted into the Late Holocene, when the H_2 phase appeared. Again, archaeological evidence suggests approximately when it was laid down: at the Sanctuary of Zeus, an earlier H_2 phase buried the surface of the Classical Greek landscape and later buried Byzantine walls. Deposition in the latest Holocene (H_3 set) is not voluminous, although the modern practice of bulldozing terraces out of the soft marl slopes and cultivating them without building terrace walls has already caused thin but widespread colluviation downslope. Modern streams in the valley are deeply incised.

[23] British Naval Intelligence Division, *Handbook to Greece* III, London 1945.

[24] The Quaternary stratigraphy of the Xerokampos Valley fits the model for the Nemea Valley, with minor modifications as noted in Table 1.

[25] L. H. Gile, F. F. Peterson, and R. B. Grossman, "Morphological and Genetic Sequence of Carbonate Accumulation in Desert Soils," *Soil Science* 101, 1966, pp. 347–360.

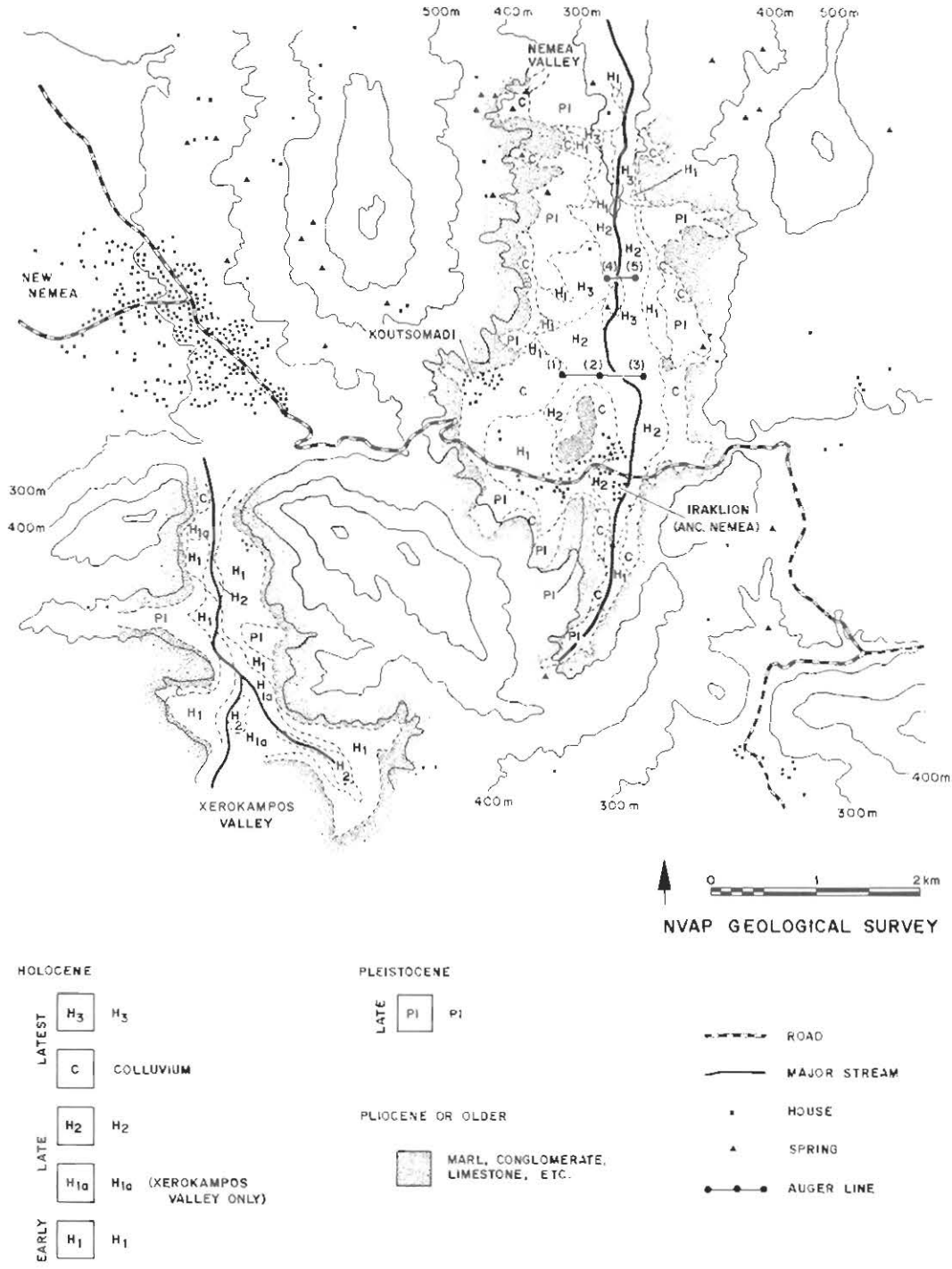

FIG. 3. The Quaternary geology of the NVAP study region (Anne Demitrack and Julia E. Pfaff)

TABLE 1: Quaternary Stratigraphy of the Nemea Valley and Environs

Byz. = Byzantine; C = Classical; EBA = Early Bronze Age; EN = Early Neolithic; P = Palaeolithic

Age	Unit Name	Deposit Type	Soil Descriptions			Artifacts, Sites
			Color	Clay	$CaCO_3$	
HOLOCENE	H_3 set[1]	stream deposits,[2] colluvium	? 10YR5/3	none or very few, very thin	none, but reacts to acid	a) Contains modern artifacts b) ?
	H_2 set	stream deposits	10YR5/4; 7.5YR5/4	very few, thin common, thin	none; filamentous pore coats	a) Buries Byz walls at Sanct. of Zeus
						b) Buries C surface at Sanct. of Zeus
	H_1	stream deposits	7.5YR4/4 to 5YR3/4	common, medium thick	nodules (1mm) or none	Contains EN sherds
PLEISTOCENE	Pl set	alluvial fan deposits	2.5YR3/4	continuous, medium thick	nodules (10 cm) or none	P tools at surface
The stratigraphy of the Xerokampos Valley is identical to that of the Nemea Valley except for Units H_1 and H_{1a}. Entries for these two units are as follows:						
HOLOCENE	H_{1a}	stream deposits	5YR4/4	continuous, thin	none	Contains artifacts, period not identified
	H_1	stream deposits alluvial fan deposits	5YR4/3	continuous, medium thick	none or disseminated	EBA site (512) on surface

[1] A "set" comprises two or more deposits of close but not equal age, each with its own soil. Where possible, these have been distinguished in the field but are not yet fully mapped as separate units; therefore, they are treated as a single entry in the stratigraphic table.

[2] Stream deposits include channel, overbank and backswamp deposits.

Sluggish drainage created seasonal or perhaps year-round swampy conditions sometime in the Early or Middle Holocene. Five auger cores in two east–west, cross-valley transects all show the same pattern. An upper 75–150 cm. of well-drained, brown silt loam (with H_2 soil development) grades downward into 175–500 cm. of predominantly silty clay or clay. H_2 soil development on the brown silt loam indicates that it has been exposed to weathering for some time and, together with the absence of mottling in the deposit, suggests that the (stream) flooding which deposited the loam was not sustained for any long period. In contrast, the very fine texture, gley coloring, and poor or nonexistent soil development on the underlying silty clay/clay in three of the five cores points to seasonal or longer term swamp conditions. In the other two cores, a buried H_1 soil at the stratigraphic level of the silty clay/clay shows that in post-Neolithic times some parts of that horizon had been exposed to surface weathering. Thus, while there has been a long-term evolution towards the better-drained conditions seen today, the distribution of micro-environments on the valley floor has shifted over time in a complex pattern. The role of man in these changes, in both recent and prehistoric times, remains to be determined.

Historical Ecology and Palynology

During the 1985 field season, an investigation of aspects of the modern and ancient vegetation of the Nemea region was undertaken.[26] There were two main goals: 1) to locate and core several sites likely to produce ancient pollen; 2) to study the modern vegetation with a view to understanding the historical ecology of the wider region within which the NVAP study area lies. Almost fifty locations were visited in the Nemea, Phliasian and Kleonai valleys, together with their surrounding mountain slopes, as well as places farther afield in the north-central Argolid and in the Arkadian-Lakonian-Argolic corner.

Nemea lies close to the dividing line between the wetter, western and drier, eastern sides of Greece, a division corresponding roughly to areas with more or less than 600 mm. annual rainfall.[27] As in other parts of Greece, the regime of vegetation in the valley appears to be determined mainly by moisture (i.e., not only by rainfall but also by the water-retaining properties of soils and rocks). The mosaic of maquis, garigue, and steppe vegetation on hard limestone (e.g. Mt. Daouli) is replaced by lusher, more nearly continuous maquis on soft limestone and marl, but massive, unfissured rocks (e.g. the conglomerate of Mt. Polyphengi) have only garigue and steppe, with little maquis. The hills around Nemea are well vegetated with dense but patchy maquis of *Quercus coccifera* (prickly oak) and other trees in the form of shrubs. Among indicators of relatively high rainfall, *Arbutus unedo* (strawberry tree) is locally abundant, but *Arbutus andrachne* (andrachne) is somewhat rare, and *Quercus ilex* (holm oak) is to be found no nearer than the eastern Argolid. The vegetation

[26] By Dr. Oliver Rackham (University of Cambridge), Dr. Margaret Atherden (College of Ripon and York), Dr. Jennifer Moody (University of Minnesota), and Elliott Lax. The present account, a select summary drawn from a report submitted by this team, is the work of Atherden, Moody, and Rackham.

[27] Nemea is also close to another frontier, namely the southwesterly limit of the *Pinus halepensis* (Aleppo pine) woods of the Isthmus and northern Peloponnesos. Here, as in Boiotia, their distribution is poorly understood, not being obviously linked either to rainfall or particular soil types.

changes abruptly as one moves southeastward from Nemea: Mycenae, only 10 km. distant over the hills, is much more arid. The sibljak (deciduous maquis) of Lakonia, and the lowland deciduous woods of Lakonia and western Crete, are poorly represented here. There are no mountain pines, and the nearest montane vegetation is to be found in the firwoods and the remains of deciduous woods on Mts. Pharmakas and Oligyros and in the basin of Lake Stymphalos, some 25 km. to the west.

Well over half the Nemea region is now under cultivation, which, most unusually for Greece (see pp. 594–603 below), is more extensive now than a century ago. Very little remains of the fens in the plains, and even Lake Stymphalos has been much reduced by drainage. The modern wild vegetation is limited partly by the availability of moisture and partly by browsing of ovi-caprids and burning.[28] Woodland is now increasing, at least in the upland regions, through the growth into trees of *Quercus coccifera* and other maquis shrubs. This is in part a result of the decline in sheepherding, which has reduced browsing that has in the past maintained the wood as shrubs. The decline in the sheep and goat population, however, is not yet great, and woodland is increasing no more rapidly than in Boiotia and much less quickly than in Lakonia.[29] In general the cliffs around Nemea are not remarkable botanically (as they are in Lakonia and Crete) as refugia of trees sensitive to browsing. There is also a southwestward advance of *Pinus halepensis* (Aleppo pine) and, on a small scale, a downward advance of the mountain firs.

Although the history of vegetation must await analysis of our pollen samples and the detailed study of historical sources, it is apparent that the structure of the present landscape is very dependent on human activities. Except for the spread of cultivation, it appears not to have changed much in the last 2000 years. To judge from the little that contemporary authors tell us, the landscape of the northeast Peloponnesos in Classical times was already much closer to the present balance of land uses than to the original wildwood. Woodland was already rare; sacred groves were often not the natural woods but plantations of cypress (the traces of one of which have been excavated in the Sanctuary of Zeus at Nemea).[30] Another surviving detail of the Classical landscape is the wild celery, which plays a part in

[28] Burning is on the increase, largely because the maquis becomes more combustible as it gets taller; it has been possible to study the effects of several fires that have occurred in the study region since 1983. Maquis appears to be more combustible and to recover more easily from a fire than garigue; all the evergreen trees and shrubs sprout from the base. *Pinus halepensis* is killed by fire, but fire stimulates germination of its seeds, and it seems that a pinewood could still be maintained even if it burned every 15 years. See O. Rackham, "Observations on the Historical Ecology of Boeotia," *BSA* 78, 1983, pp. 291–351, esp. pp. 325–326.

[29] Boeotia: Rackham, *op. cit.*; Lakonia: field studies by Rackham in 1984 (final report in preparation).

[30] Pausanias, 2.15.2; S. G. Miller, "Excavations at Nemea, 1976," *Hesperia* 46, 1977 (pp. 1–26), p. 11; *idem*, "Excavations at Nemea, 1977," *Hesperia* 47, 1978 (pp. 58–88), p. 65 and pl. 11 (the evidence for a sacred grove in the sanctuary is being published by Professor Darice Birge for the University of California at Berkeley project in the Sanctuary of Zeus). The team visited places where Pausanias mentions trees and woods. Among them is Skotitas (sacred to Zeus Skotitas), between Agios Petros and Arachova in the northern Parnon; it represents the oldest named wood lot known in Europe. It is a coppice wood chiefly of *Quercus frainetto* (deciduous oak), which appears to be the special oak of ancient woods in the Peloponnesos, and it has a rich flora full of relict species from a more northerly climate.

TABLE 2: Radiocarbon Dates from the Kleonai Core

Sample No.	Radiocarbon Age B.P.	Calibrated Ages B.C. (Maximum Minimum)
AA-2739	3345.0±70.0	1735 (1685 1673 1657 1655 1638) 1530
AA-2740	3820.0±50.0	2429 (2292 2246 2235) 2146
AA-2741	4770.0±70.0	3643 (3619 3576 3531) 3383
AA-2742	6150.0±70.0	5227 (5200 5170 5139 5102 5082) 4949
AA-2743	7495.0±60.0	6431 (6387 6311 6311 6307 6275 6267) 6187
AA-2744	7475.0±60.0	6423 (6379 6319 6248) 6183
AA-2745	9030.0±100.0	Not Available

Nemean mythology and which was used to crown the victors in the Nemean games. The species, still growing by the local springs, is *Apium nodiflorum*, not certainly recorded elsewhere in Greece.

Erosion is a spectacular feature of the northeastern Peloponnesian landscape, although it is confined to marls and schists. It dates, at least in part, from after the Roman period, but the process is now dormant almost everywhere, unless reawakened by modern agriculture. Our observations suggest strongly that the lack of plant cover has not been responsible for erosion; tectonic movement is the most probable cause.

The study of palaeo-vegetation has been approached by means of prospection for sites likely to produce ancient pollen. After much searching, three sites were selected for vibrocoring: 1) in the Nemea Valley itself, about 1 km. north of the Sanctuary of Zeus; 2) southeast of the village of Kephalari, at the foot of Mt. Kyllini; and 3) in the Kleonai Valley, between Kondostavlos and Chania. All three cores were sampled at 5-cm. intervals for pollen, shell, and soil, but so little pollen was preserved in the cores from the first two locations that their analysis was abandoned as unproductive. The Kleonai core, however, is 329 cm. long and preserves at least 19 stratigraphic units, defined on the basis of color and soil texture, some of which contain significant organic matter, including satisfactory quantities of palaeo-pollen and micro-mollusca.[31] It is already clear that the vegetational story of the region accords generally with that seen at other sites in southern Greece, although radiocarbon dates (Table 2) suggest an earlier appearance of some indicators of human presence than previously thought.[32] For example, the presence at a depth of 172 cm. of pollen of *Castanea* (sweet chestnut), a tree thought to have been introduced by man from *ca.* 3500–3200 B.P. onwards, is here dated to *ca.* 8380–8136 B.P. (at one standard deviation).[33]

[31] The mollusca have been analyzed by Dr. Hartwig Schütt. All species from the core are known from present-day freshwater contexts in Greece, and no evidence has been recognized that suggests any alteration in the climate (personal communication, 27 March 1989).

[32] H. E. Wright, Jr., "Vegetation History," in McDonald and Rapp (footnote 10 above), pp. 188–199.

[33] *Contra* W. Van Zeist and S. Bottema, "Vegetational History of the Eastern Mediterranean and the Near East during the Last 20,000 Years," in *Palaeoclimates, Palaeoenvironments, and Human Communities in the Eastern Mediterranean Region in Later Prehistory* (*BAR* International Series 133), J. L. Bintliff and W. Van Zeist, edd., Oxford 1982, pp. 277–321, esp. p. 287.

ANTHROPOLOGICAL STUDIES

The project has supported a detailed anthropological study of the valley's contemporary condition, a study which has explored not only those aspects of past technology still practiced in the present but also those features of modern life which have few antecedents.[34] As a way of fulfilling the project's general goals the anthropological component has aimed at producing a systemic, regional understanding of contemporary settlement and land use.

Methods and Approaches for Understanding the Modern Period

This research strategy, which compares the full round of modern life to various periods of the past, sees more in the present than simply the occasional remains of practices also found in antiquity. A sizable body of research on modern Greece now exists,[35] yet the full power of this corpus has seldom been used in the study of the Greek past. Indeed, anthropological work often has been used to identify technological practices that are believed not to have changed from antiquity to the present. In this process, other aspects of contemporary life are discarded as not comparable to the past. Such endeavors, however well intentioned, both underutilize the ethnoarchaeological information available and reflect a misunderstanding of the historical context of contemporary Greek life. They reflect an implicit assumption that current Greek villages are carriers of an unbroken agricultural tradition only recently transformed by the processes of industrialization, urbanization, and tourism. This assumption is only heightened by the tendency of most village studies to emphasize the deleterious effects of recent out-migration, thus giving the misleading impression that these settlements have long been stable.

This sense of untouched and timeless rural Greek life exists, however, in the face of considerable evidence to the contrary. There is every indication that Mediaeval and modern Greek villages were shaped by the same forces of change as ancient ones. The rural Greek

[34] This section of the report is the work of Susan B. Sutton. In this study I have been helped by six excellent research assistants. William Alexander threw himself into all aspects of this research with skill, good humor, and a remarkable ability to converse with villagers about their lives; Anastasia Karakasidou undertook the delicate task of eliciting local political opinions; Mary Stender, Janine Beckley, Marytheresa Fagan, and Will O'Daix diligently turned our scraps and pieces of notes into usable computer files. Archaeological survey teams also painstakingly recorded tract-by-tract data on modern land use.

Several families, including those of Theodosios and Vasiliki Zavitsas, Katina Papadopoulos, Panayiotis and Panagoula Schoinoehoritis, Ritsa Pitterou, Photis Chiotis, and Vasilis Zaimis, were constant sources of advice and information. Officials of near-by villages, the National Statistical Service, and the Corinthian Agricultural Ministry were similarly forthcoming with public records.

[35] Anthropological and sociological studies of modern Greece might best be sampled by beginning with classic works such as J. Campbell, *Honour, Family and Patronage*, Oxford 1964; E. Friedl, *Vasilika*, New York 1962; I. Lambiri, *Social Change in a Greek Country Town*, Athens 1965; and I. T. Sanders, *Rainbow in the Rock*, Cambridge 1962 and then moving on to more recent studies such as M. Herzfeld, *The Poetics of Manhood*, Princeton 1985; *Regional Variation in Modern Greece and Cyprus* (*Annals of the New York Academy of Sciences* 268), M. Dimen and E. Friedl, edd., New York 1976; and *Gender and Power in Rural Greece*, J. Dubisch, ed., Princeton 1986. Important geographical studies are J. Baxevanis, *Economy and Population Movements in the Peloponnesos of Greece* (National Centre of Social Research), Athens 1972; B. Kayser, P.-Y. Péchoux, and M. Sivignon, *Exode rural et attraction urbaine en Grèce*, Athens 1971; Kolodny; and Wagstaff. Mouzelis and K. Vergopoulos, Τὸ ἀγροτικὸ ζήτημα στὴν Ἑλλάδα, Athens 1975, have placed the study of the Greek political economy on an equal footing with these other concerns.

population has quite literally been in motion for centuries.[36] The well-known Slavic and Albanian migrations of the Middle Ages provide but one example. The disproportionate growth of mountain villages in the 17th century, followed by the reappearance and development of lowland ones in the 19th, provides yet another. Indeed, even the most seemingly isolated villages today have long been affected by the marketization of the Greek economy and the transformation from an imperial system to a nation-state that occurred on the heels of the Greek Revolution. To assert that contemporary villages are only just now becoming aware of, or involved in, the forces of change is to follow a very selective application of historical principles.

If Greek villages have indeed been in a state of flux for many centuries, what is one to make then of the points of similarity which sometimes seem to exist between these settlements and those of antiquity? The simple answer would be to say that some aspects of life have survived intact throughout time while others have changed. This may sometimes be true, but a more complex, and probably more accurate, answer allows for traits to appear, disappear, and then reappear, depending on the circumstances in which a particular region finds itself at various points in history. The periodicity of settlement, a unifying theme of NVAP, is consistent with such assumptions. Times of population concentration in the Nemea Valley may be discovered to have something in common with each other such that even when they occur at widely separated dates no direct continuity need be documented. Conversely, a particular agricultural practice may have continued throughout times of both population growth and decline but has taken on a very different meaning in each of these contexts.

The ethnoarchaeological study of the Greek present must, therefore, be more than a search for artifactual relics and residual cultural practices.[37] A complete study of the contemporary situation can reveal both the interpretive context of isolated traits and the causal factors behind current settlement and economic strategies. Such insights, in turn, indicate which periods of the past most resemble the present and are thus most suitable for drawing parallels. When such complete analyses are undertaken for all periods within a particular region, enough factors may be held constant to reveal the forces behind both recurrent and unique patterns of settlement and economy in that region.

Our attempt to gain a systemic understanding of modern settlement has been guided by particular attention to the transformation from the imperial, largely feudal system of the Ottoman Empire to a centralized nation-state greatly involved in international, capitalized networks.[38] Understanding how the Nemea Valley fared in this process has required several

[36] For a more detailed discussion of such historical migration patterns, see H. Antoniades-Bibicou, "Villages désertes en Grèce: un bilan provisoire," in *Villages désertes et histoire economique, XI^e–XVIII^e siècles* (École Pratique des Hautes Études), Paris 1965, pp. 343–417; Kolodny; McGrew; V. Panayiotopoulos, *Πληθυσμὸς καὶ οἰκισμὸς τῆς Πελοποννήσου, 13ος–18ος αἰώνας*, Athens 1985; S. B. Sutton, "What Is a 'Village' in a Nation of Migrants?" *Journal of Modern Greek Studies* 6, 1988, pp. 187–215; Wagstaff.

[37] One might, therefore, take issue with the position recently espoused by Jacobsen ([footnote 8 above] pp. 92–93).

[38] While some may feel that not all modern Greek villages have participated in this process, Mouzelis (*passim*) has convincingly argued that Greece's subordinate position in international networks has produced a disarticulated economy in which labor-intensive, familial economic strategies exist alongside industrialized

lines of inquiry. Some of this work has involved the identification of changing agricultural and housing patterns by dating existing structures and settlements, compiling agricultural production statistics from official records, collecting data on current agricultural land use from the tract records of the archaeological survey, comparing a series of aerial and hilltop photographs of the valley taken over the last 60 years, and undertaking discussions and historical research concerning land tenure, village formation, and changing agricultural strategies. This information has been placed even more firmly in its human context through intensive interviews with a representative sample of valley residents, together with a detailed genealogical analysis of local population records. Observations and discussions of relationships with other settlements have also been made. The preliminary results of this research have identified the Nemea Valley as an area of demographic growth during the modern period, and indeed one that illustrates well the processes of village formation and the development of an agricultural system oriented toward export.

Modern Settlement Growth in the Nemea Valley

The last two centuries of Ottoman rule in Greece witnessed a gradual depopulation of lowland areas in favor of mountainous ones.[39] The feudal systems of the Ottoman Empire increasingly came to supply raw materials and foodstuffs to the economically expansive nations of western Europe.[40] As this happened, Turkish landowners extracted larger and larger payments from the Greek peasants working on their estates. Many peasants subsequently fled the plains, where Turkish rule was more firmly established, and sought refuge in the mountains. While exact dating of such movement for the Nemea area must await further analysis, it is already clear that the area did lose population sometime prior to the modern period. Survey data (Fig. 11) suggest the Nemea Valley was well populated and farmed in Byzantine times, but both travelers' accounts and oral history indicate that it was very sparsely inhabited just prior to the Greek Revolution. A few Stymphalian and Arkadian shepherds wintered their flocks there, and a small village of some twenty families was perched on Prophitis Ilias, the western hill bounding the valley.[41] This village, then known

ones. Both types are nevertheless part of the same system, and the products and migrant labor produced by villages with low levels of mechanization find their way into the markets and workplaces of Athens. To view these less mechanized villages as unconnected to the rest of the modern Greek economy is to misunderstand how that economy works. Thus to extract the occasional use of older agricultural techniques from this context and treat them as indicating only a locally oriented economy is dubious at best.

[39] McGrew; Panayiotopoulos (footnote 36 above).

[40] See V. Kremmydas, Τὸ ἐμπόριο τῆς Πελοποννήσου στὸ 18ο αἰώνα (1715–1792), Athens 1972; Mouzelis, pp. 5–8.

[41] Descriptions of the Nemea Valley at this time may be found in E. D. Clarke, *Travels in Various Countries of Europe, Asia and Africa*, London 1814, p. 714 and F. C. H. L. Pouqueville, *Voyage de la Grèce*, Paris 1826, V, p. 182. The latter quotes population figures from the Turkish cadastre in use in the early 19th century. According to oral history there was also a second small village, Groutsi, located on the eastern flank of Prophitis Ilias, toward the extreme northern end of the valley. Since this region lies outside the study area, it was not included in this analysis. Its history is somewhat parallel to that of Koutsoumadi, since no village is located there today, and most of its former inhabitants are said to have moved either to the villages in the Phliasian Plain or to Chalki.

as Koutsoumadi but today abandoned and referred to as Palaiochori (directly above Koutsoumadi in Figure 2),[42] pursued a mixed economy of grain farming, wine making, and sheepherding. Only the remains of the temple of Zeus, scattered shepherds' shelters, and the village's wine-making structures were on the valley floor, which was often flooded and marshy in the spring and summer.

While research began with the assumption that the modern Nemea Valley was always part of a settlement system oriented toward the Corinth–Argos road, such ideas were soon overturned. Mounting evidence has shown that the old village of Koutsoumadi looked not eastward but westward toward the town of Agios Georgios (now Nea Nemea) in the Phliasian Plain. Agios Georgios, a settlement of 600 inhabitants in 1800, was closely aligned with the near-by monastery of the Panagia tou Vrachou Nemeas (on Mt. Polyphengi: Fig. 2; Fig. 4, site 900), both of which had strong seasonal relationships with the shepherd communities of the mountains even further west. Together, they served as an agricultural, marketing, and political center for a settlement system bordered by Lake Stymphalos and Pheneos on the west and the old village of Koutsoumadi on the east (Fig. 1). This settlement system was connected, in turn, to the much larger market town of Argos, not by the Tretos Pass but rather by a road exiting the southwestern corner of the Phliasian Plain (the Kelossa Pass of Classical antiquity).

Older residents of the Nemea Valley still recall that late into the 19th century their families transported wine and other produce to Argos via this road, often using the services of merchants from Agios Georgios. They also confirm that the place of origin of the shepherds who used the valley for winter pasturage was the mountains near Lake Stymphalos and beyond.

The Nemea Valley thus began the modern period as a thinly inhabited side pocket of a regional system centering around the Phliasian Plain and extending westward into the mountains. Agricultural production for sale was at fairly low levels throughout this system, the valley was little farmed, much of the land was given over to pasturage, and its only village was located as close to the Phliasian Plain as possible. The scant Turkish remains found in the Nemea Valley indicate that it may also have served as a buffer zone between the strongly controlled Turkish farming estates found closer to Corinth and the more independent upland areas to the west.

The forces set in motion by the Greek Revolution soon transformed such settlement patterns. With the expulsion of the Ottomans, small family farms came to predominate over feudal forms of land tenure in Greece,[43] while local political systems began to look toward the centralized national government in Athens.[44] Additionally, the direct involvement of

[42] The change of place names in this region can be confusing. The old village of Koutsoumadi, now abandoned, is called Palaiochori. The new village of Linoi eventually took on the name Koutsoumadi. It and the new village of Heraklion form the *koinotes* now officially called Archaia Nemea but hardly ever referred to as that by the local residents. Agios Georgios is now officially Nea Nemea, and referred to by everyone, including residents of Archaia Nemea, simply as Nemea.

[43] Mouzelis, pp. 11–16; McGrew.

[44] J. A. Petropoulos, *Politics and Statecraft in the Kingdom of Greece, 1833–1843*, Princeton 1968.

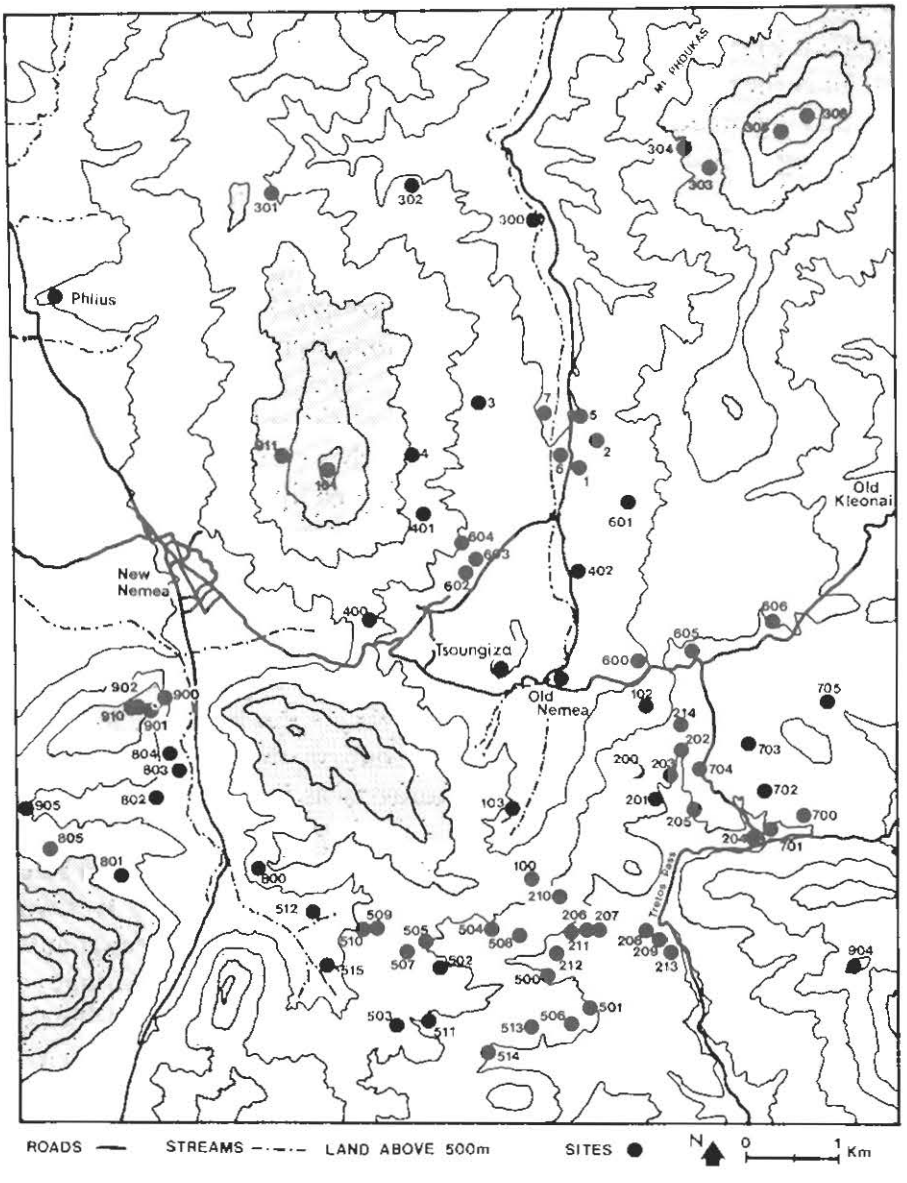

FIG. 4. Map showing the distribution of sites recorded by the NVAP survey (John Cherry)

other European nations in the establishment of the new state created strong relationships between Greece and these nations. Such forces resulted in a series of migrations that largely reversed the demographic trends of the previous three centuries, and generally brought rural Greeks into more direct contact with the national and international systems now surrounding them.[45] The refuge afforded by geographical isolation was considered less necessary with the

[45] McGrew (*passim*) describes the migrations; Vergopoulos ([footnote 35 above] pp. 101–162) discusses the increasing involvement of the countryside in commercialized agriculture.

TABLE 3: Demographic Growth of Nemea Valley and Phliasian Plain during the Modern Period

Date	*Nemea Valley*	*Town of Agios Georgios (New Nemea)*
1800	100	600
1851	140	960
1870	216	1517
1920	618	2620
1981	748	4182

The figures for 1800 are drawn from Pouqueville (footnote 41 above), p. 182. Those for 1851 come from K. Kousolos, «Διοικητικὴ διάρθρωσις τῆς Κορινθίας ἀπὸ τὸ ἔτος 1833 ἕως τὸ 1964», Ἀρχεῖον Κορινθιακῶν Μελετῶν 1, 1971 (pp. 405–427), p. 421. The rest are from official results of Greek national censuses, available at the National Statistical Service in Athens.

departure of the Turks. Rural Greeks began leaving the mountains and once again settling the plains and coasts to take advantage of the new opportunities which were appearing.

Both the Nemea Valley and Phliasian Plain benefited from these events. All evidence shows the expansion of population, settlement, and agricultural vitality for these areas virtually up to the present. The availability of open and unclaimed land situated relatively close to the increasingly important centers of Argos and Corinth provided opportunities not matched in many other areas of the Peloponnesos. As shown in Table 3, the population of both the Nemea Valley and the town of Agios Georgios has increased. These growth rates far exceed those of national rates of natural increase and reflect the in-migration of peasants from other areas. The first waves of these migrants appeared shortly after the Greek Revolution. Family histories, the *demotologio* (municipal census), and the local list of men maintained for the military draft indicate that most newcomers to the Nemea Valley were from the mountains near Lake Stymphalos and further south into Arkadia, while a few others were attracted from parts of Central Greece. At least some, if not most, of the former already had some connection to the area, either through kinship or previous use of the area as winter pasturage. Some of the migrants attached themselves to the existing village of Koutsoumadi, which dominated the farm lands of the valley, while others created a series of isolated familial compounds scattered at the valley's perimeter and beyond.

The Koutsoumadiote families expanded their agricultural operations by staking out fields and vineyards in the valley bottom. The valley was part of the National Lands which became available for purchase at very low rates from the Greek government during the 19th century. Koutsoumadiotes trekked up and down the hillside to these newly opened lands, turning many into vineyards for either currants or wine grapes.[46] The fact that the soil of both the Nemea Valley and the Phliasian Plain was considered particularly suitable for vineyards was especially important as currants became the principal Greek export crop of the 19th century. Peloponnesian currant cultivation had slowly increased during the 18th

[46] All grapes and currants are variations of one single species, *vitis vinifera*. Currant grapes, known in the Peloponnesos as *mavri* (black) or *korinthiaki staphida* (Corinthian raisin grape) differ from most other variations primarily by their small size and dark color; they are dried before processing or consumption.

century, as these small, dark, dried grapes found their way into the increasingly sweet diets of northern Europe and North America.[47] Production levels grew at an even faster pace in the 19th century as the English taste for dried currants reached its peak, and French vintners began using a re-liquefied dried currant base for their wines after French vineyards suffered a devastating blight in 1877. This general expansion of Koutsoumadiote vineyards also involved some production of must from both currants and other grapes, sold locally and also exported as a basis for wine and other alcoholic beverages.

So successful was this entrance into market-oriented agriculture that when an earthquake leveled Koutsoumadi in 1876,[48] its inhabitants, rather than reconstructing the old village, moved to the new lands they had opened up either in the Phliasian Plain or the Nemea Valley. In this process, the stone foundations of the ruined mud-brick houses were carried down the hill, which at least partially accounts for the very scanty remains that now mark where old Koutsoumadi once stood. Two loose clusters of houses thus appeared on the Nemea Valley floor, one just at the base of Prophitis Ilias and called Linoi (later changed to the name of the old village, Koutsoumadi; Fig. 2), and the other at the small hill of Tzoungiza and called Heraklion. Histories concerning familial land holdings indicate that each of these two settlements was formed primarily by families who owned land in that particular area.

The scattered familial compounds which had simultaneously been arising in near-by areas outside the valley were not so directly involved in viticulture as Linoi and Heraklion. Interviews with descendants of these families indicate that some compounds were former winter shelters of shepherd families which were gradually converted into more permanent residences as these families became more attached to the area. A milling operation formed the nucleus of another hamlet at Chani Anesti in the Tretos Pass, and the new compound of a sheepherding family which moved to the area on a year-round basis from central Greece became known as Papoutseïka.

By the end of the 19th century this proliferation of settlements began coalescing toward the two major clusters of houses in the Nemea Valley. Elderly villagers now recall the stories of their parents and grandparents concerning this period. Both Linoi and Heraklion were developing a sense of community. There was a general belief among their residents that much was to be gained if these settlements were to take on the characteristics of proper villages. Government recognition and services, marketing opportunities, and the quality of social life would all be enhanced. It also appears that intermarriage among family lines led to the families of subsequent generations each holding land in various locations around the valley, which reinforced the utility of a settlement centrally located in the midst of these fields. Thus, churches were established in each village, some families donated land for communal squares (*plateies*) and other facilities, and small groceries (*pantopoleia*) appeared.

[47] S. Mintz, *Sweetness and Power*, New York 1985. The British Diplomatic and Consular Reports on Trade and Finances (District of Patras) from the Peloponnesos, which present a yearly accounting of the ups and downs of the 19th-century currant trade from 1871 to 1914 (Foreign Office, London 1871–1914), indicate that few currants were grown under the Ottomans until the 17th century, when production of dried currants for English markets slowly increased.

[48] A. G. Galanopoulos, «Σεισμικὴ Γεογραφία τῆς Ἑλλάδος», Γεωλογικὸς Χρονικὸς τῶν Ἑλληνικῶν Χωρῶν 6, 1955 (pp. 83–121), p. 93.

As this process continued, the two villages became the focus of most new in-migration to the area, and many surrounding hamlets were abandoned when their inhabitants decided to move to the new centers. Buildings became more densely packed within the two settlements as new houses for married children were built in the open spaces surrounding the original houses. Conversely, the buildings of the former outlying compounds were either converted from houses to sheepfolds or left to ruin.

A change in transportation networks also worked to the benefit of the Nemea Valley. While in the 18th century the roadways of greatest importance to the Nemea Valley had been to the Phliasian Plain and from there down to Argos or up to the mountains, other routes supplanted these in the 19th century. The road along the Tretos Pass between Argos and Corinth became the major land route for communications between much of the Peloponnesos and the growing center of Athens. People from the Phliasian Plain and further west thus began traversing the Nemea Valley as the most direct link to this new thoroughfare. Traffic through the valley increased even more when the Athens–Argos–Nauplion railroad was completed in 1890. This valley, which had once been a side pocket of the Phliasian Plain, thus became an artery in that area's communication with the outside. Heraklion, situated more firmly on the connecting road than Linoi, outpaced the other village in population growth. Its original *plateia*, somewhat north of the main road, was eventually abandoned as the village assumed an increasingly linear pattern along the main road through the valley.

Because the Corinthia in general and the Nemea area in particular produced currants of the highest quality, these areas were able to withstand the economic crisis which hit many Peloponnesian farmers at the end of the 19th century. When French vineyards were regenerated around 1890, and that nation placed a virtual ban on the importation of the very Greek currants which they had once so eagerly welcomed, many currant growers throughout the Peloponnesos found themselves impoverished almost overnight. Major waves of rural Greek migration both to Athens and the United States resulted. The Nemea area, however, was able to command what remained of the currant market and continues as one of the largest producers of dried currants in Greece to this day. The declining demand for dried currants, however, was also met with some diversification of the market crops grown in the valley. There has since been a steady increase in the number of vineyards converted to other types of wine grapes, especially after a *Phylloxera* blight destroyed many of the valley's currants in the 1950's. Nemean wine (from both the Nemea Valley and Phliasian Plain) is widely marketed throughout Greece. More recently, extensive olive orchards have been planted, sometimes replacing vineyards, as a more reliable and less labor-intensive cash crop than vines. Almost all the valley and its slopes have thus been progressively opened up for cultivation, a situation which appears clearly in a comparison of aerial photographs for different dates during the 20th century. At the same time, subsistence crops for local use, such as grains, have virtually disappeared. The area has become fully integrated into an external, market economy, a process intensified by seasonal employment created by the foreign archaeological work done in the area in recent years.

Discussion

Far from being untouched repositories of ancient custom, the contemporary villages of the Nemea Valley thus owe their very existence to the new systems set in motion by the creation of the modern Greek state. As noted earlier, however, this fact does not remove these villages from comparison with the valley's earlier development. Indeed, it identifies exactly what about the present is most relevant for understanding the past, and *vice versa*. The modern period has been a time of settlement foundation, population growth, and increased cultivation for the Nemea Valley. The valley has experienced similar patterns of growth, followed by decline, only to be followed by growth once again throughout its history (see pp. 616–617, 638 below). Both the past and the present can inform each other on this matter.

Certainly this study of the present reveals much concerning the creation of settlements in the area. How is it that a phase with very few settlements could be followed very suddenly by one with many settlements, a phenomenon not limited to modern times? This is actually exactly what has been observed for the modern period, when the single settlement of old Koutsoumadi was followed in short order by the installation of many vineyards and the construction of familial compounds. At least for modern times, such a proliferation of settlement has indicated a time of familial mobility and the opening up of new opportunities.

The eventual coalescence of these many small settlements into fewer but larger villages is also illuminating. The functions of centralized villages that the villagers themselves perceive and the role of intermarriage and land inheritance in reinforcing this perception may well find parallels in ancient periods. The growth of the valley's main settlement at a geographical location which has been its center at several other times indicates something about that specific location. Modern Heraklion encompasses and surrounds Tsoungiza, a position which rises above the sometimes swampy areas, yet is centrally located when the valley floor is under cultivation, and is found on both the main east–west and north–south communication routes of the valley.

In modern times the Phliasian Plain emerges as an almost constant demographic and economic center, while settlement in the Nemea Valley has been more ephemeral. The Phliasian Plain is equally fertile and well watered but is also much larger and slightly higher than Nemea, a condition which makes it suitable for a wider variety of crops, as shown today by the production figures for both areas. Not only is it a natural agricultural center but it is also a major point of connection between mountainous areas and the similarly long-lived center of Argos. The Nemea Valley, on the other hand, lacks such characteristics. Its fortunes are clearly a reflection of the larger system around it and can best be understood in this context. In this light, a comprehensive study of the modern Nemea Valley advances the general understanding of Greek history by demonstrating how marginal areas develop in response to these other centers and what they contribute to the growth or decline of the better-known settlements.

The general idea that Greek agriculturalists have been on the move as much as they have been settled now seems beyond doubt. The study of the modern period underscores what this means for the standard terms used to describe settlement. Villages, houses, family

lines, in short the most fundamental institutions of Greek rural life, are shown to have a flexibility which defies rigid definition. Over time, a building can change from a seasonal shelter to a permanent one to a stable and in the end be completely abandoned.[49] Familial composition, geographical affiliation, and land holdings are similarly not so fixed as idealized statements concerning *patrida* (fatherland) and *oikogeneia* (family) sometimes indicate. The lesson to be learned, of course, is to modify these terms to account for the elements of time, change, and adaptive modifications, especially for a population as mobile as has been that of rural Greece.

ARCHAEOLOGICAL STUDIES

The Archaeological Survey

Goals and Scope

Specific problems addressed by the archaeological survey, in addition to the general goals cited at the outset (p. 584 above), fall into three distinct categories: 1) establishing the distribution of artifacts of particular dates within the survey area; 2) evaluating how far such distributions adequately represent past patterns of settlement and other human activities; 3) providing some explanation for long-term changes in the human behavior which such patterns reflect. These issues clearly require careful consideration of geomorphological processes which in some cases may have been responsible for the dispersion and redeposition of artifacts. The survey takes as its most basic unit of analysis not the site but rather the individual artifact: we are interested in accounting for the existence of all traces of human activity on the landscape and not merely major concentrations of artifacts or those which still remain in their original place of deposition.[50]

Given the emphasis of earlier work in the Nemea region on its central places, or on other sites of special architectural interest (such as towers or the segment of a Roman aqueduct on the slopes of Mt. Strongylo, below Polyphengi; Fig. 2),[51] our chief focus has been on the nature and distribution of less prominent remains of all periods, but other more specific

[49] This is a cycle of use carefully documented by T. M. Whitelaw in "The Ethnoarchaeology of Recent Rural Settlement and Land Use in Northwest Keos," chapter 21 in Cherry *et al.*, *Archaeological Landscape*.

[50] This section of the report is the work of John F. Cherry, Jack L. Davis, and Eleni Mantzourani. Our method of survey is in many ways similar to that of so-called "non-site" surveys: cf. D. H. Thomas, "Non-site Sampling in Archaeology: Up the Creek without a Site?" in *Sampling in Archaeology*, J. W. Mueller, ed., Tucson 1975, pp. 61–81; R. Foley, "Off-site Archaeology: An Approach for the Short-sited," in *Pattern of the Past: Studies in Honour of David Clarke*, I. Hodder, G. L. Isaac, and N. Hammond, edd., Cambridge 1981, pp. 157–183; R. C. Dunnell and W. S. Dancey, "The Siteless Survey: A Regional Scale Data Collection Strategy," *Advances in Archaeological Method and Theory* VI, M. B. Schiffer, ed., New York 1983, pp. 267–287; and S. J. Shennan, *Experiments in the Collection and Analysis of Archaeological Survey Data: The East Hampshire Survey*, Sheffield 1985.

[51] E.g., Russell; Sakellariou and Faraklas (footnote 18 above); Faraklas; Biers, 1969; Biers, 1971; W. R. Biers, "Excavations at Phlius, 1970," *Hesperia* 40, 1971, pp. 424–447; *idem*, "Excavations at Phlius, 1972," *Hesperia* 42, 1973, pp. 102–120; *idem*, "The Theater at Phlius: Excavations of 1973," *Hesperia* 44, 1975, pp. 51–68; Biers (footnote 19 above); Miller, 1975; Miller, 1976; S. G. Miller, "Excavations at Nemea, 1976," *Hesperia* 46, 1977, pp. 1–26; Miller, 1977 and 1978 (footnote 30 above); S. G. Miller, "Excavations at Nemea, 1978," *Hesperia* 48, 1979, pp. 73–103; Miller, 1980; Miller, 1982; Miller (footnote 15 above).

questions may also be noted. For the Neolithic and Bronze Ages, basic issues are whether there ever existed in the valley a recognizable hierarchy of sites and what role Tsoungiza played in any such settlement system. Later, in Classical antiquity, one might have expected the area around Nemea to be organized as a city-state, like the near-by territories of Kleonai, Phlius, and Sikyon; in fact, the historical sources show that it was politically weak and that the panhellenic sanctuary was controlled for much of its life by external powers. The extent to which this situation was the product of general depopulation in the Greek Dark Age and in early historical times or was forced upon the Nemeans through the intervention of external states is a question of considerable interest and one to which only archaeology at a regional scale can contribute fresh information. As regards Byzantine, Frankish, and Ottoman times, there is so little archaeological evidence for patterns of rural settlement and land use in southern Greece that any new fieldwork could be expected to produce useful additional knowledge.

The total area of *ca.* 80 sq.km. available to the project extends south from Mt. Phoukas and the ridge of ancient Phlius to the Dervenakia (Tretos) Pass and Mt. Strongylo (south of Polyphengi on Figure 2; see also Figure 4 and Plate 93:a). In three years of fieldwork, *ca.* 50 sq.km. of this total has been examined, much of it in a contiguous block around the site of Tsoungiza and the Sanctuary of Zeus but also including substantial samples of the more northerly reaches of the upper Nemea Valley and of the valleys immediately to the south; of the west slope of Mt. Prophitis Ilias, east and southeast of Phlius; and of the slopes overlooking the Longopotamos Valley, southwest of ancient Kleonai. The zones examined each season were selected to provide a good cross section of the variety of landscape types and locational settings, and the cumulative results of each campaign have guided the selection of areas (chosen on the basis of landscape, vegetation, and soil types) to be examined in subsequent years.

Methods

The essential feature of our method of survey is the examination of many individual "tracts", which are natural or arbitrary areas of relatively uniform vegetation, land use, and visibility, no more than one or two hectares in size.[52] These are surveyed by teams of 5 to 7 members walking across them at *ca.* 15-m. intervals in parallel transects. Each member uses a handheld counter to record quantities of pottery, tile, and other materials for each 100-m. segment of his one or more "passes" across the tract. Collections are made of all potentially diagnostic pottery (i.e., all but plain body sherds), all chipped stone, and any other types of materials. Tracts are described in terms of their present-day land use, soil type, vegetation cover, and the extent to which the ground surface is visible at the time of survey. The end result is a computer-generated archive of mosaiclike maps, which now cover some 4,800 surveyed tracts and which show the over-all density and distribution of artifacts of various

[52] Individual finds are numbered sequentially within sectors, a grid of numbered one-km. squares covering the entire survey area, which in turn has been split into five topographically distinct areas; thus each tract has a unique Area-Sector-Tract designation.

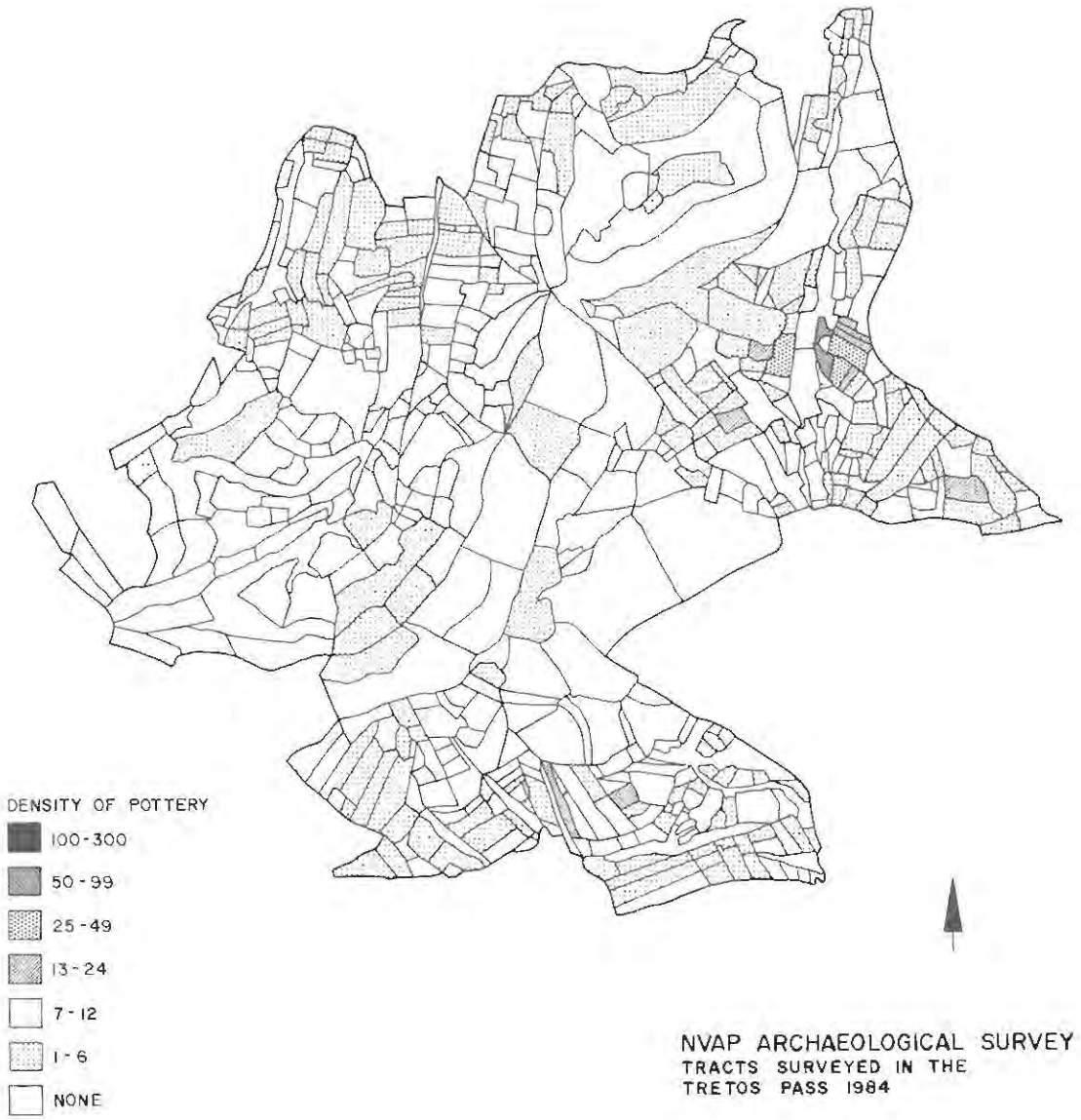

FIG. 5. Tracts surveyed in the area north of the Tretos Pass, 1984, showing the overall density of pottery (Joan Pederson and Julia E. Pfaff)

kinds and dates over the entire area surveyed (e.g., Figs. 5 and 6). From these it is possible, for instance, to evaluate the effect of relative surface-visibility conditions on the observed spatial patterns of artifacts of different periods. The collection of information on vegetation, visibility, and artifact density, as well as details of the artifacts themselves, produces a volume of data that would be unmanageable without the use of computers for storage and

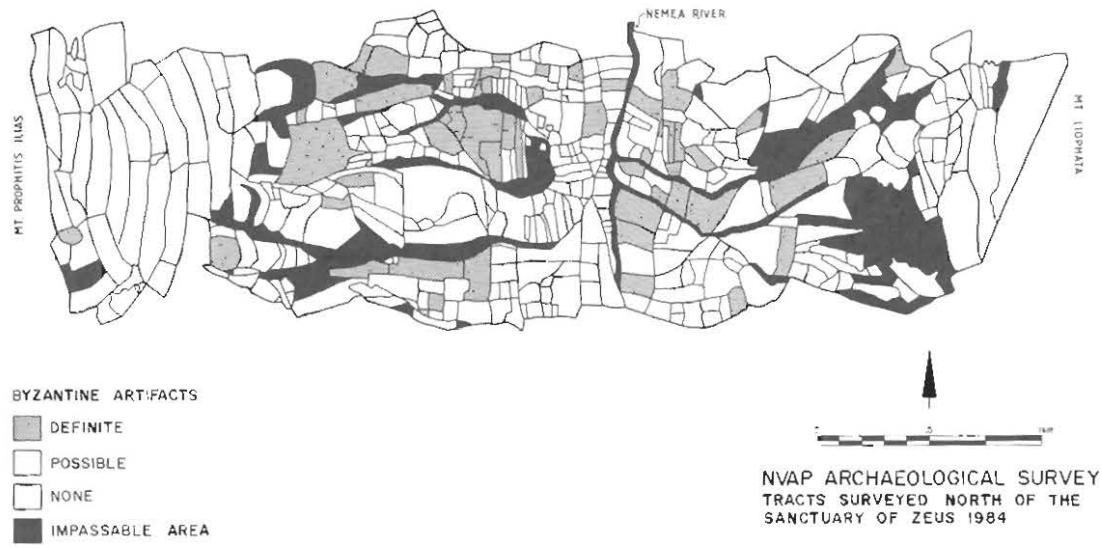

FIG. 6. Tracts surveyed in a 1-km. wide transect across the Nemea Valley located 2 km. north of the Sanctuary of Zeus, 1984, showing the density of Byzantine pottery (Joan Pederson and Julia E. Pfaff)

processing; even the basic file recording each walker's artifact counts is well over 20,000 lines in length and contains information on 23 variables.[53]

Sites are surprisingly difficult to define objectively in any survey. We consider them to be anomalously dense concentrations of artifacts with definable spatial limits. Once recognized using these criteria, they are investigated further, generally by the collection of additional samples of artifacts. Standard procedure involves the collection of all artifacts found within circles 5 sq.m. in area, located at 5- or 10-m. intervals along each of four orthogonal transects laid over the site, after which "grab" samples of potentially diagnostic artifacts are collected from each of the four quadrants defined by the transects. In many cases, however, it has been preferable to lay down a 10- or 20-m. grid (or even at times one of smaller frame) to allow greater spatial control over the collection and plotting of material (Fig. 7). Thus, it is possible to gain not only a quantified estimate of the over-all size of the site but also a good understanding of its extent and nature during each of the periods when it was in use. Work at such places normally includes documentation by means of photographs, sketch maps, and

[53] Information gathered daily by teams in the field was entered on an Epson Geneva PX-8 lap-computer and later transferred to the Project's Kaypro IV personal computer in the Nemea Museum (a portable Zenith with a 20 mb. hard disk is now used). Densities of artifacts for each tract could thus be calculated readily and mapped immediately, so that the locations of potential sites could be singled out for re-examination in the field the next day. The dating, counting, and weighing of artifacts collected from tracts rapidly provide information on the distribution of finds of particular dates and on the dating of material from high-density concentrations (many of which are later treated as "sites"). Eventually, information from both the field and the museum is transferred to mainframe computers, where it can be analyzed more readily and where computer-generated maps can be produced.

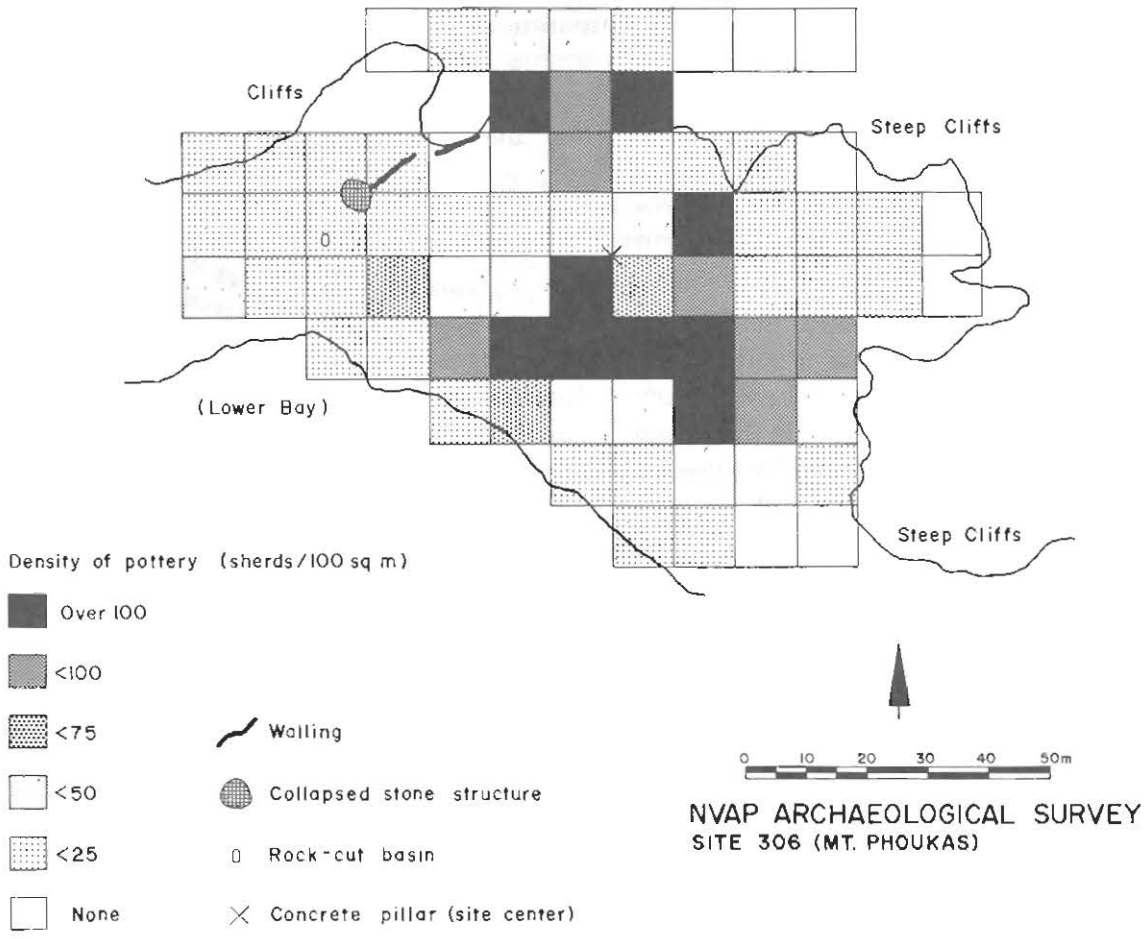

FIG. 7. The ash altar of Zeus atop ancient Mt. Apesas, showing the survey grid and the density of pottery collected from the site (John Cherry and Julia E. Pfaff)

measured drawings; when feasible, further information about subsurface remains may be gathered, for instance by geophysical survey.[54]

It is obvious that various natural processes can lead to the dispersion of artifacts at the surface, affecting our perception of the scale and kind of activities conducted in the past at a particular location. Geomorphological investigation of disturbances at "sites" has thus become routine procedure on most archaeological surveys. The focus of our project on the individual artifact, however, forces us also to consider how far post-depositional geomorphological disturbances have contributed to the creation of lower-density artifact distributions of the sort which have been found to be nearly continuous in many parts of the survey area. Analytical procedures are needed to distinguish between those cases which represent

[54] For a more detailed illustration of the different phases of data collection in the field, see Cherry *et al.*, 1988.

short-term, comparatively ephemeral human activities in the past, and those in which artifacts have been redeposited from other locations through non-cultural means.[55] An example may be useful.

On the northeast slope of the undulating ridge leading down from Evangelistria (just east of Heraklion) towards Chani Anesti (immediately north of the Tretos Pass; Fig. 2), Classical, Hellenistic, and Byzantine pottery was found in moderate quantities (tract 71-8). The tract lies downhill from site 200 (Fig. 4) just to the north, although Classical and Hellenistic remains were not found there; site 201 to the south and site 203 to the northeast both have Classical and Hellenistic artifacts but are separated from tract 71-8 by a ravine. The likelihood is thus that the artifacts here are *in situ*. On the opposite side of the ravine to the northeast, in tract 71-2, Byzantine pottery was noted; in this case, however, the position of the tract downslope from site 203 (where pottery of this date was plentiful) makes it likely that the artifacts in this tract are not in their original place of deposition, and geomorphological considerations add weight to this conclusion. When this approach is extended to the entirety of the study area, we anticipate that patterns in the quantities, location, and date of artifacts, both *in situ* and in post-depositional contexts, may contribute to our understanding not only of changes in land use but also of the erosional history of the region.

General Character of the Survey Finds

Material collected from the surveyed area[56] ranges in date from early prehistoric times through the 20th century after Christ.[57] It may be noted in passing that as much as one-third of the total quantity derives from collections in tracts, thus providing some indication of how much useful information is lost if attention is restricted solely to material from "sites". Finds of ancient glass and metal (including coins) have been surprisingly sparse. The collection of chipped stone (mostly Melian obsidian and a variety of local cherts) is

[55] A preliminary approach to such studies using NVAP data may be found in J. Pederson, "*Background Noise" in Pedestrian Archaeological Survey: A Geomorphological Evaluation in the Nemea Valley, Greece* (M.A. thesis, Department of Geography, University of Illinois at Chicago 1986).

[56] Professor Robert F. Sutton, Jr. has been in over-all charge of the processing and initial study of survey finds in the Nemea Museum, assisted by Shari Stocker (1984), Professsor Lynn Kraynak (1984), Thomas Strasser (1985–1987), Effie Athanassopoulou (1985–1987), and by other members of the survey teams. A portion of the following discussion is extracted from notes provided by Sutton. Final reports on the following categories of survey finds are in preparation: Neolithic pottery (Strasser), Early Bronze Age pottery (Laurie Roberts), Later Bronze Age pottery (Cherry, Davis, and Mantzourani), Geometric through Roman pottery (R. Sutton), Mediaeval pottery (Athanassopoulou), and tile (Hugh Elton). Chipped and ground stone has been studied by Dr. Robin Torrence and Professor Curtis N. Runnels, respectively, and will be published by Cherry. We are particularly grateful to members of the NVAP team for their comments on prehistoric pottery and to the following who have examined material in Nemea or offered other help and advice: Professor Kathleen W. Slane, who served as a regular consultant on Roman pottery and local wares in general, Professor John E. Coleman, Margarete Hahn, Dr. John W. Hayes, Professor John C. Lavezzi, Catherine A. Morgan, Professor Catherine Perlès, Guy Sandars, Ulrike Steppeke, Professor Karen D. Vitelli, Dr. Berit Wells, and Dr. Charles K. Williams, II.

[57] At several localities, particularly near the headwaters of the Nemea River, there have been found heavily rolled and patinated lithic artifacts resting on the surface of Pleistocene alluvial fans (Table 1, Fig. 3); these are not easy to date either by their geomorphological context or by their typology but are very probably of Palaeolithic date.

small and for the most part not readily datable; ground stone includes fragments of imported hand-querns and millstones of Classical to Mediaeval date, and a number of large olive presses of local conglomerate have been recorded in the field. Ancient standing architecture of any sort is not common. Thus the overwhelming majority of our chronological information on the distribution of ancient settlement and land use is based on pottery, tile, and other terracotta small finds, of which well in excess of 100,000 items have been recorded in the course of tract-walking. The state of preservation makes close chronological or functional identification difficult for much of this material, but assignment to broad periods (e.g., Archaic to Classical, or Late Roman to Byzantine) is usually possible.[58] A brief selection of typical diagnostic survey finds is presented here as representative of the sort of material on which more general conclusions inevitably rest.

Prehistoric pottery from the survey in general closely parallels the excavated material from Tsoungiza in terms both of types and of principal chronological periods represented. A conspectus of the Neolithic material has already been presented elsewhere;[59] it is noteworthy that, as at Tsoungiza, EN and MN pottery of standard northeast Peloponnesian types is well attested, while the LN and FN periods are scarcely represented at all. Similarly, the occurrence of EH I and (especially) EH II material, in substantial quantities and at many sites, stands in stark contrast to the rarity of EH III sherds and the virtual absence of recognizable MH types.[60] Our ability to discriminate among different phases of Mycenaean pottery depends largely on the level of preservation of the individual sherds, but Early Mycenaean pottery (i.e., earlier than LH IIIA:2) is in general readily distinguished from that of later phases.[61] Late Bronze Age finds, however, are notably sparse in an area so close to the Mycenaean heartland.

A major goal of the study of the pottery of the historic periods has been to differentiate strictly local products (i.e., those produced in the area surveyed or near-by centers such as Kleonai) from material imported from the dominant neighboring centers of the Corinthia and the Argolid, or from further afield (see Appendix, pp. 646–659 below). The discovery

[58] After washing (without acid), finds were transferred to the Nemea Museum. All non-pottery finds (including tile from sites and lamps) were immediately registered individually in a central database stored on the microcomputer. Ceramic finds from all samples collected from sites and tracts were weighed and counted, and the number of datable finds assignable to each period was recorded. Finally, detailed descriptions of all pottery and tile from tracts and of a selection of chronologically and functionally representative finds from sites were compiled: these will form the basis of catalogues of finds to be included in final publications.

[59] Cherry *et al.*, 1988, where examples of MN and FN vessels are illustrated, together with a general discussion of Neolithic finds of all periods in the Nemea region.

[60] It may be noted that the abundance or scarcity of pottery of different periods does not correspond to their relative "visibility" as defined in J. B. Rutter, "Some Thoughts on the Analysis of Ceramic Data Generated by Site Surveys," in *Archaeological Survey in the Mediterranean Area* (*BAR* International Series 155), D. R. Keller and D. W. Rupp, edd., Oxford 1983, pp. 137–142. For instance, MH is one of Rutter's periods of "high visibility", yet we have recovered virtually no sherds of Minyan or Matt-painted wares.

[61] For a preliminary study of the EH finds from the survey, see L. Roberts, "Early Bronze Age Settlement in Southern Greece: New Data from the Nemea Valley," *AJA* 92, 1988, p. 252 (abstract); Mycenaean material and its specific distribution in the survey area has been discussed by J. L. Davis, "'If There's Room at the Top, What's at the Bottom?'" *BICS* 35, 1988, pp. 164–165 (abstract) and Wright *et al.*, "Early Mycenaean Settlement."

of two new kilns (at sites 510 and 512), at least one used for pottery, is particularly useful in this respect; they may be set alongside the two tile kilns previously excavated in the Sanctuary of Zeus.[62] We plan a variety of scientific pottery analyses to enhance the results of more conventional study. Most of the pottery does, in fact, seem to have been made in the northeast Peloponnesos. Large quantities of imports from further afield occur only at Phlius and certain other very large sites. This isolated pattern provides a clear contrast to the record from those parts of the island of Keos and of the Southern Argolid which have recently been surveyed by comparable techniques and whose extensive coastlines provided direct access to maritime commerce.[63] This dearth of imports is not restricted to fine wares that might be considered luxuries traded for their own sake, e.g., Attic black glaze (p. 649 below; Fig. 23),[64] Roman sigillata or Red Slip (p. 655 below; Fig. 26), and Proto-Majolica wares, but also includes coarse-ware trade amphoras, of which only Corinthian A jars occur with any frequency (p. 653 below; Fig. 24). The rarity of amphoras is especially striking in comparison to the situation on Keos and suggests that, while the islanders made considerable use of imported foodstuffs carried in such containers, the region around Nemea was much more self-sufficient.[65]

Site Types and Long-term Patterns of Settlement

The most common types of site encountered are characterized by small scatters of Archaic, Classical, or Hellenistic finds, including tile, cooking and storage vessels, small quantities of fine ware, and (less often) quernstones or olive presses. Many of these are probably farmhouses or other rural agricultural installations of the kind that typify most sets of survey data in southern Greece.[66] With the exception of Phlius, the Sanctuary of Zeus, and near-by sites such as Kleonai, there are few really large sites of these dates that obviously belong to another level of settlement hierarchy. Functionally specific sites of other kinds, however, are known: for instance, four isolated towers, built of large dressed limestone or conglomerate blocks,[67] and several sites possibly to be considered as rural sanctuaries on the basis of the discovery of likely votive material. In Roman and Byzantine times the pattern of

[62] Cf. Biers, 1971, pp. 401–402 on the difficulties of distinguishing the fabric of Phlius from those of Corinth and Argos; he and others seem to apply the term "Argive" loosely to products from various centers in the Argive plain. For the kilns see B. H. Hill, *The Temple of Zeus at Nemea* (revised and supplemented by Charles K. Williams, II), Princeton 1964, p. 46; Miller, 1975, pp. 161–165; Miller, 1976, pp. 186–189.

[63] R. Sutton, chapter 11 in Cherry *et al.*, *Archaeological Landscape* and R. Sutton in M. H. Munn, D. J. Pullen, and C. N. Runnels, *Artifact and Assemblage: Finds from a Regional Survey of the Southern Argolid*, Stanford (in preparation).

[64] A conspectus of finds from the survey is given in the Appendix.

[65] R. Sutton, in Cherry *et al.*, *Archaeological Landscape*.

[66] E.g., chapter 17 in Cherry *et al.*, *Archaeological Landscape*; Bintliff and Snodgrass (footnote 13 above); Van Andel and Runnels (footnote 13 above). By no means all such sites need have been residential: cf. R. Osborne, "Buildings and Residence on the Land in Classical and Hellenistic Greece: The Contribution of Epigraphy," *BSA* 80, 1985, pp. 119–128 and *idem*, *Classical Landscape with Figures*, London 1987.

[67] Sites 800, 904, 905, and 911. All are square except 904, which is circular, and all probably served a military function, since they occupy strategic points on important routes. The associated pottery dates mainly to the Classical and Hellenistic eras. For references, see Faraklas, Appendix 2, nos. 2 and 3; Pritchett, p. 98 and pl. 67; Russell, pp. 41 and 44; Lord (footnote 20 above), pp. 80–85 and pl. iv:a; Wiseman, pp. 113–116 and figs. 157–159; E. Meyer, *RE* XX, 1, 1941, cols. 269–290, *s.v.* Phleious.

residential settlement was evidently more differentiated, since in addition to small rural establishments there existed a number of much larger sites. Some idea of the range of sites other than small-scale rural settlements, and of the types of material to be found at them, may be conveyed by several brief examples.

1. Site 204 (Fig. 8) occupies a small bluff overlooking the National Highway as it runs through the Tretos Pass, a few hundred meters north of Chani Anesti (Fig. 4). Bulldozing and deep ploughing in 1984 brought to light over 2,000 well-preserved sherds of EH I and early (pre-sauceboat) EH II date spread throughout an area a little over 1 ha. in extent. A number of other small prehistoric sites near the Tretos are comparable in size and topographic setting. A second phase of use dates to Late Geometric through Classical times and is concentrated in two discrete locations, the northernmost associated with plentiful tile, blocks, and several pits exposed in section. The material includes much fine pottery, such as miniature Corinthian votive cups, Attic black- and red-figured and black-glaze wares, pithoi with impressed decorative bands and, in one case, a dipinto, and a Late Classical molded figure representing a bearded male. It seems possible that one function served by this site in Archaic and Classical times was that of a rural shrine. Despite the damage inflicted on the site by plowing, collection of artifacts from its surface using a grid of 10-m. squares has allowed clear spatial discrimination of the two main phases of its use.

2. Xenophon (*Hellenica* 7.2.1 and 7.3.5) mentions a border fort which the Argives fortified in their campaign against Phlius in 366 B.C. Some authorities have located it at our Site 101, atop the highest of the three peaks of ancient Mt. Trikaranon (Prophitis Ilias; Figs. 2 and 4), a key fortifiable position likely to have been of strategic importance at many periods in the past.[68] Pottery and tile are abundant around the church of Prophitis Ilias, into the southwest wall of which has been built a small engaged Corinthian pilaster. The church itself is partly constructed from ancient blocks and includes two Byzantine capitals. To the southeast the road to the summit has been cut through ancient deposits, revealing in section a pit and a short stretch of well-built wall preserved two courses high, and there are other signs that structures and fortification walls survive at the site. The prehistoric period is faintly represented by two or three pieces of EH II urfirnis, and pottery of Roman and Byzantine date has also been recovered, but Archaic to Hellenistic (especially Classical) material is dominant. Some of the most diagnostic pieces are of the 4th or 3rd century B.C. The quality of the pottery, in general, is high; it consists mainly of black-glaze and blister-ware shapes for eating and drinking, rather than domestic forms such as lekanai and mortars, and some of it may even be votive in character. Notable finds include a lead sling bullet of Classical to Hellenistic date and a silver coin of Stymphalos datable to *ca.* 431–370 B.C.

3. Investigations at Phlius have been of considerable importance (Figs. 2, 9, and 10), since the site represents the highest-level political center within the study area in Graeco-Roman times and thus, not surprisingly, provides examples of types of material not well attested at rural settlements. Despite several campaigns of excavation by the American

[68] The site was noted by several 19th-century travelers. A. Frickenhaus and W. Müller ("Aus der Argolis," *AM* 36, 1911 [pp. 21–38], p. 23) described the ruins then as an inner fort with outer surrounding walls. For more recent discussion, see Pritchett, p. 104 and G. Gauvin, "Profitis Elias, un position clef au sommet du Trikaranon," *Newsletter of the Canadian Archaeological Institute at Athens* 9, 1980.

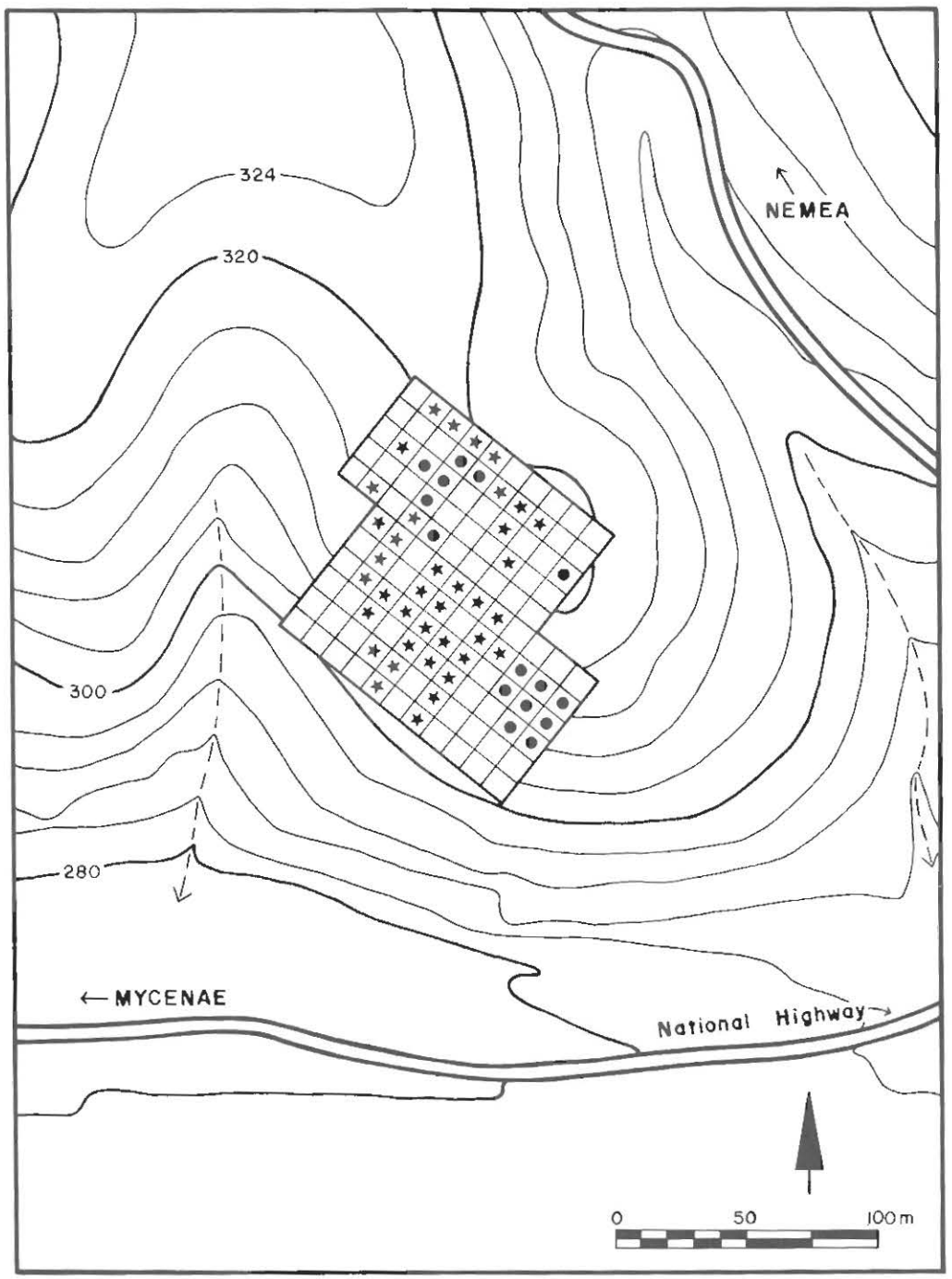

FIG. 8. Site 204, showing the survey grid and the distribution of prehistoric and Classical material (Jack Davis and Julia E. Pfaff). ● Predominantly C–HL. ★ Predominantly EH

School of Classical Studies,[69] there existed no detailed map showing the surviving walls and other architectural remains over the extent of the site at different periods of its use. Accordingly, our work was designed to complement previous results by concentrating on several goals: 1) systematic mapping of architectural remains; 2) intensive collection of surface artifacts over much of the site and its immediate hinterland on the lower slopes of Prophitis Ilias to the east; and 3) establishing with greater precision the size of the settlement at different periods of its use and the degree to which the site shows discontinuity of the sort typical of other smaller sites in the area.

Conglomerate and poros blocks scattered in the fields (Fig. 9) are mostly from walls (the course of some of which can be traced most clearly on the acropolis), but architrave and column fragments, column capitals, bedrock cuttings, a statue base, and a Classical inscription were also recorded. Architectural finds are concentrated in the plain to the west and south of the acropolis near the area conventionally known as the "agora" and on the flat summit and west end of the acropolis itself, particularly in and around the chapel of Panagia Rachiotissa. No work was undertaken in the plain to the west of the acropolis, but previous excavation and casual inspection make it clear that many fragments of ancient structures exist there also.

Pottery densities (Fig. 10) mirror the southwestward bias of the architectural fragments. On the south, southeast, and northeast edges of the site, quantities of finds fall dramatically, and the limits of the ancient city in those directions now seem well defined. The western boundary of our study area lay at the Perivoli spring, southwest of the acropolis; pottery densities there remain quite high, and it is clear that the urban area continued farther west. Field-walking southeast of the acropolis on the slopes of Prophitis Ilias revealed a large continuous area of tracts with high-density concentrations of mainly Roman and Byzantine pottery; it appears that in late antiquity a settlement of very considerable size existed here on the outskirts of the Classical city. The pottery collected from the site of Phlius is generally similar to that known from earlier excavations. Neolithic, Early Helladic, and Late Helladic material was recovered in small quantities; the Mycenaean finds were a surprise, given previous assertions that the period was scarcely represented at the site.[70] The wide distribution of Roman material, however, confirms the picture given by Pausanias of a flourishing community in the 2nd century after Christ; its quantity and variety offer a marked contrast with pottery from other sites occupied at this time. Among the more striking finds was a votive deposit containing hundreds of fragments of pottery and figurines dating from the Archaic and Classical periods (see p. 647 below; Pl. 96:b–d). These may have been dumped from a sanctuary on the acropolis but might equally well derive from a small extramural shrine. Also to the northwest of the acropolis, but lower

[69] For earlier excavations, see H. S. Washington, "Excavations at Phlius in 1892," *AJA* 27, 1923, pp. 428–446; C. W. Blegen, "Excavations at Phlius, 1924," *Art and Archaeology* 20, 1925, pp. 23–33; Meyer (footnote 67 above); Biers, 1969; Biers, 1971; Biers 1971, 1973, and 1975 (all cited in footnote 51 above). Work in the field was conducted under the direction of Dr. Susan E. Alcock. Biers led Wright on an historical tour of the site and provided archival material and much helpful advice for our researches.

[70] Biers, 1969, p. 457.

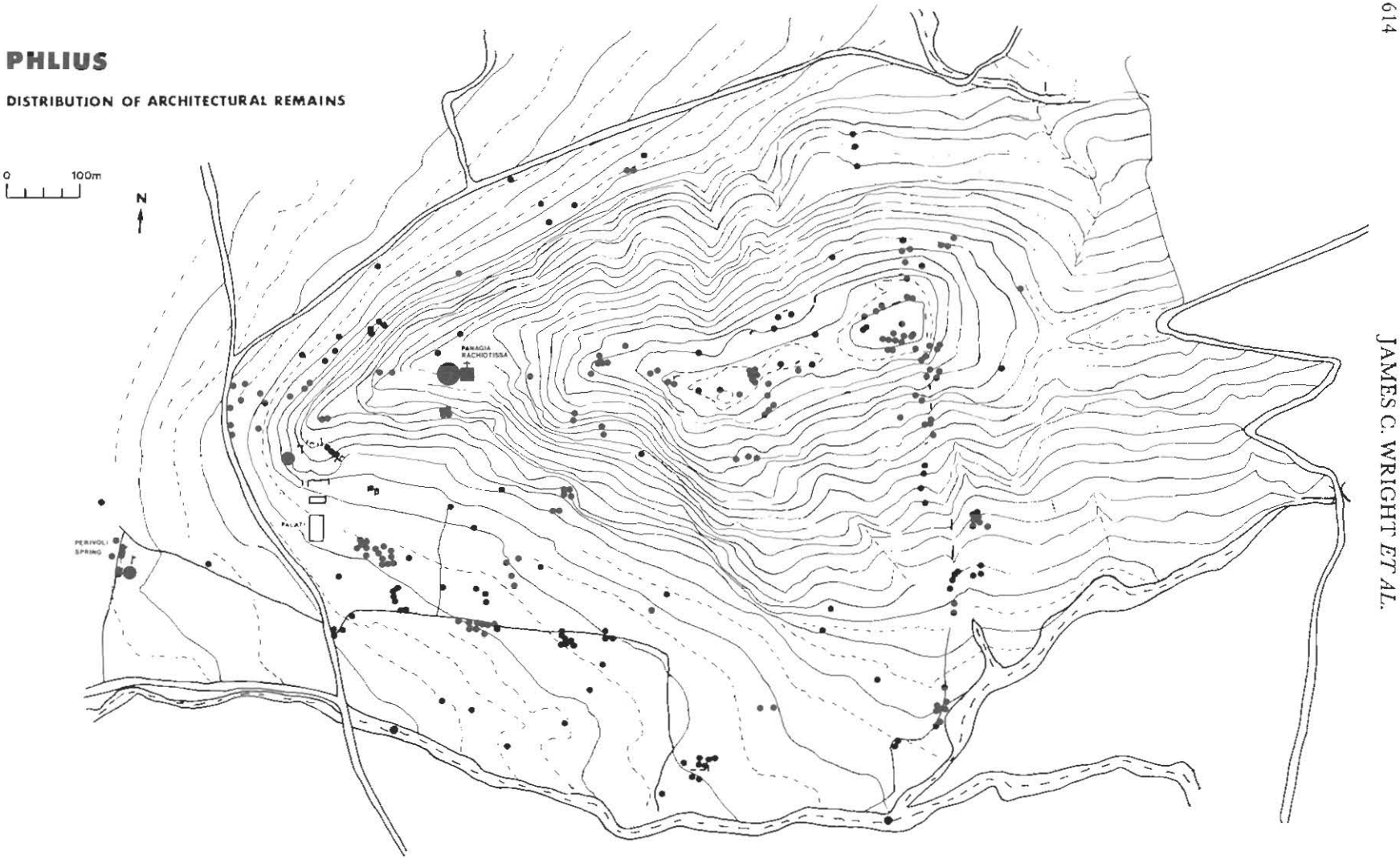

FIG. 9. The distribution of architectural blocks and ancient walling at the site of Phlius (Susan A. Alcock and Julia E. Pfaff)

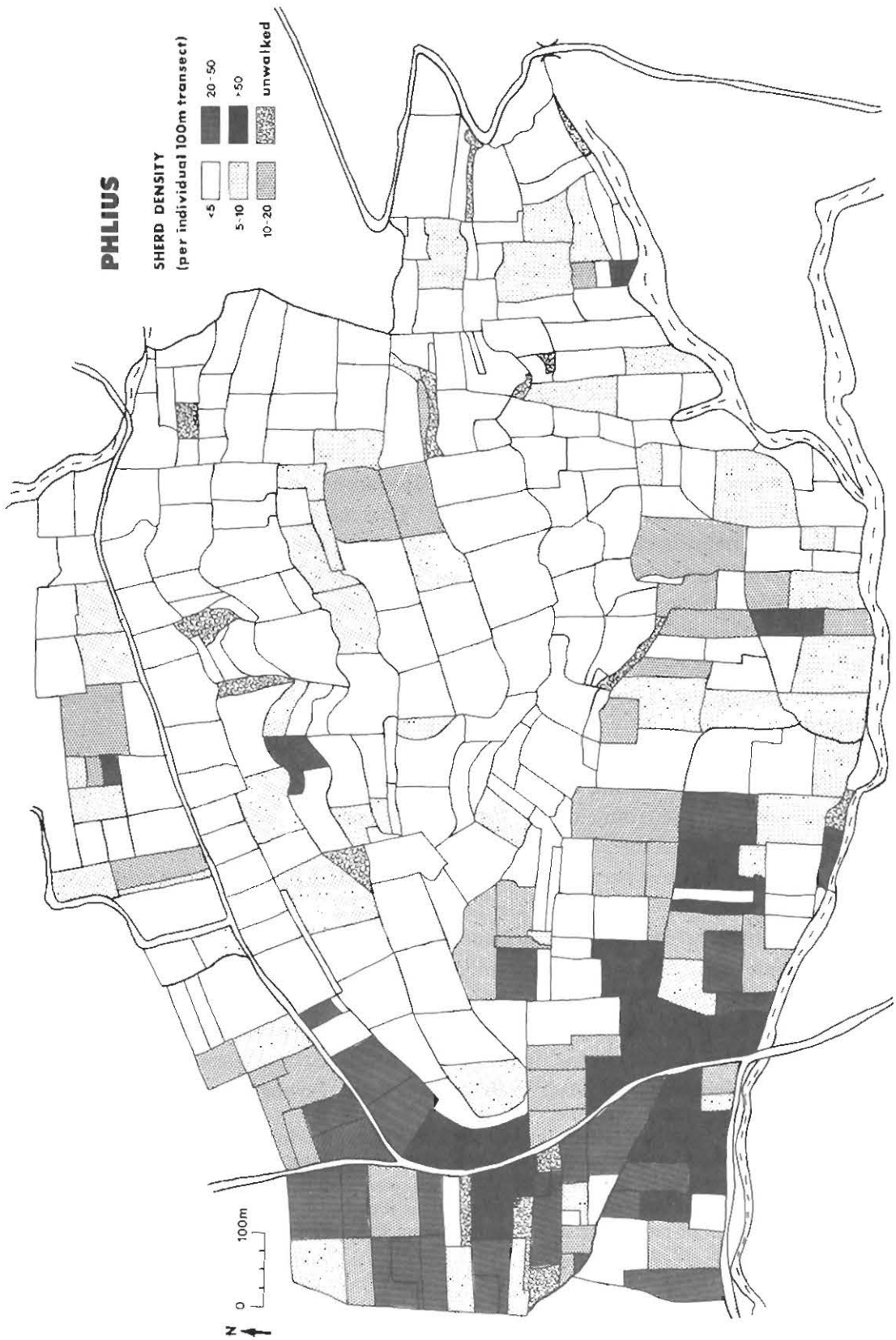

FIG. 10. The density of pottery of all periods at Phlius (Susan A. Alcock and Julia E. Pfaff)

down at the edge of the plain, among human bones and pottery apparently from graves destroyed by the deep plow, were nearly complete vessels of the Early or Middle Geometric period (p. 647 below; Fig. 22).

4. Of outstanding importance among the many Mediaeval sites encountered is a complex of sites around the peak of Polyphengi, the precipitous mountain at the southern end of the Phliasian Plain, guarding what was until the 19th century the principal route south towards Argos.[71] Its strategic significance is signalled by a Frankish (and later?) kastro, recently much disturbed by looters, atop the summit of the mountain (Fig. 4, Site 902). This is a small building, built of rough stone and tile, comprising a tower with basement-level rooms and adjoining structures. The kastro is approachable on the Nemean side only via a rock-cut tunnel through the summit cliffs; near by is an arched cistern, apparently of Frankish date. In the steep cliffs immediately beneath the summit of the mountain at its eastern end is a fortified rock shelter (Site 901), 40 m. long. A curtain wall reaching from floor to ceiling was built across the entire mouth of the shelter, although this now survives only at its eastern end; its defensive character is indicated by a projecting semicircular bastion and a number of slit windows. The walls and ceiling were formerly plastered and decorated with frescoes, of which the single identifiable scene depicts the Presentation at the Temple and is probably of late 12th-century date.[72] This may well be the site of the original monastery, the first mention of which occurs in 1402; it was later replaced by the Monastery of Panagia tou Vrachou (Site 900), located at the foot of the 150-meter-high vertical rock cliff on the east side of the mountain. The monastery buildings incorporate numerous Middle and Late Byzantine ecclesiastical architectural members in marble, re-used from buildings presumably located elsewhere, and there are signs of several phases of architectural rebuilding and remodeling. The church contains poorly preserved wall and ceiling frescoes of Byzantine date, although the monastery is said to have been founded only in 1633. Above it lies a deserted Mediaeval village (Site 910), which occupies much of the sloping plateau to the east of the summit, overlooking modern Nea Nemea. The ground is covered by a nearly continuous spread of rubble from collapsed structures, probably both houses and churches, since early travelers reported the presence of as many as three dozen churches on Polyphengi. Other isolated structures have been noted farther west, including a probable watchtower or guardhouse commanding the route of ascent by the southeast ridge. Ceramic material from the village is of considerable interest, since the settlement, which is first mentioned in the *Chronicle of Morea*, seems to have been abandoned by the 17th century after Christ.

It will already be clear from the discussion above that for certain periods remarkably few chronologically diagnostic artifacts have come to light, while others are plentifully represented (Fig. 11). The periods for which little archaeological evidence seems to exist are the Late and Final Neolithic, the Middle Bronze Age, the Protogeometric and Geometric

[71] The wide variety of archival and historical documents bearing on this cluster of sites have been discussed by M. S. Kordosis, *Συμβολή στην Ἱστορία καί Τοπογραφία της Περιοχῆς Κορίνθου στούς Μέσους Χρόνους*, Athens 1981, pp. 176–184 and 368–372.

[72] We thank Robin Cormack for suggesting the date of the scene on the basis of examination of photographs; see also the report of its restoration in E. Kounoupiotou, "Ἀσκητήριον Πολυφέγγι Νεμέας," *Δελτ, Χρονικὰ* 26, 1971, p. 191, pl. 172:a, b.

periods, and the Ottoman through early Modern eras. Later Hellenistic and early Roman material is very rare aside from a few big sites, but pottery of Late Roman date is more widespread. The fact that these periodic patterns are reflected in both tract and site collections (and, as noted above, that careful attention has been paid to the potential problems of surface visibility and geomorphological erosion or aggradation) inspires confidence in their reality, although they must remain somewhat imprecise and unquantified until our detailed studies are complete.

Sites occupied or in use during a single period only are unusual, most having produced material diagnostic of several, often widely separated, chronological phases. For instance, settlement and land use in all parts of the area during the 12th through 14th centuries after Christ seem to have been so intensive that almost every site, irrespective of its dominant period of use, has provided some material of Middle Byzantine to Frankish character. Similarly, prehistoric pottery, often no more than a few worn sherds, has been found at a high proportion of later sites. Detailed analysis will be necessary to determine whether such material represents either a significant prehistoric component masked by the remains of later occupation, or finds similar to those found "off site" in tract collections. Other surveys have often assumed, but not demonstrated, a picture of nearly uninterrupted settlement at favored locations. Our evidence suggests instead a much more dynamic and discontinuous pattern of ebb and flow in settlement, at the level both of individual sites and of the region as a whole.

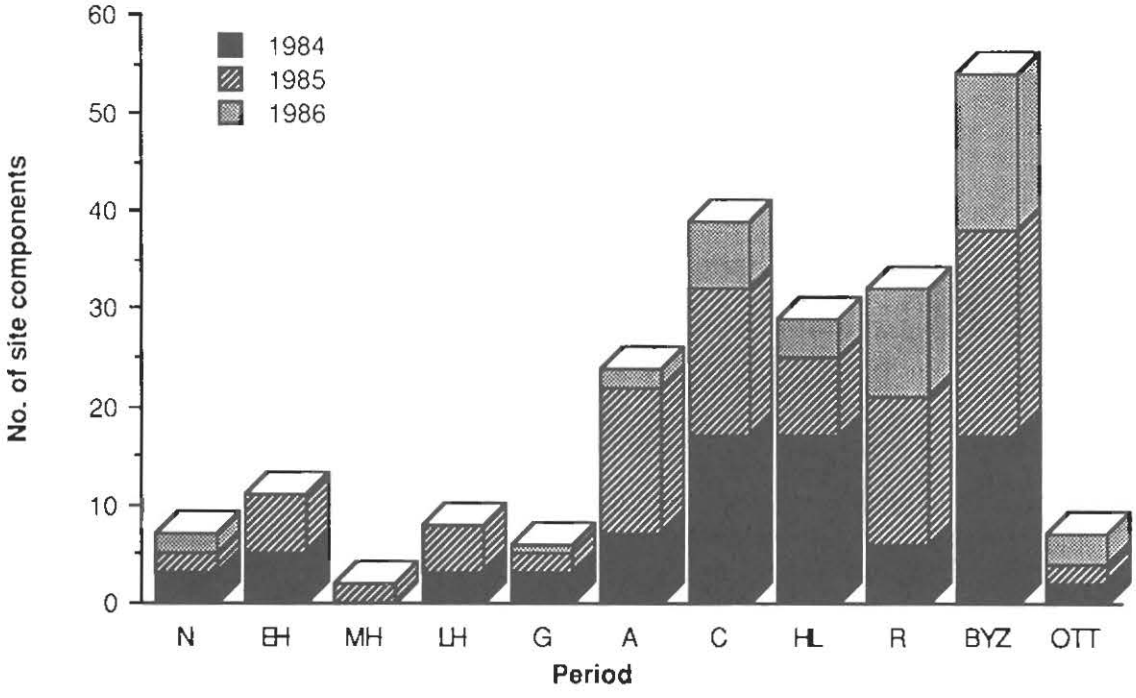

FIG. 11. Bar graph showing numbers of sites with components of different periods (John Cherry)

The Excavation on the Hill of Tsoungiza

Goals and Scope

Excavation on Tsoungiza has had five major goals: 1) to determine as fully as possible the physical extent and chronological range of settlement; 2) to understand processes of site formation; 3) to examine the economic system of the settlement; 4) to relate the record of an excavated site to that recovered for comparable periods by survey; 5) to compare the phases of settlement on Tsoungiza to the pattern of settlement both within the study area and in the adjacent regions of the Corinthia and the Argolid.[73] Each of these goals has required the development of specific methods for 1) recovering, recording, and analyzing excavated material; 2) recording artifact distributions over the site; 3) examining the geomorphology of the hill; 4) studying the environment of the site's resource area.[74]

Excavation on Tsoungiza began with the work of Carl Blegen and James P. Harland during the 1920's. In 1924–1925 Blegen excavated an extensive Neolithic deposit from the hill.[75] In 1926 and 1927 Harland carried out extensive excavations of the Bronze Age settlement (Fig. 12), and their publication is another facet of NVAP.[76] Salvage work in 1974, 1975, 1979, 1981, and 1982 uncovered further remains at the site.[77] Although different standards of excavation and recording were employed by these earlier excavators, the reconstruction of a detailed and comprehensive understanding of the site's history has not been impaired.

Methodological Overview

Four strategies of data collection have been pursued: surface survey, remote sensing, excavation according to a grid of 1-sq.m. units, and sieving (including water sieving and flotation for collecting organic remains).

[73] This section of the report is by James C. Wright. Supervisors of Excavation Units were as follows: 1981, Mary Dabney (EU1); 1982, Anastasia Lambropoulou (test trenches); 1984, Nick Kardulias (EU2), Dr. Susan Petrakis (EU3), Elliott Lax (EU4), Professor Daniel Pullen (EU5), Professor Michael Toumazou and Anastasia Lambropoulou (EU6), Rebecca Mersereau (EU7); 1985, Dr. Nancy Leinwand and Nick Kardulias (EU2), Daniel Pullen (EU5), Rebecca Mersereau (EU7), Jennifer Tobin (EU8 and "Area L"), Kevin Glowacki (EU9), Michael Toumazou (EU10); 1986, Kevin Glowacki (EU2), Kathleen Krattenmaker (EU5), Rebecca Mersereau (EU7 and EU1), Keith Dickey and Natalia Vogeikoff (EU8), John Marszal (EU9), Marina Markantonatos (EU10 and EU11).

[74] Different components of these research objectives and strategy are discussed in Binford; K. W. Butzer, *Archaeology as Human Ecology*, Chicago 1982; M. B. Schiffer, "Toward the Identification of Formation Processes," *American Antiquity* 48, 1983, pp. 375–406; and, most recently, reviewed in Redman.

[75] Blegen, 1975.

[76] Harland. At his death in 1973, Harland left behind a nearly complete manuscript on the excavations. Completed during the 1930's, it had been reviewed by Blegen for publication along with other material from the early excavations in the Sanctuary of Zeus. This manuscript was willed to Professor George E. Mylonas, who kindly passed it on to Wright when he undertook the responsibility for the excavation of Tsoungiza. Harland also left a complete set of excavation notes, drawings, and photographs at the University of North Carolina, Chapel Hill. These were turned over to Wright by Professor G. Kenneth Sams. Wright thanks Professors Mylonas, Sams, and Stephen G. Miller for making this material available.

[77] Miller, 1975, pp. 150–152; 1976, pp. 174–177; Miller, 1980, pp. 37–40.

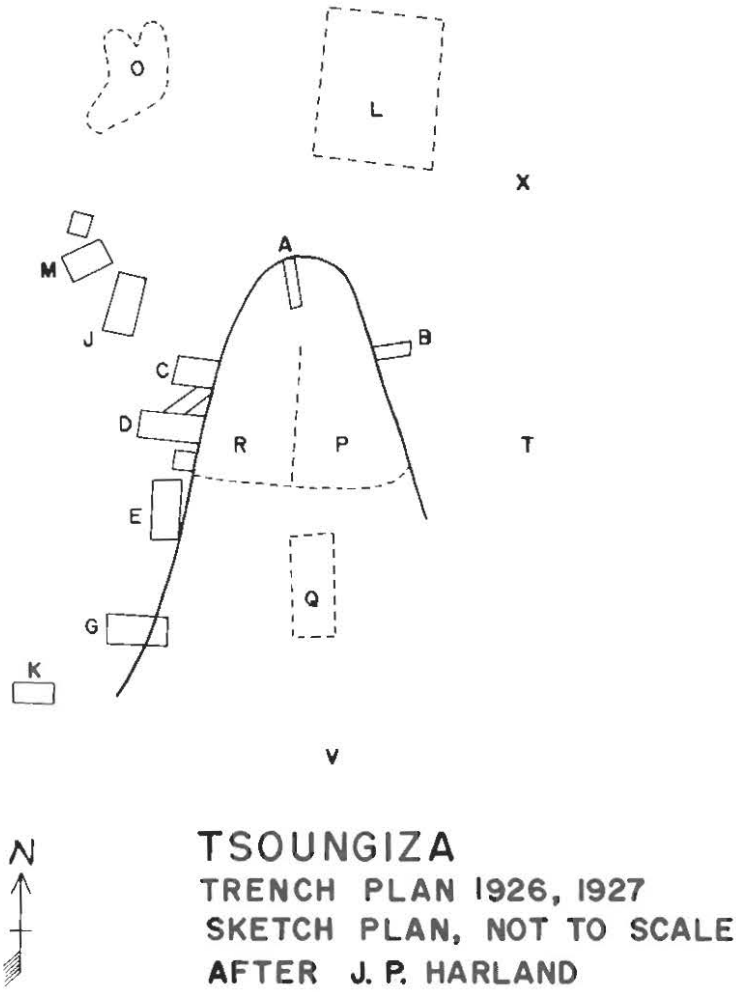

FIG. 12. Tsoungiza, sketch plan by J. P. Harland, 1927, showing approximate location of trenches (adapted by Julia E. Pfaff)

1. Surface survey offered an opportunity to study the relation of surface to subsurface artifact distributions.[78] Because of the degree of disturbance by earlier excavation, this technique was not practical over the whole of the site and was therefore confined to the southern area (Fig. 13, Excavation Units [EU] 2, 3, 6, 7, 8), where all surface material was picked up in 1 × 1 m. units. An intensive survey using a 10 × 10 m. grid of the unexcavated areas of the site is planned for the future. A slightly less intensive investigation examined the peripheries of the site according to standard procedures (pp. 604–607 above).

[78] L. R. Binford *et al.*, "Archaeology at Hatchery West, Carlyle, Illinois," *Memoirs of the Society for American Archaeology*, no. 24, 1970; C. L. Redman and P. J. Watson, "Systematic Intensive Surface Collection," *American Antiquity* 35, 1970, pp. 279–291.

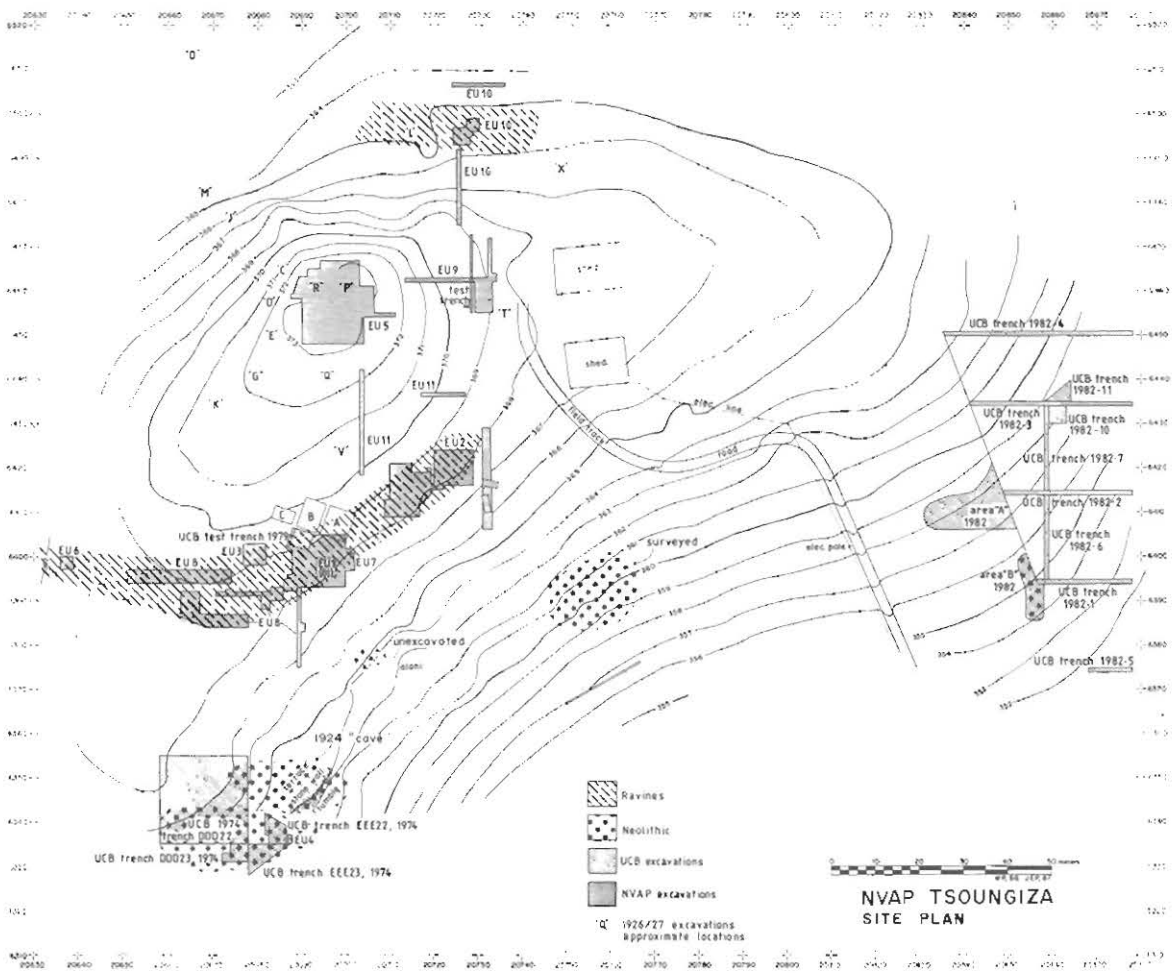

FIG. 13. Tsoungiza, plan of Excavation Units and earlier trenches, 1987. "UCB" refers to trenches of the University of California at Berkeley (Walter Payne and Julia E. Pfaff)

2. Experimentation with a variety of remote sensing procedures was carried out as a means of determining where to excavate. Extensive coring using a geological auger was conducted over the site. Cores were taken every 5 and 10 m. along north–south and east–west lines in order to determine the depth and type of stratigraphy and the depth of bedrock. This proved a quick and efficient means of learning about the stratigraphy of the site. In 1984 and 1985 limited areas of the site were inspected using a resistivity meter, and the preliminary results of this work were largely confirmed by excavation.[79]

[79] We thank Professor John Gifford for the loan of his auguring equipment and Dr. Kevin Pope for examining several cores in 1984. The resistivity work in 1984 was conducted by Mr. David Jordan of Bradford University, who offered his assistance while he was working with Professor Hector Williams at Stymphalos. In 1985 a more extensive resistivity survey was conducted by Mr. Carl Heron, presently at the University of Wales, who also supplied us with computer plot maps of the results.