

economic conditions within the empire would have affected differential responses, resulting in variations in types, methods, and locations of the linear fortifications.

Despite these shortcomings, the author deserves high praise for her arduous and meticulous work, which brings to scholarly attention hitherto neglected structures, such as the fortifications in the valley of the Porecka River, or the "kleine und grosse Schanze" on the Plain of Bačka (Serbia). The book will remain a standard reference work on Roman linear fortifications in years to come.

These four recent publications amply illustrate what is old and new in Roman military studies, and what research directions are underway at the turn of the millennium. Each is a valuable contribution in its own way. There is little doubt that Roman frontier studies will continue the traditional course of examining the excavated evidence in order to tighten up the existing classification and typology of military infrastructure and artifacts. Any new epigraphic

material will certainly help to improve the currently accepted framework of troop dispositions and dislocations. It is hoped, however, that research will also proceed beyond these goals in ways that will improve our understanding of the intricate military-civilian relationships in the frontier zones, urban centers, and the countryside. Such research would focus on variations in patterns of behavior, and differential stimuli and responses in sociopolitical and economic affairs. Simultaneously, traditional methods of research need to be enriched by the latest advances in behavioral sciences, including cross-cultural analysis, cultural ecology, and environmental studies.

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BOOK REVIEWS

TRACES OF THE PAST: UNRAVELING THE SECRETS OF ARCHAEOLOGY THROUGH CHEMISTRY, by *Joseph B. Lambert*. Pp. xvi + 319, color pls. 16, figs. 127, table 1. Helix Books/Addison-Wesley, Reading, Mass. 1997. \$30. ISBN 0-201-40928-3.

ARCHAEOLOGICAL CHEMISTRY, by *A. Mark Pollard* and *Carl Heron*. Pp. xv + 375, figs. 103, map 1, tables 2. Royal Society of Chemistry, Cambridge 1996. \$39. ISBN 0-85404-523-6.

Both of these volumes are refreshingly significant contributions to the archaeological science literature. In a departure from other texts that emphasize analytical techniques, they are organized around materials and what modern archaeologists can learn from them using chemistry. *Traces of the Past* and *Archaeological Chemistry* are, however, very different in scope, presentation, and intended audience.

Lambert's volume is directed at a wide audience, covers a comprehensive range of materials and applications in clear language, and has no in-text citations. It presents a variety of chemical applications to archaeology, with a broad chronological and geographic range of examples drawn from the literature, and at the same time has as a parallel theme the history of human manipulation of materials using chemistry. This approach should make the volume appealing to academic and lay scientific audiences as well as archaeology enthusiasts without any scientific background.

The first chapter ("Stone") opens with provenance studies, followed by a consideration of rock varnish, weathering, and synthetic stone (plaster and cement). The examples chosen range from the Colossi of Memnon, via Stonehenge, to obsidian in Mesoamerica. A much shorter second chapter ("Soil") is concerned with chemical traces of human activity at archaeological sites (e.g., phosphates and organic residues). Chapter 3 ("Pottery") covers clay and temper selection, firing and color, paints and glazes, using several

Bronze and Iron Age examples from the eastern Mediterranean, as well as Italian majolica and Chinese porcelain. The pigments and dyes used for wall paintings, cosmetics, pottery, and cloth, and even as writing ink, are the focus of chapter 4 ("Color"); Egyptian, Roman, Islamic, and other contributions to the development of glass and enamel are treated in chapter 5 ("Glass"). A wide variety of materials, including foods, fabrics, products from animals (e.g., skins, hides, hair, ivory), and natural substances (e.g., bitumen, asphalt, jet, resins, amber, lacquer, glue), are discussed in chapter 6 ("Organics"). The principal metals used in antiquity and the pyrotechnological processes used to transform them into coins, weapons, Chinese vessels, and even the Liberty Bell are dealt with in chapter 7 ("Metals"). The final chapter ("Humans") is concerned with dietary evidence from coprolites and isotopic analysis of bone; dating methods including amino acid racemization, electron spin resonance, and thermoluminescence; and population genetics based on blood groups and DNA studies. The volume also includes a brief epilogue, a glossary of some 250 terms, extensive references in a section entitled "Further Reading," a substantial index, and two time lines.

Traces of the Past is an extremely readable overview of the archaeological history of chemistry and of chemical analysis in modern archaeological practice. Lambert successfully weaves together the history of human chemical manipulation of materials with recent examples of their analysis and archaeological interpretation. The book is accurate and clear in its presentation of a wide range of materials and analytical methods, and the many archaeological examples used to illustrate their application are well chosen. The excellent text is enhanced by an abundance of illustrations, including 16 color plates.

Archaeological Chemistry, on the other hand, is aimed at students of archaeological science as well as "chemists interested in new applications." Its 10 chapters are seamlessly written by the two authors. Chapter 1 covers the historical development of archaeological chemistry. Chapter 2 dis-

cusses the many spectrographic analytical techniques available today, from the widely used x-ray fluorescence and neutron activation analysis, to newer mass-spectrometric methods, including ICP-MS. This chapter is highly technical but provides important information on how these methods work, their applicability to certain materials, the precision obtained, etc. Background on atomic structures and the electromagnetic spectrum, some fundamental constants, and alphabetic and periodic tables of the elements are found in the five appendices.

At the heart of the volume are seven topical chapters, each essentially a stand-alone article with numerous in-text citations and separate bibliography. Each begins with fully detailed sections on the structure and chemistry of the material and the scientific principles which make its analysis possible, followed by a single archaeological application. Pollard and Heron use selected case studies (listed here in parentheses), often based on their own research, to deal with different archaeological materials or topics: obsidian characterization (eastern Mediterranean); the geochemistry of clays (Rhenish pottery from Roman Gaul); the chemistry and corrosion of glass (Medieval York); the chemical study of metals (European brass); the chemistry and use of resinous and other organic substances (Neolithic tar in Europe, including samples from the Ice Man); amino acid stereochemistry (first people in the New World); and lead isotope geochemistry and the trade in metals (Mediterranean copper). Chapter 10 is a brief discussion of future directions in archaeological chemistry.

Archaeological Chemistry is designed with the premise that a thorough understanding and even mastery of the scientific principles is required for proper archaeological application and interpretation. Although there are numerous illustrations of molecular structures, phase diagrams, charts, and graphs, a strong science background is not necessary to learn a lot from this book. There are parts, however, which will be difficult reading for any nonspecialist. Pollard and Heron's rigorous approach recognizes that for archaeological chemistry to be successful, both high-quality science and informed realization of the archaeological implications are required. This has not always been achieved when physical scientists and archaeologists have collaborated, and this volume is an excellent model of how scholars with dual or hybrid training and experience can effectively integrate science and archaeology. *Archaeological Chemistry* is thus for anyone truly interested in the role of science in archaeology, and is well-suited as a primary text for a graduate-level course on archaeological science.

Traces of the Past is intended for a wider range of readers and will be an eye-opener for anyone unfamiliar with the application of chemistry to archaeological materials. Although it too provides a significant level of detail, this volume is eminently readable and informative for archaeology enthusiasts and scientists alike; it can be used as the principal text for an undergraduate course—as it is for chemistry students at my own university.

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THE LACONIA SURVEY 2: CONTINUITY AND CHANGE IN A GREEK RURAL LANDSCAPE. ARCHAEOLOGICAL DATA, by William Cavanagh, Joost Crowwel, R.W.V. Catling, and Graham Shipley (with contributions by many others). (BSA Suppl. 27.) Pp. xxx + 459, pls. 22, figs. 71, ill. 129, tables 8, indexes 3, maps 3 + pocket map. British School at Athens, London 1996. £58.50. ISBN 0-904887-23-5.

It is no easy task to shepherd a major archaeological project through to final publication; often fascicles do not appear in their intended order. The present volume represents the second half of a two-volume series on the British School at Athens's Laconia Survey, containing the primary data collected in fieldwork from 1983 to 1988, while the first volume, which will include an account of survey methods as well as diachronic syntheses of the results, has not yet appeared. There is much in volume 2 that cannot be properly digested without reference to information contained in the first volume; thus, a full assessment of the Laconia Survey cannot yet be written, and volume 2 must be evaluated on its merits as a repertorium of data.

The Laconia Survey amassed an impressive amount of information about surface findspots and their related cultural material in a relatively rugged, inland section of Laconia, encompassing approximately 70 km² to the east of Sparta. The first eight chapters (chs. 10–17; chs. 1–9 are assigned to volume 1) catalogue the pottery by chronological period (Neolithic, by Cavanagh; Early Helladic, by Cavanagh and Crowwel; Middle Helladic and Late Helladic I–II, by Cavanagh and Crowwel; Mycenaean [Late Helladic III], by Crowwel; Archaic and Classical, by Catling; Hellenistic, by H. Visscher; Roman, by J. Lawson; and Byzantine and Ottoman, by P. Armstrong). Although the chapters vary substantially in length as a consequence of the amount of material, their method and scope are similar. For each period, a number of ceramic "types" are generated, illustrated, and documented with comparanda. Commentary is limited mainly to chronological and taxonomic issues. A broader theme common to many contributions is the contrast between the assemblages from urban centers and sanctuaries, which have been at least minimally studied, and those from rural sites, which have received little or no prior attention.

Three short chapters (ch. 19, the small finds by M. Overbeek; ch. 20, the stone architectural and sculptural fragments by D. Hibler; and ch. 21, the epigraphic material by Shipley) report the miscellaneous finds. Overbeek's catalogue is dominated by terracotta objects, including architectural fragments, lamps, kiln equipment, loomweights, figurines, and plaques. Rare finds of metal, coins, stone, and glass are also described. The material presented by Hibler comprises 23 architectural pieces and one fragment of a sculpted relief. In Shipley's chapter, some 77 inscriptions from the survey area are assembled, ranging in date from Archaic to modern times.

Two chapters stand out as fundamentally different from the rest. The chapter on the chipped and ground stone (ch. 18) by T. Carter and M. Ydo, and that concerning the phosphate and geophysical surveys (ch. 22) by Cavanagh, R. Jones, and A. Sarris, are freestanding studies that can be under-