

AMERICAN JOURNAL OF ARCHAEOLOGY

THE JOURNAL OF THE ARCHAEOLOGICAL INSTITUTE OF AMERICA



Volume 104 • No. 1

January 2000

ARCHAEOLOGICAL INSTITUTE OF AMERICA
2000

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AMERICAN JOURNAL OF ARCHAEOLOGY

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Volume 104 · No. 1

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A Letter from the Editor-in-Chief

The year 2000 marks the 115th year of the *American Journal of Archaeology*. It is perhaps an appropriate moment to recall the priorities of the *AJA* as defined by its first editor, Arthur Lincoln Frothingham, Jr. He proposed that the *Journal* serve as “an instrument of centralization, in which all the important work done in the field of Archaeology may be brought to a focus and made accessible, in a convenient but scholarly form, to all who wish to inform themselves of the progress made in this branch of study” (quoted by A.A. Donohue, *AJA* 89 [1985] 7). This vision, expressed in the florid prose style of the late 19th century, has particular merit for this publication at the beginning of the 21st century. Although *AJA*'s mandate remains devoted to “the art and archaeology of ancient Europe and the Mediterranean, including the Near East and Egypt from prehistoric to late antique times,” we believe that the *Journal* must become ever more responsive to all that its mandate encompasses. This means publishing articles, field reports, newsletters, and reviews that reflect the vast changes in the scope, diversity, and complexity of the study of the art and archaeology of western Eurasia and northern Africa over the past half-century. As readers of this journal will discover, the work published in the current volume is moving in this direction. We hope this trend will continue and to that end encourage authors to submit articles that break new ground, challenge conventional thinking, present new finds, and, most importantly, advance our knowledge and understanding of the ancient world. Finally, the *Journal* will also publish, as it has since its inception, occasional articles in art and archaeology that extend beyond its stated geographic and chronological scope, as we believe it is important for our readership to remain informed of significant new work occurring in other parts of the globe and outside of antiquity.

As part of our effort to respond to the changes within our discipline, we have revised and updated our editorial policy, instructions for contributors, and list of abbreviations (pp. 3–24 below). Readers familiar with *AJA* will note that we have made significant changes in the manner in which works are cited in notes. We have also added a new section on the citation of electronic sources and provided a fuller presentation on matters of style. The list of abbreviations has been slightly expanded to include new publications that have been deemed essential additions.

The success of *AJA* in the 21st century depends not only on presenting scholarship that shapes the field, but also on building upon the *Journal*'s distinguished history as an accessible, state-of-the-art publication. To that end, we are committed to producing an electronic version of the *Journal* that will complement, not supersede or replace, the printed edition. With this issue, *AJA* has a new Web site (<http://www.ajaonline.org>). Over the course of the year, we hope to upgrade the site such that by January 2001 it will be possible for our readers to subscribe to a fully online version of the *Journal*.

The computer and Internet represent new media for the presentation of information and have their own attributes. Among these is the ability to present more efficiently and inexpensively more *reviewed and edited* information than can be published on paper in any given issue of the *Journal*. For *AJA* this will translate into the ability to present important supplementary material to some articles, particularly (but not exclusively) data from field reports. It will also mean having the capability to offer a select archive of past *AJA* articles online.

By the fall of this year, you will discover another change in the *Journal*: the appearance of a supplemental publication, *AJA Outlook*. This booklet lists both announcements of interest to *AJA* readers, such as calls for papers and notices of fellowships, scholarships, and the like, as well as paid advertisements. We hope that *Outlook* will both allow us to keep our readers better informed of opportunities in the field as well as provide a new source of revenue with which we can fund the technological development of the *Journal*.

It has not been my custom to introduce each volume with an editorial. But as the *Journal* changes, I believe it is important to explain these developments to you, our readers. Moreover, although I have not done so to this point, I believe it may be useful, from time to time, to discuss significant work appearing in future volumes.

As I look back on the long history of the *Journal*, one thing seems clear: *AJA* has not been averse to change and growth while remaining true to its mission. As the first Editor-in-Chief of the new century, I intend to continue that dynamic tradition.

R. BRUCE HITCHNER
Editor-in-Chief

Editorial Policy, Instructions for Contributors, and Abbreviations

The following expands and supersedes the notes for contributors and list of abbreviations published in *AJA* 95 (1991) 1–16. Contributors are requested to observe the following instructions when preparing manuscripts for submission to *AJA*. For guidance on issues not addressed below, authors are referred to *The Chicago Manual of Style*, 14th edition (Chicago 1993; hereafter *ChicagoMS*¹⁴) and J.R. Walker and T. Taylor, *The Columbia Guide to Online Style* (New York 1998; hereafter *ColumbiaGOS*).

Editorial Policy

1.1 The *American Journal of Archaeology*, the journal of the Archaeological Institute of America, is one of the oldest and most widely circulated journals of archaeology in the world. Founded in 1885, its second series was begun in 1897. The scope of *AJA* is defined by the Governing Board of the Archaeological Institute of America as “the art and archaeology of ancient Europe and the Mediterranean world, including the Near East and Egypt, from prehistoric to late antique times.” The editors welcome the submission of manuscripts on any subject within that definition. Submissions that announce discoveries, present new information, or break new theoretical ground are especially welcome. Although *AJA* has customarily published both short essays and articles of substantial length, contributions that do not exceed 8,000 words in length including works cited are preferred.

1.2 In keeping with the policy of the Archaeological Institute of America, the *AJA* will not accept any article that serves as the primary publication of any object or archaeological material in a private or public collection after 30 December 1973 unless it was part of a previously existing collection or has been legally exported from the country of origin (see F.S. Kleiner, “On the Publication of Recent Acquisitions of Antiquities,” *AJA* 94 [1990] 525–7).

1.3 In addition to articles, *AJA* regularly publishes newsletters on the archaeology of various regions, obituaries, the proceedings of each annual meeting of the Archaeological Institute of America, and solicited book reviews and review articles (see the editorial statement of the Book Review Co-editors in *AJA* 103 [1999] 699 and §6.1 below). Announcements of interest to *AJA* readers by nonprofit organizations are published in *AJA Outlook*.

1.4 An important aim of the *AJA* is to publish articles that reflect its broad scope and wide readership. Articles should therefore avoid being too narrowly focused and must be written in a style that is clear and accessible.

1.5 Manuscripts submitted to the *AJA* are reviewed

by appropriate experts *without exception*. While the members of the *AJA*'s advisory board often serve as reviewers, manuscripts are also screened by other experts in North America and abroad. Most submissions are read by two scholars in addition to the editors.

Preparation of Copy

INITIAL SUBMISSIONS

2.1 Manuscripts should be submitted to the Editor-in-Chief, *American Journal of Archaeology*, located at Boston University, 656 Beacon Street, Boston, Massachusetts 02215-2006 (tel. 617-353-9364, fax 617-353-6550, email aja@bu.edu). Articles must be submitted in triplicate, including three copies of all illustrations. Original photographs, drawings, and plans should not be sent at this time. Each submission must include an abstract of approximately 200 words outlining the subject(s) discussed, methodology, and conclusions. In order to facilitate the peer-review process, manuscripts should be prepared in such a way as to maintain the anonymity of the author. A cover letter providing the title, author's name, affiliation, mailing address, telephone number, and email address should accompany all submissions.

REVISED SUBMISSIONS

2.2 When an article is accepted for publication, the author will be asked to provide original illustrations and a revised version of the manuscript that conforms to the guidelines outlined in §§2.3–14, 3.1–9, 4.1–5, and 5.1–3 below. An article improperly prepared, even though accepted for publication, may be returned to the author for revision in accordance with these guidelines.

2.3 Abstract. With the revised manuscript the author should also submit a revised version of the article abstract.

2.4 Copies and format. One hard copy of the revised manuscript and one electronic copy (computer diskette) should be submitted. Ample margins of at least 1 in. (2.5 cm) are to be left on all edges of

the page. All parts of the manuscript—abstract, text, notes, figure captions, tables, and list of works cited—must be double-spaced on one side only of standard-size paper (8½ × 11 in. or A4). A computer diskette with an electronic copy of all parts of the manuscript should accompany the submission of the revised hard copy. A standard word processing program should be used for composition.

2.5 Paragraphs. Paragraphs should be justified to the left margin, separated by a space, and unindented.

2.6 Page numbering. All pages, including captions, notes, etc., should be numbered in the upper right-hand corner. Pages should be numbered consecutively throughout the text, not by individual sections.

2.7 Headings. All headings should be typed on a separate line, not run in with the text. A-level subheads should be set in all caps and B-level subheads in italics. C-level subheads are to be avoided but, when necessary, should be set underlined. Thus:

INTRODUCTION

Bronze Age Sites

Pylos

2.8 Greek characters. Authors are strongly encouraged to set Greek text in SPIonic, a public domain Greek font available in both PC and Macintosh formats at <http://purl.org/TC/fonts>.

2.9 Notes. Notes should be numbered in one series, double-spaced on pages assembled at the end of the text, never in the text or at the bottom of pages of text. Notes must be formatted according to the guidelines given below (§§4.1–5, 5.1–3).

2.10 Acknowledgments. Acknowledgments should be placed immediately before the first footnote and referenced by an asterisk at the end of the abstract.

2.11 Tables. All sections of tables should be double-spaced and numbered consecutively with Arabic numerals. Provide each table with a short caption above the table.

2.12 List of figures. A list of figures with appropriate captions, legends, and credits should be provided on a separate sheet at the end of the text. Captions should be set in the format suggested by *ChicagoMS*¹⁴ §11.24, with credits placed in parentheses:

Fig. 1. Detail of the northwest corner of the Sanctuary of Apollo with an earlier street superimposed on it

Fig. 2. Trench 1, section A-a, northern elevation with strata indicated, from the south. The foundation trench is represented by deposits 4–8 and 17.

Fig. 3. Corridor Z, layout of the decoration, assembled by the author. (After Paley and Sobolewski 1987, pl. 4; courtesy R.P. Sobolewski)

Fig. 4. Vedder painting concentric circles on the skyphos. Note the tilt of the pivot in the direction of motion. (R. Schreiber)

2.13 List of works cited. A list of sources cited in the text must accompany revised submissions, with full bibliographic information according to the guidelines given below (§§4.2, 5.1–3).

2.14 Illustrations. With the revised manuscript, authors should submit camera-ready illustrations of professional quality (original drawings, plans, etc., or glossy photographic prints, preferably no larger than 8½ × 11 in., or 21.5 × 28 cm). Illustrations should be numbered consecutively and marked (in soft pencil) on the reverse with the author's name and indication of top. Although analog format is preferred, illustrations may be submitted as digital files. Instructions concerning the submission of digital files are available upon request from the editors.

In selecting and sizing illustrations, authors should consider *AJA's* dimensions and column width. The maximum printable area is 6¾ × 9¼ in. (or 16.3 × 23.5 cm). Illustrations may be published from one-column (3 in., or 7.6 cm) to two-column (6¾ in., or 16.3 cm) width. Whenever possible, diagrams and plans should be drawn to the same scale.

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General Matters of Style

3.1 Spelling and capitalization. The American style of spelling is to be used. When there are alternative ways of spelling a word, the first choice in *Webster's Third New International Dictionary* (Springfield, Mass. 1986) is to be preferred. Authors should be consistent in their use of capitalization. Overcapitalization should be avoided; many words that are commonly capitalized may be set in lowercase (see in general *ChicagoMS*¹⁴ §§7.2–124).

Most period designations, except for those including proper nouns and adjectives, are lowercased:

late antiquity
ancient Greece
classical literature
imperial Rome

Cultural periods recognized by archaeologists based upon characteristic technology or typology are capitalized:

Bronze Age
Early Helladic period
Archaic period
Late Antique period

The names of specific buildings, monuments, and parts of cities are capitalized. Standing alone, such terms as *agora*, *theater*, *monument*, *prytaneion*, *fountain*, and the like are lowercased. When part of an official or formal name, however, such terms are uppercased:

the East Gymnasium; the gymnasium
the Athenian Agora; the agora
Treasury of Athens; Athenian treasury

The use of proper nouns as adjectives should be avoided unless such a construction has become conventional:

the Temple of Athena (*not* the Athena Temple)
but
Lucius Verus Monument

3.2 Numerals. Roman numerals are to be avoided whenever possible. Cardinal and ordinal numbers less than 10 should be spelled out; Arabic numerals should be used for all numbers 10 and above. If a number occurs in a phrase in which most of the numbers are above nine, use Arabic numerals for all:

first century
nine sherds
10th century
11 coins, 15 lamps, and 3 statuettes

3.3 Measurements. International units of measurements are to be preferred. All measurements should be expressed with Arabic numerals and abbreviated units unless they appear at the beginning of a sentence:

20 cm
Twenty-five kilometers from the site

If multiple dimensions are cited, use the following format:

1.5 × 1.9 m
0.3–0.5 cm in height

3.4 Chronological references. Era designations are to be set in capital letters followed by periods and without spaces, never in small caps. Authors may choose to use either B.C. (“before Christ”) and A.D. (*anno Domini*), or B.C.E. (“before the common era”) and C.E. (“common era”).

All numerical dates are to be written in their entirety except in cases of conventional epigraphic usage:

211–202 B.C.
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A.D. 208/9

References to decades should be identified by their century and expressed in numerals. No apostrophe is needed between the year and the s:

240s

In citing radiocarbon dates, lowercase letters (b.p., b.c.) may be used for uncalibrated determinations, but it is advisable to specify this convention at the first mention in the text:

4000 b.c. (uncalibrated)

Modern dates should be cited as day/month/year, without punctuation:

15 January 1996

3.5 Abbreviations. Units of measure should be abbreviated in the text. Common abbreviations such as

fig., *pl.*, *e.g.*, *i.e.*, and the like should be used in footnotes and parenthetical references within the text, but otherwise written out in full:

Horizontal bands below the rim on the interior of bowls and lids (e.g., fig. 15) are common.

or

As can be seen in figure 15, for example, horizontal bands below the rim on the interior of bowls and lids are common.

or

¹ See, e.g., fig. 15 for horizontal bands below the rim on the interior of bowls and lids.

3.6 Transliteration of Greek words and names. In the transliteration of Greek, most Latinate forms of Greek words or proper names that have come into general use may be employed. Authors are at liberty to use any system of transliteration that is intelligible and reasonably consistent, although the editors reserve the right to modify it to conform to current *AJA* editorial policy. Authors who wish to do so may follow the system recommended in *AR 45* (1998–1999) inside cover. Systems for the transliteration of other languages may be found in G.F. von Ostermann, *Manual of Foreign Languages*, fourth edition (New York 1952).

3.7 References to classical literature. Latin titles are preferred, italicized according to the list of abbreviations given in S. Hornblower and A. Spawforth, eds., *The Oxford Classical Dictionary*, third edition (Oxford 1996; hereafter *OCD*³), followed by the appropriate book, chapter, paragraph, or line numbers, separated by periods. Authors' names and titles should be written out completely when appearing in the text, abbreviated when appearing in footnotes or parenthetical references within the text. Only the first word, proper nouns, and proper adjectives are to be capitalized:

As noted by Vitruvius (*De arch.* 2.3.3)
Vitruvius notes in *De architectura* (2.3.3)
¹ Vitr. *De arch.* 2.3.3

3.8 Foreign terms and phrases. Familiar words and phrases in a foreign language should be set in Roman type unless there is a risk of confusion with an identically spelled English word:

in situ
terminus post quem
raison d'être
Weltanschauung
limes

Isolated words in a foreign language that are likely to be unfamiliar to readers, such as technical terms, should be set in italics upon their first appearance in the text. Thereafter they may be considered to be familiar:

An inscription on the column base records a vote granting the Naxians *promanteia*, or “precedence in consulting the oracle.” *Promanteia* in effect encourages the favor of the god by identifying his most faithful supplicants.

3.9 *Inscriptions.* Inscriptions should be marked according to the Leiden system, as outlined in A.G. Woodhead, *The Study of Greek Inscriptions*, second edition (Cambridge 1981) 6–11 and S. Dow, *Conventions in Editing: A Suggested Reformulation of the Leiden System* (Durham 1969). Inscriptions quoted within the text should be written with a division of lines corresponding to those on the stone:

ἀγαθῆ [τύχη
Μακεδὼν καὶ Πάμ-
φιλος οἱ Παμφίλου
ἱερασάμενοι τῆ γλυ-
5 κτάτη πατρίδι τὴν
ἀνάστασιν τοῦ ἱερά-
του παρ' ἑαυτῶν
ἐποιήσαντο

Appearing in notes, inscriptions may be written continuously, with a single upright line (|) used to mark the beginning of each line and a double upright line (||) used to indicate the beginning of every fifth line:

¹ The inscription (Calder 1928, 220 no. 417) reads:
ἀγαθῆ [τύχη | Μακεδὼν καὶ Πάμφιλος οἱ Παμφίλου |
ἱερασάμενοι τῆ γλυ||κτάτη πατρίδι τὴν | ἀνάστασιν
τοῦ ἱερά|του παρ' ἑαυτῶν | ἐποιήσαντο.

Bibliographical References and Footnotes

GENERAL POLICY

4.1 Footnotes may contain explanation, amplification, or commentary in addition to short bibliographical citations whose full form is given in a list of all cited works, published at the end of the article. No in-text citations are to be used.

FORMAT AND STYLE

4.2 *End list of works cited.* Articles will end with a list of all works cited, in alphabetical order by last name of first author. Sample citations are provided in §§4.6–9 and 5.4 below. Authors are encouraged to consult in addition *ChicagoMS*¹⁴ §§16.3–179 and *ColumbiaGOS* §§2.1–16.

4.3 *Footnotes.* Footnotes may consist of discussion only, discussion and bibliographical citation, or bibliographical citation only. Bibliographical citations in footnotes are drawn from the list of cited works appearing at the end of the article. These citations should consist of the author's last name, the year of publication, and relevant inclusive pages, sections, figures, plates, and the like.

4.3.1 *Footnotes with bibliographical citations only.* Footnotes containing no supplementary information should be formatted as follows:

SINGLE-VOLUME WORKS CITED

- ¹ Harrison 1982, 40–53.
² Blümel 1966, pl. 36b.
³ Jones 1937, 30 n. 23.

MULTIPLE-VOLUME WORKS CITED

- ¹ Lane 1904, 1:71–2.

MULTIPLE WORKS CITED

- ¹ Carlisle 1998, 265–87; see also Balzer 1996, 164–82; Margreth 1993.

MULTIPLE REFERENCES TO THE SAME WORK OR AUTHOR

- ¹ Lancaster 1998, 1999.
² Fitzmyer 1983, 47–106; 1990, 306.
³ Hamilton 1997a, 1997b.
⁴ Geagan 1995a, 16–20, 42.

4.3.2 *Footnotes with discussion and bibliographical citations.* Footnotes containing secondary discussion in addition to source documentation should be formatted in the author-date style as follows:

¹ Hallager (1996, 235) notes that the four “classic” nodule types had not yet appeared in MM II–III.

² The inscription has been dated by Robert (1966, 108–18; cf. Roueché 1993, 163) to the first century A.D. on the basis of the script.

4.3.3 *Supra and infra references.* When it is necessary to have footnotes refer to other footnotes, use “supra” and “infra” (without italics) instead of “above” and “below”:

¹ Although no paintings have been reported in room X (see supra n. 20), remains of wall paintings were found on the floor of neighboring room S (Tomabechi 1986, 54).

4.4 *Abbreviations.* Abbreviations of titles of periodicals and standard reference works are given in §7.2 below. Works not listed there should be written out in full. Abbreviations of ancient authors and works should be those listed in *OCD*³ xxix–liv.

4.5 *Page numbers.* Abbreviations such as f. or ff. for “following page(s)” are to be avoided; inclusive page references must be cited. The second number of inclusive page numbers is abbreviated to include only the changed part of the first number:

7–14	100–4	205–6	417–542
46–8	300–18	908–17	1241–7
89–112	1100–62	1004–7	1396–430

Inclusive Roman numerals should be given in full:

xxii–xxxviii cvi–cix

SAMPLE REFERENCES

4.6 *Sample references to books in list of works cited.* The reference list entry is given first, followed by a sample footnote entry:

ONE AUTHOR

Dyson, S.L. 1985. *The Creation of the Roman Frontier*. Princeton: Princeton University Press.

- ¹ Dyson 1985, 86.

TWO OR MORE AUTHORS

Curtis, J., and A. Green. 1997. *Excavations at Khirbet Khattuniyeh*. London: British Museum Press.

- ¹ Curtis and Green 1997, 104–5.

Hunter, J., C. Roberts, and A. Martin. 1997. *Studies in Crime: An Introduction to Forensic Archaeology*. New York: Routledge.

¹ Hunter et al. 1997, 46–51.

EDITOR OR TRANSLATOR AS AUTHOR

Colonna, G., ed. 1996. *L'altorilevo di Pyrgi: Dei ed eroi greci in Etruria*. Rome: "L'ERMA" di Bretschneider.

¹ Colonna 1996, fig. 18.

Krzyżaniak, L., K. Kroeper, and M. Kobusiewicz, eds. 1996. *Interregional Contacts in the Later Prehistory of Northeastern Africa*. Studies in African Archaeology 5. Poznań: Poznań Archaeological Museum.

¹ Krzyżaniak et al. 1996, 37.

Sommerstein, A.H., ed. and trans. 1982. *Clouds*. Comedies of Aristophanes 3. Chicago: Bolchazy-Carducci.

¹ Sommerstein 1982, 162 n. 52.

EDITOR OR TRANSLATOR WITH AUTHOR

Hakemi, A. 1997. *Shahdad: Archaeological Excavations of a Bronze Age Center in Iran*. Translated by S.M.S. Sajjadi. New Delhi: Istituto italiano per il Medio ed Estremo Oriente.

¹ Hakemi 1997, 453.

Droysen, J.G. 1996. *Ιστορία του Μεγάλου Αλεξάνδρου*. 3rd ed. 2 vols. Translated by R. Apostolides. Athens: Trapeza Pisteos.

¹ Droysen 1996, table 5.

ORGANIZATION OR ASSOCIATION AS AUTHOR

École française de Rome. 1995. *Les Grecs et l'Occident: Actes du colloque de la villa "Kérylos" (24–25 octobre 1991)*. CEFR 208. Rome: École française de Rome.

¹ École française de Rome 1995, 142–51.

BOOK IN A SERIES (WITH SERIES IN AJA LIST OF ABBREVIATIONS)

Buitron-Oliver, D. 1996. *The Sanctuary of Apollo Hylates at Kourion: Excavations in the Archaic Precinct*. SIMA 109. Jonsered: Paul Åström.

¹ Buitron-Oliver 1996, 55–7.

BOOK IN A SERIES (WITH SERIES NOT IN AJA LIST OF ABBREVIATIONS)

Knauß, F.S. 1997. *Der lineare Inselstil: Eine kykladische Keramikwerkstatt am Übergang von der spätgeometrischen zur archaischen Zeit*. Saarbrücker Studien zur Archäologie und alten Geschichte 13. Saarbrücken: Saarbrücker Druckerei und Verlag.

¹ Knauß 1997, 98–116.

BOOK IN MORE THAN ONE EDITION

Feder, K.L. 1996. *Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology*. 2nd ed. Mountain View, Calif.: Mayfield.

¹ Feder 1996, xii–xiii.

Pedley, J.G. 1997. *Greek Art and Archaeology*. Rev. ed. New York: Abrams.

¹ Pedley 1997, fig. 4.

BOOK IN MORE THAN ONE VOLUME (CITING THE WORK AS A WHOLE)

Kiderlen, M. 1995. *Megale Oikia: Untersuchungen zur Entwicklung aufwendiger griechischer Stadthausarchitek-*

tur: Von der Früharchaik bis ins 3. Jhr. v. Chr. 2 vols. Hürth: Martin Lange.

¹ Kiderlen 1995, 1:247.

BOOK IN MORE THAN ONE VOLUME (CITING A PARTICULAR VOLUME)

Caminos, R.A. 1998. *Semna-Kumma*. Vol. 2, *The Temple of Kumma*. London: Egypt Exploration Society.

¹ Caminos 1998, 100–17.

ONE VOLUME IN TWO OR MORE BOOKS

Fraser, P.M. 1960. *Samothrace*. Vol. 2, pt. 1, *The Inscriptions on Stone*. Bollingen Series 60.2.1. New York: Pantheon.

¹ Fraser 1960, 131–5.

BOOK IN PREPARATION FOR PUBLICATION

Patton, K.C. Forthcoming. *Religion of the Gods: Ritual, Paradox, and Divine Reflexivity*. New York: Oxford University Press.

¹ Patton (forthcoming), 148.

REPRINT EDITION

Myres, J.L. 1974. Reprint. *Handbook of the Cesnola Collection of Antiquities from Cyprus*. New York: Arno. Original edition, New York: Metropolitan Museum of Art, 1914.

¹ Myers 1974, no. 43.

4.7 Sample references to parts of books in list of works cited.

CHAPTERS OR OTHER TITLED PARTS OF A BOOK

Snodgrass, A. 1990. "Survey Archaeology and the Rural Landscape of the Greek City." In *The Greek City from Homer to Alexander*, edited by O. Murray and S. Price, 113–36. Oxford: Oxford University Press, Clarendon Press.

¹ Snodgrass 1990, 113–9.

Hägg, R. 1998. "Osteology and Greek Sacrificial Practice." In *Ancient Greek Cult Practice from the Archaeological Evidence*, edited by R. Hägg, 49–56. *SkrAth* 8°, 15. Stockholm: Paul Åströms.

¹ Hägg 1998, fig. 1.

CHAPTER ORIGINALLY PUBLISHED ELSEWHERE

Markle, M.M. 1999. "La sarisse macédonienne, la lance et l'équipement connexe." In *La guerre en Grèce à l'époque classique*, edited by P. Brulé and J. Oulhen, 149–72. Rennes: Presses universitaires de Rennes. Originally published in *AJA* 81 (1977) 323–39.

¹ Markle 1999, 162–5.

Mendels, D. 1998. "The Polemical Character of Manetho's *Aegyptiaca*." In *Identity, Religion, and Historiography: Studies in Hellenistic History*, 139–57. Journal for the Study of the Pseudepigrapha Suppl. 24. Sheffield: Sheffield Academic. Originally published in H. Verdin, G. Schepens, and E. De Keyser, eds., *Purposes of History: Studies in Greek Historiography from the 4th to the 2nd Centuries B.C.* (Leuven: Leuven University Press, 1990).

¹ Mendels 1998, 144–50.

PREFACE, FOREWORD, INTRODUCTION, AND SIMILAR PARTS OF A BOOK

de Montebello, P. 1988. Foreword to *Bronze and Iron: Ancient Near Eastern Artifacts in the Metropolitan Museum*

of Art, by O.W. Muscarella, 7. New York: The Metropolitan Museum of Art.

¹ de Montebello 1988, 7.

Vermeule, E. 1972. Introduction to *The Mycenaean Origin of Greek Mythology*, by M.P. Nilsson, vii–xiii. Sather Classical Lectures 8. Berkeley: University of California Press.

¹ Vermeule 1972, vii–xiii.

4.8 Sample references to journal articles.

JOURNAL ARTICLE (WITH JOURNAL IN LIST OF ABBREVIATIONS)

Büsing, H. 1982. "Metrologische Beiträge." *JdI* 97:1–45.

¹ Büsing 1982, 27–9.

JOURNAL ARTICLE (WITH JOURNAL NOT IN LIST OF ABBREVIATIONS)

Goren, Y., and I. Segal. 1995. "On Early Myths and Formative Technologies: A Study of Pre-Pottery Neolithic B Sculptures and Modeled Skulls from Jericho." *Israel Journal of Chemistry* 35:155–65.

¹ Goren and Segal 1995, 161.

JOURNAL WITH NO VOLUME NUMBER

Pichard, M.P. 1992. "La composition architecture des temples de Pagan." *CRAI*:357–74.

¹ Pichard 1992, 372–3.

BOOK REVIEWS

Smith, C. 1999. Review of *Il Comizio di Roma dalle origini all'età di Augusto*, by P. Carafa. *AJA* 103:571–2.

¹ Smith 1999, 571–2.

Wainwright, G. 1999. Review of *The Archaeological Process: An Introduction*, by I. Hodder. *Antiquity* 73:718–9.

¹ Wainwright 1999, 718–9.

4.9 Sample references to unpublished materials.

THESES AND DISSERTATIONS

Hoff, M.C. 1988. "The Roman Agora at Athens." Ph.D. diss., Boston University.

¹ Hoff 1988, 109–11.

PAPERS READ AT MEETINGS

Schluntz, E.L. 1999. "From Palace to Bouleuterion at Petra: Continuity of Function in Civic Administrative Space after Roman Annexation." Paper read at the 1999 Annual Meeting of the American Academy of Religion and the Society of Biblical Literature, 20–23 November, Boston.

¹ Schluntz 1999.

Citing Electronic Sources

GENERAL POLICY

5.1 The citing of electronic sources should be treated, as much as possible, as bibliographic references to printed sources, with sufficient information provided to allow readers to locate original documents or sources of information. If printed versions of electronic sources exist, references should be made to the most recent and complete version.

The most common sources of electronic information are files ("pages" comprising a "site") on the World

Wide Web (WWW) and electronic publications, such as CD-ROMs. Both of these are considered below. Authors are strongly encouraged to consult in addition *ColumbiaGOS* §§2.1–16. Modifications to *ColumbiaGOS* are available online at <http://www.columbia.edu/cu/cup/cgos/update.html>.

FORMAT

5.2 *References to files on Web sites.* The end list of works cited should normally contain full citations to the home page (introductory file) of a Web site; footnotes may cite a site's home page or other pages, files, links, paragraphs, or graphics. The basic format for citing electronic sources in the reference list is as follows:

Author's Last Name, Initial(s) *or* Maintainer *or* Sponsoring Institution. Year, date of publication *or* last update. "Title of Document." *Title of Site or Journal Name*, volume number (year) [if applicable]. Protocol and address and access path *or* directories (date of access).

5.3 *References to CD-ROMs and similar electronic publications.* The basic format for citing electronic publications in the reference list is as follows:

Author's Last Name, Initial(s). Date of publication. "Title of Article." *Title of Publication* (Version *or* file number). Series name [if applicable]. City: Publisher *or* Distributor.

5.4 Sample references.

HOME PAGE OF A WEB SITE

Wolle, A. 1999, 22 October. *Çatalhöyük: Excavations of a Neolithic Anatolian Höyük*. <http://catal.arch.cam.ac.uk/catal/catal.html> (29 November 1999).

¹ Wolle (1999, 22 October) introduces Ian Hodder's excavations at Çatal Höyük.

SECONDARY PAGE OF A WEB SITE

Wolle, A. 1999, 22 October. *Çatalhöyük: Excavations of a Neolithic Anatolian Höyük*. <http://catal.arch.cam.ac.uk/catal/catal.html> (29 November 1999).

¹ A summary of the 1999 excavations can be found in Wolle (1999, 22 October, <http://catal.arch.cam.ac.uk/catal/summer99/summer99.html>).

ARTICLE IN AN ONLINE JOURNAL

Hodder, I. 1999, 8 March. "Archaeology and Global Information Systems." *Internet Archaeology* 6 (1999). <http://intarch.ac.uk/> (25 November 1999).

¹ At the end of his online article, Hodder (1999, 8 March, "Conclusions," <http://intarch.ac.uk/journal/issue6/hodder/conclusions.html>) speaks of the "erosion of the boundaries between specialist and popular archaeology."

REVIEW IN AN ONLINE JOURNAL

Burton, D. 1999, 17 February. Review of *Sotades: Symbols of Immortality on Greek Vases*, by H. Hoffmann. *BMCR* 10 (1999). <http://ccat.sas.upenn.edu/bmcr/1999/1999-02-17.html> (29 November 1999).

¹ Burton (1999, 17 February, para. 4, <http://ccat.sas.upenn.edu/bmcr/1999/1999-02-17.html>) emphasizes the secular aspect of the Greek symposium.

ONLINE GRAPHIC

Hellenic Ministry of Culture. 1995–1998. “Hellenic Institute of Marine Archaeology.” <http://www.culture.gr/2/21/215/21502/e21503.html> (25 November 1999).

¹ The Hellenic Ministry of Culture (1995–1998, <http://www.culture.gr/2/21/215/21502/00/ienael.jpg>) illustrates the excavation of an EH II sauceboat from the underwater site of Dokos, perhaps a shipwreck.

Crane, G., ed. 1997, September. *The Perseus Project*. <http://www.perseus.tufts.edu> (29 November 1999).

¹ The remains of the south wall of the propylon can be seen in Crane (1997, September, <http://www.perseus.tufts.edu/cgi-bin/image?lookup=1991.09.0760>).

CD-ROM

Duchêne, H., and S. Girerd. 1998. *Delos: A Database of Archaeological Images* (U.S. version). Translated by N.K. Rauh, R.F. Townsend, and J.C. Bednar. New York: Educagri éditions.

¹ Duchêne and Girerd (1998, fig. 4278) illustrate a Hellenistic bronze plaque from the Fountain of Minoe depicting Hekate at an altar.

Guidelines for Book Reviewers

EDITORIAL POLICY

6.1 The *AJA* seeks reviews that assess a book's strengths and weaknesses, as well as locating it within the current field of scholarship. A review should not simply be a listing of contents, though its overall organization and emphasis are up to the individual reviewer. Please avoid lists of minor imperfections (e.g., misplaced commas), but do not hesitate to draw attention to serious editorial problems and errors of fact or interpretation. It is also helpful if reviewers indicate for which audiences and libraries the book seems appropriate. The editors reserve the right to edit for content and length. Examples of other reviews in recent fascicles of *AJA* may serve as models, and reviewers should read the editorial statement regarding reviews in *AJA* 103 (1999) 699. It is *AJA* policy not to print replies or responses to reviews.

The *AJA* does not accept unsolicited reviews but welcomes inquiries from those who are interested in reviewing individual books. Those who wish to become reviewers should contact the book review co-editors directly and provide a *curriculum vitae* that includes a list of publications.

SUBMISSIONS

6.2 Book review articles and book reviews should be submitted to Paul Rehak and John G. Younger, Co-editors, *AJA* Book Reviews, Department of Classical Studies, Box 90103, Duke University, Durham, North Carolina 27708-0103 (tel. 919-684-5076, fax 919-681-4262, email aja-reviews@duke.edu). Email submissions are preferred, but reviews may be sent on computer diskette or in hard copy. In the latter case, two copies should be submitted, double-spaced

on one side only of standard-size paper, with ample margins of at least 1 in. on all edges of the page.

FORMAT

6.3 Heading. Each review should be preceded by a heading in standard *AJA* format listing the book to be reviewed, number of pages and illustrations, publisher, year of publication, price (if available), and ISBN number:

AEGEAN PAINTING IN THE BRONZE AGE, by Sara A. Immerwahr. Pp. xxiv + 240, figs. 41, b&w pls. 92, color pls. 23. Pennsylvania State University Press, University Park 1990. \$50. ISBN 0-271-00628-5.

BURIAL ARCHAEOLOGY: CURRENT RESEARCH, METHODS, AND DEVELOPMENTS, edited by Charlotte A. Roberts, Francis Lee, and John Bintliff. (*BAR-IS* 211.) Pp. x + 293, figs. 56, tables 14. British Archaeological Reports, Oxford 1989. £18. ISBN 0-86054-671-3.

ATLAS PRÉHISTORIQUE DE LA TUNISIE. Vol. 11, KAIROUAN, by Jamel Zoughlami, Robert Chenorkian, and Mounira Harbi-Riahi. Pp. 158, figs. 38, pls. 74, foldout map 1. École française de Rome, Rome 1998. ISBN 2-7283-0521-8.

YOQNE'AM 1: THE LATE PERIODS, by A. Ben-Tor, M. Avissar, and Y. Portugali, with contributions by S. Agadi, M. Ben-Dov, B.Z. Kedar, E. Khamis, L. Kolska Horwitz and E. Dahan, A. Lester, Y. Meshorer, R. Rosenthal-Heginbottom, P. Smith, and P. Sabari. (*Qedem Reports* 3.) Pp. 262, figs. 479, b&w pl. 1, color pls. 2, tables 5, plans 35. Institute of Archaeology, Hebrew University of Jerusalem and the Israel Exploration Society, Jerusalem 1996. \$52. ISBN 0793-4289.

6.4 Author information. At the end of each review, authors should supply their name, full mailing address, and email address. The editors should be informed if authors wish proofs and offprints to be sent elsewhere than to this address.

6.5 References. Footnotes and lists of works cited are not to be used in book reviews. References should be kept to a minimum and incorporated into the text itself, as follows:

Enough compartment seals occurred to suggest that they were in use locally and not just as imports (660).

In his discussion of Julius Caesar (ch. 4), Arafat suggests that Pausanias viewed Caesar's refoundation of Corinth as the introduction to Greece of a large-scale and permanent Roman presence.

The equivocal nature of the archaeological remains cries for a more theoretically grounded approach, perhaps through ethnographic comparanda along the lines of P.K. Wason, *The Archaeology of Rank* (Cambridge 1994).

For the earlier period he points in particular to the apsidal houses and the incised pottery at the Altis site at Olympia, which J.B. Rutter (*Hesperia* 51 [1982] 459–88) has identified as belonging to the early EH III.

K.S.B. Ryholt (*The Political Situation in Egypt during the Second Intermediate Period, c. 1800–1550 B.C.* [Copenhagen 1997] 104–5) has offered a different perspective on the palace.

6.6 Quotations. Long quotations are to be avoided.

Abbreviations

7.1 The following list of abbreviations of periodicals, series, and books supersedes those previously published in *AJA*. Although it is unlikely that all archaeological journals—let alone all journals dealing with the ancient world—will ever adopt a universal set of abbreviations, those employed by *AJA* are generally in common use.

7.2 *Abbreviations of periodicals, series, books, etc.*

<i>A&A</i>	Antike und Abendland
<i>AA</i>	Archäologischer Anzeiger
<i>AAA</i>	Ἴ�ρχαιολογικὰ ἀνάλεκτα ἐξ Ἀθηνῶν (Athens Annals of Archaeology)
<i>AAES</i>	Publications of an American Archaeological Expedition to Syria
<i>AAS</i>	Annales archéologiques arabes syriennes
<i>AASOR</i>	Annual of the American Schools of Oriental Research
<i>AbhBerl</i>	Abhandlungen der Deutschen Akademie der Wissenschaften zu Berlin
<i>AbhGött</i>	Abhandlungen der Akademie der Wissenschaften zu Göttingen
<i>AbhHeid</i>	Abhandlungen der Heidelberger Akademie der Wissenschaften
<i>AbhKM</i>	Abhandlungen für die Kunde des Morgenlandes
<i>AbhLeip</i>	Abhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig, Philologisch-historische Klasse
<i>AbhMainz</i>	Abhandlungen der Geistes- und Sozialwissenschaftlichen Klasse, Akademie der Wissenschaften und der Literatur in Mainz
<i>AbhMünch</i>	Bayerische Akademie der Wissenschaften, München, Philosophisch-historische Klasse. Abhandlungen
<i>ABL</i>	C.H.E. Haspels, <i>Attic Black-figured Lekythoi</i> (Paris 1936)
<i>ABV</i>	J.D. Beazley, <i>Attic Black-figure Vase-painters</i> (Oxford 1956)
<i>Acme</i>	Acme: Annali della Facoltà di Filosofia e Lettere dell'Università statale di Milano
<i>ACNAC</i>	Ancient Coins in North American Collections
<i>ActaAArtHist</i>	Acta ad archaeologiam et artium historiam pertinentia
<i>ActaArch</i>	Acta archaeologica [Copenhagen]
<i>ActaArchHung</i>	Acta archaeologica Academiae scientiarum Hungaricae
<i>ActaArchLov</i>	Acta archaeologica Lovanensia
<i>ActaInstRomFin</i>	Acta Instituti romani Finlandiae
<i>ActaLund</i>	Acta Universitatis Lundensis
<i>ActaNum</i>	Acta numismatica
<i>ActaOrHung</i>	Acta orientalia Academiae scientiarum Hungaricae
<i>ADAJ</i>	Annual of the Department of Antiquities of Jordan
<i>AdI</i>	Annali dell'Istituto di corrispondenza archeologica
<i>Aegaeum</i>	Aegaeum: Annales d'archéologie égéenne de l'Université de Liège
<i>ÄgForsch</i>	Ägyptologische Forschungen
<i>AEM</i>	Archäologisch epigraphische Mitteilungen aus Österreich-Ungarn
<i>AEpigr</i>	L'Année épigraphique
<i>AeR</i>	Atene e Roma
<i>Aevum</i>	Aevum. Rassegna di scienze storiche, linguistiche e filologiche
<i>AF</i>	Archäologische Forschungen
<i>AfO</i>	Archiv für Orientforschung
<i>Africa</i>	Africa: Institut national d'Archéologie et d'Art [Tunis]
<i>AfrIt</i>	Africa italiana
<i>AfrRom</i>	L'Africa romana
<i>Agora</i>	Athenian Agora (Princeton 1953–)
<i>AgoraPicBk</i>	Excavations of the Athenian Agora: Picture Book (Princeton 1958–)
<i>AHR</i>	American Historical Review
<i>AIABull</i>	Bulletin of the Archaeological Institute of America
<i>AIANews</i>	Newsletter of the Archaeological Institute of America
<i>AiIN</i>	Annali dell'Istituto Italiano di Numismatica
<i>AION</i>	Annali dell'Istituto universitario orientali di Napoli
<i>AJA</i>	American Journal of Archaeology. The Journal of the Archaeological Institute of America
<i>AJAH</i>	American Journal of Ancient History
<i>AJN</i>	American Journal of Numismatics
<i>AJP</i>	American Journal of Philology
<i>AJSL</i>	American Journal of Semitic Languages and Literatures
<i>Akkadica</i>	Akkadica. Périodique bimestriel de la Fondation assyriologique Georges Dossin
<i>Altertum</i>	Das Altertum
<i>AltO</i>	Der alte Orient
<i>AM</i>	Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung
<i>AM-BH</i>	Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung: Beiheft

<i>AmerAnt</i>	American Antiquity
<i>AMIran</i>	Archäologische Mitteilungen aus Iran
<i>Ampurias</i>	Ampurias. Revista de prehistoria, arqueología y etnología
<i>AmtlBer</i>	Amtliche Berichte aus den königlichen Kunstsammlungen
<i>AMUGS</i>	Antike Münzen und geschnittene Steine
<i>Anadolu</i>	Anadolu. Revue annuelle des études d'archéologie et d'histoire en Turquie
<i>AnalBoll</i>	Analecta Bollandiana
<i>AnalFran</i>	Analecta Franciscana
<i>AnalOr</i>	Analecta Orientalia
<i>AnalRom</i>	Analecta Romana Instituti Danici
<i>Anatolia</i>	Anatolia. Revue annuelle de l'Institut d'archéologie de l'Université d'Ankara
<i>Anatolica</i>	Anatolica: Annuaire international pour les civilisations de l'Asie antérieure
<i>AnatSt</i>	Anatolian Studies. Journal of the British Institute of Archaeology at Ankara
<i>AncEg</i>	Ancient Egypt
<i>AncW</i>	The Ancient World
<i>AnnAcFenn</i>	Annales Academiae scientiarum Fennicae
<i>AnnArch</i>	Annales archéologiques
<i>AnnArchBrux</i>	Annales de la Société royale d'archéologie de Bruxelles
<i>AnnArchStorAnt</i>	Annali del Seminario di studi del mondo classico: Sezione di archeologia e storia antica
<i>AnnBari</i>	Annali della Facoltà di Lettere e Filosofia, Università di Bari
<i>AnnÉconSocCiv</i>	Annales. Économie, sociétés, civilisations
<i>AnnFaina</i>	Annali della Fondazione per il Museo "Claudio Faina"
<i>AnnInst</i>	Annales Institutorum
<i>AnnLiv</i>	Annals of Archaeology and Anthropology [Liverpool]
<i>AnnLux</i>	Annales de l'Institut archéologique du Luxembourg [Arlon]
<i>AnnNap</i>	Annali della Facoltà di Lettere e Filosofia, Università di Napoli
<i>AnnParis</i>	Annales de l'Université de Paris
<i>AnnPerugia</i>	Annali della Facoltà di Lettere e Filosofia, Università degli studi di Perugia
<i>AnnPhilHist</i>	Annuaire, Institut de philologie et d'histoire, Université libre, Bruxelles
<i>AnnPisa</i>	Annali della Scuola normale superiore di Pisa
<i>AnnRepCypr</i>	Annual Report of the Director of the Department of Antiquities, Republic of Cyprus
<i>AnnTor</i>	Annuario della Accademia delle scienze di Torino
<i>ANRW</i>	H. Temporini, ed., <i>Aufstieg und Niedergang der römischen Welt</i> (Berlin 1972–)
<i>ANSMN</i>	American Numismatic Society Museum Notes
<i>Antaeus</i>	Antaeus. Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften
<i>AntAfr</i>	Antiquités africaines
<i>AntCl</i>	L'Antiquité classique
<i>AntCr</i>	Antichità cretesi
<i>AntDenk</i>	Antike Denkmäler
<i>AntHung</i>	Antiquitas Hungarica
<i>Antiquity</i>	Antiquity. A Quarterly Review of Archaeology
<i>AntJ</i>	The Antiquaries Journal. The Journal of the Society of Antiquaries of London
<i>AntK</i>	Antike Kunst
<i>AntK-BH</i>	Antike Kunst. Beiheft
<i>AntP</i>	Antike Plastik
<i>AntW</i>	Antike Welt. Zeitschrift für Archäologie und Kulturgeschichte
<i>AnzAW</i>	Anzeiger für die Altertumswissenschaft
<i>AnzSchweiz</i>	Anzeiger für schweizerische Altertumskunde
<i>AnzWien</i>	Anzeiger. Österreichische Akademie der Wissenschaften, Wien, Philologisch-historische Klasse
<i>AOAT</i>	Alter Orient und Altes Testament
<i>Apulum</i>	Apulum. Acta Musei Apulensis
<i>AquilNost</i>	Aquileia nostra
<i>AR</i>	Archaeological Reports (supplement to <i>JHS</i>)
<i>Archaeology</i>	Archaeology. An Official Publication of the Archaeological Institute of America
<i>Archaeometry</i>	Archaeometry. Bulletin of the Research Laboratory for Archaeology and the History of Art, Oxford University
<i>ArchAnthrop</i>	Archiv für Anthropologie
<i>ArchAusgr</i>	Archäologische Ausgrabungen
<i>ArchAustr</i>	Archaeologia austriaca
<i>ArchCl</i>	Archeologia classica
<i>ArchDelt</i>	Ἀρχαιολογικὸν Δελτίον
<i>ArcheologiaPar</i>	Archeologia. Trésors des âges [Paris]
<i>ArcheologiaRom</i>	Archeologia. Rivista bimestrale [Rome]
<i>ArcheologiaWar</i>	Archeologia. Rocznik Instytutu historii kultury materialnej Polskiej akademii nauk [Warsaw]

<i>ArchErt</i>	Archaeologiai ertesító
<i>ArchEsp</i>	Archivo español de arte y arqueología
<i>ArchEspArq</i>	Archivo español de arqueología
<i>ArchEspArt</i>	Archivo español de arte
<i>ArchGeogr</i>	Archaeologia geographica
<i>ArchHom</i>	F. Matz and H.G. Buchholz, eds., <i>Archaeologia Homerica</i> (Göttingen 1967–)
<i>ArchInf</i>	Archäologische Informationen. Mitteilungen zur Ur- und Frühgeschichte
<i>Architectura</i>	Architectura. Zeitschrift für Geschichte der Baukunst
<i>ArchJug</i>	Archaeologia iugoslavica
<i>ArchJ</i>	Archaeological Journal
<i>ArchKF</i>	Archiv für Keilschriftforschung
<i>ArchKorrBl</i>	Archaeologisches Korrespondenzblatt
<i>ArchMiss</i>	Archives des Missions scientifiques et littéraires
<i>ArchNews</i>	Archaeological News
<i>ArchOrient</i>	Archiv orientální
<i>ArchPer</i>	Archaeologia perusina
<i>ArchPF</i>	Archiv für Papyrusforschung und verwandte Gebiete
<i>ArchPhilos</i>	Archives de philosophie
<i>ArchRW</i>	Archiv für Religionswissenschaft
<i>ArchSchw</i>	Archäologie der Schweiz. Mitteilungsblatt der Schweizerischen Gesellschaft für Ur- und Frühgeschichte
<i>ArchStor</i>	Archivio storico italiano
<i>ArchVen</i>	Archeologia veneta
<i>ArhVest</i>	Arheoloski vestnik
<i>ArqPort</i>	O arqueólogo português
<i>ArtB</i>	The Art Bulletin
<i>ArtJ</i>	Art Journal
<i>ARV²</i>	J.D. Beazley, <i>Attic Red-figure Vase-painters</i> , 2nd ed. (Oxford 1963)
<i>AS</i>	Assyriological Studies
<i>ASAE</i>	Annales du Service des antiquités de l'Égypte
<i>ASAtene</i>	Annuario della Scuola archeologica di Atene e delle Missioni italiane in Oriente
<i>ASE</i>	Archaeological Survey of Egypt
<i>ASR</i>	C. Robert et al., <i>Die antiken Sarkophagreliefs</i> (Berlin 1890–)
<i>Athenaeum</i>	Athenaeum. Studi periodici di letteratura e storia dell'antichità, Università di Pavia
<i>'Atiqot</i>	'Atiqot. Journal of the Israel Department of Antiquities
<i>AttiBol</i>	Atti e memorie. Deputazione di storia patria per le province di Romagna [Bologna]
<i>AttiCantCl</i>	Atti. Centro ricerche e documentazione sull'antichità classica
<i>AttiCSDIR</i>	Atti. Centro studi e documentazione sull'Italia romana
<i>AttiCSIR</i>	Atti del Congresso nazionale di studi romani
<i>AttiFir</i>	Atti e memorie dell'Accademia toscana di scienze e lettere "La Colombaria" [Florence]
<i>AttiIstr</i>	Atti e memorie della Società istriana di archeologia e storia patria
<i>AttiMGrecia</i>	Atti e memorie della Società Magna Grecia
<i>AttiMod</i>	Atti e memorie. Deputazione di storia patria per le antiche province modenesi
<i>AttiPal</i>	Atti della Accademia di scienze, lettere e arti di Palermo
<i>AttiPontAcc</i>	Atti della Pontificia Accademia romana di archeologia
<i>AttiTaranto</i>	Atti del Convegno di studi sulla Magna Grecia, Taranto
<i>AttiTor</i>	Atti della Accademia delle scienze di Torino
<i>AttiVen</i>	Atti. Istituto veneto di scienze, lettere ed arti
<i>AuChr</i>	Antike und Christentum
<i>AUF</i>	Archiv für Urkundenforschung
<i>AusgrFu</i>	Ausgrabungen und Funde. Nachrichtenblatt für Vor- und Frühgeschichte
<i>AvP</i>	Altertümer von Pergamon
<i>AZ</i>	Archäologische Zeitung
<i>BA</i>	Beiträge zur Assyriologie
<i>BAAIg</i>	Bulletin d'archéologie algérienne
<i>BABesch</i>	Bulletin antieke beschaving. Annual Papers on Classical Archaeology
<i>BAC</i>	Bulletin archéologique du Comité des travaux historiques et scientifiques
<i>BACrist</i>	Bullettino di archeologia cristiana
<i>BAHBeyrouth</i>	Bibliothèque archéologique et historique, Institut français d'archéologie de Beyrouth
<i>BalkSt</i>	Balkan Studies
<i>BaM</i>	Baghdader Mitteilungen
<i>BAMaroc</i>	Bulletin d'archéologie marocaine
<i>BANarb</i>	Bulletin de la Commission archéologique de Narbonne
<i>BAncLit</i>	Bulletin d'ancienne littérature et d'archéologie chrétienne

<i>BAntFr</i>	Bulletin de la Société nationale des antiquaires de France
<i>BAProv</i>	Bulletin archéologique du Provence
<i>BAR</i>	British Archaeological Reports
<i>BAR-BS</i>	British Archaeological Reports, British Series
<i>BAR-IS</i>	British Archaeological Reports, International Series
<i>BASOR</i>	Bulletin of the American Schools of Oriental Research
<i>BASP</i>	Bulletin of the American Society of Papyrologists
<i>BASPR</i>	Bulletin of the American School of Prehistoric Research
<i>BAssBudé</i>	Bulletin de l'Association Guillaume Budé
<i>BByzI</i>	Bulletin of the Byzantine Institute
<i>BCH</i>	Bulletin de correspondance hellénique
<i>BCH Suppl.</i>	Bulletin de correspondance hellénique. Supplément
<i>BClevMus</i>	The Bulletin of the Cleveland Museum of Art
<i>BCSSA</i>	Bollettino del Centro di studi per la storia dell'architettura
<i>BdA</i>	Bollettino d'arte
<i>BdI</i>	Bollettino dell'Istituto di corrispondenza archeologica
<i>Beazley Addenda</i>	L. Burn and R. Glynn, <i>Beazley Addenda: Additional References to ABV, ARV², and Paralipomena</i> (Oxford 1982)
<i>BÉFAR</i>	Bibliothèque des Écoles françaises d'Athènes et de Rome
<i>Belleten</i>	Belleten. Türk tarih kurumu
<i>Benndorf-Schöne</i>	O. Benndorf and O. Schöne, <i>Die antiken Bildwerke des Lateranensischen Museums</i> (Leipzig 1867)
<i>BÉO</i>	Bulletin d'études orientales [Damascus]
<i>BerJfV</i>	Berliner Jahrbuch für Vor- und Frühgeschichte
<i>BerlMus</i>	Berliner Museen. Berichte aus den preussischen Kunstsammlungen
<i>BerlNumZ</i>	Berliner numismatische Zeitschrift
<i>BerRGK</i>	Bericht der Römisch-Germanischen Kommission
<i>Berytus</i>	Berytus. Archaeological Studies
<i>BFAM</i>	Bulletin of the Fogg Art Museum
<i>BFC</i>	Bollettino di filologia classica
<i>BIABulg</i>	Izvestija na Arheologiceskija institut. Bulletin de l'Institut archéologique bulgare
<i>BIALond</i>	Bulletin of the Institute of Archaeology of the University of London
<i>BibAr</i>	Bibliotheca archaeologica [Rome]
<i>BibArch</i>	Biblical Archaeologist (see <i>NEA</i>)
<i>BibM</i>	Bibliotheca mesopotamica
<i>BibO</i>	Bibliotheca orientalis
<i>BICS</i>	Bulletin of the Institute of Classical Studies of the University of London
<i>BIÉ</i>	Bulletin de l'Institut d'Égypte
<i>BIES</i>	Bulletin of the Israel Exploration Society
<i>BIFAQ</i>	Bulletin de l'Institut français d'archéologie orientale de Caire
<i>BIHBelge</i>	Bulletin de l'Institut historique belge de Rome
<i>BIranInst</i>	Bulletin of the Iranian Institute
<i>BjB</i>	Bonner Jahrbücher des rheinischen Landesmuseums in Bonn und des Vereins von Altertumsfreunden im Rheinlande
<i>BJPES</i>	Bulletin of the Jewish Palestine Exploration Society
<i>BLund</i>	Bulletin de la Société royale de lettres de Lund
<i>BMC</i>	<i>Catalogue of the Greek Coins in the British Museum</i> (London 1873–)
<i>BMCR</i>	Bryn Mawr Classical Review [online]
<i>BMCRE</i>	<i>Coins of the Roman Empire in the British Museum</i> (London 1923–)
<i>BMCRR</i>	H.A. Grueber, <i>Coins of the Roman Republic in the British Museum</i> (London 1910)
<i>BMF</i>	Bulletin des Musées de France
<i>BMFA</i>	Bulletin of the Museum of Fine Arts, Boston
<i>BMFEA</i>	Bulletin of the Museum of Far Eastern Antiquities
<i>BMMA</i>	Bulletin of the Metropolitan Museum of Art, New York
<i>BMon</i>	Bulletin monumental
<i>BMonMusPont</i>	Bollettino dei monumenti, musei e gallerie Pontificie
<i>BMOP</i>	British Museum Occasional Paper
<i>BMQ</i>	British Museum Quarterly
<i>BMusBeyr</i>	Bulletin du Musée de Beyrouth
<i>BMusBrux</i>	Bulletin des Musées royaux d'art et d'histoire, Bruxelles
<i>BMusHongr</i>	Bulletin du Musée hongrois des beaux-arts
<i>BMusImp</i>	Bollettino del Museo dell'impero romano
<i>BMusKöln</i>	Museen in Köln. Bulletin
<i>BMV</i>	The British Museum Yearbook
<i>BNum</i>	Bulletin de numismatique
<i>BOffInt</i>	Bulletin de l'Office internationale des Instituts d'archéologie et d'histoire de l'art

<i>BollMC</i>	Bolletino dei Musei comunali di Roma
<i>BOran</i>	Bulletin trimestriel des antiquités africaines recueillis par les soins de la Société de géographie et d'archéologie de la Province d'Oran
<i>Boreas</i>	Boreas. Münstersche Beiträge zur Archäologie
<i>BPI</i>	Bollettino di paleontologia italiana
<i>BPW</i>	Berliner philologische Wochenschrift
<i>BrBr</i>	H. Brunn, <i>Denkmäler griechischer und römischer Sculptur in historischer Anordnung</i> (Munich: Bruckmann, 1888–1911)
<i>Britannia</i>	Britannia. A Journal of Romano-British and Kindred Studies
<i>BrookMusQ</i>	Brooklyn Museum Quarterly
<i>BSA</i>	Annual of the British School at Athens
<i>BSAE</i>	British School of Archaeology in Egypt, Publications
<i>BSOAS</i>	Bulletin of the School of Oriental and African Studies
<i>BSocBulg</i>	Bulletin de la Société archéologique bulgare
<i>BSOS</i>	Bulletin of the School of Oriental Studies
<i>BSPF</i>	Bulletin de la Société préhistorique française
<i>BSR</i>	(see <i>PBSR</i>)
<i>BSRAA</i>	Bulletin de la Société royale d'archéologie d'Alexandrie
<i>BSuM</i>	Bollettino dell'Associazione internazionale degli studi mediterranei
<i>BullAIEMA</i>	Bulletin d'information de l'Association internationale pour l'étude de la mosaïque antique
<i>BullCom</i>	Bollettino della Commissione archeologica Comunale di Roma
<i>BullGov</i>	Bollettino della Commissione archeologica del Governatorato di Roma
<i>BullRoum</i>	Académie roumaine, Bulletin de la section historique
<i>BullZagreb</i>	Bulletin international de l'Académie yugoslave [Zagreb]
<i>BurlMag</i>	The Burlington Magazine
<i>BWPr</i>	Winckelmannsprogramm der archäologischen Gesellschaft zu Berlin
<i>Byzantion</i>	Byzantion. Revue internationale des études byzantines
<i>ByzArch</i>	Byzantinisches Archiv
<i>ByzZeit</i>	Byzantinische Zeitschrift
<i>CAD</i>	The Assyrian Dictionary of the Oriental Institute of the University of Chicago
<i>Caesaraugusta</i>	Caesaraugusta. Publicaciones del Seminario de arqueología y numismática
<i>CaesMarit</i>	The Joint Expedition to Caesarea Maritima, Excavation Reports
<i>CAF</i>	Congrès archéologique de France
<i>CAG</i>	Carte archéologique de la Gaule
<i>CAH</i>	Cambridge Ancient History
<i>CahArch</i>	Cahiers archéologiques
<i>CahArchSubaq</i>	Cahiers d'archéologie subaquatique
<i>CahArt</i>	Cahiers d'art
<i>CahByrsa</i>	Cahiers de Byrsa
<i>CahÉtAnc</i>	Cahiers des études anciennes
<i>CahHistArch</i>	Cahiers d'histoire et d'archéologie
<i>CahNum</i>	Cahiers numismatiques
<i>CahRhod</i>	Cahiers rhodaniens
<i>CahTech</i>	Cahiers techniques de l'art
<i>CahTun</i>	Cahiers de Tunisie
<i>CAJ</i>	Cambridge Archaeological Journal
<i>CANE</i>	Civilizations of the Ancient Near East
<i>CB</i>	L.D. Caskey and J.D. Beazley, <i>Attic Vase Paintings in the Museum of Fine Arts, Boston</i> (Oxford 1931–1963)
<i>CÉFR</i>	Collection de l'École française de Rome
<i>CHD</i>	The Hittite Dictionary of the Oriental Institute of the University of Chicago
<i>ChicagoMS¹⁴</i>	<i>The Chicago Manual of Style</i> , 14th ed. (Chicago 1993)
<i>Chiron</i>	Chiron. Mitteilungen der Kommission für alte Geschichte und Epigraphik des Deutschen Archäologischen Instituts
<i>CHR</i>	Catholic Historical Review
<i>ChrÉg</i>	Chronique d'Égypte
<i>CIA</i>	Corpus inscriptionum atticarum
<i>CIE</i>	Corpus inscriptionum etruscarum
<i>CIG</i>	Corpus inscriptionum graecarum
<i>CII</i>	Corpus inscriptionum iudicarum
<i>CIL</i>	Corpus inscriptionum latinarum
<i>CIS</i>	Corpus inscriptionum semiticarum
<i>CJ</i>	Classical Journal
<i>ClAnt</i>	Classical Antiquity

<i>ClMed</i>	Classica et mediaevalia. Revue danoise de philologie et d'histoire
<i>ClRh</i>	Clara Rhodos
<i>CMH</i>	Cambridge Mediaeval History
<i>CMS</i>	Corpus der minoischen und mykenischen Siegel
<i>CoinH</i>	Coin Hoards
<i>CollLatomus</i>	Collection Latomus
<i>CoMIK</i>	J. Chadwick et al., <i>Corpus of Mycenaean Inscriptions from Knossos</i> (Cambridge 1986–1998)
<i>Corinth</i>	Corinth. Results of Excavations Conducted by the American School of Classical Studies at Athens
<i>CP</i>	Classical Philology
<i>CPCA</i>	University of California Publications in Classical Archaeology
<i>CPCP</i>	University of California Publications in Classical Philology
<i>CPJ</i>	Corpus papyrorum Judaicarum
<i>CQ</i>	Classical Quarterly
<i>CR</i>	Classical Review
<i>CRAI</i>	Comptes rendus des séances de l'Académie des inscriptions et belles-lettres [Paris]
<i>CretChron</i>	Κρητικά χρονικά. Κείμενα και μελέται της κρητικής ιστορίας
<i>CronCatania</i>	Cronache di archeologia e di storia dell'arte, Università di Catania
<i>CronErcol</i>	Cronache ercolanensi
<i>CronPomp</i>	Cronache pompeiane
<i>CRPetersb</i>	Compte-rendu de la Commission impériale archéologique, St. Pétersbourg
<i>CSCA</i>	University of California Studies in Classical Antiquity
<i>CSCO</i>	Corpus scriptorum christianorum orientalium
<i>CSE</i>	Corpus speculorum etruscorum
<i>CSEL</i>	Corpus scriptorum ecclesiasticorum latinorum
<i>CSIR</i>	Corpus signorum imperii romani
<i>CUE</i>	Corpus delle urne etrusche di eta ellenistics
<i>CurrAnthr</i>	Current Anthropology
<i>CVA</i>	Corpus vasorum antiquorum
<i>CVind</i>	Commentationes Vindobonenses
<i>CW</i>	Classical World
<i>Dacia</i>	Dacia. Revue d'archéologie et d'histoire ancienne
<i>DACL</i>	F. Cabrol and E. Leclercq, <i>Dictionnaire d'archéologie chrétienne et de liturgie</i> (Paris 1907–1953)
<i>DAF</i>	Documents d'archéologie française
<i>DarSag</i>	C. Daremberg and E. Saglio, <i>Dictionnaire des antiquités grecques et romaines</i> (Paris 1875)
<i>Dédalo</i>	Dédalo. Revista de arte e archeologia
<i>Délos</i>	Exploration archéologique de Délos faite par l'École française d'Athènes
<i>DenkschrWien</i>	Österreichische Akademie der Wissenschaften, Wien, Philosophisch-historische Klasse. Denkschriften
<i>DialArch</i>	Dialoghi di archeologia
<i>Dioniso</i>	Dioniso. Trimestrale di studi sul teatro antico
<i>DissPan</i>	Dissertationes Pannonicae
<i>DissPontAcc</i>	Atti della Pontificia Accademia romana di archeologia. Dissertazioni
<i>Djbn</i>	Deutsches Jahrbuch für Numismatik
<i>DLZ</i>	Deutsche Literaturzeitung
<i>DM</i>	Damaszener Mitteilungen
<i>Docs²</i>	M. Ventris and J. Chadwick, <i>Documents in Mycenaean Greek</i> , 2nd ed. (Cambridge 1973)
<i>DOP</i>	Dumbarton Oaks Papers
<i>DossPar</i>	Histoire et archéologie. Les dossiers [Paris]
<i>EA</i>	P. Arndt and W. Amelung, <i>Photographische Einzelaufnahmen antiker Skulpturen</i> (Munich 1893–1940)
<i>EAA</i>	<i>Enciclopedia dell'arte antica, classica e orientale</i> (Rome 1958–1984)
<i>EchCl</i>	Echos du monde classique. Classical Views
<i>EchOr</i>	Echos d'Orient
<i>EEF</i>	Egypt Exploration Fund
<i>EES</i>	Egypt Exploration Society
<i>ÉHPR</i>	Études d'histoire et de philosophie religieuses
<i>EHR</i>	English Historical Review
<i>EJA</i>	European Journal of Archaeology
<i>Eirene</i>	Eirene. Studia graeca et latina
<i>Emerita</i>	Emerita. Boletín de lingüística y filología clásica
<i>EntrHardt</i>	Entretiens Hardt
<i>Eos</i>	Eos. Commentarii Societatis philologiae polonorum
<i>EpetByz</i>	Ἐπετηρίς Ἑταιρείας βυζαντινῶν σπουδῶν
<i>EphDac</i>	Ephemeris dacoromana

<i>EphEp</i>	Ephemeris epigraphica
<i>Ephesos</i>	Forschungen in Ephesos veröffentlicht vom Österreichischen Archäologischen Institut in Wien
<i>EpigAnat</i>	Epigraphica Anatolica. Zeitschrift für Epigraphik und historische Geographie Anatoliens
<i>Epigraphica</i>	Epigraphica. Rivista italiana di epigrafia
<i>EPK</i>	Egyetemes philologiai Közlöny
<i>ÉPRO</i>	Études préliminaires aux religions orientales dans l'empire romain
<i>EpSt</i>	Epigraphische Studien
<i>EranJb</i>	Eranos Jahrbuch
<i>Eranos</i>	Eranos. Acta philologica suecana
<i>Ergon</i>	Tò 'Εργον τῆς Ἀρχαιολογικῆς Ἑταιρείας
<i>ErIsr</i>	Eretz-Israel
<i>ES</i>	Etruskische Spiegel
<i>ESA</i>	Eurasia septentrionalis antiqua
<i>Espérandieu</i>	E. Espérandieu, <i>Recueil général des bas-reliefs, statues, et bustes de la Gaule romaine</i> (Paris 1907–)
<i>ET</i>	H. Rix, <i>Etruskische Texte: Editio minor</i> (Tübingen 1991)
<i>ÉtBalk</i>	Études balkaniques
<i>ÉtByz</i>	Études byzantines
<i>ÉtCelt</i>	Études celtiques
<i>ÉtCl</i>	Les études classiques
<i>ÉtCrét</i>	Études crétoises
<i>ÉthmolAnz</i>	Ethnologischer Anzeiger
<i>Ethnos</i>	Ethnos. Revista do Instituto português de arqueologia, história e etnografia
<i>ÉtPap</i>	Études de papyrologie
<i>EtrStud</i>	Etruscan Studies. Journal of the Etruscan Foundation
<i>ÉtTrav</i>	Études et travaux. Studia i prace. Travaux du Centre d'archéologie méditerranéenne de l'Académie des sciences polonaise
<i>EVP</i>	J.D. Beazley, <i>Etruscan Vase Painting</i> (Oxford 1947)
<i>EW</i>	East and West
<i>ExcArqEsp</i>	Excavaciones arqueológicas en España
<i>Expedition</i>	Expedition. Bulletin of the University Museum of the University of Pennsylvania
<i>FA</i>	Fasti archaeologici
<i>FdD</i>	Fouilles de Delphes, École française d'Athènes
<i>FelRav</i>	Felix Ravenna
<i>FGrHist</i>	F. Jacoby, <i>Fragmente der griechischen Historiker</i> (Berlin 1923–)
<i>FHG</i>	K. Müller, <i>Fragmenta historicorum graecorum</i> (Frankfurt 1975, repr. of 1841–1938 eds.)
<i>FIFAO</i>	Fouilles de l'Institut français d'archéologie orientale
<i>Figlina</i>	Figlina. Documents du Laboratoire de céramologie de Lyon
<i>Fittschen-Zanker</i>	K. Fittschen and P. Zanker, <i>Katalog der römischen Porträts in den Capitolinischen Museen und den anderen kommunalen Sammlungen der Stadt Rom</i> (Mainz 1985–)
<i>FolArch</i>	Folia archaeologica. Magyar Nemzeti Múzeum Történeti Múzeumának Évkönyve
<i>FolOr</i>	Folia orientalia
<i>FR</i>	A. Furtwängler and K. Reichhold, <i>Griechische Vasenmalerei</i> (Munich 1900–1925)
<i>Franchthi</i>	Excavations at Franchthi Cave, Greece
<i>FuB</i>	Forschungen und Berichte. Staatliche Museen zu Berlin
<i>FuF</i>	Forschungen und Fortschritte
<i>GacNum</i>	Gaceta numismática [Barcelona]
<i>Gallia</i>	Gallia. Fouilles et monuments archéologiques en France métropolitaine
<i>GalliaPrHist</i>	Gallia préhistoire
<i>GaR</i>	Greece and Rome
<i>GazArch</i>	Gazette archéologique
<i>GBA</i>	Gazette des beaux-arts
<i>GCS</i>	Griechische christliche Schriftsteller der ersten drei Jahrhunderte
<i>Genava</i>	Genava. Bulletin du Musée de Genève
<i>Gercke-Norden</i>	A. Gercke and E. Norden, <i>Einleitung in die Altertumswissenschaft</i> (Leipzig 1910–1912)
<i>Germania</i>	Germania. Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts
<i>GettyMusJ</i>	The J. Paul Getty Museum Journal
<i>GGA</i>	Göttingische gelehrte Anzeiger
<i>GGR³</i>	M.P. Nilsson, <i>Geschichte der griechischen Religion</i> , 3rd ed. (Munich 1967)
<i>Glotta</i>	Glotta. Zeitschrift für griechische und lateinische Sprache
<i>Gnomon</i>	Gnomon. Kritische Zeitschrift für die gesamte klassische Altertumswissenschaft
<i>GORILA</i>	L. Godart and J.-P. Olivier, <i>Recueil des inscriptions en Linéaire A</i> (Paris 1976–)
<i>GöttNachr</i>	Nachrichten von der Gesellschaft der Wissenschaften zu Göttingen

<i>GPVJ</i>	Gesellschaft pro Vindonissa. Jahresbericht
<i>GrazBeitr</i>	Grazer Beiträge
<i>GRBM</i>	Greek, Roman and Byzantine Monographs
<i>GRBS</i>	Greek, Roman and Byzantine Studies
<i>GRBSA</i>	Greek, Roman and Byzantine Scholarly Aids
<i>GrCircLB</i>	G.E. Mylonas, <i>Grave Circle B of Mycenae</i> (Lund 1964)
<i>Gymnasium</i>	Gymnasium. Zeitschrift für Kultur der Antike und humanistische Bildung
<i>HallWPr</i>	Hallisches Winckelmannsprogramm
<i>HBA</i>	Hamburger Beiträge zur Archäologie
<i>HBN</i>	Hamburger Beiträge zur Numismatik
<i>HdA</i>	<i>Handbuch der Archäologie</i> (<i>Handbuch der Altertumswissenschaft</i> , Berlin 1931–)
<i>Helbig⁴</i>	W. Helbig, <i>Führer durch die öffentlichen Sammlungen klassischer Altertümer in Rom</i> , 4th ed. supervised by H. Speier (Tübingen 1963–1972)
<i>Heldensage³</i>	F. Brommer, <i>Vasenlisten zur griechischen Heldensage</i> , 3rd ed. (Marburg 1973)
<i>Helikon</i>	Helikon. Rivista di tradizione e cultura classica
<i>Helinium</i>	Helinium. Revue consacrée à l'archéologie des Pays-Bas, de la Belgique et du Grand Duché de Luxembourg
<i>Helios</i>	Helios. Journal of the Classical Association of the Southwestern United States
<i>HelvArch</i>	Helvetia archaeologica
<i>Hephaistos</i>	Hephaistos. Kritische Zeitschrift zur Theorie und Praxis der Archäologie und angrenzendes Wissenschaften
<i>Hermes</i>	Hermes. Zeitschrift für klassische Philologie
<i>Hesperia</i>	Hesperia. The Journal of the American School of Classical Studies at Athens
<i>HispAnt</i>	Hispania antiqua. Revista de historia antigua
<i>Historia</i>	Historia. Zeitschrift für alte Geschichte
<i>HistrArch</i>	Histria archaeologica
<i>HJ</i>	Historisches Jahrbuch
<i>HSCP</i>	Harvard Studies in Classical Philology
<i>HTR</i>	Harvard Theological Review
<i>HuelvaArq</i>	Huelva arqueológica
<i>HZ</i>	Historische Zeitschrift
<i>ICr</i>	Inscriptiones creticae
<i>IEJ</i>	Israel Exploration Journal
<i>IG</i>	Inscriptiones graecae
<i>IGCH</i>	C. Kraay, O. Mørkholm, and M. Thompson, <i>An Inventory of Greek Coin Hoards</i> (New York 1973)
<i>IGForsch</i>	Indogermanische Forschungen
<i>IGLSyr</i>	Inscriptions grecques et latines de la Syrie
<i>IGRR</i>	Inscriptiones graecae ad res romanas pertinentes
<i>II</i>	Inscriptiones Italiae
<i>Ijb</i>	Indogermanisches Jahrbuch
<i>IJCT</i>	International Journal of the Classical Tradition
<i>IJMES</i>	International Journal for Middle East Studies
<i>IJNA</i>	International Journal of Nautical Archaeology and Underwater Exploration
<i>ILLRP</i>	H. Degraasi, <i>Inscriptiones latinae liberae rei publicae</i> (Rome 1957–)
<i>ILN</i>	The Illustrated London News
<i>ILS</i>	H. Dessau, ed., <i>Inscriptiones latinae selectae</i> (1892–1916)
<i>IMJ</i>	Israel Museum Journal
<i>IMN</i>	Israel Museum News
<i>INJ</i>	Israel Numismatic Journal
<i>IntArch</i>	Internet Archaeology [online]
<i>IOS</i>	Israel Oriental Studies
<i>Iran</i>	Iran. Journal of the British Institute of Persian Studies
<i>Iranica</i>	Iranica antiqua
<i>Iraq</i>	Iraq, published by the British School of Archaeology in Iraq
<i>IsMEO</i>	Istituto italiano per il Medio ed Estremo Oriente
<i>İstArkMüzYill</i>	İstanbul Arkeoloji Müzeleri Yillığı
<i>IstForsch</i>	Istanbuler Forschungen
<i>IstMitt</i>	Istanbuler Mitteilungen
<i>IstMitt-BH</i>	Istanbuler Mitteilungen. Beiheft
<i>Italica</i>	Italica. Cuadernos de trabajos de la Escuela española de historia y arqueología en Roma
<i>JaarbAkAmst</i>	Jaarboek van de Akademie te Amsterdam
<i>JAC</i>	Jahrbuch für Antike und Christentum

<i>JANER</i>	Journal of Ancient Near Eastern Religions
<i>JANES</i>	Journal of the Ancient Near East Society of Columbia University
<i>JAnthArch</i>	Journal of Anthropological Archaeology
<i>JAOS</i>	Journal of the American Oriental Society
<i>JARCE</i>	Journal of the American Research Center in Egypt
<i>JAS</i>	Journal of Archaeological Science
<i>JBerlMus</i>	Jahrbuch der Berliner Museen
<i>JBernHistMus</i>	Jahrbuch des Bernischen historischen Museums
<i>JBL</i>	Journal of Biblical Literature
<i>JCS</i>	Journal of Cuneiform Studies
<i>JdI</i>	Jahrbuch des Deutschen Archäologischen Instituts
<i>JdI-EH</i>	Jahrbuch des Deutschen Archäologischen Instituts. Ergänzungsheft
<i>JEA</i>	The Journal of Egyptian Archaeology
<i>JEOL</i>	Jaarbericht van het Vooraziatisch-egyptisch genootschap "Ex Oriente Lux"
<i>JESHO</i>	Journal of the Economic and Social History of the Orient
<i>JFA</i>	Journal of Field Archaeology
<i>JGH</i>	Journal of Garden History (continued by <i>SHG</i>)
<i>JGött</i>	Jahrbuch der Akademie der Wissenschaften in Göttingen
<i>JGS</i>	Journal of Glass Studies
<i>JHS</i>	Journal of Hellenic Studies
<i>JIAN</i>	Journal international d'archéologie numismatique
<i>JIES</i>	Journal of Indo-European Studies
<i>JJurP</i>	Journal of Juristic Papyrology
<i>JKF</i>	Jahrbuch für kleinasiatische Forschung
<i>JKSW</i>	Jahrbuch der Kunsthistorischen Sammlungen in Wien
<i>JMA</i>	Journal of Mediterranean Archaeology
<i>JMainz</i>	Jahrbuch. Akademie der Wissenschaften und der Literatur [Mainz]
<i>JMFA</i>	Journal of the Museum of Fine Arts, Boston
<i>JMithSt</i>	Journal of Mithraic Studies
<i>JMünch</i>	Jahrbuch. Bayerische Akademie der Wissenschaften [Munich]
<i>JNES</i>	Journal of Near Eastern Studies
<i>JNG</i>	Jahrbuch für Numismatik und Geldgeschichte
<i>JÖBG</i>	Jahrbuch der Österreichischen Byzantinischen Gesellschaft
<i>JOS</i>	Journal of Oman Studies
<i>JP</i>	Journal of Philology
<i>JPKB</i>	Jahrbuch preussischer Kulturbesitz
<i>JPKS</i>	Jahrbuch der preussischen Kunstsammlungen
<i>JPOS</i>	Journal of the Palestine Oriental Society
<i>JPR</i>	Journal of Prehistoric Religion
<i>JQR</i>	Jewish Quarterly Review
<i>JRA</i>	Journal of Roman Archaeology
<i>JRAI</i>	Journal of the Royal Anthropological Institute
<i>JRAS</i>	Journal of the Royal Asiatic Society
<i>JRel</i>	Journal of Religion
<i>JRGS</i>	Journal of the Royal Geographic Society
<i>JRGZM</i>	Jahrbuch des Römisch-germanischen Zentralmuseums, Mainz
<i>JRS</i>	Journal of Roman Studies
<i>JSAH</i>	Journal of the Society of Architectural Historians
<i>JSav</i>	Journal des savants
<i>JSOR</i>	Journal of the Society of Oriental Research
<i>JSS</i>	Journal of Semitic Studies
<i>JThS</i>	Journal of Theological Studies
<i>Jura</i>	Jura. Rivista internazionale di diritto romano e antico
<i>JWalt</i>	Journal of the Walters Art Gallery
<i>JWarb</i>	Journal of the Warburg and Courtauld Institutes
<i>Kadmos</i>	Kadmos. Zeitschrift für vor- und frühgriechische Epigraphik
<i>Kairos</i>	Kairos. Zeitschrift für Religionswissenschaft und Theologie
<i>Karo</i>	G. Karo, <i>Die Schachtgräber von Mykenai</i> (Munich 1930–1933)
<i>Karthago</i>	Karthago. Revue d'archéologie africaine
<i>Kenchreai</i>	Kenchreai. Eastern Port of Corinth. Results of Investigations by the University of Chicago and Indiana University for the American School of Classical Studies at Athens
<i>Kerameikos</i>	Kerameikos. Ergebnisse der Ausgrabungen
<i>KF</i>	Kleinasiatische Forschungen
<i>KirchPA</i>	J.E. Kirchner, <i>Prosopographia attica</i> (Chicago 1981, repr. of 1901–1903 ed.)

<i>Klearchos</i>	Klearchos. Bollettino dell'Associazione amici del Museo nazionale di Reggio Calabria
<i>Klio</i>	Klio. Beiträge zur alten Geschichte
<i>KlPauly</i>	Der kleine Pauly. Lexicon der Antike
<i>KMT</i>	KMT. A Modern Journal of Ancient Egypt
<i>Kokalos</i>	Κόκαλος. Studi pubblicati dall'Istituto di storia antica dell'Università di Palermo
<i>KölnJb</i>	Kölner Jahrbuch für Vor- und Frühgeschichte
<i>LÄ</i>	Lexicon der Ägyptologie
<i>Latinitas</i>	Latinitas. Commentarii linguae latinae excolendae
<i>Latomus</i>	Latomus. Revue d'études latines
<i>LCM</i>	Liverpool Classical Monthly
<i>Levant</i>	Levant. Journal of the British School of Archaeology in Jerusalem and the British Institute at Amman for Archaeology and History
<i>LibAnt</i>	Libya antiqua
<i>LibSt</i>	Libyan Studies
<i>LIMC</i>	<i>Lexicon iconographicum mythologiae classicae</i> (Zurich and Munich 1974–)
<i>LitArts</i>	Liturgical Arts
<i>LSA</i>	Lavori e studi di archeologia pubblicati dalla Soprintendenza archeologica di Roma
<i>LSJ</i>	H.G. Liddell, R. Scott, and H. Stuart Jones, <i>Greek-English Lexicon</i> , 9th ed. (Oxford 1940)
<i>LTUR</i>	E.M. Steinby, ed., <i>Lexicon topographicum urbis romae</i> (Rome 1993)
<i>L'Urbe</i>	L'Urbe. Rivista romana
<i>MÂ</i>	Le moyen âge
<i>MAAR</i>	Memoirs of the American Academy in Rome
<i>MAGW</i>	Mitteilungen der anthropologischen Gesellschaft [Vienna]
<i>Maia</i>	Maia. Rivista di letterature classiche
<i>MAMA</i>	Monumenta Asiae minoris antiqua
<i>MAntFr</i>	Mémoires de la Société nationale des antiquaires de France
<i>MarbWPr</i>	Marburger Winckelmann-Programm
<i>Mari</i>	Mari. Annales de recherches interdisciplinaires
<i>Marsyas</i>	Marsyas. Studies in the History of Art
<i>MASCAJ</i>	MASCA Journal. Museum Applied Science Center for Archaeology, University Museum, University of Pennsylvania
<i>MASCAP</i>	MASCA Research Papers in Science and Archaeology
<i>Matz-Duhn</i>	F. Matz and F. von Duhn, <i>Antike Bildwerke in Rom</i> (Leipzig 1881–1882)
<i>MCI</i>	Il mondo classico
<i>MDAV</i>	Mitteilungen des Deutschen Archäologen-Verbandes
<i>MdF</i>	Musées de France
<i>MdI</i>	Mitteilungen des Deutschen Archäologischen Instituts
<i>MDIK</i>	Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo
<i>MDOG</i>	Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin
<i>MDP</i>	Mémoires de la Délégation française en Perse
<i>Meded</i>	Mededeelingen van het Nederlands Historisch Instituut te Rome
<i>MedHum</i>	Medievalia et humanistica
<i>MeditArch</i>	Mediterranean Archaeology. Australian and New Zealand Journal for the Archaeology of the Mediterranean World
<i>MedKøb</i>	Meddelelser fra Ny Carlsberg Glyptotek [Copenhagen]
<i>MedMusB</i>	Medelhavsmuseet, Bulletin [Stockholm]
<i>MedRen</i>	Mediaeval and Renaissance Studies
<i>MÉFR</i>	Mélanges d'archéologie et d'histoire de l'École française de Rome
<i>MÉFRA</i>	Mélanges de l'École française de Rome, Antiquité
<i>MÉFRM</i>	Mélanges de l'École française de Rome. Moyen âge, temps modernes
<i>MélBeyrouth</i>	Mélanges de l'Université Saint Joseph, Beyrouth
<i>MémAcInscr</i>	Mémoires présentés par divers savants à l'Académie des inscriptions et belles lettres [Paris]
<i>MemBol</i>	Atti della Accademia delle scienze dell'Istituto di Bologna. Memorie
<i>MemLinc</i>	Memorie. Atti della Accademia nazionale dei Lincei, Classe di scienze morali, storiche e filologiche
<i>MemNap</i>	Memorie dell'Accademia di archeologia, lettere e belle arti di Napoli
<i>MemPontAcc</i>	Memorie. Atti della Pontificia Accademia romana di archeologia
<i>Mesopotamia</i>	Mesopotamia. Rivista di archeologia
<i>MF</i>	Madriider Forschungen
<i>MGH</i>	Monumenta Germaniae historica
<i>MIÉ</i>	Mémoires de l'Institut d'Égypte
<i>Migne, PG</i>	J.P. Migne, <i>Patrologia graeca</i> (Paris 1928–1936)
<i>Migne, PL</i>	J.P. Migne, <i>Patrologia latina</i> (Paris 1879)
<i>Milet</i>	Milet. Ergebnisse der Ausgrabungen und Untersuchungen seit dem Jahre 1899

<i>Minerva</i>	Minerva. The International Review of Ancient Art and Archaeology [London]
<i>Minos</i>	Minos. Revista de filología egea
<i>MIO</i>	Mitteilungen des Instituts für Orientforschung
<i>MittNumGes</i>	Mitteilungen, Numismatische Gesellschaft [Vienna]
<i>MLJ</i>	Modern Language Journal
<i>MLN</i>	Modern Language Notes
<i>MM</i>	Madriider Mitteilungen
<i>MMAJ</i>	Metropolitan Museum of Art Journal
<i>MMR²</i>	M.P. Nilsson, <i>The Minoan-Mycenaean Religion</i> , 2nd ed. (Lund 1950)
<i>MMS</i>	Metropolitan Museum Studies
<i>Mnemosyne</i>	Mnemosyne. Bibliotheca classica batava
<i>MÖIG</i>	Mitteilungen des Österreichischen Instituts für Geschichtsforschung
<i>MonAnt</i>	Monumenti antichi
<i>MÖNG</i>	Mitteilungen der Österreichischen numismatischen Gesellschaft
<i>MonInst</i>	Monumenti inediti pubblicati dall' Instituto di corrispondenza archeologica
<i>MonPiot</i>	Monuments et mémoires. Fondation E. Piot
<i>MüJb</i>	Münchener Jahrbuch der bildenden Kunst
<i>MünchBeitr</i>	Münchener Beiträge zur Papyrusforschung und antiken Rechtsgeschichte
<i>MusB</i>	Musée belge
<i>Muse</i>	Muse. Annual of the Museum of Art and Archaeology, University of Missouri
<i>MusHelv</i>	Museum Helveticum
<i>MusJ</i>	Museum Journal [Philadelphia]
<i>MusKöln</i>	Museen in Köln. Bulletin
<i>MVAG</i>	Mitteilungen der vorderasiatisch-ägyptischen Gesellschaft
<i>MVEOL</i>	Mededeelingen en Verhandelingen ex Oriente Lux
<i>MZ</i>	Mainzer Zeitschrift
<i>NA</i>	Neues Archiv der Gesellschaft für ältere deutsche Geschichtskunde
<i>NAHisp</i>	Noticiario arqueológico hispánico
<i>NAkG</i>	Nachrichten von der Akademie der Wissenschaften in Göttingen
<i>Nash</i>	E. Nash, <i>Pictorial Dictionary of Ancient Rome</i> , 2nd ed. (New York 1968)
<i>NatGeogRes</i>	National Geographic Research
<i>NC</i>	Numismatic Chronicle
<i>NCirc</i>	Numismatic Circular
<i>NEA</i>	Near Eastern Archaeology (formerly <i>BiblArch</i>)
<i>Nichoria</i>	Excavations at Nichoria in Southwest Greece
<i>NJbb</i>	[Neue] Jahrbücher für Philologie und Pädagogik; Neue Jahrbücher für das klassische Altertum; Neue Jahrbücher für Wissenschaft und Jugendbildung
<i>NL</i>	Numismatic Literature
<i>NLB</i>	Numismatisches Literaturblatt
<i>NNM</i>	American Numismatic Society. Numismatic Notes and Monographs
<i>NomChron</i>	Νομισματικά χρονικά
<i>NouvArch</i>	Nouvelles archives des Missions scientifiques
<i>NouvClio</i>	La nouvelle Clio
<i>NR</i>	Numismatic Review
<i>NS</i>	American Numismatic Society. Numismatic Studies
<i>NSc</i>	Notizie degli scavi di antichità
<i>NTDAR</i>	L. Richardson, <i>A New Topographical Dictionary of Ancient Rome</i> (Baltimore 1992)
<i>NumAntCl</i>	Numismatica e antichità classiche. Quaderni ticinesi
<i>Numen</i>	Numen. International Review for the History of Religions
<i>NumJ</i>	Numismatic Journal
<i>NuovB</i>	Nuovo bulletino di archeologia cristiana
<i>NZ</i>	Numismatische Zeitschrift
<i>OA</i>	Oriens antiquus
<i>OAr</i>	Orientalisches Archiv
<i>OC</i>	Oriens christianus
<i> OCD³</i>	S. Hornblower and A. Spawforth, eds., <i>The Oxford Classical Dictionary</i> , 3rd ed. (Oxford 1996)
<i>OGIS</i>	Oriens Graeci inscriptiones selectae
<i>OIC</i>	Oriental Institute Communications
<i>OIP</i>	Oriental Institute Publications
<i>OJA</i>	Oxford Journal of Archaeology
<i>ÖJh</i>	Jahreshefte des Österreichischen archäologischen Instituts in Wien
<i>ÖJhBeibl</i>	Jahreshefte der Österreichischen archäologischen Instituts in Wien, Beiblatt
<i>OlBer</i>	Bericht über die Ausgrabungen in Olympia

<i>OLD</i>	<i>Oxford Latin Dictionary</i> (Oxford 1982)
<i>OlForsch</i>	Olympische Forschungen
<i>Olynthos</i>	Excavations at Olynthos
<i>OLZ</i>	Orientalische Literaturzeitung
<i>OpArch</i>	Opuscula archaeologica
<i>OpAth</i>	Opuscula atheniensi
<i>OpFin</i>	Opuscula Instituti romani Finlandiae
<i>OpPh</i>	Opuscula philologica
<i>OpRom</i>	Opuscula romana
<i>Ostraka</i>	Ostraka. Rivista di antichità
<i>OWAN</i>	Old World Archaeology Newsletter
<i>PAAR</i>	American Academy in Rome. Papers and Monographs
<i>PAES</i>	Publications of the Princeton University Archaeological Expeditions to Syria
<i>Paléorient</i>	Paléorient. Interdisciplinary Review of Prehistory and Protohistory of Southwestern Asia
<i>PalJb</i>	Palästinajahrbuch
<i>Palladio</i>	Palladio. Rivista di storia dell'architettura
<i>Pantheon</i>	Pantheon. Internationale Zeitschrift für Kunst
<i>PAPS</i>	Proceedings of the American Philosophical Society
<i>Paralipomena</i>	J.D. Beazley, <i>Paralipomena</i> (Oxford 1971)
<i>PastPres</i>	Past and Present
<i>PBSR</i>	Papers of the British School at Rome
<i>PCPS</i>	Proceedings of the Cambridge Philological Society
<i>PECS</i>	R. Stillwell et al., eds., <i>Princeton Encyclopedia of Classical Sites</i> (Princeton 1976)
<i>PEFA</i>	Palestine Exploration Fund Annual
<i>PEFQ</i>	Palestine Exploration Fund Quarterly Statement
<i>PEQ</i>	Palestine Exploration Quarterly
<i>Persica</i>	Persica. Jaarboek van het Genootschap Nederland-Iran
<i>PetMitt</i>	Petermanns Mitteilungen
<i>PGC</i>	H.G. Buchholz and V. Karageorghis, <i>Prehistoric Greece and Cyprus</i> (London 1973)
<i>Philologus</i>	Philologus. Zeitschrift für klassische Philologie
<i>PhilWoch</i>	Philologische Wochenschrift
<i>Phoenix</i>	Phoenix. The Classical Association of Canada
<i>PIR</i>	Prosopographia imperii romani
Platner-Ashby	S.B. Platner and T. Ashby, <i>A Topographical Dictionary of Ancient Rome</i> (London 1929)
<i>PM</i>	Arthur Evans, <i>Palace of Minos</i> (London 1921–1935)
<i>PO</i>	Patrologia Orientalis
<i>Pontica</i>	Pontica. Studii si materiale de istorie, arheologie si muzeografie, Constanta
<i>PP</i>	La parola del passato
<i>PPS</i>	Proceedings of the Prehistoric Society
<i>PQ</i>	Philological Quarterly
<i>Prakt</i>	Πρακτικά τῆς ἐν Ἀθήναις Ἀρχαιολογικῆς Ἐταιρείας
<i>PraktAkAth</i>	Πρακτικά τῆς Ἀκαδημίας Ἀθηνῶν
<i>PreussJb</i>	Preussische Jahrbücher
<i>ProcBritAc</i>	Proceedings of the British Academy
<i>ProcJPES</i>	Proceedings of the Jewish Palestine Exploration Society
<i>ProcPhilAs</i>	Proceedings of the American Philological Association
<i>ProcRNS</i>	Proceedings of the Royal Numismatic Society
<i>Prometheus</i>	Prometheus. Rivista quadrimestrale di studi classici
<i>Prospettiva</i>	Prospettiva. Rivista d'arte antica e moderna
<i>ProvHist</i>	Provence historique
<i>PrzArch</i>	Przegląd archeologiczny
<i>PrzKl</i>	Przegląd klasyczny
<i>PZ</i>	Prähistorische Zeitschrift
<i>QAL</i>	Quaderni di archeologia della Libia
<i>QArchEtr</i>	Quaderni del Centro di studio per l'archeologia etrusco-italica
<i>QDAP</i>	Quarterly of the Department of Antiquities in Palestine
<i>Qedem</i>	Qedem. Monographs of the Institute of Archaeology, Hebrew University of Jerusalem
<i>QITA</i>	Quaderni dell'Istituto di topografia antica della Università di Roma
<i>RA</i>	Revue archéologique
<i>RAA</i>	Revue des arts asiatiques
<i>RACentre</i>	Revue archéologique du Centre consacrée aux antiquités nationales
<i>RACrist</i>	Rivista di archeologia cristiana

<i>RAEst</i>	Revue archéologique de l'Est et du Centre-Est
<i>RAfr</i>	Revue africaine
<i>RALouvain</i>	Revue des archéologues et historiens d'art de Louvain
<i>RANarb</i>	Revue archéologique de Narbonnaise
<i>RArq</i>	Revista di arqueología
<i>RassIGI</i>	Rassegna indo-greco-italica
<i>RAssyr</i>	Revue d'assyriologie et d'archéologie orientale
<i>RASyr</i>	Revue archéologique syrienne
<i>RBArch</i>	Revue belge d'archéologie et d'histoire de l'art
<i>RBibl</i>	Revue biblique
<i>RBN</i>	Revue belge de numismatique et de sigillographie
<i>RBPhil</i>	Revue belge de philologie et d'histoire
<i>RdA</i>	Rivista di archeologia
<i>RDAC</i>	Report of the Department of Antiquities, Cyprus
<i>RE</i>	Pauly-Wissowa, <i>Real-Encyclopädie der klassischen Altertumswissenschaft</i> (1893–)
<i>REÁ</i>	Revue des études anciennes
<i>REByz</i>	Revue des études byzantines
<i>RecSciRel</i>	Recherches de science religieuse
<i>RecTrav</i>	Recueil de travaux relatifs à la philologie et à l'archéologie égyptiennes et assyriennes
<i>REg</i>	Revue d'égyptologie
<i>REG</i>	Revue des études grecques
<i>REgA</i>	Revue de l'Égypte ancienne
<i>REH</i>	Revue des études historiques
<i>REHom</i>	Revue des études homériques
<i>REI</i>	Revue des études islamiques
<i>REL</i>	Revue des études latines
<i>RendAccIt</i>	Atti della R. Accademia d'Italia. Rendiconti della classe di scienze morali
<i>RendBol</i>	Atti della Accademia delle scienze dell'Istituto di Bologna. Rendiconti
<i>RendIstLomb</i>	Rendiconti. Istituto lombardo, Accademia di scienze e lettere
<i>RendLinc</i>	Atti dell'Accademia nazionale dei Lincei. Rendiconti
<i>RendNap</i>	Rendiconti dell'Accademia di archeologia, lettere e belle arti, Napoli
<i>RendPontAcc</i>	Atti della Pontificia Accademia romana di archeologia. Rendiconti
<i>REpigr</i>	Revue épigraphique
<i>RepKunstW</i>	Repertorium für Kunstwissenschaft
<i>RES</i>	Revue des études sémitiques
<i>RHA</i>	Revue hittite et asianique
<i>RHist</i>	Revue historique
<i>RhM</i>	Rheinisches Museum für Philologie
<i>RHR</i>	Revue de l'histoire des religions
<i>RIC</i>	<i>The Roman Imperial Coinage</i> (London 1923–)
<i>RIN</i>	Rivista italiana di numismatica e scienze affini
<i>RivFil</i>	Rivista di filologia e d'istruzione classica
<i>RivIstArch</i>	Rivista dell'Istituto nazionale d'archeologia e storia dell'arte
<i>RivStorAnt</i>	Rivista storica dell'antichità
<i>RivStorIt</i>	Rivista storica italiana
<i>RLA</i>	Reallexikon der Assyriologie und vorderasiatischen Archäologie
<i>RLouvre</i>	La revue du Louvre et des musées de France
<i>RLV</i>	Reallexikon der Vorgeschichte
<i>RM</i>	Mitteilungen des Deutschen Archäologischen Instituts, Römische Abteilung
<i>RM-EH</i>	Mitteilungen des Deutschen Archäologischen Instituts, Römische Abteilung. Ergänzungsheft
<i>RN</i>	Revue numismatique
<i>RömÖ</i>	Römisches Österreich. Jahresschrift der Österreichischen Gesellschaft für Archäologie
<i>RömQSchr</i>	Römische Quartalschrift für christliche Altertumskunde und Kirchengeschichte
<i>ROrChr</i>	Revue de l'Orient chrétien
<i>Roscher</i>	W.H. Roscher, <i>Griechischen und römischen Mythologie</i> (Leipzig 1897–1902)
<i>RPhil</i>	Revue de philologie, de littérature et d'histoire anciennes
<i>RSGR</i>	S. Reinach, <i>Répertoire de la statuaire grecque et romaine</i> (Paris 1897–1924)
<i>RSO</i>	Rivista degli studi orientali
<i>RStFen</i>	Rivista di studi fenici
<i>RStLig</i>	Rivista di studi liguri
<i>RStPomp</i>	Rivista di studi pompeiani
<i>RVAp</i>	A.D. Trendall and A. Cambitoglou, <i>The Red-figured Vases of Apulia</i> (Oxford 1978–)
<i>Saalbjb</i>	Saalburg-Jahrbuch. Bericht des Saalburg-Museums
<i>SAOC</i>	Studies in Ancient Oriental Civilizations

<i>SardisMon</i>	Archaeological Exploration of Sardis. Monograph
<i>SardisRep</i>	Archaeological Exploration of Sardis. Report
<i>SBBerl</i>	Sitzungsberichte der Deutschen Akademie der Wissenschaften zu Berlin, Klasse für Sprachen, Literatur und Kunst
<i>SBHeid</i>	Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Philosophisch-historische Klasse
<i>SBLEip</i>	Sitzungsberichte der Sächsischen Akademie der Wissenschaften zu Leipzig
<i>SBMünch</i>	Sitzungsberichte, Bayerische Akademie der Wissenschaften [München], Philosophisch- historische Klasse
<i>SBWien</i>	Sitzungsberichte, Österreichische Akademie der Wissenschaften [Wien], Philosophisch-historische Klasse
<i>ScAnt</i>	<i>Scienze dell'Antichità: Storia, archeologia, antropologia</i> (Rome 1987–)
<i>SchwMbl</i>	Schweizer Münzblätter
<i>SEG</i>	Supplementum epigraphicum graecum
<i>SemKond</i>	Seminarium Kondakovianum
<i>SHG</i>	Studies in the History of Gardens and Designed Landscapes (continuation of <i>JGH</i>)
<i>SicArch</i>	Sicilia archeologica
<i>SIG</i>	W. Dittenberger, <i>Sylloge inscriptionum graecarum</i> (Leipzig 1883–)
<i>SIMA</i>	Studies in Mediterranean Archaeology
<i>SIMA-PB</i>	Studies in Mediterranean Archaeology and Literature. Pocketbook
<i>SkrAth</i>	Skrifter utgivna av Svenska Institutet i Athen
<i>SkrLund</i>	Skrifter utgivna av Vetenskaps-Societeten i Lund
<i>SkrRom</i>	Skrifter utgivna av Svenska Institutet i Rom
<i>SkrUppsala</i>	Skrifter utgivna av K. Humanist. Vetenskaps-Samfundet i Uppsala
<i>SlovArch</i>	Slovenská archeológia
<i>SLS</i>	Society for Libyan Studies, Annual Report
<i>SMEA</i>	Studi micenei ed egeo-anatolici
<i>SMS</i>	Syro-Mesopotamian Studies
<i>SNG</i>	Sylloge nummorum graecorum
<i>SNR</i>	Schweizerische numismatische Rundschau. Revue suisse de numismatique
<i>SovArch</i>	Sovetskaja archeologija
<i>StadelJb</i>	Stadel-Jahrbuch
<i>Stadion</i>	Stadion. Zeitschrift für Geschichte des Sports und der Körperkultur
<i>StAncTech</i>	Studies in Ancient Technology
<i>StArch</i>	Studia archaeologica
<i>StBiz</i>	Studi bizantini e neoellenici
<i>StClas</i>	Studii clasice. Societatea de studii clasice din Republica Socialista România
<i>StEb</i>	Studi eblaiti
<i>StEtr</i>	Studi etruschi
<i>StIr</i>	Studia iranica
<i>StIt</i>	Studi italiani di filologia classica
<i>StMat</i>	Studi e materiali. Soprintendenza ai beni archeologici per la Toscana
<i>StMisc</i>	Studi miscellanei. Seminario di archeologia e storia dell'arte greca e romana dell'Università di Roma
<i>Stobi</i>	Studies in the Antiquities of Stobi
<i>StPap</i>	Studia papyrologica
<i>StrennaRom</i>	Strenna dei Romanisti
<i>StRom</i>	Studi romani
<i>StSard</i>	Studi sardi
Stuart Jones, <i>Cap.</i>	H. Stuart Jones, <i>A Catalogue of the Ancient Sculptures Preserved in the Municipal Collections of Rome: The Sculptures of the Museo Capitolino</i> (Oxford 1926)
Stuart Jones, <i>Cons.</i>	H. Stuart Jones, <i>A Catalogue of the Ancient Sculptures Preserved in the Municipal Collections of Rome: The Sculptures of the Palazzo dei Conservatori</i> (Oxford 1912)
<i>Sumer</i>	Sumer. A Journal of Archaeology and History in Iraq
<i>SwCyprusExp</i>	The Swedish Cyprus Expedition
<i>SymbOslo</i>	Symbolae osloenses
<i>Syria</i>	Syria. Revue d'art oriental et d'archéologie
<i>Talanta</i>	Τάλαντα. Proceedings of the Dutch Archaeological and Historical Society
<i>TAPA</i>	Transactions of the American Philological Association
<i>TAPS</i>	Transactions of the American Philosophical Society
<i>Taras</i>	Taras. Rivista di archeologia
<i>TelAviv</i>	Tel Aviv. Journal of the Tel Aviv University, Institute of Archaeology
<i>TJK</i>	Tidskrift för Konstvetenskap
<i>Thera</i>	Excavations at Thera
<i>ThLE</i>	<i>Thesaurus linguae etruscae</i> (Rome 1978–)

<i>ThLZ</i>	Theologische Literaturzeitung
<i>TKB</i>	G. Mylonas, Ὁ ταφικός κύκλος Β τῶν Μυσηνῶν (Athens 1972–1973)
<i>TLE²</i>	M. Pallottino, <i>Testimonia linguae etruscae</i> , 2nd ed. (Florence 1968)
<i>TLG</i>	Thesaurus linguae graecae
<i>TLL</i>	Thesaurus linguae latinae
<i>TLS</i>	Times Literary Supplement
Travlos, <i>Athens</i>	I. Travlos, <i>Pictorial Dictionary of Ancient Athens</i> (London 1971)
Travlos, <i>Attika</i>	I. Travlos, <i>Bildlexikon zur Topographie des antiken Attika</i> (Tübingen 1988)
<i>TravMém</i>	Travaux et mémoires. Centre de recherche d'histoire et civilisation byzantine, Paris
<i>TrWPr</i>	Trierer Winckelmannsprogramm
<i>TrZ</i>	Trierer Zeitschrift für Geschichte und Kunst des Trierer Landes und seiner Nachbargebiete
<i>TTAED</i>	Türk Tarih, Arkeologya ve etnografya dergisi
<i>TUAS</i>	Temple University Aegean Symposium
<i>TürkArkDerg</i>	Türk arkeoloji dergisi
<i>UAVA</i>	Untersuchungen zur Assyriologie und Vorderasiatischen Archäologie
<i>UCLAMon</i>	University of California at Los Angeles, Institute of Archaeology, Monograph
<i>UCLAPap</i>	University of California at Los Angeles, Institute of Archaeology, Occasional Paper
<i>UgaritF</i>	Ugarit-Forschungen. Internationales Jahrbuch für die Altertumskunde Syrien-Palästinas
<i>UMI</i>	University Microfilms
<i>UPMB</i>	University of Pennsylvania Museum Bulletin
<i>UppsÅrsskr</i>	Uppsala Universitets Årsskrift
<i>VDI</i>	Vestnik drevnej istorii
<i>VigChr</i>	Vigiliae christianae
<i>VuG</i>	Vergangenheit und Gegenwart
<i>WeltIsl</i>	Die Welt des Islam
<i>Wjh</i>	Wiener Jahreshefte
<i>WKP</i>	Wochenschrift für klassische Philologie
<i>WorldArch</i>	World Archaeology
<i>WPZ</i>	Wiener prähistorische Zeitschrift
<i>WS</i>	Wiener Studien
<i>WürzJbb</i>	Würzburger Jahrbücher für die Altertumswissenschaft
<i>WVDOG</i>	Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft
<i>WZKM</i>	Wiener Zeitschrift für die Kunde des Morgenlandes
<i>Xenia</i>	Xenia. Semestrare di antichità
<i>YaleBull</i>	Yale University Art Gallery Bulletin
<i>YCS</i>	Yale Classical Studies
<i>ZA</i>	Zeitschrift für Assyriologie und vorderasiatische Archäologie
<i>ZÄS</i>	Zeitschrift für ägyptische Sprache und Altertumskunde
<i>ZATW</i>	Zeitschrift für die alttestamentliche Wissenschaft
<i>ZChrK</i>	Zeitschrift für christliche Kunst
<i>ZDA</i>	Zeitschrift für deutsches Altertum
<i>ZDMG</i>	Zeitschrift der deutschen morgenländischen Gesellschaft
<i>ZDPV</i>	Zeitschrift des deutschen Palästina-Vereins
<i>ZfA</i>	Zeitschrift für Archäologie
<i>ZfE</i>	Zeitschrift für Ethnologie
<i>ZfK</i>	Zeitschrift für Kunstgeschichte
<i>ZfN</i>	Zeitschrift für Numismatik
<i>ZivaAnt</i>	Ziva antika. Antiquité vivante
<i>ZNTW</i>	Zeitschrift für die neutestamentliche Wissenschaft
<i>ZÖstG</i>	Zeitschrift für die Österreichischen Gymnasien
<i>ZPE</i>	Zeitschrift für Papyrologie und Epigraphik
<i>ZSav</i>	Zeitschrift der Savigny-Stiftung für Rechtsgeschichte
<i>ZSchwArch</i>	Zeitschrift für schweizerische Archäologie und Kunstgeschichte
<i>ZSchwG</i>	Zeitschrift für schweizerische Geschichte

Neolithic Statues from 'Ain Ghazal: Construction and Form

CAROL A. GRISSOM

Abstract

Reassembly of five large lime plaster statues from the seventh millennium B.C. following their excavation in 1985 at 'Ain Ghazal, Jordan, provided an opportunity to examine evidence of their construction. For the most part, the statues had lain horizontally during fabrication, and they were made in stages by applying plaster to reed bundles bound with cordage. Full-scale replication of a bust and a figure provided additional information about construction. Plaster probably had to be applied while armatures were horizontal because of the statues' large size; broad, flat, and simple forms were made as a consequence. In order to fashion the complex standing figures, legs were modeled separately and joined to the rest of the statue with plaster. Statues may have been accessorized with wigs, clothing, or other materials to simulate human appearance.*

INTRODUCTION

The discovery during the 1980s of two caches of extraordinary PPNB (Pre-Pottery Neolithic B) plaster statues at the site of 'Ain Ghazal in Jordan has aroused considerable interest among archaeologists as well as the wider public. Numbering more than 30 in total, the caches' busts and standing figures are among the world's oldest known large-scale statues, solidly dated to the seventh millennium B.C. (uncalibrated); they are exceptionally well preserved. From a visual standpoint the faces are compelling, with black bitumen decoration drawing attention to the eyes. Furthermore, because PPNB societies were pre-literate, the meaning of the statues remains enigmatic, inviting speculation. Archaeology has provided little additional information about the use of PPNB plaster statues because most have been excavated from pits where they were apparently buried when no longer wanted for their original purpose.¹ Moreover, the practice of making large-scale plaster statues ceased after the PPNB, so that there are no later exemplars to be used as an aid in interpretation. Thus, the principal source of information about meaning is the corpus of PPNB plaster statues itself.

* I am especially indebted to Kathy Tubb and Sue Gilbert for access to the cache of statues excavated at 'Ain Ghazal in 1983, and to Roger Moorey, Elisabeth Fontan, and Annie Caubet for access to Jericho material. I would also like to thank my valued colleague Rae Beaubien, as

This paper focuses on fabrication of statues in the second of the two caches excavated at 'Ain Ghazal. In particular, it will endeavor to show that the material limitations of plaster used on a large scale played an important role in determining statue forms. Moreover, it will be argued that, in part because of formal limitations, the statues were likely adorned with other materials, for example, clothing and wigs or headgear, during display.

Three types of evidence are integrated to support these hypotheses: construction details visible in the original plaster, information acquired during replication of two statues, and the forms and fabrication of similar PPNB statues. Construction details were observed during reassembly of statues in cache 2 at the Smithsonian Institution and are considered primary evidence, especially the excellent impressions left by entirely disintegrated reed-and-cordage armatures on interior surfaces of statue fragments. Such evidence was thoroughly documented during treatment because it would become inaccessible for study after the statues were reassembled and prepared for museum display.² Full-scale replicas of a large bust and standing figure were made in order to better interpret primary evidence. The process provided an unexpected dividend, showing that statue forms had to be relatively flat, shallow, and simple to be successfully made. Closely related statues in the first cache excavated at 'Ain Ghazal in 1983 were examined while they were in the process of treatment at the University of London, giving access to construction evidence. PPNB plaster statue fragments in the Ashmolean Museum in Oxford and the Musée du Louvre in Paris were examined in less detail, in part because restoration has obscured much evidence of fabrication. References to other PPNB material are based on published photographs and written accounts.

OVERVIEW OF PPNB PLASTER STATUES

The first modern discovery of PPNB plaster statues was made by Garstang at Jericho in 1935. He

well as Patricia Griffin, Ann Gunter, Zeidan Kafafi, Anne Liégey, Robert Mark, Gary Rollefson, and Denise Schmandt-Besserat for their contributions to this paper.

¹ Garfinkel 1994.

² Grissom 1997.

found two caches of relatively realistically rendered statues, each cache said to contain a “man” that was about life-size, a “woman” (with breasts) half that size, and a doll-sized “child.”³ The only known fragments of these caches, however, are those of a “man” in the collection of the Rockefeller Museum in Jerusalem, consisting of a pair of legs and a well-preserved head decorated with shell eyes and radially painted lines,⁴ and miscellaneous fragments in the Musée du Louvre in Paris, including a shoulder, a smaller pair of legs (one with a six-toed foot), and a separate fragmentary foot.⁵ Kenyon, excavating at Jericho in the 1950s, found a cache of at least three highly stylized busts without sculpted features.⁶ The most complete bust, painted yellow overall with eyes and nose possibly outlined by dark paint, is in the Jordanian Archaeological Museum in Amman. From the same find are a similar but more fragmentary yellow-painted bust (1958.771) and a large red-painted section (1958.772), apparently the base of a bust; both are in the collection of the Ashmolean Museum in Oxford.⁷ Kenyon believed the statues she found to be later than those found by Garstang, but she noted that the stratigraphic position of the Garstang material was “not very certain.”⁸ Plaster fragments recently found in the Nahal Hemar Cave have well-preserved impressions of reeds and cordage.⁹ Although too limited to reconstruct, they are believed to be parts of at least four statues because analyses show four distinct material compositions.¹⁰

³ Garstang 1935, 166–7; Garstang and Garstang 1940, 57–8.

⁴ Both the head and legs were found in deposit 195 (Garstang 1935, pls. 25, 51, 52). Based on photographs shown in Tubb and Grissom (1995, pls. 14, 15), the legs measure about 50 cm, essentially the same length as those of two-legged figures in cache 2 excavated at ‘Ain Ghazal. Based on a photograph shown in Garstang (1935, pl. 53), and Garstang and Garstang (1940, pl. 10), the head (IDAM acc. no. 35.3289; fig. 12 here) is a little smaller than that of statue #2 but larger than other heads found in cache 2. Thus, the statue must have been somewhat less than life-size, like figures in cache 2. Radially painted lines on the head are often interpreted as depicting a beard.

⁵ Measuring less than 40 cm in height, the legs in the Louvre are smaller than those in Jerusalem and may be those identified by Garstang as belonging to a woman. In which of the two deposits these legs and the shoulder were found is not known, but Garstang (1935, 167) notes that a foot with modeled toes was found in deposit 190, probably the separate fragmentary foot (acc. nos. include AO 18850, 18855, 18856, and 18857).

⁶ Kenyon 1960, 91–2, pl. 12.

⁷ Small unattached fragments, most of which appear to have been parts of the larger bust sections, are also in the Ashmolean’s collection, as are plaster fragments found at Jericho that are white except for red surface paint (acc.

Given the fragmentary nature of earlier finds, discovery of the first cache of plaster statues at ‘Ain Ghazal in 1983 was a remarkable event.¹¹ The number of statues was large (26), consisting of busts and standing figures with arms, and most statues were substantially complete although badly broken and distorted since burial. Radiocarbon dating of two samples of charcoal closely associated with the statues produced almost the same dates, 6750 ± 80 B.C. (uncalibrated) and 6710 ± 80 B.C. (uncalibrated).¹² Furthermore, the technique of blocklifting the entire cache for laboratory excavation and conservation treatment at the Institute of Archaeology in London resulted in preservation of essentially all material.¹³

Discovery of the second cache of statues at ‘Ain Ghazal occurred the following year at the end of the excavation season, so that the contents of the pit were not blocklifted until 1985.¹⁴ They were subsequently transported to a facility of the Smithsonian Institution near Washington, D.C., where they were excavated and conserved.¹⁵ Based on radiocarbon dating of charcoal found below them, statues in the second cache were buried after 6570 ± 110 B.C. (uncalibrated),¹⁶ thus indicating that they are later than those in the first cache. Five statues were reassembled: two standing figures and three two-headed busts (fig. 1). Unattached fragments include two additional heads, one of which is fragmentary. Because of their different sizes and associated torso fragments, these two heads had probably been incorporated in sepa-

no. 1964.698). The latter have also been analyzed and their results tabulated with those of bust fragments (Goren and Segal 1995; Kingery, Vandiver, and Prickett 1988). The interior surfaces of these fragments, however, are unusually smooth, and I have found no convincing evidence that the fragments formed parts of statues.

⁸ Kenyon 1960, 92.

⁹ Bar-Yosef and Alon 1988, 20–1, pl. 8.

¹⁰ Goren, Segal, and Bar-Yosef 1993.

¹¹ Rollefson 1984.

¹² OxA-1473 and OxA-1472 respectively (Hedges et al. 1989, 228). Calibrated dates, in this case 7723 ± 122 B.C. and 7654 ± 121 B.C., were done by probability distribution (Method B), % area enclosed (Gary Rollefson, personal communication, 23 June 1999).

¹³ Tubb 1985, 1987; Tubb and Grissom 1995. In a series of steps, surrounding soil was removed, and the deposit was encased in polyurethane foam within a wooden crate, built while it remained in situ. Separated from the deposit with foil, the foam immobilized and cushioned the deposit during this process and later for transport.

¹⁴ Rollefson and Simmons 1987.

¹⁵ Then known as the Conservation Analytical Laboratory, it is now called the Smithsonian Center for Materials Research and Education (SCMRE). Grissom 1996, 1997.

¹⁶ The C-14 sample number was Beta-19907 (Simmons et al. 1988). The calibrated date is 7580 ± 110 B.C.

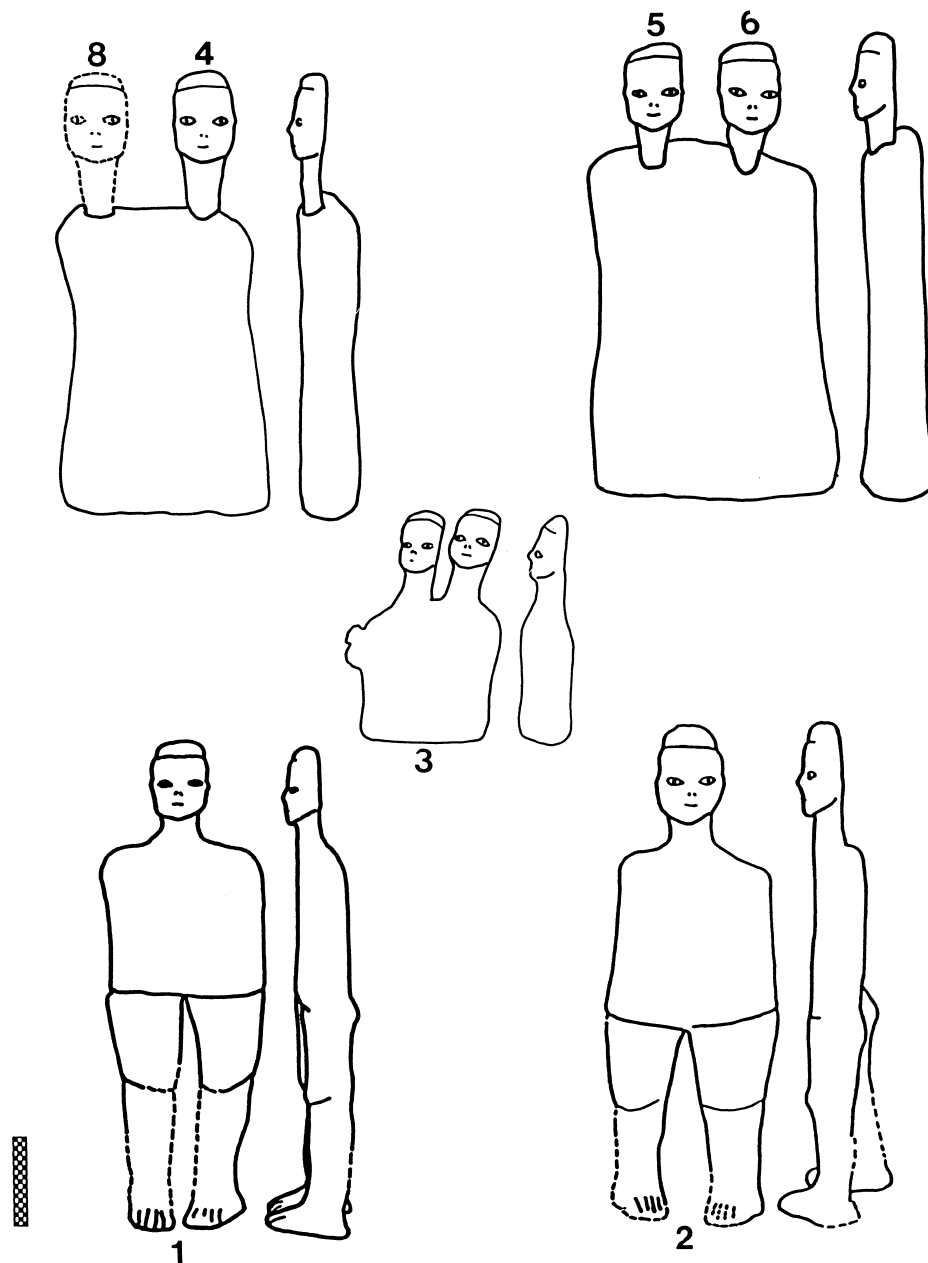


Fig. 1. Drawing of cache 2 statues with numerical designations. Dashed lines indicate modern compensation at perimeters. Scale measures 20 cm.

rate busts, at least one of which had two heads (the second head or heads apparently missing). Thus, it is likely that portions of seven statues had been buried in total, possibly including as many as five two-headed busts.¹⁷ Two-headed representations are unique

among known PPNB plaster statues, although two-headed statuettes and ceramics have been found in later millennia of the Neolithic and even more commonly in subsequent periods.¹⁸

Stylistic similarities of statues in the two caches

¹⁷ Three reassembled statues and the two unattached heads are now displayed at the Jordanian Archaeological Museum on the Citadel in Amman. Statue #2 is on long-term loan to the Musée du Louvre in Paris. All are prop-

erty of the Department of Antiquities of the Hashemite Kingdom of Jordan.

¹⁸ For examples, see Schmandt-Besserat 1998.

found at 'Ain Ghazal are many, but there are also significant differences. Heads in the two caches are modeled in a generally similar fashion that indicates that they are part of the same tradition. All are shallow in depth, relatively flat on the back, and have recessed brows that suggest the addition of wigs or headdresses made of other materials. Mouths, nostrils, and eye perimeters are defined by incised lines. Shapes of heads in cache 2, however, are essentially rectangular with the addition of pointed chins; bitumen pupils are depicted with slightly truncated diamond shapes; outlines of eyes are pointed at the corners; and features are strikingly similar to those of a plastered skull found at 'Ain Ghazal in 1988,¹⁹ probably because it is close in date. Heads of statues in cache 1, by comparison, tend to be wider toward the top; the bitumen pupils are round; the eyes are larger and more protuberant, and their outlines are usually rounded; and features can be readily differentiated from those of cache 2 and the plastered skull found in 1988. That all busts in cache 2 have two heads while those in cache 1 have single heads is another obvious iconographic disparity.

Differences between the statues' bodies in the two caches seem more pronounced than those between the heads. Torso shapes in cache 2 are rectangular, while those in cache 1 are slope-shouldered and more shapely, having waists. While two-legged figures in both caches are disproportionately shallow in depth, torsos in cache 2 are essentially flat on front and back, but those in cache 1 display slight curvature. Moreover, figures in cache 2 are armless and have no sexual features or body paint, while those in cache 1 have arms, painted stripes or other designs on their bodies, and, in a few cases, breasts or female genitalia.²⁰ Busts in cache 2 are also flat on front and back surfaces, and constant in depth from base to shoulders, while bust torsos in cache 1 are more rounded, and both wider and deeper at the bottom.

Statues in cache 2 are appreciably larger than those in cache 1 (fig. 2). While the largest two-legged figure in cache 2 measures 104 cm in height compared to a little over 90 cm for the tallest figure in cache 1, the figures in cache 2 are volumetrically even larger because of their blocky shapes and proportionally larger bodies. Only the smallest bust in cache 2 (statue #3) is comparable to busts in cache 1, although at 46 cm in height, it is larger than the tallest bust in cache 1, which measures 35 cm in height. The two large busts in cache 2 (statues #4/8 and #5/6), averaging 86 cm

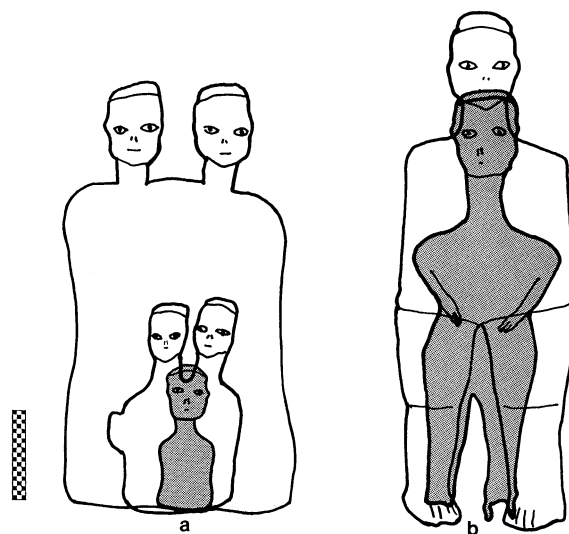


Fig. 2. Size comparison between statues in cache 2 (outlined) and cache 1 (shaded): (a) busts and (b) standing figures. Scale measures 20 cm.

in height, have no equivalent in form or size to busts in cache 1. Because of the larger size of the statues in cache 2, it is hypothesized that aspects of their fabrication had to be different, which would have led to differences in forms, particularly for the bodies.

MATERIALS

Knowledge of the properties and general usage of the principal materials used to make PPNB statues is fundamental to understanding their construction. Some of these materials, such as the reeds and cordage used to make armatures, have entirely disintegrated but can be studied through impressions left in plaster. For each material described below, the one used to make statues in cache 2 is described first, followed by material for replicas and other PPNB plaster statues.

Reeds

Fine parallel striations on interior surfaces of plaster fragments allow the principal armature material to be identified as a grass. Edges of individual leaf blades can be discerned, showing that leaves varied from 8 to 15 mm in width. The only grasses in the area that grew this large were *Phragmites* or *Arundo*,²¹ both commonly known as reeds. Replication of statue armatures was accomplished with *Phragmites* obtained from a marshy area along the Patuxent River near Washington, D.C.

¹⁹ Simmons et al. 1990.

²⁰ Tubb and Grissom 1995.

²¹ Dr. Joy McCriston, Assistant Professor, Department

of Anthropology, Ohio State University (Columbus, Ohio), kindly provided her expertise in ancient Near Eastern botany to identify these plants (summer 1993).



Fig. 3. Statue #5/6, height 88 cm. Torso fragments that displayed cleavage indicative of two plaster applications are outlined. (Courtesy Diane Nordeck, Smithsonian Institution)

Reeds were neatly assembled in bundles that are distinguishable because each bundle had some individual cordage binding. Impressions for these discrete bundles measure from 2 to 6 cm in width. The armature for the small bust was made of at least eight bundles, while armatures for the four larger statues were made of 20 or more. Torsos were constructed on so many contiguous bundles that they left substantial continuous cavities inside each statue after the reeds had disintegrated (figs. 3–8).

Replication showed that both the stem and leaves of the reed were generally used. The stem provided some rigidity to the bundle and organized the leaves that enclosed it, keeping them parallel. Curvilinear impressions of bundle ends indicate that reeds were folded to produce bundles of a particular size, as was clear on the interior of statue #1 (figs. 7–9). Folding a group of reeds to create a bundle precluded cutting and reduced the number of loose ends, and it proved an efficient means of production during rep-

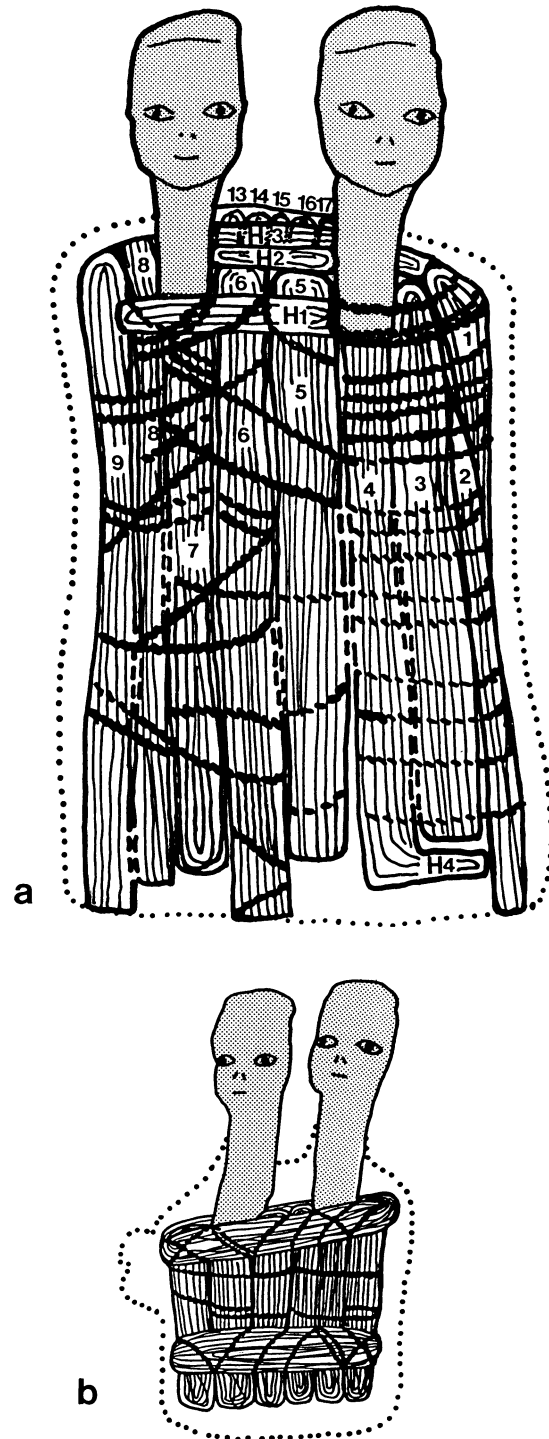


Fig. 4. Drawing illustrating construction of: (a) statue #5/6 and (b) statue #3. Shading indicates the modeled plaster heads and necks around which reed-and-cordage torso armatures were built. Dotted lines around armatures indicate statue perimeters.

lication. Experimentation also indicated that armatures would have been made when reeds were fresh: when dry, they proved difficult to bend and did not align well. The banks of the three wadis located at

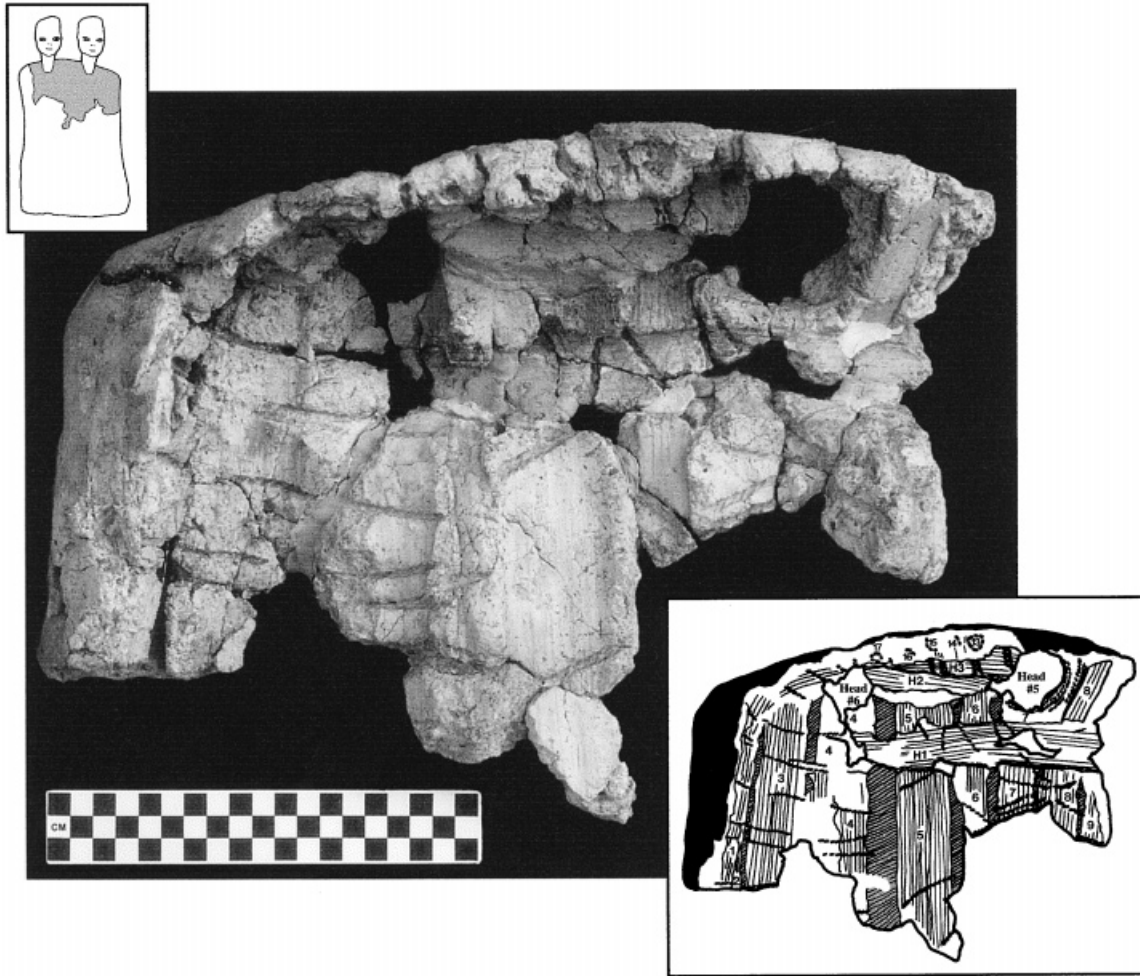


Fig. 5. Interior of upper front and shoulders of statue #5/6 during treatment (location on bust shown by drawing at upper left). In the drawing at lower right, striated impressions of reed bundles are numbered; crests between reed bundles are indicated by hatching; cordage impressions are also marked.

‘Ain Ghazal should have provided inhabitants of the Neolithic village with an unlimited supply.

Reed impressions inside statues in cache 1 are similar to those of cache 2, but bundles were smaller, they did not leave large continuous cavities inside the torsos, and they were far fewer in number. Figures were typically made on armatures composed of only five reed bundles, compared to 26 and 27 bundles for those in cache 2. Busts were made on single bundles, compared to at least eight bundles for the comparable small bust. Information about the size and overall structure of armatures for the Nahal Hemar statues is precluded by the small number of fragments, but reed impressions appear similar to those of material from ‘Ain Ghazal.²² For the Jericho head

in the Israel Museum, a cavity left by an armature is visible in X-radiographs extending vertically inside the head; linear density variations parallel to the cavity suggest that it was made by reeds.²³ Legs associated with the head are also reported to bear impressions of reeds.²⁴ Legs from Jericho in the Musée du Louvre are hollow, indicating that they had been made on disintegrated armatures, but linear striations indicative of reeds were not observed. The Jericho bust sections in the Ashmolean Museum appear to be solid in their present reconstructed form. One small separate red-painted fragment (1958.773) associated with bust base section 1958.772, however, shows tantalizing impressions of what appear to be reeds. Although these may be anomalous, it seems

²² Bar-Yosef and Alon 1988, pl. 8.

²³ Kingery, Vandiver, and Noy 1992.

²⁴ Amiran 1962.

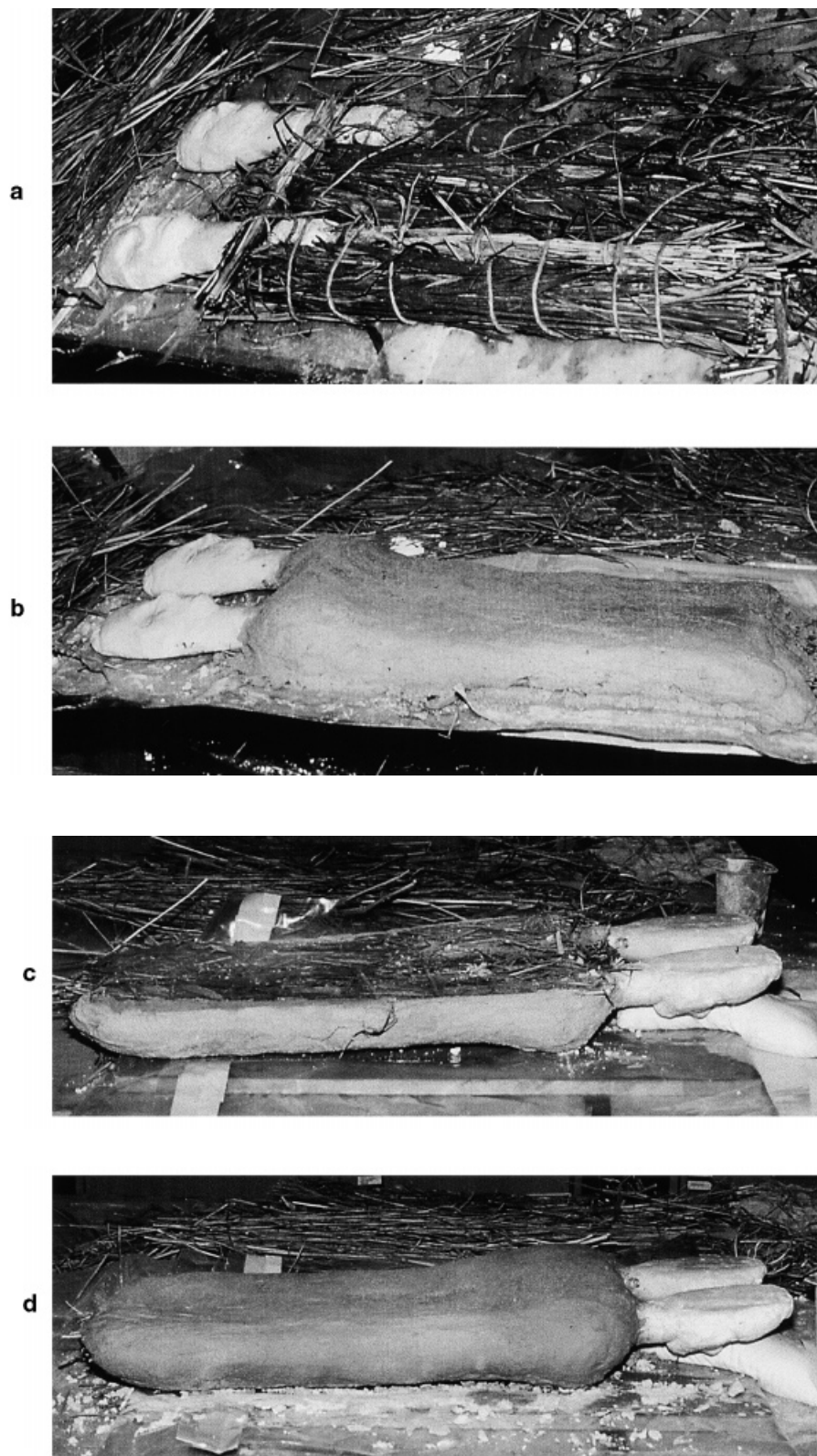


Fig. 6. Making the replica of statue #5/6: (a) heads modeled in plaster and torso armature constructed around them; (b) plaster applied to torso front; (c) bust reversed; and (d) plaster applied to torso back. Plaster on the heads is lighter in color than that on the bodies because a slightly different mixture was used.

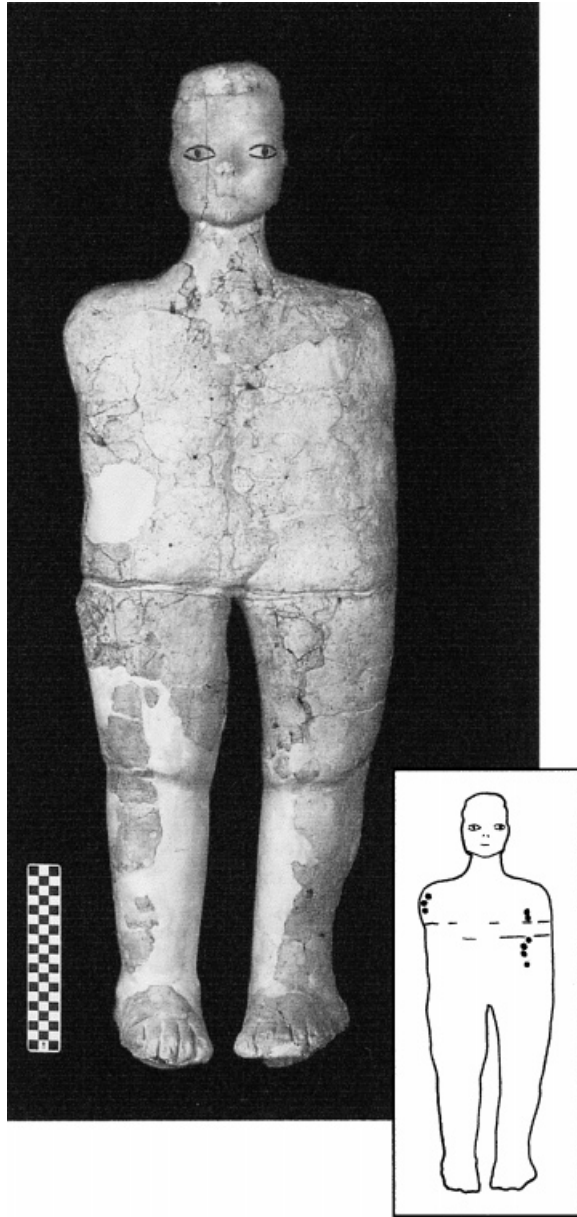


Fig. 7. Statue #1, height 99 cm (Courtesy Diane Nordeck, Smithsonian Institution). Drawing at lower right shows locations of fingertip and linear indentations.

possible that other similar impressions may be present and no longer visible because of reassembly, or they have been lost on account of the plaster's weakness and poor consolidation.

Cordage

Based on S-twist impressions in the plaster, reeds were bound with unspun two-ply Z-twist cordage, which measured 2 to 5 mm in diameter (fig. 5). Cordage may have been made from reeds, since unspun two-ply Z-twist reed or rush cordage has been found in the Nahal Hemar Cave,²⁵ and reeds were also being used to make the armatures. Commercial jute cordage of approximately the same size as the original was used for binding reed bundles of replica armatures.

Impressions in original plaster show that cordage was closely coiled around the bundle where the neck and head were plastered. Otherwise it was used at more widely spaced intervals, tying bundles together where they crossed or spiraling around the length of bundles.

Impressions of cordage for statues in cache 1 are similar to those of cache 2 in every respect except size: they measure about half the diameter. Just like the statues in cache 2, the head-and-neck bundle was closely bound, except for one bust whose single bundle was unbound; elsewhere on the figures, armatures were bound less frequently. Impressions of cordage are visible at the edges of plaster fragments found at Nahal Hemar, but further information could not be derived from photographs.²⁶ No cordage impressions have been reported for material from Jericho, nor are impressions of cordage visible in the X-radiograph of the Garstang-excavated head in the collection of the Rockefeller Museum.

Plaster

An extensive program of laboratory analyses showed that plaster was made from 'Ain Ghazal marl, by definition a clay-containing limestone. Around 10 percent of the plaster was acid-insoluble, identified by X-ray diffraction analysis as primarily an expanding-layer clay. Based on laboratory experiments and analytical work, powdered marl is believed to have been mixed with a small percentage of lime (about 10 percent) that had been made by calcining the marl, as well as vegetal fibers.²⁷ It is noteworthy that plaster used to model three faces on skulls, also excavated at the site and conserved at the Smithsonian, was made from raw material indistinguishable from that for the statues; a higher percentage of true lime was used, however, and the quality of plaster was superior.²⁸

Plaster for the replications was made in imitation

²⁵ Schick 1988.

²⁶ Bar Yosef and Alon 1988, pl. 8.

²⁷ Grissom 1997; Griffin, Grissom, and Rollefson 1998; Boulton 1988.

²⁸ The three plaster faces were blocklifted in the same season as the statues but from a different area. C-14 analy-

sis of burned wood found in strata above them indicates that they were probably buried about 500 years before the statues. Because materials used to make the artifacts were similar, however, including lime plaster, bitumen, and rope, comparisons proved stimulating for research (Griffin, Grissom, and Rollefson 1998).

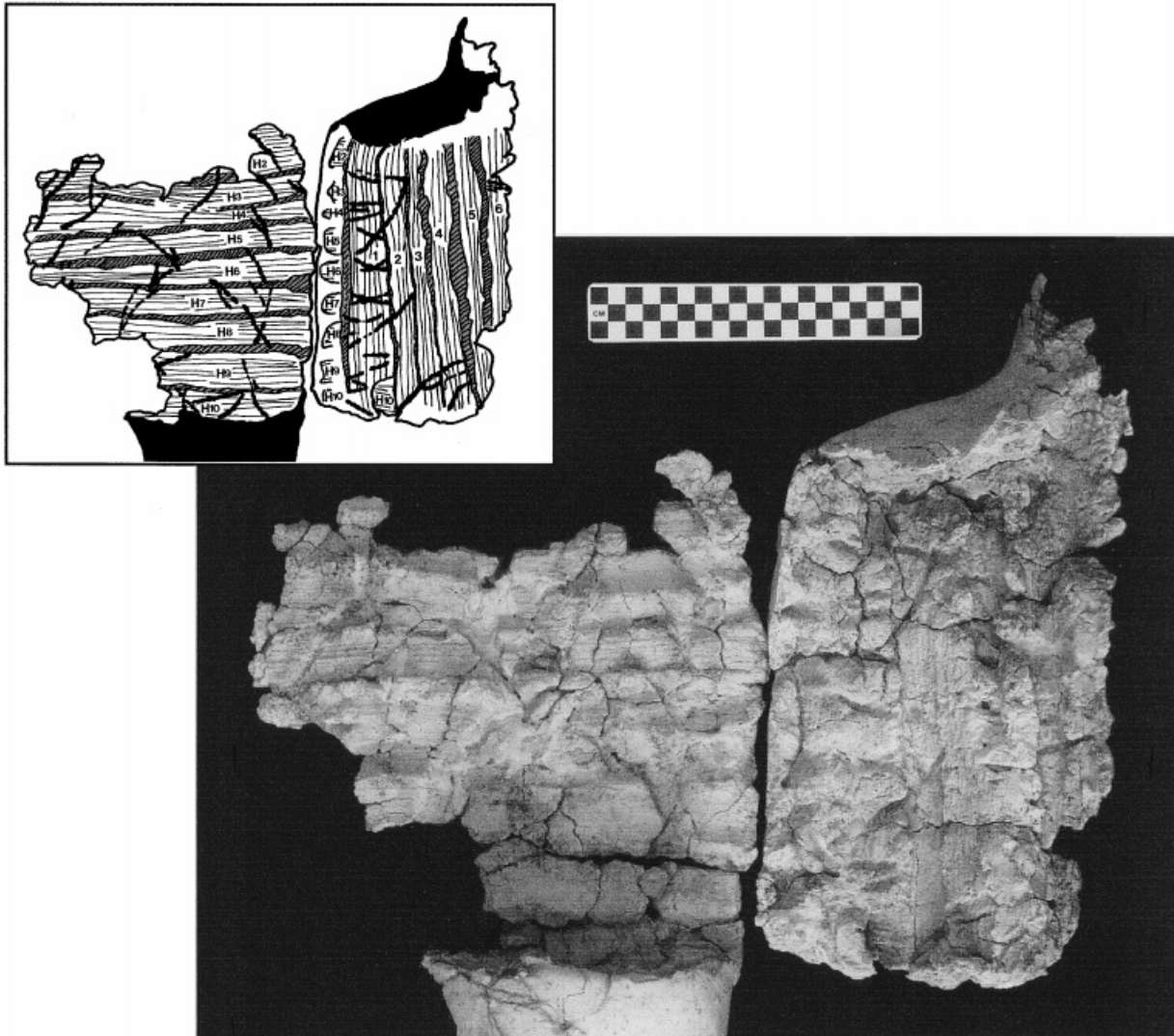


Fig. 8. Torso interiors of statue #1 during treatment: back (on left) and proper left front (on right). In the drawing at upper left, striated impressions of reed bundles are numbered; crests between reed bundles are indicated by hatching; cordage impressions are also marked. Note impressions of curved bundle ends for H2–H10 at the side front.

of the original. It was initially made with marl obtained from 'Ain Ghazal, mixed with a small percentage of commercial lime. However, the supply of marl was limited, and subsequently replication was done with a mixture of chalk or powdered limestone, about 10 percent commercial lime and about 10 percent clay. When one replication mixture was initially prepared without clay, its poor plasticity demonstrated the important role of that ingredient.

Analyses indicate that plaster used to make statues in cache 1 was similar to that used in cache 2,²⁹ and plaster samples from the two caches appear almost

identical in color and texture when placed side by side. The only obvious difference is that statues in cache 1 have a thin coating of whiter material on some surfaces; although as yet unidentified, it seems likely that this was a layer of pure lime. The whiter layer is found covering the exterior of well-preserved two-legged figures (except for the undersides of the feet), but on busts it appears only above a V-shape on the chest. Plaster used to make the Jericho statue at the Rockefeller Museum was also made from marl with a high calcite content, possibly mixed with a small amount of lime.³⁰ The fragmentary foot from

²⁹ Tubb and Grissom 1995.

³⁰ Goren and Segal 1995.

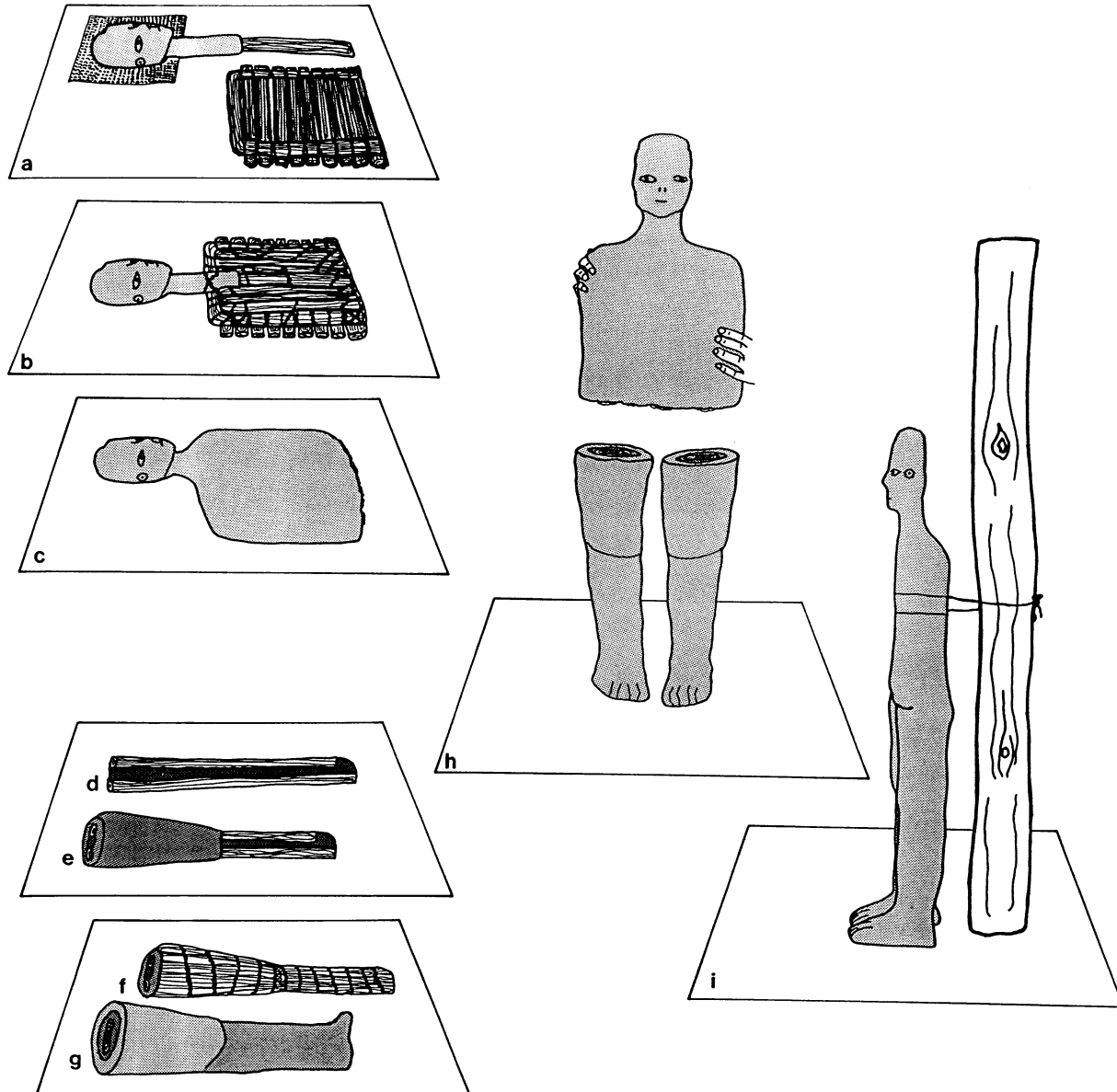


Fig. 9. Drawing showing stepwise fabrication of a figure in cache 2: (a) head and neck plastered while lying on a mat, and back of armature fabricated; (b) head-and-neck and other vertical bundles attached to the armature front; (c) torso plastered; (d) several bundles assembled with plaster to form a leg core; (e) plaster applied to the upper leg; (f) thin layer of reeds added, and cordage spiraled around the leg; (g) final layer of plaster applied to the leg, and modeling of the foot begun; (h) legs placed upright, feet (especially heels) completed, and torso placed on the legs (cf. finger locations to indentations shown in fig. 7); (i) joint between legs and torso filled with plaster, buttocks modeled, tops of thighs delineated, and statue secured with cord (cf. cord location in fig. 7). Shading indicates plaster.

Jericho in the Louvre seems to have been made with similar plaster but with more siliceous material in a lower layer.³¹ In contrast, other Jericho fragments in the Louvre appear to have been made entirely of uncalcined marl. The plaster of the Jericho busts exca-

vated by Kenyon is visibly poor in quality, especially two core layers that are medium brown in color and made from marl of about equal parts calcite and silica; a white surface layer of plaster is more calcite-rich and finer in quality.³² Fragments found in the

³¹ Bouquillon 1998.

³² Goren and Segal 1995. Analytical techniques used by Kingery, Vandiver, and Prickett (1988) provide less precise

information about constituents but also indicate that the Kenyon-excavated statue plaster was inferior to the "man" excavated by Garstang.



Fig. 10. Back of head of statue #1.



Fig. 11. Back of head of statue #2.

Nahal Hemar Cave were made of high-quality plaster, the matrices consisting of calcined material.³³ Such differences in plaster composition provide data for theories of technological development and interchange of ideas.³⁴ There is little evidence that they affected the sculptural products, however, since smooth surfaces and shaped forms were achieved for nearly all sculptures. Only the simplified forms of busts excavated by Kenyon might be attributed to the limitations of poor-quality plaster.

PLASTER APPLICATION

A general description of plaster application is useful as background for detailing the complex fabrication of statues in cache 2. The most fundamental feature is that most plaster appears to have been applied to the uppermost surfaces of armatures as they lay horizontally, requiring reversal to apply plaster to the opposite surfaces (fig. 6). Next, plaster was separately applied to model different portions of the statues: head and torso for the busts; head, torso, and legs for the two-legged figures. Finally, the four larger statues were placed upright only for the last stage of fabrication: for completion of the base of the large busts, and for final assembly and finishing of the standing figures (fig. 9).

Evidence that most plaster was applied while armatures lay horizontally is ample. First, the curvature of

bundle impressions is flattened front and back (fig. 5). Second, the front and back torso surfaces of the statues are flat, as are the backs of the heads (figs. 10, 11); and depth from the base to the shoulders of the busts is constant (fig. 1). Finally, the meeting of front and back applications at the sides, necessitated by horizontal application, was indicated by one of only two areas of plaster cleavage found on the bodies: at the sides of a torso. Apparently where the second application slightly overlapped the first, it subsequently separated because the first layer had dried before the second was applied (fig. 3). The probable reason for horizontal construction was shown during replication. When plaster was applied to full-scale armatures in upright position, it either fell off or slumped toward the base, regardless of consistency.

Whether other PPNB statues were plastered horizontally is less clear, in part because of limited access to evidence. The shape of the Garstang-excavated head from Jericho, however, suggests horizontal construction (fig. 12): it is flat and squared-off on the reverse, reminiscent of the backs of statue heads in cache 2 (figs. 10, 11). It also seems likely that the heads in cache 1 were plastered horizontally because they are similarly flat in shape and many neck cavities appear flattened. The torsos of the two-legged figures in cache 1 are perhaps even more shallow in depth than those in cache 2, suggesting that they were

³³ Goren, Segal, and Bar-Yosef 1993.

³⁴ Kingery, Vandiver, and Prickett 1988; Goren and

Segal 1995.



Fig. 12. Back of head of statue excavated by Garstang at Jericho. Rockefeller Museum, Jerusalem, Israel Department of Antiquities and Museums 35.3289. (Courtesy Israel Museum)

plastered while horizontal. Other evidence for these figures, however, does not confirm horizontal plastering: bundles do not appear to have been flattened, and front and back surfaces are slightly rounded.

One limitation of horizontal construction is that only one face of a statue can be plastered at a time. In order to plaster the opposite face, the partially plastered armature has to be reversed while it is still damp. If it is too dry at the time of reversal, “new” plaster does not adhere properly to “old” where applications meet, as was illustrated by cleavage found on statue #5/6 (fig. 3). On the other hand, it was found during replication that even when plaster was made with the least possible amount of water, it fell off armatures if they were moved just after application. When allowed to dry overnight, however, the plaster seemed to “stiffen,” and reversal was accomplished. Thus, it seems likely that there was a short drying period before reversal.

A rigid auxiliary support was likely used to assist with reversal. When replications were manipulated without support, plaster fell off the armatures, apparently because of the considerable weight of the wet plaster and flexing of the wet reeds. Reversal was successfully accomplished by sandwiching partially plastered armatures between wooden boards. Flat surfaces on the front and back of the statues facilitated reversal since they made parts easier to sandwich between the boards and reduced the possibility

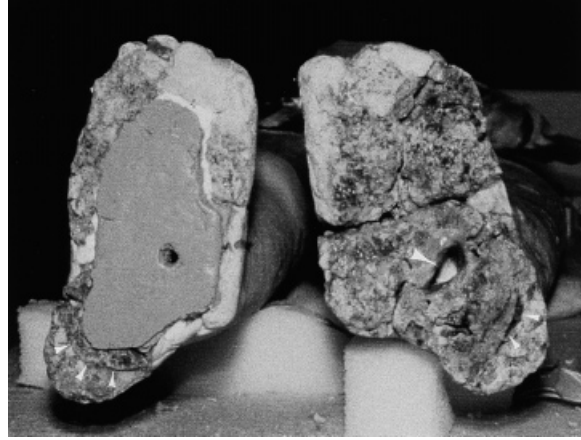


Fig. 13. Feet undersides of statue #1 during treatment. A small elliptical reed-bundle cavity is indicated by a large arrow on the foot at the right (the plaster perimeter is glossy because of adhesive). Narrow curvilinear gaps that indicate separate plaster application to model the heels are indicated by small arrows. Auxiliary support layers obscure the center of the foot on the left.

of flexing. For the same reasons as for reversal, auxiliary supports were likely used to orient busts or figure parts upright. This was accomplished during replication by tilting boards on which the busts or figure parts rested until they were vertical.

With the exception of the small bust, there is solid evidence that the statues in cache 2 were upright in the final stage of fabrication, probably for the most part to make them more stable during display. Surfaces on the undersides of feet and bust bases are flat, and these surfaces had clearly been formed by pressing fresh plaster against a flat surface rather than by hand modeling (fig. 13). The forming surface might have been one of the burnished plaster floors found at ‘Ain Ghazal, not fresh enough for the statue plaster to adhere to it. Slight plaster flanges where plaster meets the floor and horizontal striations on exterior surfaces near the bases confirm that finishing work was done there, after the statues were upright.

Flat and generally even smoother surfaces on the bottoms of all statues in cache 1 and the bottom of the Jericho bust fragment in the Ashmolean Museum (1958.772) indicate that these statues were upright when plaster was fresh at their bases. Moreover, although heads were probably modeled while flat, torsos of busts in cache 1 and of Kenyon-excavated busts may have been entirely plastered while upright: they are larger in every direction at the bottom, apparently because plaster slumped downward during upright modeling. Slight spreading of plaster where the figures in cache 1 meet the floor confirms

that at least the feet had been modeled when the statues were upright. The position of these figures at other points has not been otherwise elucidated, although fabrication seems to have differed from that for statues in cache 2 in several respects. Leg bundles were apparently set into the floor, since evidence found during excavation indicates that bundles extended as much as 18 cm below the feet.³⁵ It seems likely that this task was done prior to modeling the legs with plaster because it would have been difficult to accomplish the manipulation required to set the bundles and simultaneously keep plaster intact if the legs had already been modeled. Moreover, the generally columnar shape of the legs suggests upright plastering, as it contrasts with the flattened shapes of the horizontally plastered legs of statues in cache 2.

As will be detailed in the next section, evidence indicates that plaster was applied to cache 2 torso armatures in a single layer, except for slight overlapping at the sides. Multiple application layers were found on the head and legs, but the appearance of the plaster is identical throughout. This contrasts with visibly different plaster layers found on Kenyon-excavated busts from Jericho and some Garstang-excavated fragments in the Musée du Louvre. For statues in both 'Ain Ghazal caches, no evidence of the specific application method was noted, such as edges of wads or slabs. During replication, application by the handful seemed natural, and the plaster handfuls merged easily once applied. Horizontal strip application of plaster, posited for the Garstang-excavated Jericho head on the basis of cracks and density variations seen in X-radiographs, did not seem a useful technique when attempted during replication.³⁶

Plaster surfaces of bust torsos in cache 2 are marked by groups of more or less parallel striations, apparently because these surfaces received little or no further attention after plaster was applied. Similar striations were produced when plaster was spread broadly across armatures during replication, formed by dragging coarser particles across the surface. Plaster above the forehead and on the back of each head also appears unsmoothed.

Surfaces of faces, in contrast, are entirely smooth and without striations, and only close examination of the bodies of figures reveals remnants of striations, nearly obscured by smoothing. Smooth sur-

faces were easily imitated on replicas, accomplished by rubbing with the fingers and occasional wetting. The best time for smoothing was found to be after the plaster had dried for a day; at that point, modeling was not disturbed. For statues in cache 1, all surfaces of heads and two-legged figures appear to have been smoothed, while bust torso surfaces appear less carefully finished and somewhat lumpy.

Replication of the statues required several days each: seven for the standing figure and four for the large bust (three days is estimated for the small bust, but its replication was not attempted). Replicas cracked when not covered loosely with plastic sheeting in a building where relative humidity is maintained at about 45 percent. Thus, it is expected that covering the statues was done to slow their drying. Complete drying of the replicas required more than a month.

STATUE CONSTRUCTION

Construction of statues found in cache 2 is detailed in the order of original fabrication. First, fabrication of the heads and necks is described for all statues because each head and neck was made in the same way and completed before its body armature was constructed. Then the narrative is divided into three parts, as subsequent construction and plastering of torso armatures around the plastered necks differed for the large busts, small bust, and two-legged figures. Separate construction of the legs, as well as their joining to the base of the torso, is also described in the section on the figures.

Heads

Construction of the heads is well documented by xeroradiography (fig. 14), and it is more complex than that of the statues in cache 1, which seem to have been modeled with a single layer of plaster. In brief, a reed bundle measuring nearly the combined length of the head and torso was assembled (fig. 15a). To form the head and neck, plaster was applied to one end of the bundle in two layers with cordage in between. Then the torso armature was built around the lower portion of the bundle, overlapping the lower edge of plaster on the neck.

Described in more detail and illustrated by head #4,³⁷ the first or inner plaster layer was made with a small amount of plaster added directly to the reed bundle (fig. 15b). In nearly all cases, this reed bundle was flattened so that it was substantially wider

³⁵ Tubb 1985, 117, pl. 5.

³⁶ Kingery, Vandiver, and Noy 1992.

³⁷ Head #4 is the proper left head of statue #4/8. Heads

were assigned numbers during excavation before it was known that any statues had two heads, and such dual designations have been retained.

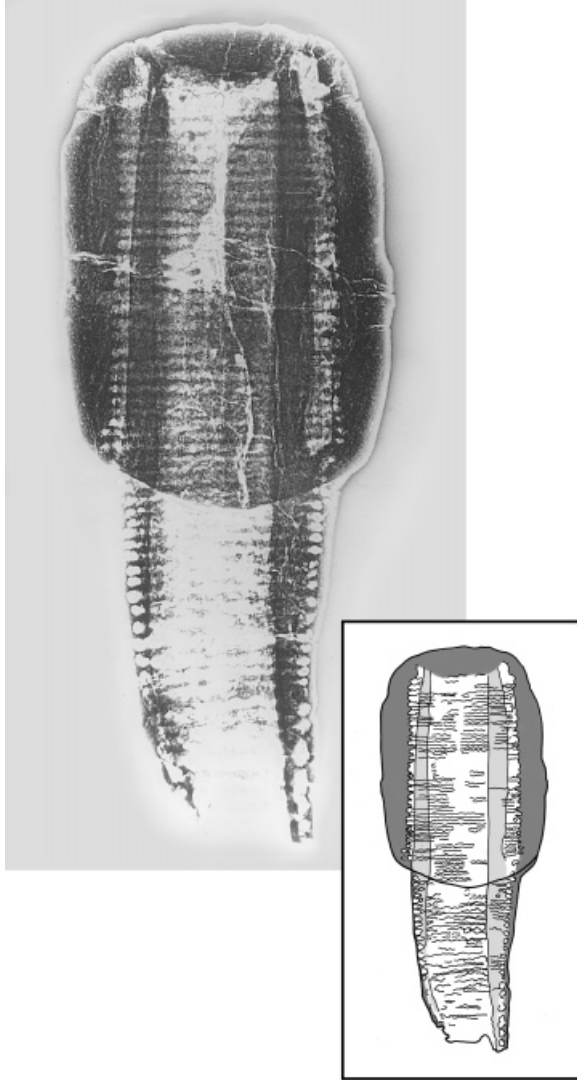


Fig. 14. Xeroradiograph of statue head #4. Drawing of a section through the head at lower right identifies the first application of plaster by light shading and the second application by dark shading; cordage is indicated by horizontal squiggles.

than deep, for example, the reed-bundle cavity inside head #4 measured about 4×2 cm in cross section. Flattening is also visible in the neck's external shape because the neck plaster is essentially uniform in thickness. Extra plaster is present at the sides of the head: for head #4, the first layer averages 1.5 cm in width on each side while it measures as little as 0.2 cm at the center. Cordage was then wrapped closely around the entire plastered portion of the bundle (fig. 15c). Thus, this first plaster layer is characterized by vertical reed impressions on its inner side and parallel rows of horizontal cordage impressions on the outer side. Because of extra plaster at the sides and the cordage layer, the composite armature

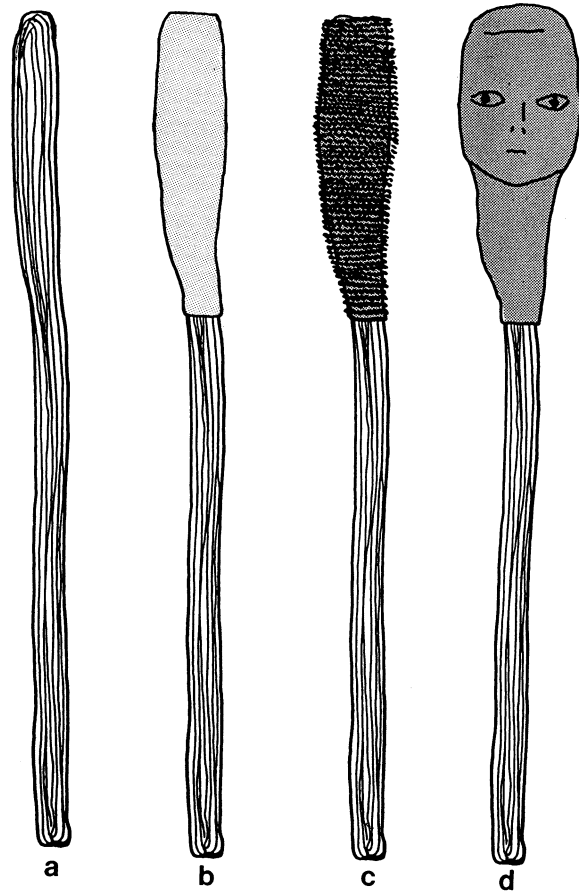


Fig. 15. Drawing showing stepwise fabrication of statue head #4, based on its xeroradiograph (fig. 14): (a) reeds folded to form a bundle the combined height of the head and torso; (b) first layer of plaster applied to the bundle, with extra plaster placed at the sides of the head; (c) cordage spiraled closely around the first layer of plaster; and (d) a second layer of plaster added, features modeled, and bitumen applied.

inside a head was often about twice as wide as the reed bundle, increasing to about 8 cm for head #4.

The second and outer layer of plaster is characterized by parallel rows of horizontal cordage impressions on its interior surface. It is minimally attached to the inner layer by plaster that squeezed between the coils of cordage. The outer layer thinly covered the armature on the neck and the back of the head, while on the front it was thickly applied for modeling facial features (fig. 15d). During plastering, the armature surely lay on a horizontal surface, found to be the only reasonable position during replication. The back of the head must have been plastered first because the head could have then been reversed and plaster applied for the features; in reverse order, modeling of protrusive features like the nose would have been jeopardized. During replication it was

found that the head, in contrast to body parts, could be turned over immediately after plaster had been applied and before it had stiffened, probably because of its small size and closely bound armature. Since plaster on the back of the replicated head was relatively wet at this point, it conformed closely to the working surface after reversal. This produced a flat shape on the back, almost square at the sides, remarkably similar to that of the original heads. Moreover, the back was impressed by the material on which it lay, just as regular patterns must have been impressed on the backs of some original heads, perhaps from mats on which they rested (fig. 10, 11).³⁸ These impressions could easily have been smoothed off. It is most plausible that the maker chose not to remove them because he knew that they would be covered by a wig or headdress and hence would not be seen. Similar impressions appear in an early photograph of the back of the Garstang-excavated head from Jericho (fig. 12), but none has been found on statues in cache 1 or reported for other PPNB statues.

Replication experiments also shed light on larger questions of head construction methodology presented by the flattened reed bundle, the extra plaster at the sides of the head, and the application of plaster in two layers. Attempts to reproduce extra plaster at the sides of the heads showed that extra plaster was intentional from the beginning: it could be replicated only when stiff plaster was placed at the sides of the bundle and the bundle carefully wrapped in order not to dislodge it. It did not accumulate just by the weight of the plaster or simply by pressing the bundle flat after wrapping. Even when plaster was quite stiff, it squeezed out between the cordage coils, leaving only a thin layer inside. The probable reason for the extra plaster and flattened bundles became clear only when faces were modeled for the replicas: plaster slumped around the edges of the cordage-wrapped armature, limiting the width of the area on which features could be readily modeled. Thus, it has been concluded that the composite armature served to increase the width of support for the faces, making it easier to create heads that were wider than the necks. Replication experiments showed that more plaster could be added onto the sides of the head after plaster had dried overnight, but this method proved unsatisfactory because the additions tended to crack.

Experiments in replication also demonstrated that close coiling of the head-and-neck bundle produced a more rigid bundle, even when wet, and indicated

at least one reason why this was important. During torso construction, the heads and necks would have been horizontal but elevated above the working surface, and a rigid bundle would have prevented breakage of the thinly plastered necks. As a precaution, heads were supported with sandbags when torsos were made during replication (fig. 6), but in the absence of rigid neck bundles this might not have prevented breakage of neck plaster. Cordage would also have provided purchase for adhesion of plaster on the heads. Neck plaster was quite thin, as little as 0.6 cm in total, and might have otherwise cleaved off the relatively smooth reeds.

That torso armatures were built around the lower ends of the head-and-neck bundles when the heads were finished is best illustrated by a remarkable separation between torso plaster and the lower portion of the neck of head #6 that it had enclosed, apparently because of prior drying of the neck plaster. When excavated, the neck appeared to measure 18 cm in length, but close examination subsequently revealed that the lower 9 cm of plaster had been enclosed by the torso during fabrication, leaving only 9 cm exposed on the statue. The portion that had been inside the torso exhibited a relatively smooth outer surface similar to the exposed neck surface, providing evidence that the necks (and by extension the heads) had been completed prior to fabrication of the torso armature. Separation of plaster layers in the neck area of statue #39 in cache 1, the "Pacha Mama," indicates that its head and neck were also plastered first.³⁹

Large Busts

Torso armatures for the large busts, statue #5/6 (fig. 3) and statue #4/8, were made by adding vertical bundles between bundles on which the heads and necks had been completed, as well as at each side (figs. 4a, 5). Horizontal bundles (H1 and H3) were placed across the shoulders in front of and behind the vertical bundles, and a third short horizontal bundle (H2) was placed in between the heads. A second set of smaller vertical bundles was placed at the back of the armature, impressions of some of their upper ends visible between pairs of cordage impressions behind H3 (bundles 13–17). When cordage binding was imitated for the replication, it produced a tightly bound armature at the shoulders, probably necessary to secure two heads. Elsewhere, however, cordage had to be loosely tied to imitate the original wide armature shape; when tied more

³⁸ Cf. twined basketry shown in Schick 1988.

³⁹ K. Tubb, personal communication, August 1998.

tightly, the torso armature became cylindrical and the binding too close together.

Plaster was applied to one face of the torso, then the opposite face, as illustrated by photographs of the replica (fig. 6). Plaster was not added to make a natural transition between necks and shoulders, as was done for the two-legged figures, and the reason for its absence remains a puzzle. Perhaps a sloping neck interfered with “dressing” the busts with applied materials or constituted unnecessary modeling because the maker knew this area would be covered with other materials.

Plaster cleavage at the base of the statue provides evidence that plaster was added at the bottom after the bust was raised upright, probably to even out irregularities (fig. 3). Specific areas of cleavage can be correlated with places where reed bundles were short of the bottom, such as below bundles 3 and 4 (fig. 4a). Replication showed that evening the bottom edge could only have been done at the time the statues were righted: prior to that point, plaster did not stay in place at the base of short bundles because it was unsupported.

Reed-bundle impressions show that some bundles extended to the bottom of the busts, but much of the bottom surface of the more complete bust (statue #5/6) was solid plaster. Bust replication indicated that it is unlikely that reeds would have extended through the bottom to serve as anchors, however, as appears to have been the case for figures in cache 1. This would have required insertion of several bundle ends in properly spaced holes in the floor or ground during the already difficult process of erecting a heavy, still quite damp statue. Thus, the large busts could have been easily pushed over from the front or back because of their breadth and shallow, constant depth.

Small Bust

The armature for the small bust, statue #3, differed from the large busts most significantly in that horizontal reeds were present not only at the shoulders but also toward the bottom (fig. 4b). As a result, the armature was tighter and more compact. Plaster was applied as on the large busts, but reed bundles were covered by several centimeters of plaster at the bottom. Moreover, the base is not completely flat and shows evidence of hand smoothing, indicating that it was entirely plastered while horizontal. Although the bust cannot sit upright on its own at present, probably because of distortion that it suffered during burial, it may have done so when it was originally displayed, perhaps seated in soft dirt or sand.

In contrast, the somewhat smaller busts in cache 1

are absolutely flat on their bottoms, clearly formed against flat surfaces when the busts were vertical. Their dimensions increase in every direction toward the bottom, apparently because of sagging attributed to upright plastering. The single vertical reed bundle inside each bust extended from the head about halfway into the torso so that the lower half of the bust was made of solid plaster. Because of such differences in fabrication, these busts are far more stable in upright position than statue #3.

Figures

Compared to the busts, construction was more complex for the two-legged figures, statue #1 (fig. 7) and statue #2. Probably to reduce the size of parts that had to be manipulated, each leg seems to have been made separately from the torso (fig. 9). Impressions of vertical thigh bundles are substantially posterior to those of vertical torso bundles, and continuity between those bundles is also precluded by horizontal bundles that span the lower edge of the figures' torsos. Furthermore, evidence shows that legs were fabricated in multiple layers while horizontal, probably on account of their substantial size. Multiple applications would have lessened the possibility of cracking of the large mass of plaster during drying, especially at the thighs. Furthermore, drying of the lower layers of plaster would have allowed these top-heavy parts to be stood up, yet the outermost layer would still have been fresh enough to achieve a reasonably good join to the torso. The multiple reversals required for applying several layers of plaster to the legs lying horizontally also make it inconceivable that a single armature could have been used for the complex bodies of the figures, given the difficulty of reversing the simpler forms of the busts a single time. Use of single continuous armatures inside figures in cache 1 was probably made possible by their smaller size.

Armatures for figure torsos differed in several respects from those for busts. Instead of consisting primarily of vertical bundles, the torso armature was made of complete sets of vertical bundles at the front and horizontal bundles at the back (figs. 8, 9a, b). Moreover, impressions indicate that a single long reed bundle was bent into an inverted U-shape to define the perimeter of the sides and shoulders. When the original armature was imitated exactly during replication, a tight shallow composite was produced. The completed head and neck were attached in front of the horizontal bundle that defined the shoulders (fig. 9b), giving a “hunchback” effect to the plastered figures (fig. 1). In contrast to the fabrication of the busts, the head was not sandwiched between pairs of

horizontal bundles at the shoulders, perhaps because only one head had to be secured or because the torso construction of the figure was so strong.

As in the case of other statues, the torso and head would have been lying on a horizontal surface during armature construction and application of plaster (fig. 9c). Extra plaster was added at the base of the neck to create a more natural transition to the shoulders, but the torso shape remains blocky, contrasting sharply with the waisted torsos of figures in cache 1. It might be hypothesized that the torso was intentionally rectangular and armless so that it could withstand lifting and attachment to upright legs. Indeed, this task was more easily accomplished during replication than had been anticipated.

Because they would need to be in a comparable state of dampness when attached, the legs were probably made so that they were completed at the same time as the torso. Evidence shows that fabrication of each leg began with assembly of several reed bundles measuring the length of the finished leg (fig. 9d). Plaster was applied between the bundles as they lay horizontally. A second layer was applied around the upper legs, and it is largely responsible for the considerable heft of the thighs, particularly in the case of statue #2 (fig. 9e). A layer of reeds was then applied to the plaster, probably consisting only of reed leaves (excluding stems) because the gap left by the layer is so narrow (fig. 9f).⁴⁰ This reed layer may have been used to facilitate the next step: the spiraling of cordage around the entire length of the composite. Then the final layer of leg plaster was applied, probably including preliminary modeling of the toe area (fig. 9g). When legs were replicated, a minimum of five days was required because plaster had to stiffen overnight after each application, including separate applications to the front and back for each layer circumscribing the legs, so that they could be safely moved for application of the next layer of plaster.

When the final layer of plaster was stiff, the legs would have been placed upright. Considering their top-heavy forms, replica legs were found to be surprisingly stable in upright position, although leveling the feet seemed essential to provide a more solid base. At this point the heels seem to have been added somewhat peculiarly to one side of the feet, most

likely to stabilize the legs (fig. 13). Narrow curved gaps and especially flat surfaces on the bottoms of the heels provide evidence that they were modeled after the figures were upright. To accomplish righting each leg during replication, the board on which it rested was carefully tilted until upright, pivoting where the heel would be. During this process it became clear why the heel was probably modeled after the leg was upright: had it been modeled before righting, the pivoting would have damaged it.⁴¹

Evidence indicates that reed bundles did not extend below the figures as they did for figures in cache 1. While reed impressions continue to the bottoms of the feet, there is only a small elliptical aperture (2 × 0.8 cm) on the bottom of the single reasonably complete foot (fig. 13). Much smaller than reed-bundle cavities at the bottoms of figures in cache 1, its size is only a fraction of that in the ankle and lower calf, and a bundle of such small size could scarcely have provided anchorage for the figures. Moreover, anchoring bundles would have complicated erection, shown to be difficult enough during replication.

That the torso was then placed on the upright legs is supported indirectly by evidence. The torso and legs show clear evidence of separate fabrication, the legs were upright when the feet were completed, and attachment of the torso could have been easily achieved only after the legs were upright. This sequence is supported by evidence of buttock modeling when the torso and legs were joined. A slight internal gap is present between one buttock and plaster underneath, apparently because of partial drying before the buttock was modeled. Modeling of the buttocks would logically have been done at this point because the buttocks are located exactly where the torso and legs join and their protrusion would have been difficult to retain if they had been modeled when the figures were horizontal.

Probably because statues or statue parts were largely manipulated while lying on rigid supports and the plaster was allowed to stiffen before manipulation, finger impressions are rare. Finger impressions on the torso of statue #1 may have been impressed at the only time plaster had to be manipulated without support: when the damp torso was lifted for placement on the legs (figs. 7, 9h). The torso replica was

⁴⁰ No evidence of this layer was noted inside the legs of statue #1, and it may have been omitted, perhaps because the legs are slimmer than those of statue #2.

⁴¹ Alternatively, the leg might have been tilted upright in the opposite direction, leaving a previously modeled heel unaffected, but this seems less likely because it would have precluded preliminary modeling of the toe area

when the last layer of plaster was applied while the legs lay horizontally. The toes would have been more important to the upright stability of the legs when the legs were first placed upright. Moreover, although gaps indicative of drying between applications were found between leg and heel, no such gaps were present between leg and toes.

secured with ties across the chest as a precautionary measure until the plaster had dried, in keeping with parallel indentations across the front chest of statue #1, which may have been left by similar ties.

ROLE OF THE ARMATURE

Reed armatures allowed a reduction in the amount of plaster needed to make the statues. Thus, they minimized cracking from shrinkage of plaster during drying and decreased the weight of the completed statues. They also served a passive structural role during construction as forms on which plaster was applied until it had stiffened.

Contrary to expectation, armatures for statues in cache 2 did not seem to play a significant structural role once the statues were upright. This was demonstrated when the replica bust was righted: plaster was accidentally broken off, and exposed reeds bent like cooked spaghetti, having been wetted by absorption of water from the plaster. The statue sagged dramatically to one side and collapsed. Moreover, although the reeds would have regained some rigidity after drying, there is evidence that the plaster was self-supporting after it had dried, regardless of the reeds. Even after more than nine millennia and complete decomposition of the armatures, the thinly plastered necks supported heads when held vertically before auxiliary supports were added. The armature's limited structural importance may also explain why a single armature was not used inside the two-legged figures. A single armature of requisite size would have been incredibly difficult to turn over for plastering the opposite face and would not have provided any structural advantage.

Armature shapes are reflected in the final shapes of the statues to a surprising degree because in many places plaster was applied in an even layer. For example, the square shoulders reflect the application of a uniform layer of plaster to the box-shaped form of the torso armature. Even small details of the armatures can be seen in the plaster, although in some cases they were probably inadvertent. For example, a slightly protruding "sternum" on statue #1 reflects location of the head-and-neck reed bundle in front of other torso bundles. The anterior location of heads on the large busts and standing figures also reflects greater armature behind than in front, while centered heads on the small bust (#3) reflect even distribution of torso armature (fig. 1). That *form followed armature* became particularly evident during replication of the torso armatures. Plaster was applied until surfaces were relatively even and reeds adequately covered, without an attempt being made to replicate the original plastering very precisely;

nevertheless, results were nearly identical to the original statues in shape and plaster thickness.

The role of the armature and the degree to which final shapes reflect armatures were quite different for the statues in cache 1, probably in part because of their smaller scale. Armatures took up proportionately less space inside cache 1 statues. Those for the two-legged statues resembled stick figures, and varying amounts of plaster filled in areas between perpendicular members of the armatures, with more modeling done on the surfaces. Jericho statues excavated by Garstang seem to have had simple armatures, probably similar to those of figures in cache 1, but comparison is limited by minimal information and the absence of a torso.

CONSTRUCTION AND FORM

A desire for great scale appears to have been fundamental in determining forms for the statues in cache 2. The replication process demonstrated that when statues of this size were made, plaster *had* to be applied with the armatures horizontal and that flat, broad, shallow, simple shapes resulted.

Flat surfaces were probably necessary to facilitate manipulation, allowing parts to be readily sandwiched between rigid auxiliary supports for reversal or tilted for raising upright. Torso armatures were designed to be flat, but fabrication of the statues in horizontal position further flattened reed bundles and statue forms because of the weight of the plaster on the movable armatures. The flattening of armatures is reflected in flattened curvature of bundle impressions for both the original statues and the replications. The flattened front and back surfaces of thighs and torsos, as well as the flattened backs of heads, reflect the flattening of the original statue forms. Similar shapes were produced naturally during replication.

Disproportionately large breadths were necessary to accommodate the two heads on the busts. Moreover, a wide torso could be easily made without significantly increasing the difficulty of fabrication, favoring increase in width to create sizable statues. On the other hand, adding more bundles or plaster to substantially increase depth and create a more three-dimensional statue could not be accomplished if construction was horizontal. Plaster would sag or fall off at the statue's sides if too much of it was applied.

Simple shapes were necessitated by the demands of reversal and righting the statues. Protrusions on the front and back could be damaged by these processes. Moreover, significant overhangs on the sides, such as shoulders above a waist, might fail for lack of support when large statues were placed upright in a damp state; this probably accounts for the straight sides of

the statues. Exterior detailing is limited, and after the statues were upright, it seems to have been restricted to areas that were recently joined and where plaster would have been fresh. It includes modeling of the figures' toes and buttocks, as well as the delineation between torso and legs on the front of the figures. Because shapes of the plaster torsos were so simple, it seems likely that they were meant to be decorated with clothing and other accessories. In that case, the torsos served mainly as large supports for other materials.

Smaller size must have enabled bodies of two-legged statues in cache 1 to be modeled in a more shapely, detailed manner that may have made adornment with clothing unnecessary. It probably also permitted upright modeling of torsos for busts.

PRESENTATION

That PPNB statues were displayed upright seems clear. Despite their relatively high centers of gravity, the statues in cache 2 that were excavated at 'Ain Ghazal are remarkably stable when standing, even now, after considerable breakage and distortion since burial. In addition, dirt was found caked on a bottom surface as if the statue had been standing for some period of time. Deposits of orange-red pigments typical of those used to decorate plaster floors and walls were also found on statue bottoms, as if pigment had been rubbed onto them while the statues were displayed on painted floors. That the statues were "used goods" and not made strictly for burial is indicated by the wide distribution in the pit of pieces of one statue (#5/6), which suggests that the figure was already broken at the time of burial. The flat bottom surfaces on statues in cache 1 and on the red-painted bust fragment from Jericho (1958.772) also indicate that they were upright during fabrication and presumably during display.

Two-legged figures and large busts in cache 2 were probably displayed near their place of fabrication. The thinly plastered necks of the large busts and legs of the standing figures would have been particularly vulnerable to breakage during transport. The four larger statues are also quite heavy: statue #5/6 is estimated to have weighed about 28 kg, since its remaining fragments weigh nearly 17 kg. While reed anchorage has been ruled out for statues in cache 2, sticks or the like could have been pushed into reed-bundle apertures at the bottom of the large statues to secure them after plaster had dried. This would have improved their stability, just as reassembled statues are

now secured with stainless steel pins for museum display. The lighter weight of figures in cache 1 would have made them easier to move, but their reed anchorage would have limited portability. The small bust in cache 2 and all busts in cache 1 can be considered portable because of their small sizes and compact shapes.

Adornment with separate clothing and wigs or headgear seems almost certain. Although no evidence of applied decorations was found during excavation, such items might have been removed when the statues were buried, and decorative organic materials would be expected to decompose in any case. Possible clothing materials might have included animal skin, woven bast fibers, or knotted network.⁴² In addition to these materials, wigs or headdresses could have been made from reeds, hair, or feathers. In the case of bust torsos in cache 2, the unrealistically blocky, armless shapes and surfaces that seem to have been intentionally left unsmoothed suggest removable coverings. The bust torsos in cache 1 may also have been covered, since the white surface layer on the faces terminates in a V-shape at the neck, as if they were dressed with V-necked garments or draped to leave such shapes. Partial adornment, perhaps with capes and skirts or loincloths, seems most plausible for bodies of figures in cache 2. Although they are blocky, unpainted, and armless, surfaces were smoothed and some body parts are modeled, including buttocks, knees, and toes. Invariably recessed brows and unsmoothed plaster where hair is normally found argue convincingly for decoration with wigs or headgear on all statues in cache 2, as do the recessed brows on statues in cache 1 and the Jericho head in the Rockefeller Museum. There are many precedents in the ancient Near East for the adornment of statues with wigs in periods following the Neolithic.⁴³

"Dressing" the statues may have created far different and more realistic appearances. Wigs would have eliminated the ghostlike, alien images of the heads, often observed by viewers of the statues.⁴⁴ Sleeved garments or shawls could have produced the illusion of arms. Accessories could have been used to distinguish between the seemingly identical twins of the busts, perhaps identifying them as male and female. Use of clothing and other decoration might also have provided the statues with enough three-dimensionality for display in the round, although their relatively shallow shapes suggest display in front of walls or in niches.

⁴² Schick 1988.

⁴³ Matthiae, Pinnock, and Scandone Matthiae 1995,

298–302, 314–5, 318; Mazzoni 1984, 54–6.

⁴⁴ Schmandt-Besserat 1998.

THE ARTISANS

Technically skilled in their work, the statue makers successfully created large statues in plaster. Replication demonstrated that this was not a simple matter. The beauty of the facial modeling attests to significant artistic ability; in this respect, the maker of the statues in cache 2 appears to be superior to the maker of the statues in cache 1. Consistency of modeling suggests that the heads in cache 2 might have been made by a single hand, but in any case the heads are sufficiently alike to indicate contemporaneity. Similarity of modeling to that of the plastered skull found at 'Ain Ghazal in 1988 also indicates some relationship, whether stylistic or chronological.

Although differences between finely modeled faces and simple unsmoothed bust torsos might reflect a division of labor between two makers, such as master and apprentice, a single individual might have fashioned both heads and bodies, as was the case for the replicas. Lack of torso smoothing seems to have been intentional, and a craftsman may simply have conserved time and labor by not smoothing out surfaces or shaping forms that would be unseen.

Relatively few plaster statues have been found in proportion to the extent of excavated PPNB remains, but there are indications that statue making was a well-established activity. Several distinct types of statues existed, and exemplars of each type were fabricated in a similar manner. Armatures for statues in cache 2 played an especially prominent role in determining statue forms, and, as a consequence, there seems to have been less creativity at the plastering stage, especially in modeling the bodies. Probably necessitated by the desire to create larger statues, the complex armatures for these statues seem to reflect progression from the simpler ones used for cache 1, perhaps consistent with later dates of fabrication. The simplified body forms of statues in cache 2 seem inconsistent with the complexity of their armatures; but the bare plaster bodies now exhibited probably do not reflect the complexity of the statues as they were originally seen, adorned with clothing and headgear.

CONCLUSION

Close examination of plaster statues excavated at 'Ain Ghazal in 1985 indicates that their fabrication on reed-and-cordage armatures was complex, more so than other known PPNB plaster statues. It establishes that statues were fashioned largely while horizontal and that they were made in stages. In the case of two-legged figures, the torso and legs were made separately and joined. Full-scale replication of a bust and a figure proved valuable in establishing that size

probably dictated many aspects of construction and form. Such large-scale statues had to be made in stages while horizontal, and, because of horizontal construction, shapes that were broad, flat, shallow, and lacking protrusions were produced. This implies that it was the desire for size that was paramount in creation. Perhaps to compensate for plainness imposed by the limitations of large-scale fabrication, clothing and wigs or headgear were added, resulting in appearances that would have been substantially different from those now presented by the unadorned statues.

Finally, it should be emphasized that it was the blocklifting of the cache followed by laboratory excavation and conservation treatment that permitted so much material to survive and be documented. Similar methodology should be contemplated in the future when plaster statues are discovered. Moreover, detailed examination at the time of reassembly and replication of statues should be encouraged to provide a more complete picture of statue making and the PPNB societies that made them.

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Hydraulics of Roman Aqueducts: Steep Chutes, Cascades, and Dropshafts

H. CHANSON

Abstract

This paper examines the archaeological evidence for steep chutes, cascades, and dropshafts in Roman aqueducts. It also presents comparative data on steep-descent water flow in aqueducts based on physical model tests. It is suggested that the Romans were aware of the hydraulic problems posed by supercritical water flows and that the technological solutions they imposed were rudimentary but sound: for example, they understood the need for energy dissipation devices such as the stilling basin and the dropshaft.*

The Roman aqueduct remains one of the best examples of hydraulic expertise in antiquity. Many aqueducts were used, repaired, and maintained for centuries, and some, such as the aqueduct of Carthage (Tunisia), are still partly in use today.¹ Most aqueducts consisted of long, flat sections interspersed by shorter steep drops. Despite arguments suggesting that Roman aqueducts maintained a fluvial flow regime,² the present study suggests that these steep drops produced supercritical flows requiring a technical response to ensure normal water flow; it also argues that the Romans employed three methods to address this problem: chutes followed by stilling basins, stepped channels, and dropshafts.

STEEP CHUTES AND STEPPED CASCADES: HYDRAULIC CONSIDERATIONS

A chute is characterized by a steep bed slope associated with torrential flow (figs. 1–3). This chute flow

may be either smooth (fig. 2) or stepped (fig. 3). Roman designers used both designs as well as single drops along aqueducts (tables 1 and 2). There is archaeological evidence of smooth chutes along the Brévenne, Cherchell, Corinth, and Gorze aqueducts, and on the Anio Vetus, Claudia, Marcia, and Anio Novus aqueducts at Rome (table 1).³ Although there is less information on stepped channels, those at Andriake and Beaulieu are well documented. Dam spillways also employed smooth and stepped-chute designs. The oldest known stepped spillway was built around 1300 B.C. in Greece,⁴ and the famous Marib dam (Yemen) was equipped with an unlined rock chute on the left bank to spill flood waters. Roman engineers also built several significant spillway systems.⁵

The appendix provides some basic hydraulic calculations that I have applied to well-documented steep chutes. Tables 1 and 2 (column 4) summarize the results of these calculations. They were performed for “accepted” maximum flow rates (table 3) and demonstrate that high-velocity flows (velocities in excess of 8 m/s) occurred along several Roman aqueducts. The hydraulics of fluvial and torrential flows is distinguished by their fundamentally different behaviors. Torrential (supercritical) flows produce a much greater kinetic energy than fluvial flows. This value is normally expressed in terms of a “Froude number”;⁶ that is,

*I wish to acknowledge the following people (in alphabetical order) for their help and assistance: Professor C. Apelt, The University of Queensland, Australia; Mr. G. Berge Jussy, France; Dr. D. Blackman, Monash University, Australia; Ms. Chou Y.H., Brisbane, Australia; Dr. M.R. Gourlay, The University of Queensland, Australia; Dr. A.T. Hodge, Carleton University, Canada; Mr. G. Illidge, The University of Queensland, Australia; Mr. C. Lefebvre, Châtel-St.-Germain, France; Mr. P. Leveau, Université d’Aix-en-Provence, France; Mr. D. Murphy for information on Andriake cascade; Mr. J.L. Paillet, I.R.A.A., Aix-en-Provence, France; Professor N. Rajaratnam, University of Alberta, Canada; Dr. Y. Yasuda, Nihon University, Tokyo. In addition, I thank Dr. R.B. Hitchner, Editor-in-Chief of *AJA*, and Dr. S.R. Holman, former Associate Editor, for their helpful comments.

¹ Clamagirand et al. 1990, 423–31.

² That is, a tranquil flow regime such as the flow Froude number is less than unity (e.g., Chanson 1999).

³ The Carthage aqueduct has a moderate slope (0.7%) up

stream of the Oudna arcades, but the channel is technically termed “steep” because the flow was considered torrential.

⁴ The overflow stepped weir in Akarnania, Greece, built around 1300 B.C., is an earthfill embankment, 10.5 m high, with a 25 m-long crest. The downstream slope is stepped (14 steps) with masonry rubbles set in mortar. The weir was used for several centuries. It is still standing, and flash floods spill over the stepped chute. See Chanson 1997; Knauss 1995.

⁵ Roman dams equipped with a chute spillway system included: Cornalvo (Spain, second century A.D.), Al Khums (Libya, third century A.D.). Examples of drop spillway included Harbaka (Syria, third century A.D.). Examples of stepped spillway include the Kasserine dam (Tunisia), Oued Guergour dam (Tunisia, first century A.D.), Qasr Khubbaz (Syria, second century A.D.), and Tareglat dam (Libya, third century A.D.). See Chanson 1995a, 23–37.

⁶ The Froude number for a rectangular channel is defined as the ratio of the velocity to the square root of the gravity acceleration times the flow depth: i.e., $Fr = V/\sqrt{gd}$.

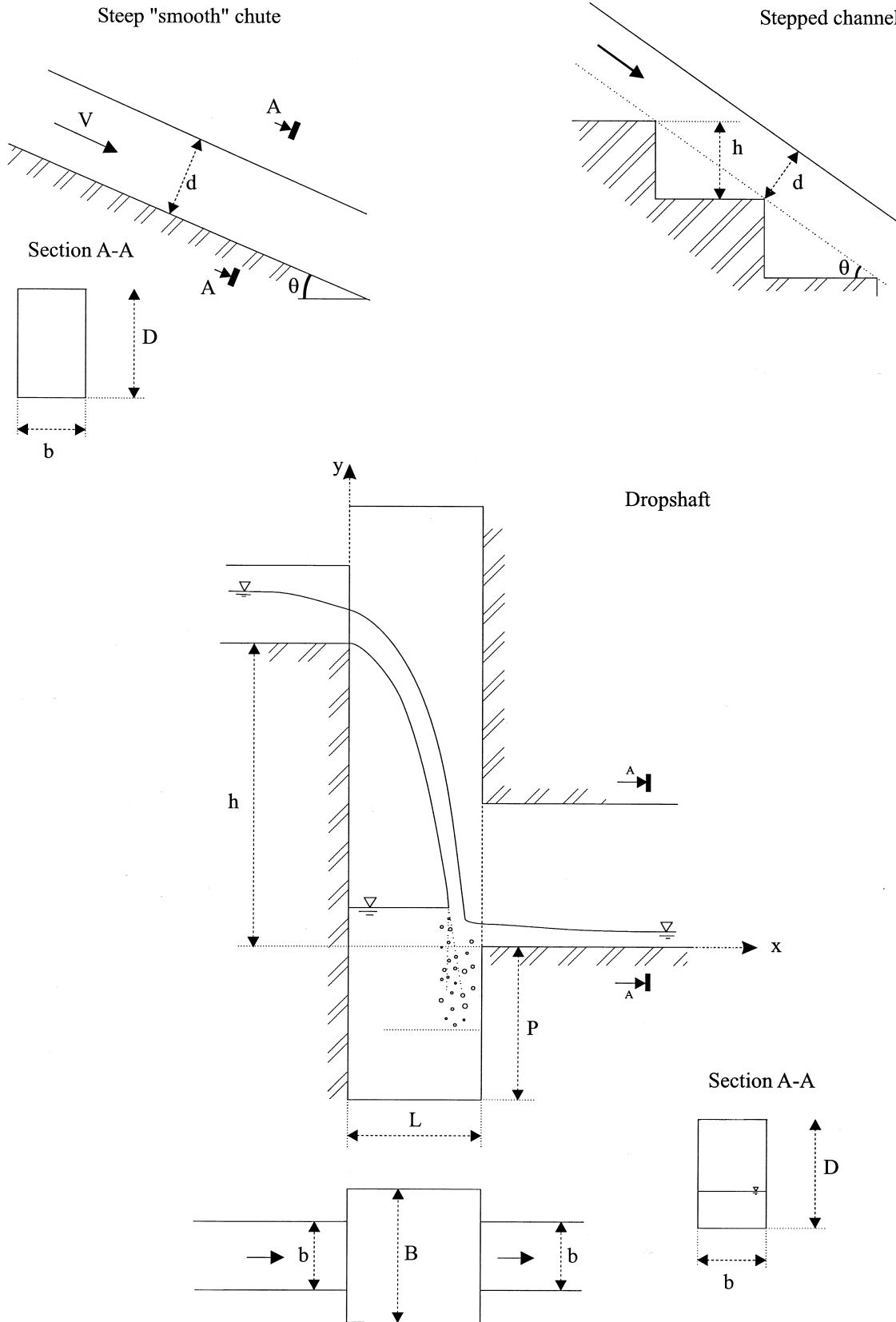


Fig. 1. Sketch of steep chute, dropshaft, and stepped channel observed in Roman aqueducts



Fig. 2. Photograph of chute flow in operation. Smooth chute flow, $Q = 0.075 \text{ m}^3/\text{s}$ ($6,480 \text{ m}^3/\text{day}$), $\tan\theta = 7\%$, $b = 0.5 \text{ m}$, $d \sim 0.035 \text{ m}$, $V \sim 4.3 \text{ m/s}$. View from downstream (flow from top to bottom).

the calculation of the properties of fluvial (lower energy) flows will produce a Froude number less than 1, while the properties of torrential flows produce a Froude number greater than 1. Supercritical torrential flow was consistently present along the entire channel of each investigated chute (table 1, column 4). Downstream of the chute, the transition to a slower flow motion took place as a hydraulic “jump,” characterized by strong energy dissipation (see appendix).

In modern engineering, hydraulic designers seek to avoid three types of hydraulic jumps: strong, oscillating, and undular jumps (fig. 4). Bed erosion and



Fig. 3. Photograph of chute flow in operation. Stepped chute flow, $Q = 0.033 \text{ m}^3/\text{s}$ ($2,850 \text{ m}^3/\text{day}$), $\tan\theta = 20\%$, $h = 0.1 \text{ m}$, $b = 0.4 \text{ m}$. View from downstream (flow from top to bottom).

“scouring” is more likely whenever there is a strong hydraulic jump, abruptly increasing the scour potential of the water at any point. It is believed that Roman aqueduct mortar and concrete could never sustain the “uplift forces” that occur in the water just beyond these strong jumps.⁷ Oscillating jumps present the risk that the position of the roller would be unsteady and fluctuate over great lengths. Further, the oscillating jump would be characterized by the unsteady propagation of the surge waves, highly undesirable in a narrow channel.⁸ The third undesirable change in water flow pattern, the undular hydraulic jump, produces steady, stationary free-surface

⁷ This comment is based upon my experience (associated with site inspections of several aqueducts) in several hydraulic studies related to concrete deterioration. I have discussed the issue of concrete resistance with world-known concrete experts and historians, who suggested similar results in Roman concrete and 19th-century concrete.

⁸ “This type [of jump] has a pulsating action. . . . [It] is one of the most difficult [types of jump] to handle” (Brad-

ley and Peterka 1957a, 1401–22). Bradley and Peterka’s work also highlighted specific problems in confined channels: “In narrow structures, such as canals [and aqueducts], waves may persist to some degree for miles. . . . Structures in this range of Froude numbers are the ones which have been found to require the most maintenance” (Bradley and Peterka 1957b, 1404–20).

Table 1. Steep Smooth Chutes in Roman Aqueducts

(1) Steep Section	(2) Ref.	(3) Geometry	(4) Flow Conditions				(5) Remarks
			ΔH (m)	d_o (m)	V_o (m/s)	X (m)	
<i>Brévenne aqueduct</i>	[Co3]						
Courzieu II/ La Verrière		$b \sim 0.55$ m, $\theta = 12.4^\circ$, mortar	44	0.05	4.24		Chute C1; 2.4 km upstream of the Basin of Sotizon
Chevinay/Plainet		$b \sim 0.76$ m, $\theta = 24.2^\circ$, paved stone	87	0.052	4.45		Chute C2
Lentilly II/Les Molières-Montcher		$b = 45$ m, $D = 0.8$ m, $\theta = 4.7^\circ$, mortar	33	0.0795	3.25		Chute C5
Limonest/ La Bruyère		$b \sim 0.53$ m, mortar	8				Chute C6
<i>Cherchell aqueduct</i>	[LP]						
Chabet Îlelouine		$b = 1.3$ m, $\theta = 38.0^\circ$	12.3	0.045	8		4 series of steep chutes followed by circular dropshaft
<i>Corinth aqueduct</i>	[Lo]						
Alepotrypes		$b \sim 1.1$ m, $\theta = 1.72^\circ$, mortar		0.29	3.62		Upstream of a large stilling basin (40×11 m ²)
<i>Gorze aqueduct</i>	[Le]						
Bridge over Moselle		Two parallel canals, each: $b \approx 0.85$ m, $\theta = 0.022^\circ$, mortar	4.3			1,100	Upstream calming basin (Ars-sur-Moselle) and downstream stilling basin (Jouy-aux-Arches)
				0.111 0.177	0.92 1.15		2 canals in operation 1 canal in operation
<i>Anio Vetus aqueduct</i>							
Tivoli, Hadrian's Villa	[VD]	$b = 0.8$ m, $D = 1.25$ m, $\theta = 11.6^\circ$, rocks and bricks	0.7	0.332	8.3		Short section [VD, p. 40; AS, pp. 63–64]
Bridge at Mola di San Gregoria	[AS]	$b \sim 1.05$ m, $D \sim 2.37$ m, $\theta = 9.3^\circ$	4.09	0.236	8.9		[AS, pp. 68–70]
<i>Claudia aqueduct</i>							
below D. Cosimato cliff	[VD]	$b = 1.15$ m, $D = 0.9$ m, $\theta = 26.6^\circ$, coarse concrete with rough reticulate	5.48	0.18	10.7		Upstream of bridge below Vicavaro [VD, p. 196; AS, p. 196]
<i>Marcia aqueduct</i>							
Casale Acqua Raminga, Gericomio	[Bl]	$b = 1.15$ m, $\theta = 8.9^\circ$, rough concrete	3.98	0.329	5.75	25.4	Upstream section [AS, p. 115; VD, p. 92]
		$b = 1.15$ m, $\theta \approx 6.13^\circ$, rough concrete	31.9	0.374	5.05	204	Downstream section
<i>Anio Novus</i>							
near Torrente Fiumicino	[Bl]	$b = 1.25$ m, $\theta \approx 3.48^\circ$, brick work	6.8	0.315	5.58		[AS, p. 261; VD, p. 280]
Ponte dell'Inferno to Ponte Scalino	[AS]	$b \approx 1.06$ m, $\theta = 0.604^\circ$	26.37	0.765	2.71		Unlined rock tunnel; cascades or steps? [AS, p. 287]
Ponte Scalino to Ponte Amato	[AS]	$b \sim 1$ m, $\theta = 0.94^\circ$		0.686	3.21		Unlined rock tunnel; cascades or steps? [AS, p. 287]
Fienile	[AS]	$b \sim 1$ m, $\theta = 0.76^\circ$		0.747	2.95		Unlined rock tunnel; cascades or steps? [AS, p. 287]
<i>Carthage aqueduct</i>	[Ra]						
upstream of Oudna arcades		$b = 0.865$ m, $\theta \approx 0.40^\circ$, mortar		0.157	1.47		Immediately upstream of Oued Miliane plain arcades

d_o : normal flow depth; V_o : normal flow velocity; X: chute length; ΔH : total head loss. References: [AS] Ashby 1935; [Bl] Blackman 1978; [Co3] Conseil Général du Rhône 1993; [CQ] Coquet 1966; [Le] Lefebvre 1996; [LP] Leveau and Paillet 1976; [Lo] Lolos 1997; [Ra] Rakob 1974; [VD] Van Deman 1934.

Table 2. Stepped Cascades and Drops in Roman Aqueducts

(1)	(2)	(3)	(4)		(5)
			Flow Conditions		
Steep Section	Ref.	Geometry	ΔH (m)	X (m)	Remarks
<i>Stepped cascades</i>					
Oued Bellah, Cherchell aqueduct	[LP]		37		Upstream of bridge Cascade?
Beaulieu aqueduct	[CQ]		18.6 37		Downstream of bridge Combination of steep chutes and dropshafts
Petite cascade		5 steps: h = 0.5 to 5.0 m	2 to 2.5		Horizontal and in- clined stepped faces
Andriake, Lycia	[Mu]	Pooled steps: h = 2.2 m, pool height = 0.78 m, b = 1.78 m, $\theta = 31.4^\circ$	11	18	Series of 5 pooled steps
Claudia aqueduct	[VD]	Single drop: h = 1.1 m			Near bridge below Vicavaro
<i>Drops</i>					
Brévenne aqueduct	[Co3]				
St-Pierre-La-Palud I		b ~ 0.45 m	30		
Lentilly II/Le		b ~ 0.45 m	38		
Guéret-La Rivoire					

b: channel width; X: cascade length; ΔH : total head loss. References: [Co3] Conseil Général du Rhône 1993; [CQ] Coquet 1966; [LP] Leveau and Paillet 1979; [Mu] personal communication, D. Murphy 1998; [VD] Van Deman 1934.

waves of significant length⁹ that have no formed roller pattern and that extend far downstream.¹⁰ Thus, for a flow depth of 0.5 m, these waves might extend for one kilometer or more. A similar wavy flow pattern may also occur with near-critical flows.¹¹ The waves generated by these undular and oscillating jumps can seriously interfere with the operation of the conduit downstream. Such problems in modern conduits include vibrations on downstream gates, disturbance of the discharge measurement devices, and changes in the way turbulent materials are dispersed within the channel.¹²

The free-surface profile at the downstream end of steep chutes is affected by both the high-speed chute flow and tailwater conditions. The latter are the flow conditions in the downstream canal.¹³ Four flow situations may occur (fig. 5). With a supercritical tailwater depth, the flow remains supercritical after the change of slope and no jump occurs. When the tailwater depth is larger than the critical depth in the downstream conduit, a hydraulic jump takes place. De-

pending upon the chute and tailwater conditions, the jump may be located far downstream or close to the change in slope. For very high tailwater depths, the hydraulic jump becomes drowned and a plunging jet flow occurs at the change of slope.

For several of the Roman steep chutes (tables 1 and 4), the effects of tailwater conditions were investigated by performing backwater computations.¹⁴ The results suggest that various types of jumps occurred, as well as plunging jet flows (table 4, column 3). These findings demonstrate that unfavorable flow conditions existed in these chutes, including oscillating hydraulic jump and undular flows, which were unsuitable for a proper operation of the aqueduct unless structures were built to dampen the surge waves. A sensitivity analysis was further performed for several chutes and aqueducts: table 4 contains a sample of the quantitative results for one of these. The study suggests no major change in backwater profiles for a broad range of discharge, from 30 to 120 percent of maximum flow rate.

⁹ E.g., $X/d \geq 2,000$ where X is the longitudinal extent of the undular flow and d is the flow depth.

¹⁰ Chanson and Montes 1995.

¹¹ Chanson 1995b.

¹² For more complete reviews, see Chanson 1995b, 1-1 to 1-4; for undular flows, see Montes and Chanson 1998; for oscillating jumps, see Bradley and Peterka 1957a and

1957b.

¹³ Assuming a long prismatic downstream conduit, the downstream flow depth, or tailwater depth, is the uniform equilibrium flow depth in the downstream conduit.

¹⁴ Standard step method, distance calculated from depth (e.g., Henderson 1966; Chanson 1999). See Chanson 1998 for further details on the calculations.

Table 3. Accepted Flow Rates and Details of Roman Aqueducts

(1) Name	(2) Location	(3) Length (km)	(4) Discharge (m ³ /day)
Arles	France	48.0	8,000
Athens	Greece	25.7	
Beaulieu	Aix-en-P., France		
Brévenne	Lyon, France	70.0	10,000
Carthage	Tunisia	132.0	17,300
Cherchell	Algeria	>45	40,000/6,600*
Cologne	Germany	95.4	
Corinth	Greece	85.0	80,000
Cuicul	Algeria	5 to 6	
Dougga	Tunisia	12	
Gier	Lyon, France	86.0	15,000
Gorze	Metz, France	22.3	15,000
Gunugu	Algeria		
Mont d'Or	Lyon, France	26.0	2,000 to 6,000
Montjeu	Autun, France		
Nikopolis	Greece	70.0	
Nîmes	France	49.8	35,000
Yzeron-Craponne	Lyon, France	40.0	13,000*
Appia	Rome, Italy	16.6	73,000
Anio/Anio Vetus	Rome, Italy	81.0	190,080
Marcia	Rome, Italy	91.3	188,000
Tepula	Rome, Italy	17.7	18,000
Julia	Rome, Italy	22.9	48,000
Virgo	Rome, Italy	22.9	100,200
Alsietima	Rome, Italy	32.8	15,700
Claudia	Rome, Italy	69.7	190,900
Anio Novus	Rome, Italy	86.9	190,080
Trajana	Rome, Italy	57.0	114,000
Alexandrina	Rome, Italy	22.0	21,000

Column (4) = maximum discharges as estimated in some references below; * present study. References: Ashby 1935; Blackman 1979; Burdy 1996; Carton 1899; Conseil Général du Rhône 1987, 1991, 1993; Fabre et al. 1992; Hodge 1992; Lefebvre 1996; Leveau and Paillet 1976; Lolos 1997; Van Deman 1934.

Design of Stilling Basins Downstream of Steep Chutes

In discussing the design of these basins, it is necessary to consider their intended purpose, stilling basin design, and chute geometry.

Settling or Stilling Basins? The presence along aqueducts of basins (i.e., short, deeper sections of the canal), often associated with inspection shafts and manholes, has been well documented.¹⁵ But were

¹⁵ For example, Hodge 1992, 103–5 and Chanson 1999, c-1. Examples of inspection shafts and manholes include: Cap Blanc at Hippo Zarite (0.3 m square shaft, $P = 0.4$ m [Gauckler 1902, 129]); Grand' Croix at Gier (0.9 m \times 0.87 m rectangular shaft, $P = 0.32$ m [Burdy 1996, 209]); and Oudna at Carthage (Rakob 1974, 49–50). Gauckler (1897, 176) illustrated an aqueduct at Ksar Soudane (Tunisia) with circular manholes, possibly acting as basins. At Hippo Zarite (near Bizerte), the Ain Nadour branch ($B = 0.2$ m wide, $P = 0.3$ m) had several circular basins ($\varnothing = 1$ m, $P \sim 2.5$ m? [Gauckler 1902, 126]). Gauckler's father, Philippe Gaspard Gauckler (1826–1905), was a French hydraulic engineer and member of the French Corps des Ponts-et-

they settling basins or stilling basins? Some studies have proposed that these were “settling basins” built to trap mud, sand, and solid waste.¹⁶

Some basin systems, however, were clearly *not* designed to trap sediments. At Alepotypes (Corinth), for example, the hydraulic power of the chute flow was about 9 kw and the downstream cistern functioned primarily as a dissipation basin.¹⁷ Three

Chaussées. He reanalyzed the experimental data of Darcy and Bazin (1865), and in 1867 he presented a flow resistance formula for open channel flows (Gauckler-Manning formula), sometimes called improperly the Manning equation (Gauckler 1867).

¹⁶ For example, Rakob 1974, 1979; Hodge 1992; Burdy 1996.

¹⁷ The concept of a stilling basin was known prior to the Roman era. In Priene (Ionia), a large stilling basin was built at the downstream end of the sewer system during the 5th century B.C. (Ortloff and Crouch 1998). The basin was about 3.23 m long, 0.8 m wide, and 0.8 m deep, and the maximum discharge was probably about 0.425 m³/s before spillage.

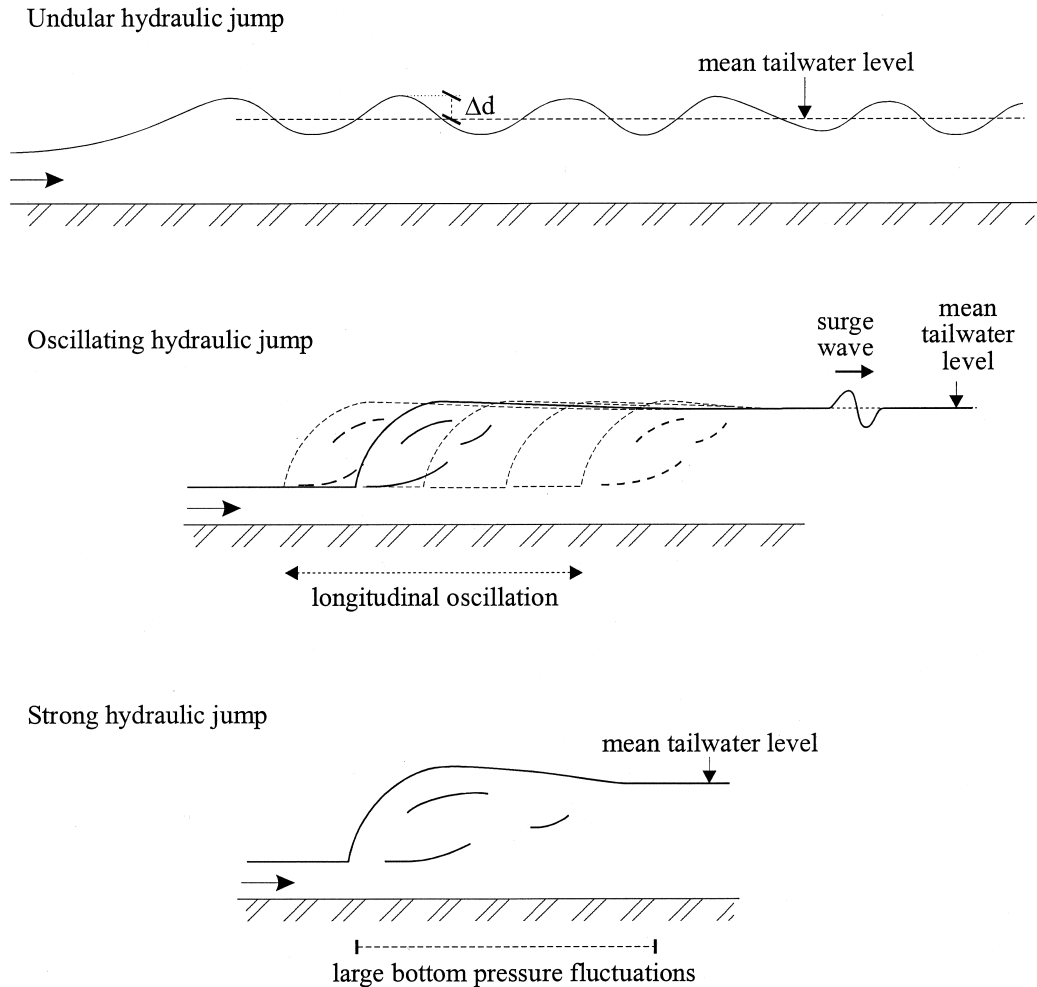


Fig. 4. Sketch of undular, oscillating, and strong hydraulic jumps

other, well-documented basin systems were built downstream of steep chutes: at Sotizon, 2,410 m downstream of the Courzieu II chute (Brévenne), at Jouy-aux-Arches, downstream of the Moselle bridge-canal (Gorze), and in the case of at least five circular basins at Oudna (Carthage)¹⁸ (figs. 6–8). Moreover, it appears that the basin dimensions are inadequate for purposes of trapping sediments. All of these aqueducts were covered and lined with mortar. The intake channel was the only possible point at which sediments could enter the system. Roman engineers

¹⁸ Sotizon is also called “Bac de Sotizon” or “Bac de nettoyage de Sotizon à En Triauge” (Conseil Général du Rhône 1993). For the Moselle bridge-canal see, e.g., Lefebvre 1996. The role of the basin was recognized early as a stilling device to calm the flow: “un espèce de puits, afin que les eaux y puissent tourner et prendre ensuite plus facilement leur direction” (François and Tabouillot 1974, 146). The five circular basins at Oudna were separated by 25 to 50 m at the start of the aqueduct arcades across

were, even by modern standards, highly expert at building intake structures, and several of these were designed with a de-silting device.¹⁹ It is obviously most efficient to trap sediments directly at the point of entry rather than further downstream. Further, the water velocity in the aqueduct channels was too slow to carry coarse sediments very far.²⁰

The degree to which a sedimentation basin may effectively trap sediment is related to the inflow properties, depth and length (geometry) of the basin, and the properties of the sediment itself.²¹ My

Oued Miliane plain (Rakob 1974, pls. 36 and 37, fig. 11). Although further basins were found near and within Carthage, it must be noted that none existed upstream of the Oued Miliane plain arcades.

¹⁹ E.g., the Gier aqueduct intake at Saint-Chamond (Burdy 1996).

²⁰ A complete set of calculations was developed in Chanson 1998, appendix E.

²¹ E.g., Fair et al. 1971.

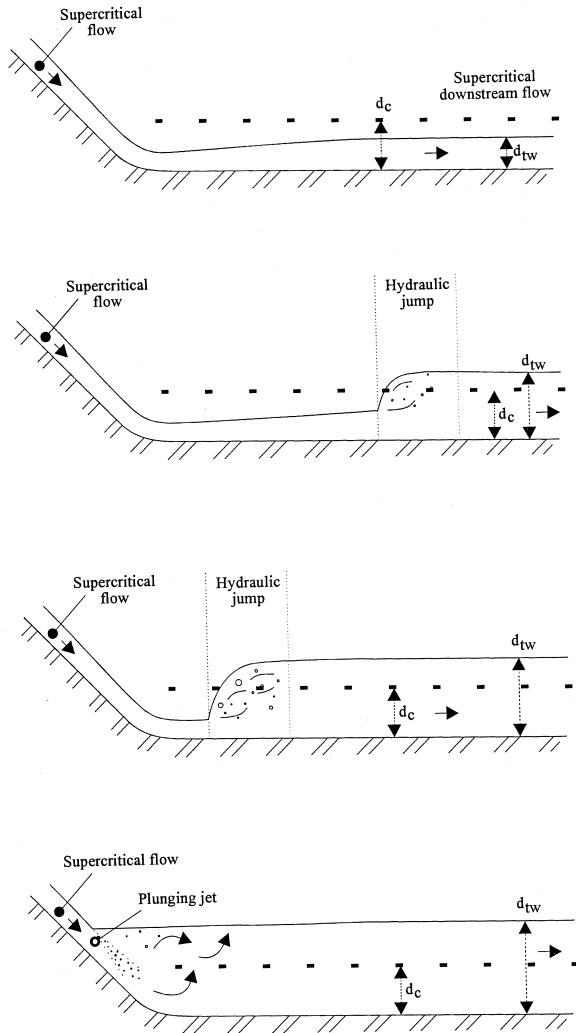


Fig. 5. Sketch of different tailwater flow conditions and associated backwater effects

calculations of maximum flow rates for the basins at Sotizon and Oudna suggest that sediment trap efficiencies were less than 50 percent. In addition, the basin volumes were small: 0.27 m^3 at Sotizon, 1.7 m^3 at Jouy, and 0.176 m^3 per basin at Oudna. With inflow sediment concentrations as low as 0.02 to 0.19 kg/m^3 , these basins would have been filled in one day at maximum flow rates. To clean the basins one had to stop the flow, making it improbable that cleaning would occur on a daily basis.²² It is unlikely,

²² Rakob (1979) commented on the frequent cleaning task of the Carthage aqueduct basins. Lefebvre (1985) similarly mentioned the rate of sediment filling at Gorze.

²³ At the start of Oued Miliane plain arcades.

²⁴ See, e.g., U.S. Department of the Interior 1960 and

in fact, that the aqueducts were stopped more than once a month, and the cleaning process would have taken several days to complete. Thus it appears to me most likely that at least four of these basins were in fact not sediment traps but stilling devices.

Stilling Basin Designs. As the preceding discussion suggests, undulations and surge waves would create serious problems for the operation of an aqueduct. The purpose of the stilling basins was to dampen the wave energy. Calculations done of the backwater show the need for substantial energy dissipation at Alepotypes and reveal unfavorable flow conditions at Courzieu II (undular jump), at Gorze bridge-canal (undular flow, $Fr = 0.88$) and at Oudna²³ (undular flow, $Fr = 0.7$) (table 4). At Sotizon, Jouy, and Oudna, the basins were primarily stilling basins to suppress downstream wave propagation (e.g., fig. 9). I believe that the Chevinay and Lentilly II chutes located downstream of the Sotizon basin were equipped with similar stilling devices, although no trace of the basin has yet been found (table 4).

Stilling basins work best when the basin itself is deep and long. The minimum length of modern hydraulic jump stilling basins is about three to six times the downstream flow depth although, for oscillating hydraulic jumps, the basin length must be longer: a length-to-depth ratio of about 6:1.²⁴ At Sotizon this ratio is approximately 4:1. At Jouy it is approximately 10:1, while at Oudna it is closer to 3.8:1, although the basins at Oudna are circular in shape. Clearly, the Jouy basin had the most efficient design while that at Oudna was less than optimal. The circular shape of the Oudna basins, associated with a small volume, may have been intended to induce three-dimensional wave motion, associated with cross-waves, wave impact on the walls, and wave reflection.²⁵ Consequently, a single basin would have been inadequate for dampening wave propagation. There are at least five basins at Oudna, and this quantity may represent an attempt by the Roman designers to address this problem.

Chute Geometry. In several instances, the design of the steep chutes differed from that of the main aqueduct channel. Some steep chutes were wider than the main channel, such as those at Chabet Ilelouine

Novak et al. 1996.

²⁵ A similar cross-wave pattern is experienced in undular hydraulic jumps and near-critical flows (Chanson and Montes 1995; Chanson 1995b).

Table 4. Tailwater Flow Conditions Downstream of Steep Chutes

(1) Steep Section	(2) Q (m ³ /day)	(3) Tailwater Flow Patterns
<i>Brévenne aqueduct</i>		
Courzieu II/La Verrière	28,000	Undular jump 15.4 m d/s of change in slope ($d_{tw} = 0.418$ m)
	10,000	Undular jump 8.5 m d/s of change in slope ($d_{tw} = 0.197$ m)
	7,000	Undular jump 6.4 m d/s of change in slope ($d_{tw} = 0.154$ m)
	5,000	Undular jump 4.6 m d/s of change in slope ($d_{tw} = 0.123$ m)
	3,500	Undular jump 3.4 m d/s of change in slope ($d_{tw} = 0.097$ m)
Chevinay/Plainet	28,000	Undular jump 13 m d/s of change in slope ($d_{tw} = 0.434$ m)
	10,000	Undular jump 7.2 m d/s of change in slope ($d_{tw} = 0.204$ m)
	7,000	Undular jump 5.4 m d/s of change in slope ($d_{tw} = 0.154$ m)
	5,000	Undular jump 3.8 m d/s of change in slope ($d_{tw} = 0.127$ m)
	3,500	Undular jump 2.8 m d/s of change in slope ($d_{tw} = 0.10$ m)
Lentilly II/Les Molières-Montcher	28,000	Steady jump immediately d/s of change in slope ($d_{tw} = 0.586$ m)
	10,000	Oscillating jump 1.5 m d/s of change in slope ($d_{tw} = 0.268$ m)
	7,000	Oscillating jump 1.2 m d/s of change in slope ($d_{tw} = 0.208$ m)
	5,000	Oscillating jump 1 m d/s of change in slope ($d_{tw} = 0.165$ m)
	3,500	Oscillating jump 0.7 m d/s of change in slope ($d_{tw} = 0.130$ m)
<i>Gorze aqueduct</i>	15,000	Undular flow in bridge-canal ($Fr = 0.88$); identical flow pattern for operation with one and two canals
<i>Carthage aqueduct</i>		
Oudna, start of Oued Miliane plain arcades	17,300	Undular flow d/s of change in slope: $Fr = 0.7$ ($d_{tw} \sim 0.228$ m)
<i>Corinth aqueduct</i>		
Alepotrypes	80,000	Plunging jet flow
<i>Anio Vetus aqueduct</i>		
Tivoli, Hadrian's Villa	190,080	Steady jump at sudden enlargement ($d_{tw} \sim 1.7$ m)
Bridge at Mola di San Gregoria	190,080	Plunging jet flow ($d_{tw} \sim 1.8$ m). Risk of undular flow in d/s conduit
<i>Claudia aqueduct</i>		
below D. Cosimato cliff	190,900	Steady jump at change in slope ($d_{tw} \sim 2.2$ m)
<i>Marcia aqueduct</i>		
Casale Acqua Raminga, Gericomio	188,000	Weak jump 9.1 m d/s of steep chute ($d_{tw} = 1.32$ m)
<i>Anio Novus</i>		
near Torrente Fiumicino	190,080	Critical flow in downstream conduit ($Fr = 1.03$, $d_{tw} = 0.668$ m)
Ponte dell'Inferno to Ponte Scalino	190,080	Subcritical backwater effect in steep chute associated with undular flow
Ponte Scalino to Ponte Amato	190,080	Plunging jet flow ($d_{tw} \sim 1.4$ m). Risk of undular flow in d/s canal
Fienile	190,080	Plunging jet flow ($d_{tw} \sim 1.0$ m). Risk of undular flow in d/s canal

d_{tw} = tailwater normal depth; results based on backwater calculations (Chanson 1998); **bold italic** = unfavorable flow conditions.

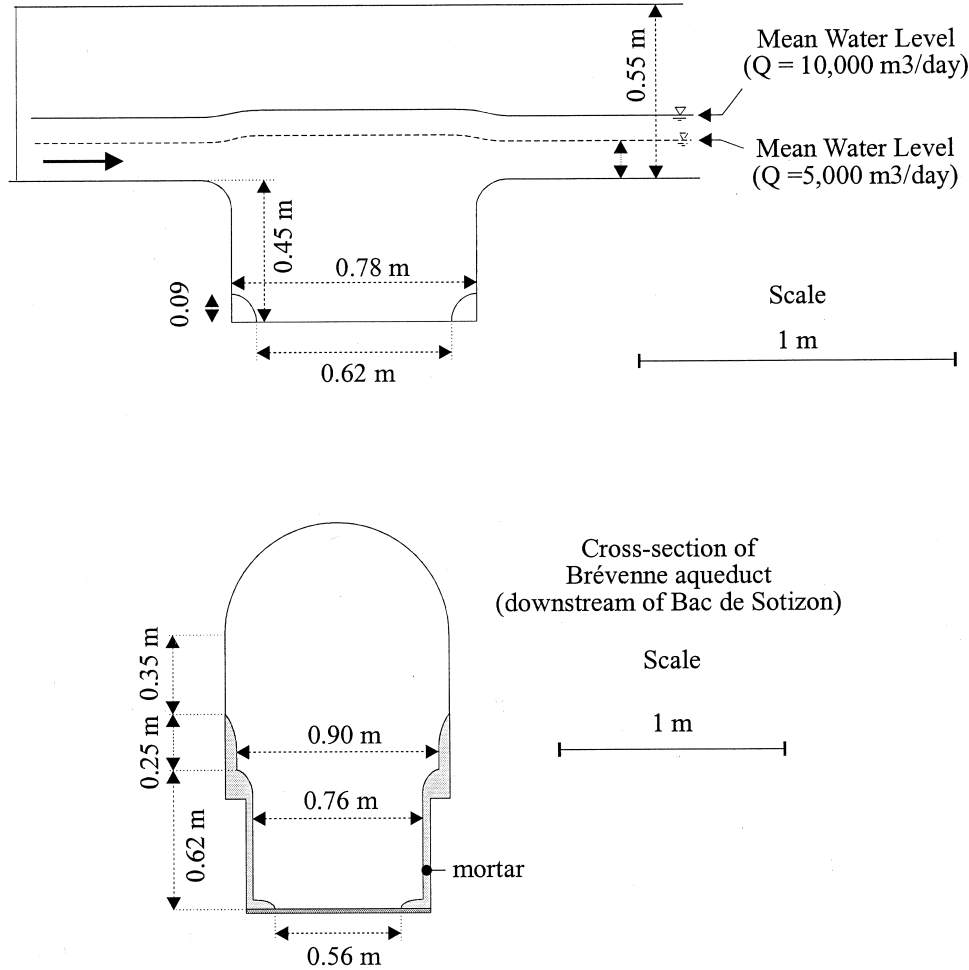


Fig. 6. Stilling basins in Roman aqueducts. Basin of Sotizon and a typical cross-section of Brévenne aqueduct. (After Conseil Général du Rhône 1993)

(Cherchell), and the Claudia aqueduct below D. Cosimato cliff. It has been suggested that this design was introduced to maximize flow resistance.²⁶ Other steep chutes were narrower than the main channel. This is the case at Courzieu II (Brévenne), Lentilly II (Brévenne), and Hadrian's Villa (Anio Vetus). Of interest, the chute outlet was often designed to be narrow at the point in which the water entered it and gradually expanding in width. This is evident at Courzieu II (Brévenne), Lentilly II (Brévenne), Alepotrypes (Corinth), Jouy (Gorze), Hadrian's Villa (Anio Vetus), and Fienile (Anio Novus). This corresponds to a transition from a cut-rock tunnel to an aqueduct bridge. In a few cases, the chute outlet design was a contraction: this occurs at the bridge at Mola di San Gregoria (Anio Vetus) and at the Clau-

dia aqueduct below D. Cosimato cliff. The gradual reduction in breadth seems related to the chute's transition into a cut-rock tunnel. Modern hydraulics suggests that a channel expansion at the chute outlet would have assisted in dissipating the energy of the flow.²⁷ The evidence of the contrary, of gradual reduction, could suggest that those who did the construction were not aware of the problem.

DROPSHAFT CASCADES

In some aqueducts Roman engineers built a series of dropshafts (called dropshaft cascades) along the aqueduct's main branch. This technology is well documented for the Cherchell, Cuicul, Cologne, Montjeu, and Yzeron aqueducts (table 5).²⁸ In Rome, vertical dropshafts were used to connect aqueducts, particu-

²⁶ Leveau and Paillet 1976.

²⁷ E.g., Hager 1992; Novak et al. 1996.

²⁸ It may also be suggested by construction details in the Beaulieu, Dougga, Gunugu, and Rusicade aqueducts.

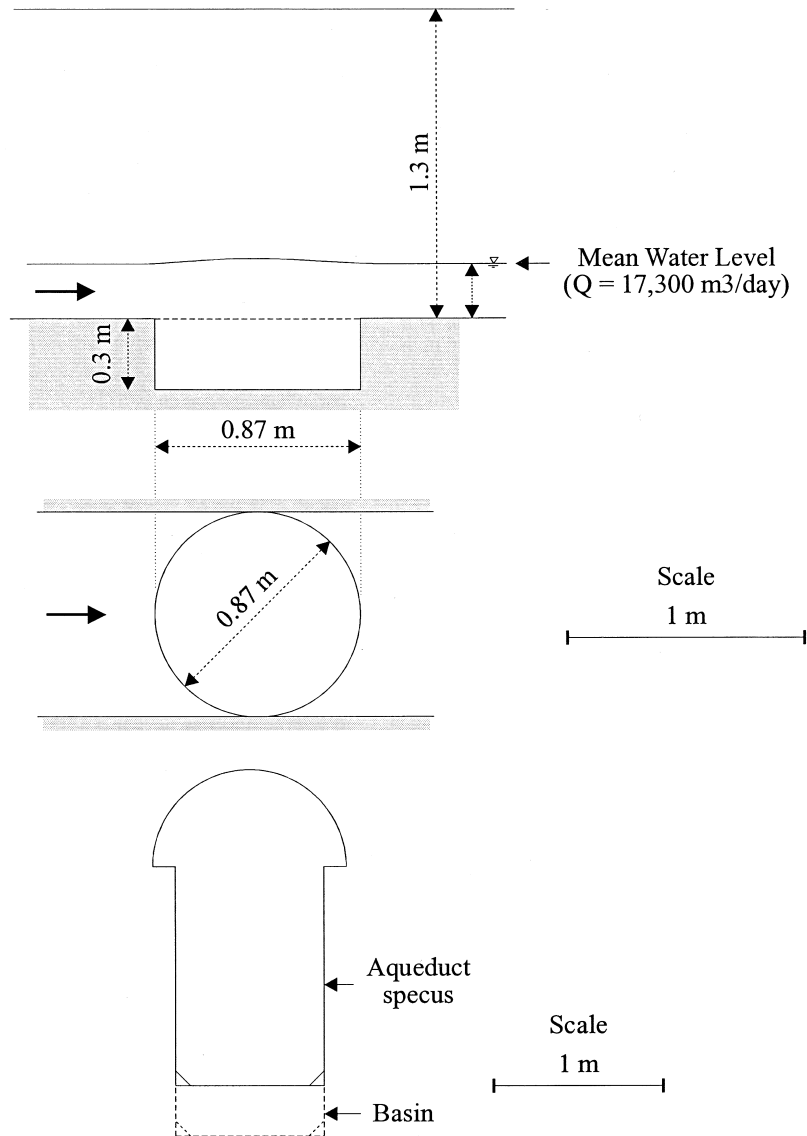


Fig. 7. Stilling basins in Roman aqueducts. Oudna, at the start of Oued Miliane plain arcades (Carthage aqueduct). (After Rakob 1974)

larly from newer, higher channels to older canals.²⁹ These shafts were sluice towers built primarily for water redistribution. It is believed that the design was probably a function of circumstances rather than a specific engineering feature of the newer aqueduct.

In modern hydraulics, there are at least three rec-

ognized purposes for designing dropshaft cascades. First, they may be used where the topography is especially steep. This is clearly the case for the Roman aqueducts at Retret and Grézieu-la-Varenne, Yzeron; and at Montjeu and Autun (table 5, figs. 10–15). Until now it has been believed that dropshafts were built to dissipate energy and possibly also, as dis-

²⁹ At Grotte Sconce (also spelled Grotte Sconcie), a branch of the Anio Novus aqueduct led to a circular dropshaft and into the Claudia aqueduct, and a second rectangular dropshaft led to the Marcia aqueduct (Ashby 1935, 277–9 and fig. 31; Van Deman 1934, 212–3, 302–3). At San Cosimato Gorge, a side channel connected the Claudia to the Marcia aqueducts through a 9.2 m-deep rectan-

gular dropshaft (Ashby 1935, 101–2 and fig. 7; Van Deman 1934, 76–7). Other examples of “interconnection shafts” included a square dropshaft from Claudia to Vetus at Voltata delle Corrozze (Van Deman 1934, 213) and a rectangular shaft from Anio Novus to Claudia near the Fosso Arcese bridge (Ashby 1935, 275).

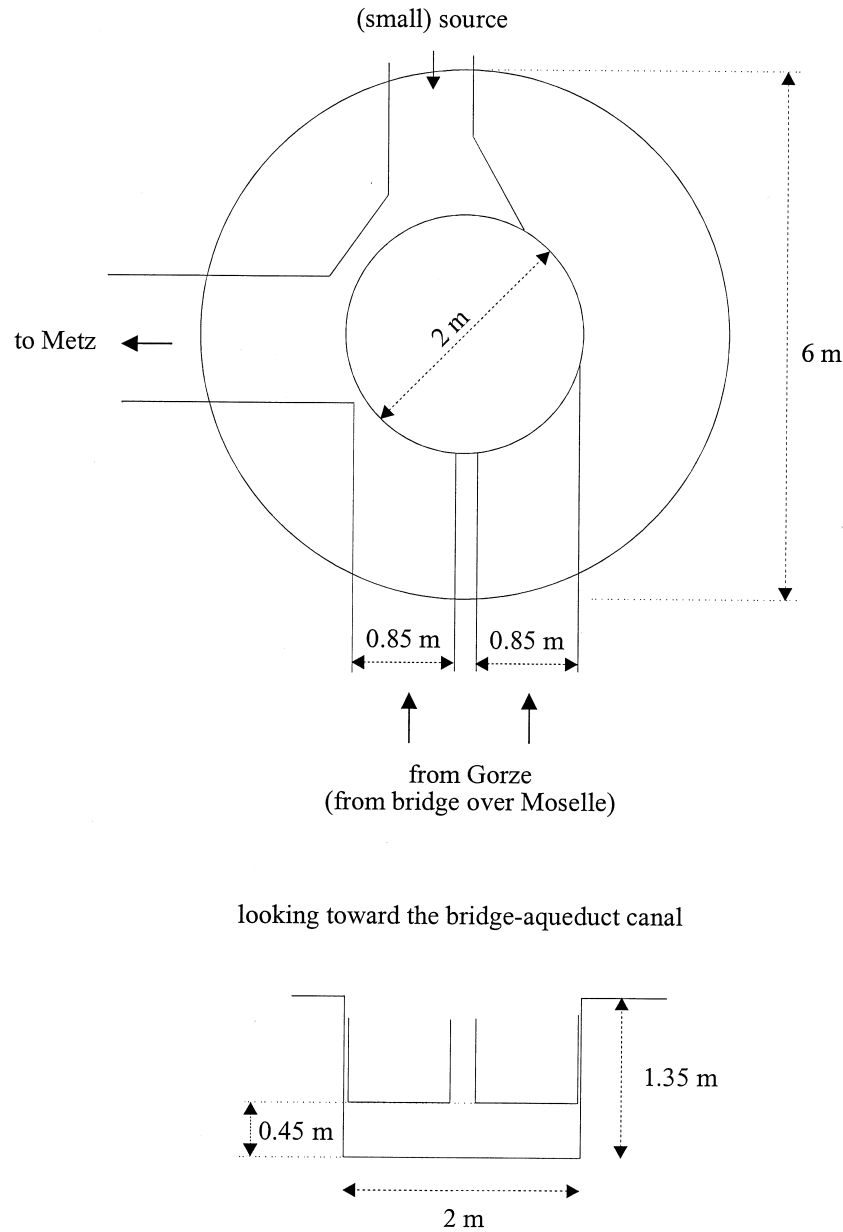


Fig. 8. Stilling basins in Roman aqueducts. Jouy-aux-Arches downstream of the Moselle bridge-canal, Gorze aqueduct. (After Lefebvre 1996)

cussed above in the context of basins, to trap sediment.³⁰ Regardless of purpose, a dropshaft by design provides a connection between two flat conduits, located at different elevations along the (usually short) length of the shaft. In contrast, a steep chute would require a much greater horizontal distance for the same drop height. A second application of the drop-

shaft is the dissipation of the kinetic energy of the flow. Such a design is still used today.³¹ To work well this design must account for three factors: drop height, shaft geometry, and flow rate. If these are not properly considered, unacceptable scour and erosion may take place. A third application of the dropshaft cascade is the aeration (or reoxygenation) of

³⁰ Conseil Général du Rhône 1991, 80; Gauckler 1902, 129. Although there is some uncertainty whether the shafts at Hippo Zarite were dropshafts or inspection holes,

Gauckler (1902) mentioned specifically that the shafts were designed with an invert drop of 0.4 m to trap impurities.

³¹ E.g., Apelt 1984; Rajaratnam et al. 1997.

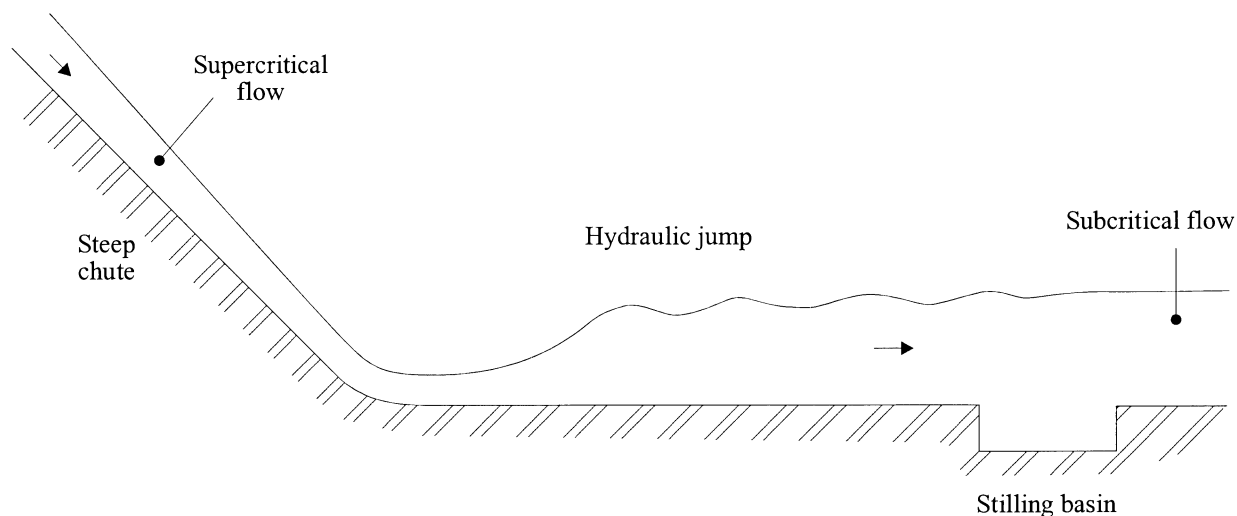


Fig. 9. Sketch of stilling basin operation in Roman aqueduct

the flow. This occurs via air bubbles entrained by plunging jet action into the shaft pool.³²

Hydraulics of Roman Dropshafts

In the Hydraulics Laboratory at the University of Queensland, we investigated the hydraulics of the Roman dropshaft using a 1:4 scale model of the Recret dropshaft on the Yzeron aqueduct (figs. 11, 16–17). The results³³ highlighted several flow patterns with increasing flow rates. We expressed this in terms of d_c/L , which is the ratio of critical flow depth (the height of the drop, measured in meters) to the length of the dropshaft (also in meters).

At low flow rates (d_c/L is less than or equal to 0.15), the free-falling nappe (the water surface) impacts into the shaft pool; we categorize this scenario as regime R1 (fig. 16). In this flow, substantial air-bubble entrainment occurs in the pool. In the downstream channel, the flow is supercritical in the absence of downstream backwater effect. In situations where the discharge rate is greater (the d_c/L is greater than 0.15 but less than 0.30), the upper nappe of the free-falling jet impacts into the downstream channel, flowing in between the inlet invert and obvert; we categorize this as regime R2 (fig. 17). In R2 the rate of energy dissipation is smaller, the pool free-surface level increases significantly, and less air-bubble entrainment is observed in the pool. At large flow rates (where d_c/L is greater than or equal to 0.30), the free-jet impacts onto

the opposite wall, above the downstream conduit obvert (regime R3). The pool free-surface rises up to the downstream channel obvert, and the water level in the pool fluctuates considerably. The third type of regime, R3, common in modern dropshafts, occurs only at large flow rates and was unlikely in Roman aqueducts.

Dropshaft Performance

The analysis of the dropshaft-model performances indicates that the optimum performances in terms of energy dissipation and flow aeration are achieved with a flow regime such as that illustrated in R1 (fig. 16). The experiments show that the flow regime R2 is characterized by poor energy dissipation, little flow aeration, and a high risk of scouring (figs. 17 and 18). In flow regime R2, extensive damage would occur very rapidly, typically in less than one day of operation. Most erosion would take place at the nappe impact and at the downstream conduit intake (fig. 18). The deterioration of modern concrete structures is well documented,³⁴ and worse damage would have occurred in Roman constructions. I suggest that, in fact, the dropshafts had to be overdesigned in order to prevent rapid and costly damage associated with the regime R2, and that the aqueduct dropshafts had to be built for an operation in a flow regime R1.

Table 6 summarizes the operation of well-documented dropshafts based on analytical calculations of the nappe trajectory and impact conditions.³⁵ At

³² E.g., Irvine and Ahmed 1982; Chanson 1998.

³³ Chanson 1998.

³⁴ E.g., U.S. Department of the Interior 1965; Chanson 1995a, 198–201; Novak et al. 1996.

³⁵ The calculations are based on the nappe trajectory equation and shaft geometry (Chanson 1998). The results were validated successfully with the physical experiments.

Table 5. Dropshaft Cascades in Roman Aqueducts

(1)	(2)	(3)	(4)			(5)
			Flow Conditions			
Steep Section	Ref.	Geometry	ΔH (m)	d_c (m)	X (m)	Remarks
Dougga aqueduct Oued Melah	[Ca]	B ~ 3.3 m b ~ 0.35 m (tunnel)	4 to 5			Located downstream of 200-m-long bridge, upstream of tunnel
Vaugneray, Yzeron aqueduct Puit du Bourg	[Co2]	Rectangular dropshaft: h = 2.55 m, b = 0.4 m, B = 1.14 m, L = 1.9 m	21.9	0.24		Vaugneray branch of Yzeron aqueduct Downstream flow conditions: d ~ 0.35 m, V ~ 1.33 m/s
Recret/Grézieu-la- Varenne, Yzeron aqueduct Puit Gouttenoire	[Co2]	Rectangular dropshafts	38			Main branch of Yzeron aqueduct
Puit-en-bas		Square dropshaft: h = 2.55 m, b = 0.55 m, B = L = 1.18 m, P = 1.12 m Rectangular dropshaft: h = 2.5 m, b = 0.55 m, B = L = 1.17 m, D = 1.26 m, P = 1.35 m		0.197		Downstream flow conditions: d ~ 0.15 m, V ~ 1.9 m/s
Chabet Ilelouine, Cherchell aqueduct Puit amont	[LP]	Circular dropshaft: h ≈ 0.77 m, b ≈ 0.94 m, ∅ = L = 2.03 m, P > 1.75 m	12.28			4 series of steep chutes followed by circular dropshaft Located downstream of steep smooth chute. Supercritical upstream flow: V ~ 8 m/s
Gunudu aqueduct Moulin Romain	[LP]	Circular dropshaft: h ~ 3.5 to 4 m, b ≈ 0.38 m, ∅ = L = 0.80 m	20			Upstream channel: 0.86 m wide
Ruscade aqueduct Beaulieu aqueduct Puit d'Olivari	[Ve] [CQ]	Circular dropshafts	37			Combination of steep chutes and dropshafts Rectangular or circular? 147 m between dropshafts
Puit du Château		Dropshaft: h ~ 8 m				Rectangular or circular? 167 m between dropshafts
Brisecou Forest, Montjeu aqueduct	[CQ, PR]	Rectangular dropshaft: h = 4.4 m, b = 0.8 m, B = 3.0 m, L = 2.4 m, D = 1.57 m, P > 0.8 m 9 dropshafts (h = 4.4 m) 15 dropshafts (h = 4.4 m)	140		770	A series of 24 dropshafts (possible combination with steep chutes) 15 to 30 m between dropshafts 50 to 120 m between dropshafts
Cuicul aqueduct Grand thermae distribution line	[Al]	Circular (?) dropshafts: h ~ 1 to 0.4 m, b ≈ 0.45 m, ∅ = L = 0.80 m	3		85	Series of 4 dropshafts on an urban distribution line
Cologne aqueduct	[Gr]	Rectangular dropshaft: h = 0.35 m, b = 0.7 to 0.75 m, B = 0.9 m, L = 1.185 m, P = 0.2 m				Several dropshafts

d_c : critical flow depth; X: dropshaft cascade length; ΔH : total head loss. References: [Al] Allais 1933; [Ca] Carton 1899; [Co2] Conseil Général du Rhône 1991; [CQ] Coquet 1966; [Gr] Grewe 1986; [LP] Leveau and Paillet 1976; [PR] Pinette and Rebourg 1986; [Ve] Vertet 1983.

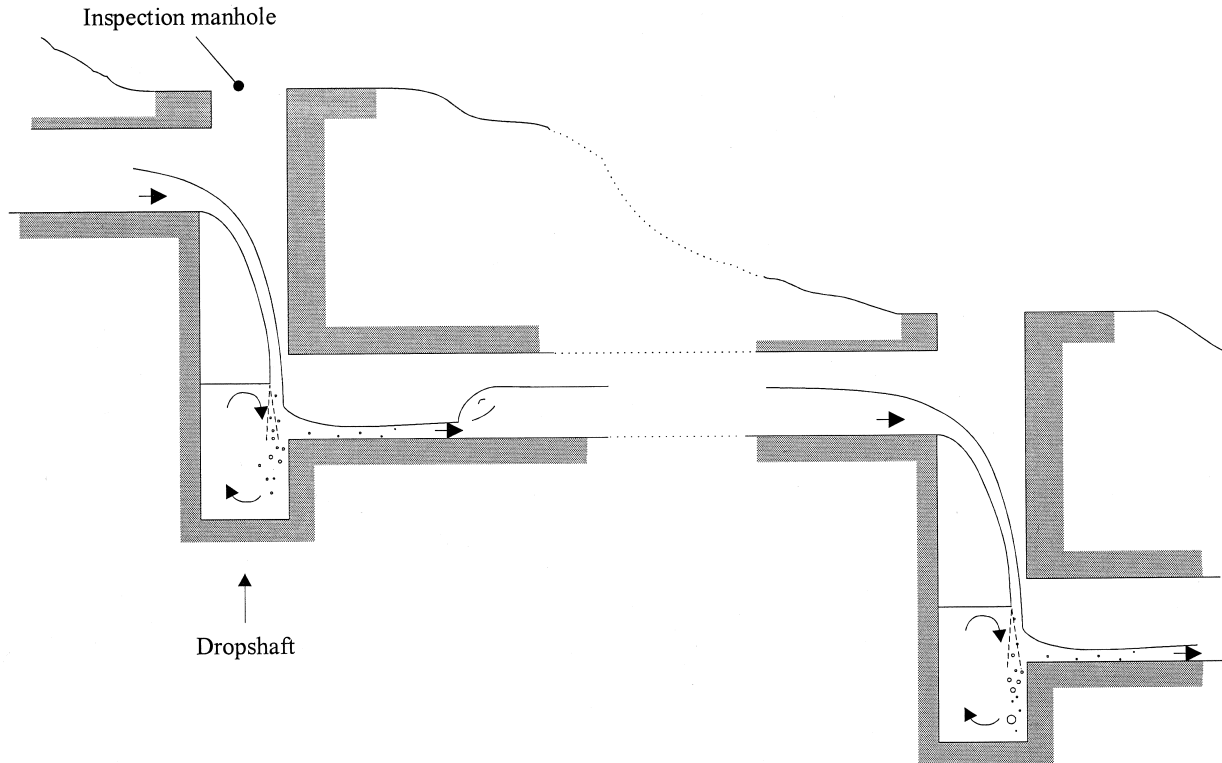


Fig. 10. Dropshaft cascade in Roman aqueduct

Cherchell, optimum performances (regime R1) were achieved for discharges less than 6,600 m³/day.³⁶ This result challenges the accepted maximum discharge of 40,000 m³/day.³⁷ For the Yzeron aqueduct, optimum operation (i.e., regime R1) occurred for flow rates up to 7,500 m³/day in the Recret main section and 22,000 m³/day in the Vaugneray branch. The Montjeu aqueduct's dropshafts at Brisecou Forest could operate safely with flow rates up to 40,400 m³/day. It is reasonable to assume that the Recret branch operated with a discharge less than 7,500 m³/day, a figure consistent with an overall discharge of 10,000 to 13,000 m³/day in the Yzeron aqueduct, assuming a flow rate of 5,000 m³/day at Vaugneray.³⁸ However, it was unlikely that either the Vaugneray branch or the Montjeu aqueduct operated at 22,000 and 40,400 m³/day respectively. It is more likely that

these two series of dropshafts were oversized designs and that optimum operation of the dropshaft was achieved in the setting outlined above as regime R1.³⁹

CHUTE AND DROPSHAFT DESIGN

Although this study demonstrates the existence of steep sections along the aqueducts, certain questions remain. Were steep chutes and dropshafts intentional design features of Roman aqueducts? Did the aqueduct designer (*librator*) understand the basic concepts of chute and dropshaft hydraulics? Indeed, it is plausible that some steep chutes were introduced as a functional solution to connect aqueduct sections that had been built by different gangs.⁴⁰ The construction of stilling basin and dropshaft was not (and is still not today) a simple job: it required the advice of an experienced engineer.

³⁶ The Cherchell dropshafts were preceded by steep chutes, and the inflow conditions of the shaft were torrential (supercritical). Chanson (1998, 4–16) developed a complete analytical solution of the problem that gave a maximum flow rate of 6,600 m³/day (for optimum performances).

³⁷ Leveau and Paillet 1976.

³⁸ For the Yzeron discharge, see Conseil Général du Rhône 1991. Estimate of the Vaugneray branch flow rate is based on the catchment in absence of further information.

³⁹ In mathematical terms, for aqueducts equipped with

dropshafts operating with subcritical inflow, the flow rate must satisfy:

$$Q < 0.1292 \times \sqrt{g} \times b \times \frac{L^3}{h^{3/2}} \quad \text{Regime R1}$$

where b is the dropshaft inflow width, L is the shaft length, and h is the invert drop (fig. 1) (Chanson 1998).

⁴⁰ For the techniques of construction and the problems associated with connecting different sections, see Fevrier 1979; Leveau 1979.

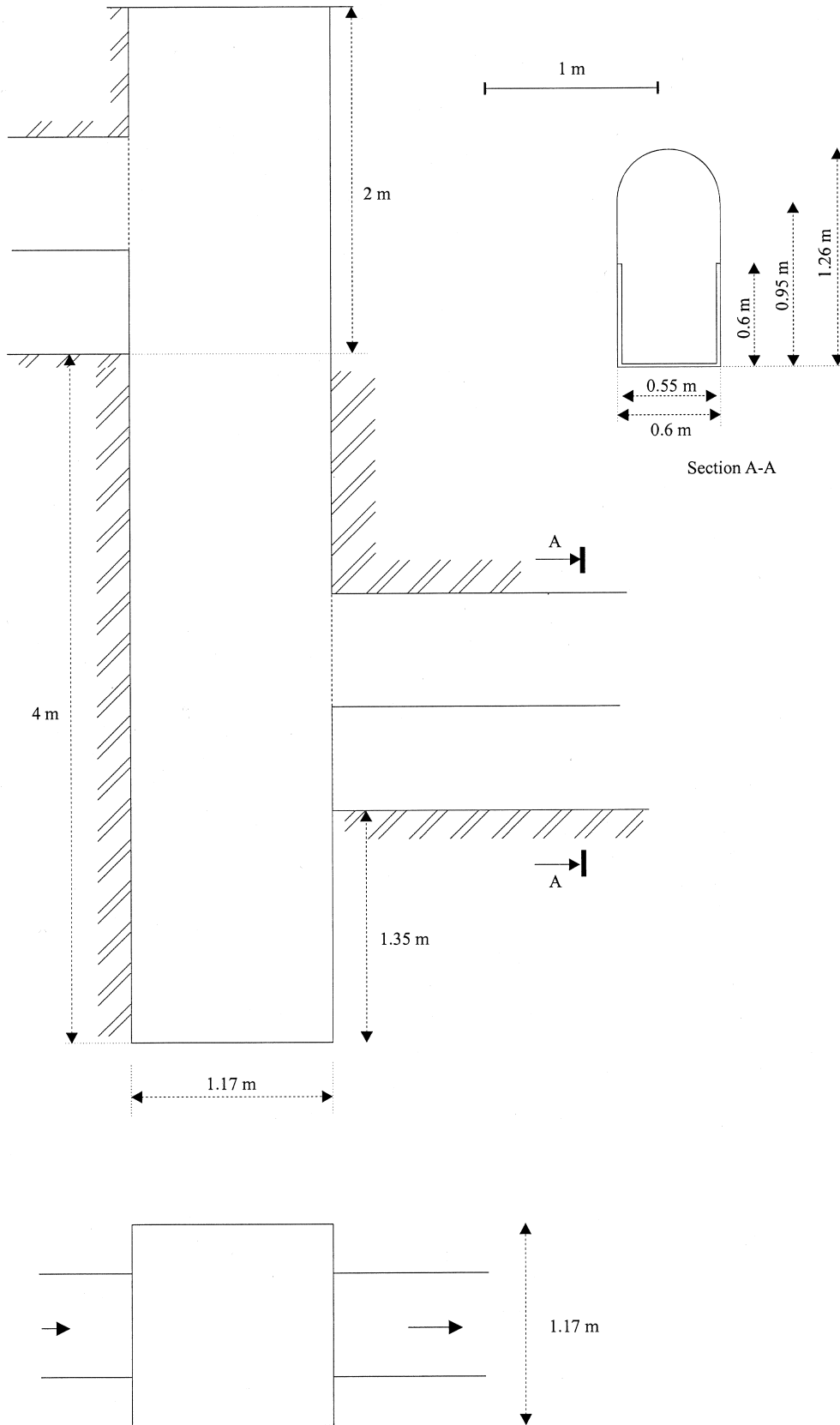


Fig. 11. Dimensioned drawings of dropshafts. Recret Puit-en-bas, Yzeron aqueduct.

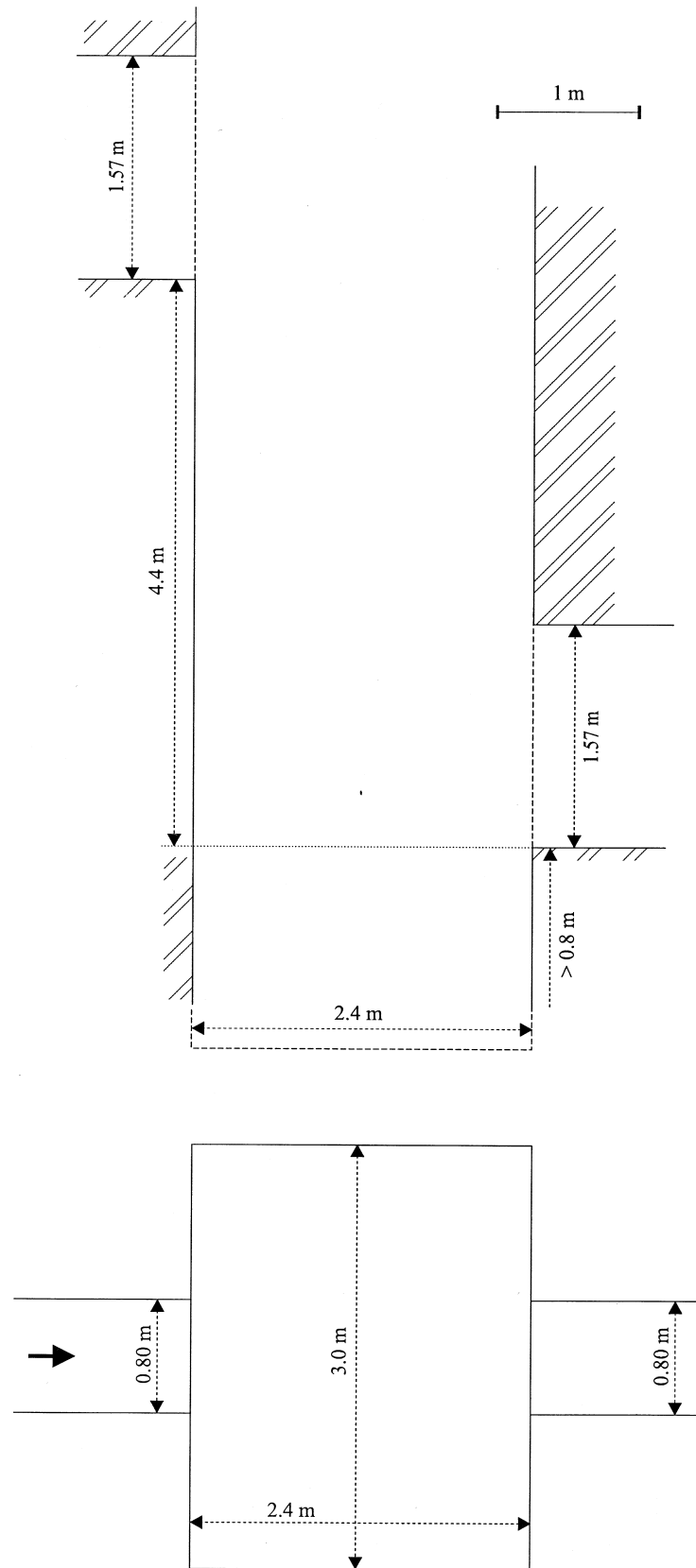


Fig. 12. Dimensioned drawings of dropshafts. Brisecou Forest, Montjeu aqueduct.

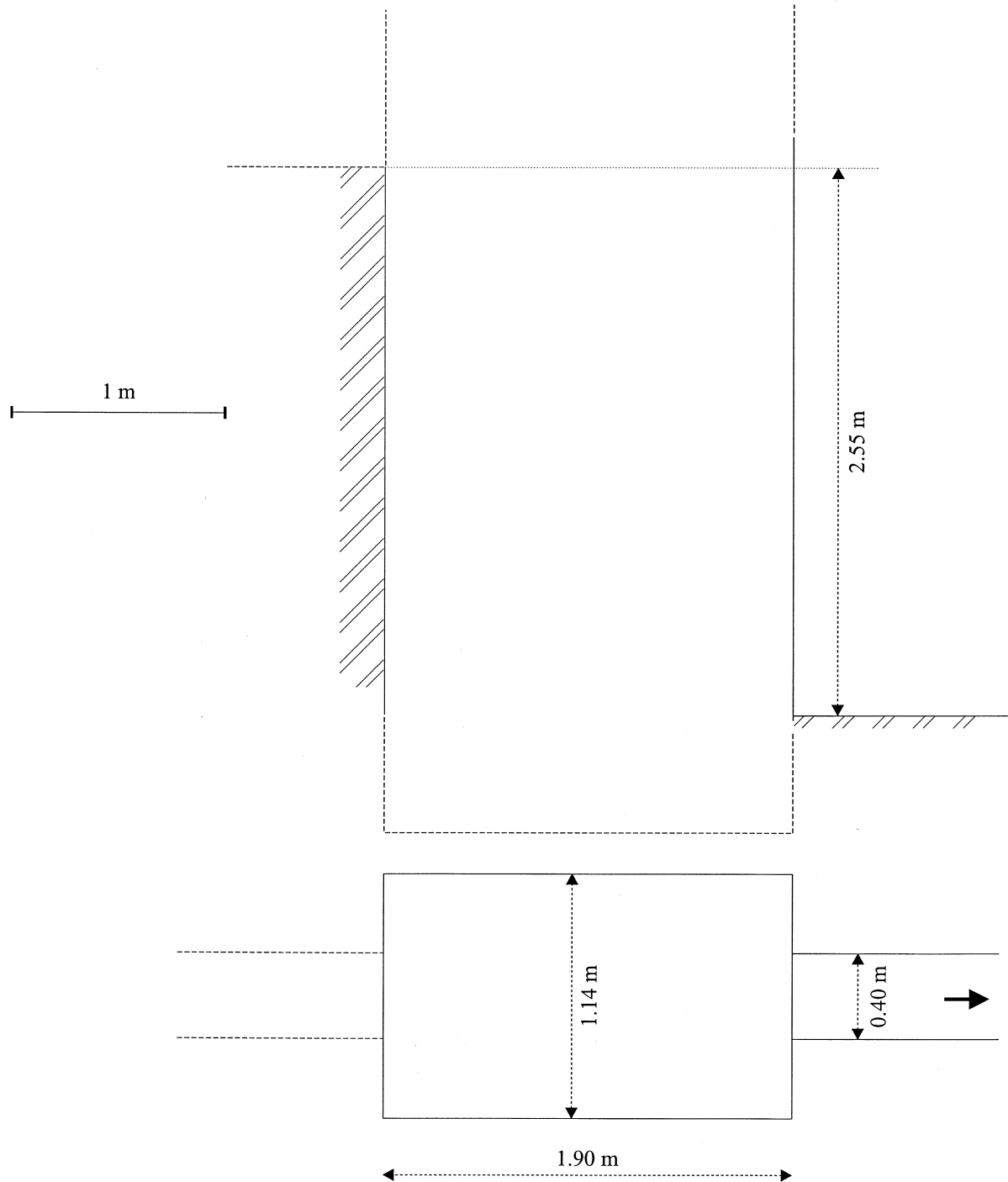


Fig. 13. Dimensioned drawings of dropshafts. Puit du Bourg, Vaugneray, Yzeron aqueduct (Vaugneray branch).

Well-documented evidence of aqueduct chutes and cascades clearly exists (tables 1–2, 5). These examples suggest that those who built them knew the problems they faced and intentionally designed the chutes and dropshafts accordingly. The series of steep chutes at Brévenne were imposed by the topography of the valley. They included vertical drops of up to 87 m (i.e.,

Chevinay/Plainet), which could not have been merely a simple construction problem. These chutes were part of the original design of the aqueducts. At Montjeu, Yzeron, and Chercell (figs. 12, 13, 15), large series of dropshafts were installed: 24 dropshafts at Autun ($\Delta H = 140$ m), at least 15 dropshafts at Retret and more at Vaugneray, and 4 dropshafts at

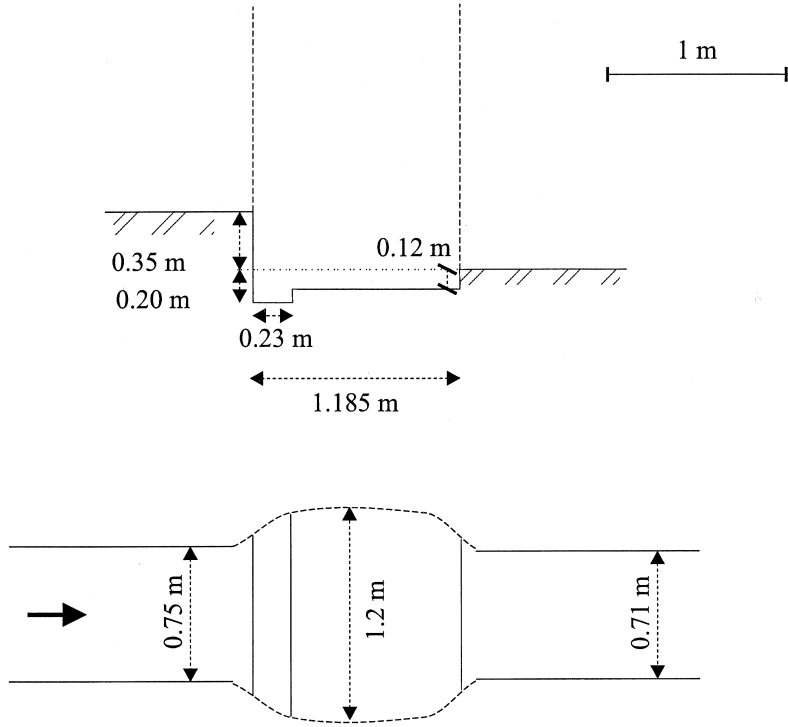


Fig. 14. Dimensioned drawings of dropshafts. Cologne aqueduct.

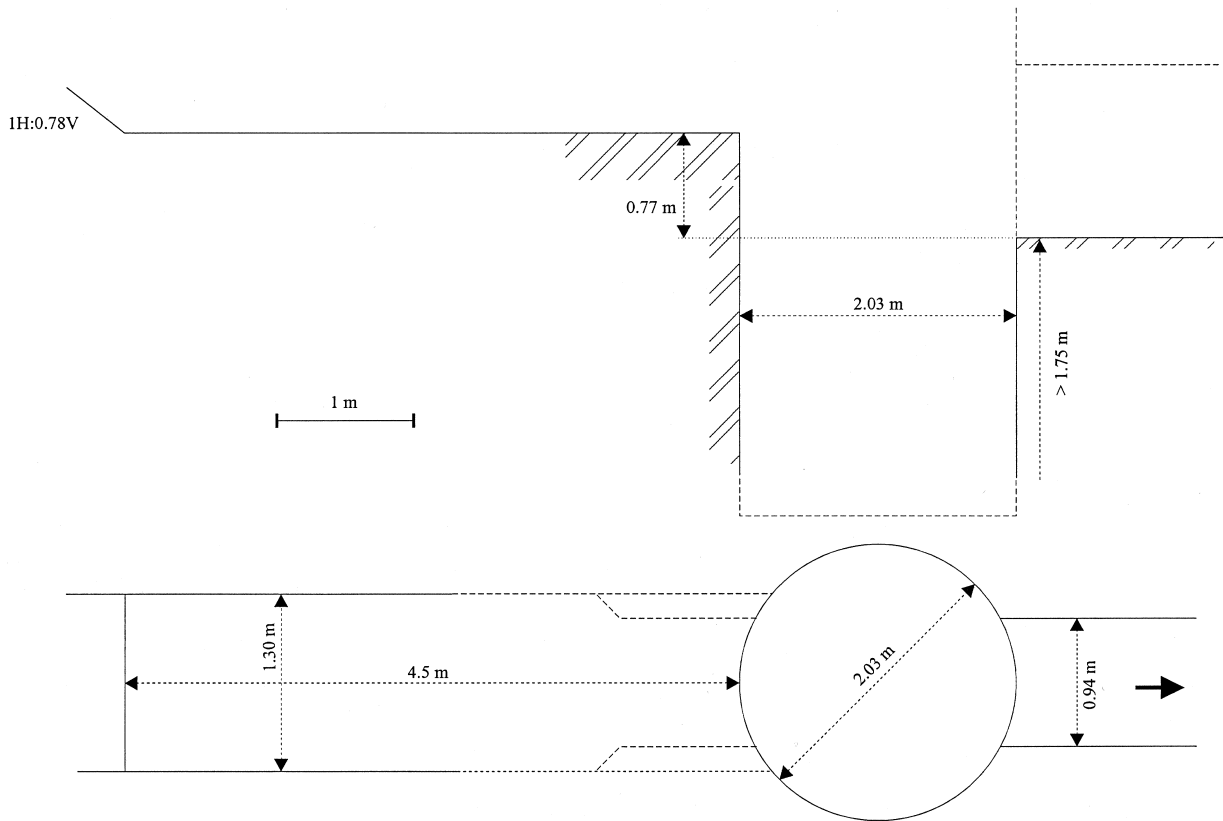


Fig. 15. Dimensioned drawings of dropshafts. Chabet Ielouine (Cherchell aqueduct).



Fig. 16. Photograph of the Recret dropshaft model in operation. Regime R1, $Q = 0.00104 \text{ m}^3/\text{s}$, $h/L = 1.68$, $D/L = 0.83$, $d_c/L = 0.0582$. Side view. Flow from left to right. High-speed photograph ($\sim 50 \mu\text{s}$).

Chabet Ielouine. Clearly these were engineering design features of the aqueducts!⁴¹ In both Roman and modern times, the hydraulic design of chutes and dropshafts has been a highly specialized task; the engineering design of the Roman aqueduct would have been reserved for only those Roman engineers with the highest skills. Nonetheless, there is no written documentation to support the theory that the engineers understood the basic concepts of continuity and energy as used in modern hydraulics. Even modern calculations of aqueduct hydraulics are embryonic.⁴²

⁴¹ At Cuicul (Djemila, Algeria), the location of the dropshaft cascade was most unusual: it was on a distribution branch in an urban environment rather than on the main line. The construction of the cascade was a major civil engineering work. Its underground location within the city might suggest that it was built prior to the surrounding buildings (e.g., *thermae*) and that careful urban planning was done at Cuicul. Alternatively, the city expansion might have taken place in stages and the cascade



Fig. 17. Photograph of the Recret dropshaft model in operation. Regime R2, $Q = 0.000975 \text{ m}^3/\text{s}$, $h/L = 1.68$, $D/L = 0.83$, $d_c/L = 0.259$. Side view, flow from left to right. High-speed photograph ($\sim 50 \mu\text{s}$).

Table 7 summarizes those observations of very steep gradients that are well documented. Here we find evidence of very steep gradients in short stretches, up to 78 percent at Chabet Ielouine, Charchell. Steep chutes were found across a wide geographic range in Italy, France, Algeria, and Turkey, suggesting that the steep-gradient design was not unique to Rome but was also employed at aqueducts elsewhere in the empire. Second, the steepest longitudinal slopes (not counting stepped spillway chutes) were smooth and stepped chutes but not a series of dropshafts. Supercritical flow took place in steep channels. Most Roman

would have been out of town in an early stage.

⁴² The present study suggests that the current “misunderstanding” of aqueduct hydraulics derives from the “ignorance” of most historians and archaeologists. The hydraulics calculations are easily feasible by undergraduate engineering students, provided that accurate information on the channel dimensions and flow rate are available (Chanson 1999; Henderson 1966).

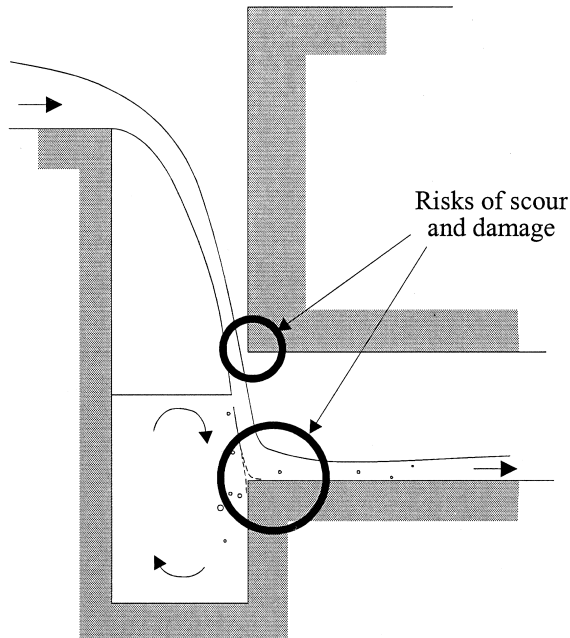


Fig. 18. Risks of scour and damage at a dropshaft operation with a flow regime R2

aqueducts had, overall, a mild slope that was associated with subcritical flows. The transition from the “steep” chute flow to the subcritical flow was characterized by a hydraulic jump. Hence, Roman engineers clearly had some experience of both supercritical flows and hydraulic jumps.

Third, and conversely, the data in table 7 highlights the fact that series of dropshafts were not used in the steepest topography, but rather for a range of longitudinal mean slopes up to 20 percent (table 7). This might suggest that dropshafts were not considered “safe” or “efficient” with very steep gradients. Construction problems may have affected the choice of dropshafts or steep chutes. Further, the dropshaft design might have been selected for purposes other than energy dissipation alone; for example, it might have been employed in some cases for re-aeration.

The Lyon aqueducts offer a useful example for a comparison between steep-chute and dropshaft cascade design. At Lyon, the Yzeron and Brévenne aqueducts were both designed with steep longitudinal gradient sections (fig. 19).⁴³ The older of the two, the Yzeron aqueduct, was equipped with a series of dropshafts (Recret, Vaugneray), while the aqueduct at Brévenne was equipped with steep “smooth” chutes (e.g., Courzieu II, Chevinay, Lentilly II).

Why? At the Yzeron aqueduct, the overall drop of the two series of dropshafts was 38 m along 490 m at Recret, and 21.9 m along 375 m at Vaugneray, or 7.8 percent and 5.8 percent, respectively. In comparison, the overall gradient was about 4.8 to 5.4 percent at Beaulieu and about 15 percent in average at Montjeu (table 5).

These longitudinal gradients might seem small compared to the steep-chute gradients along the Brévenne aqueduct—22 percent at Courzieu II, 45 percent at Chevinay, and 8.2 percent at Lentilly II (table 1)—but the intervals between the steep chutes varied from about 7 to 16 km (fig. 19)! The overall drop in elevation from one chute intake to the next one was 65 m along 16.2 km at Courzieu II, 140 m along 11.2 km at Chevinay, and 80 m along 7 km at Lentilly II (0.4 percent, 1.25 percent, and 1.1 percent, respectively).

In summary, these figures suggest that the series of dropshafts of the Yzeron aqueduct were used for an overall gradient of 6 to 8 percent, while, at Brévenne, the longitudinal gradient of the aqueduct was only about 0.4 to 1.25 percent, including the steep chutes (fig. 19).

SUMMARY AND CONCLUSION

Roman aqueducts were equipped with short steep sections. For bed slopes ranging from 1 percent to 78 percent, three types of designs were used: the steep smooth chute followed occasionally by stilling basin(s) (fig. 9), the stepped cascade, and the series of dropshafts (fig. 10).

Steep chute flows were characterized by high velocity supercritical flows. Tailwater conditions were often subcritical, and hydraulic jump flow conditions occurred at, or downstream of, the transition to the flat conduit. A complete backwater analysis has shown the presence of unfavorable conditions associated with these channels, in particular undular flows and oscillating hydraulic jumps. I suggest that stilling basins were sometimes introduced to dissipate the energy of the waters and to prevent downstream propagation of surge waves and undulations (fig. 9). These basins were found at Alepotrypes, Courzieu II, Jouy, and Oudna. This implies that Roman hydraulic engineers observed flow instabilities along aqueducts and were capable of introducing devices to dampen the effects.

In a 1:4 scale laboratory model of a Recret shaft built specifically to investigate Roman dropshaft hydraulics, I observed three flow regimes. Optimum dropshaft operation occurred for the flow regime

⁴³ Burdy 1979, 64.

Table 6. Summary of Aqueduct Dropshaft Operation

(1) Aqueduct	(2) Flow Regime	(3) Flow Conditions	(4) Remarks
<i>Cherchell</i>			
Chabet Ilelouine	Regime R1	$Q \leq 6,600 \text{ m}^3/\text{day}$	Supercritical inflow
	Regime R2	$Q > 6,600 \text{ m}^3/\text{day}$	
<i>Yzeron</i>			
Vaugneray	Regime R1	$Q \leq 22,000 \text{ m}^3/\text{day}$	Subcritical inflows
	Regime R2	$22,000 < Q \leq 52,000 \text{ m}^3/\text{day}$	
	Regime R3	$Q > 52,000 \text{ m}^3/\text{day}$	
Puit Gouttenoire	Regime R1	$Q \leq 7,500 \text{ m}^3/\text{day}$	Assuming $D = 1.26 \text{ m}$
	Regime R2	$7,500 < Q \leq 19,500 \text{ m}^3/\text{day}$	
	Regime R3	$Q > 19,500 \text{ m}^3/\text{day}$	
Puit-en-bas	Regime R1	$Q \leq 7,500 \text{ m}^3/\text{day}$	Assuming $D = 1.26 \text{ m}$
	Regime R2	$7,500 < Q \leq 20,000 \text{ m}^3/\text{day}$	
	Regime R3	$Q > 20,000 \text{ m}^3/\text{day}$	
<i>Montjeu</i>			
Brisecou Forest	Regime R1	$Q \leq 40,400 \text{ m}^3/\text{day}$	Subcritical inflows
	Regime R2	$40,400 < Q \leq 74,700 \text{ m}^3/\text{day}$	
	Regime R3	$Q > 74,700 \text{ m}^3/\text{day}$	

Table 7. Summary of Longitudinal Slopes of Steep Roman Chutes, Cascades, and Dropshaft Cascades

(1) Steep Section Type	(2) Bottom Slope $\tan\theta$ (in %)	(3) Location
<i>Aqueducts</i>		
Steep chute	1.1	Anio Novus (Ponte dell'Inferno to Ponte Scalino tunnel)
Steep chute	1.3	Anio Novus (to Fienile tunnel)
Steep chute	1.6	Anio Novus (Ponte Scalino to Ponte Amato tunnel)
Steep chute	3.0	Corinth (Alepotrypes, upstream of stilling basin)
Dropshaft	4.1	Beaulieu (Puit d'Olivari)
Dropshaft (circ.)	4.8	Beaulieu (Puit du Château)
Dropshaft (circ.)	5.1	Cuicul (Series of 4 dropshafts along thermae, distribution line)
Dropshafts	5.2	Montjeu, Autun (series of 24 dropshafts)
Dropshafts (rect.)	5.8	Yzeron (Vaugneray, Puit du Bourg)
Steep chute	6.1	Anio Novus (Torrente Fiumicino)
Dropshafts (sq.)	7.8	Yzeron (Recret/Grézieu-la-Varenne cascade)
Steep chute	8.3	Brévenne (Lentilly II/Les Molières-Montcher)
Steep chute	10.7	Marcia (Gericomio)
Steep chute	15.7	Marcia (Gericomio)
Steep chute	16.4	Anio Vetus (Bridge at Mola di San Gregoria)
Drops or chutes?	19.0	Brévenne (Lentilly II - Le Guéret-La Rivoire)
Dropshafts (rect.)	19.6	Montjeu, Autun (9 dropshafts)
Drops or chutes?	20.0	Brévenne (St.-Pierre-La-Palud I)
Steep chute	20.6	Anio Vetus (Tivoli, Hadrian's Villa)
Steep chute	22	Brévenne (Courzieu II/La Verrière)
Steep chute	45	Brévenne (Chevinay/Plainet)
Steep chute	50	Claudia (below D. Cosimato cliff, upstream of bridge below Vicavaro)
Stepped chute	61	Andriake, Lycia
Steep chutes	78	Cherchell, Chabet Ilelouine
Dropshafts + chutes	38.4	Cherchell, Chabet Ilelouine (combination of dropshafts and chutes)
<i>Spillways</i>		
Stepped chute	122 to 164	Oued Guergour dam
Stepped chute	167	Oued Bou Mazouz dam
Stepped chute	229	Kasserine dam

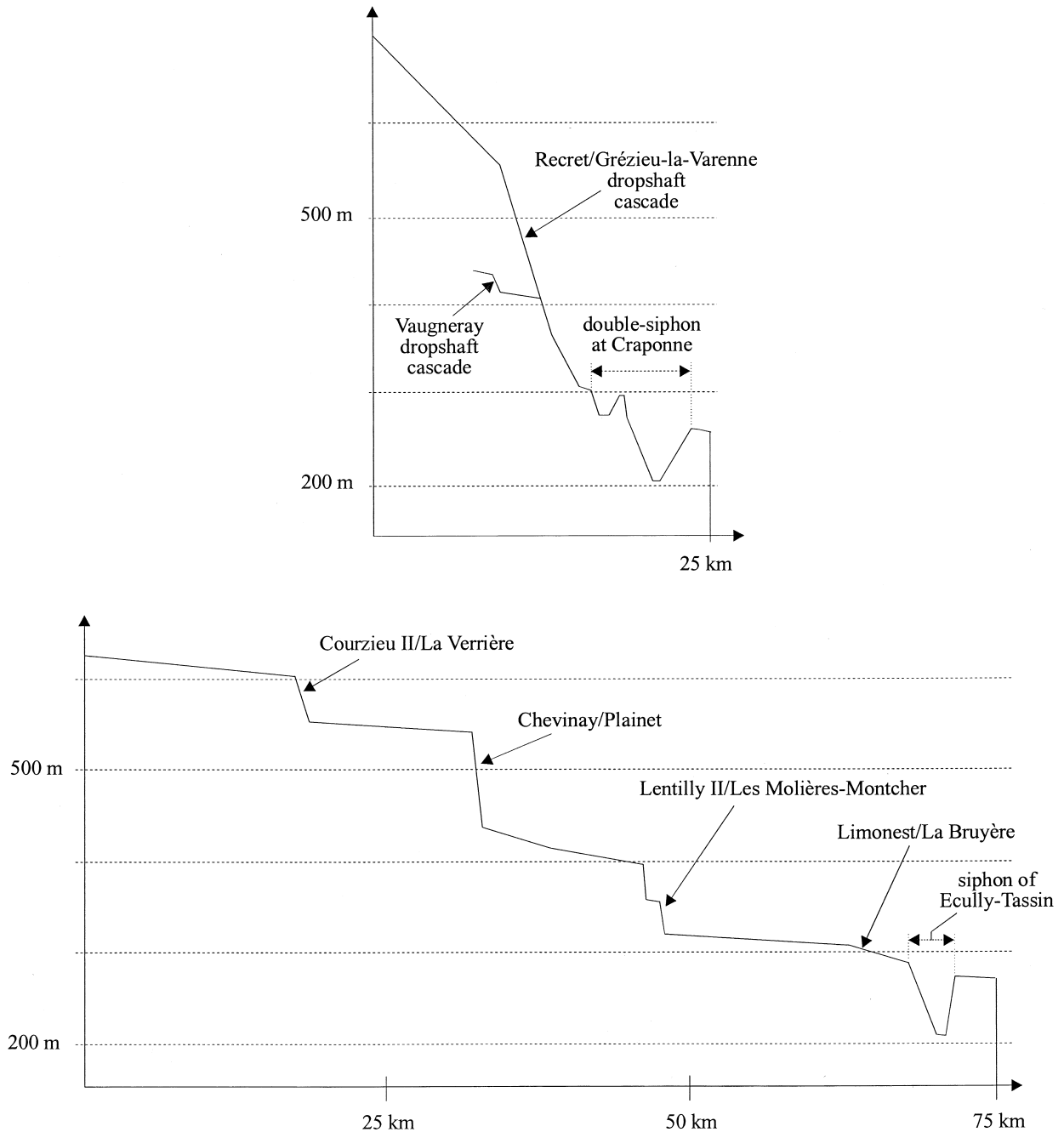


Fig. 19. Longitudinal profiles of the Yzeron (top) and Brévenne (bottom) aqueducts

R1, characterized by low flows and nappe impact into the shaft pool. In regime R1, the dropshaft design was most efficient in terms of energy dissipation and air bubble entrainment, particularly compared to modern designs. Calculations suggest that dropshaft operation at Cherchell took place for lower-than-accepted flow rates, while two series of dropshafts, at Montjeu and Vaugneray, were equipped with oversized shafts.

The designs of dropshaft cascade, as well as steep

chute followed by dissipation basin, show that the Roman aqueduct engineers were able to design specific features to cope with steep sections. It remains unclear whether they had some understanding of the hydraulic principles, or worked by observations and trial and error.

Most aqueducts were enclosed (covered) along their entire length, limiting the possibility for gas transfer at the free surface. Thus, the downstream waters were low in dissolved oxygen content unless

reoxxygenation devices were installed. I suggest that dropshafts may have been introduced in place of steep chutes in order to reoxxygenate the water as well as to dissipate the energy of the flow. Aeration technology is commonly used today to reoxxygenate depleted waters and to enhance the water quality. I recommend that further archaeological work focus on the excavation and survey of chutes and dropshafts to confirm this hypothesis.

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Appendix

HYDRAULICS OF OPEN CHANNEL FLOW: DEFINITIONS AND BASIC EQUATIONS

In open channel flows (e.g., fig. 1, a smooth chute), the *critical depth* d_c is the depth of flow producing maximum flow rate for a given specific energy. For a rectangular channel it equals: $\sqrt[3]{Q^2/gb^2}$ where Q is the discharge, g is the gravity acceleration, and b is the channel breadth. If the flow is critical, small changes in specific energy cause very large changes in depth. In practice, critical flows over a long reach of channel are unstable, characterized by large free-surface undulations. Such a flow pattern, called undular flow, is experienced with *near-critical* flows characterized by a Froude number greater than 0.3 but less than 3.0; where $Fr = V/\sqrt{gd}$, V is the flow velocity and d is the flow depth.⁴⁴

Subcritical, or tranquil, flow occurs when the flow depth (d) is greater than the critical depth. As a channel becomes steeper, water tends to flow with greater velocity and shallower depth until, on steep sections, supercritical flow occurs and the rapid flow depth is less than the critical depth. Subcritical and supercritical flows are also called fluvial and torrential flows, respectively.

The transition back from supercritical to subcritical flow conditions creates a hydraulic jump, where the depth of flow suddenly increases. A hydraulic

jump is undesirable because it leads to flow instability and possible surges, and thus has great erosive potential. Experimental observations highlighted different types of hydraulic jumps, depending upon the Froude number of the upstream flow. An undular hydraulic jump is observed at low Froude numbers (between 1 and 3). With increasing Froude numbers, other types of jumps include weak jump, oscillating jump (Froude number between 3.5 and 4.5), steady jump, and strong jump (Froude number is greater than or equal to 10) (see, e.g., fig. 4).⁴⁵

HYDRAULIC CALCULATIONS OF STEEP CHUTES AND CASCADES

In long prismatic chutes, the flow conditions in steep chutes may be calculated assuming uniform equilibrium flow conditions (i.e., normal flow):

$$V_o = \sqrt{\frac{8g}{f}} \sqrt{\frac{(D_H)_o}{4}} \sin \theta$$

where V_o is the uniform equilibrium flow velocity, $(D_H)_o$ is the hydraulic diameter⁴⁶ at uniform equilibrium, f is the Darcy-Weisbach friction factor, and θ is the channel slope (fig. 1). The friction factor f is estimated from the Moody diagram for smooth chutes.⁴⁷ I computed f to be between 0.02 and 0.04 for Roman aqueducts with smooth mortar lining. For skimming flow over stepped cascades, f increases from 0.1 to 1 for bed slopes from 5 to 10 degrees, and f equals about 1 for steeper slopes.⁴⁸

There is a fundamental difference between smooth and stepped chutes: the kinetic energy of the flow is significantly larger in smooth chute flow than for a stepped one, for identical flow rate and chute properties. As a result, larger energy dissipation must take place at the end of a smooth canal, and sometimes stilling structures must be introduced.

LIST OF SYMBOLS

- A cross-section area (m²)
- B dropshaft width (m)
- b open channel width (m)
- D conduit height (m)
- D_H hydraulic diameter (m), or equivalent pipe diameter, defined as:

$$D_H = 4 \left(\frac{\text{cross-sectional area}}{\text{wetted perimeter}} \right) = \frac{4A}{P_w}$$

⁴⁴ For near-critical flows, see Chanson 1995b. In rectangular flat channels, the Froude number is unity at critical flow conditions: i.e., $Fr = 1$ for $d = d_c$ (critical flow depth).

⁴⁵ This classification is valid only for hydraulic jumps in rectangular horizontal channels (e.g., Henderson 1966; Chanson 1999).

⁴⁶ The hydraulic diameter is defined as four times the cross-section area (of the flow) divided by the wetter perimeter: $D_H = 4(A/P_w)$.

⁴⁷ Moody 1944.

⁴⁸ Chanson 1995a, 87–8.

d	flow depth (m) measured perpendicular to the channel bed
d_b	brink depth (m): i.e., depth at the edge of a drop
d_c	critical flow depth (m); in a rectangular channel: $d_c = \sqrt[3]{q^2/g}$
d_o	uniform equilibrium flow depth (m): i.e., normal depth
d_{tw}	tailwater flow depth (m)
f	Darcy friction factor (also called head loss coefficient)
Fr	Froude number; for a rectangular channel: $Fr = V/\sqrt{gd} = Q/\sqrt{gd^3b^2}$
g	gravity constant (m/s ²)
H	total head (m)
h	1 – step height (m) 2 – invert drop (m) at a vertical dropshaft
L	1 – dropshaft length (m) 2 – length (m) of stilling basin
l	step length (m)
P	(shaft) pool height (m), measured from the shaft bottom to the downstream conduit invert
P_w	wetted perimeter (m)
Q	total volume discharge (m ³ /s) of water
q	discharge per meter width (m ² /s); for a rectangular channel: $q = Q/b$
V	flow velocity (m/s); V_b brink flow velocity (m/s)
V_o	uniform equilibrium flow velocity (m/s)
X	chute/cascade length (m)
x	horizontal Cartesian coordinate (m)
y	vertical Cartesian coordinate (m)

Greek Symbols

ΔH	head loss (m): i.e., change in total head
Δz	change in bed (invert) elevation (m)
θ	bed (invert) slope
\emptyset	diameter (m)

Subscript

c	critical flow conditions
o	uniform equilibrium flow conditions
\emptyset	tailwater flow conditions

Abbreviations

D/S (or d/s)	downstream
U/S (or u/s)	upstream

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Doric Measure and Architectural Design 1: The Evidence of the Relief from Salamis

MARK WILSON JONES

Abstract

Modern understanding of the design of ancient buildings, sculptures, and other artifacts depends in part on being able to identify the system of linear measurement utilized at the time. But while numerous examples of measuring instruments and standards inscribed in stone have been recovered from the Egyptian and Roman periods in particular, the scarcity of documentary evidence for the Greek world is reflected in a bewildering and often conflicting range of opinion. The induction of metrical units from surveys, buildings, or urban layouts cannot provide unequivocal results, and consensus is accordingly lacking, both about the number of different feet used by the Greeks, and regarding their individual lengths.

This paper focuses on the metrological relief recently discovered on the island of Salamis, which is only the second known example of its kind. On the basis of a fresh survey it can be shown that, contrary to previous discussion, the slab records the so-called Doric foot of ca. 327 mm, thus providing the first firm evidence for the very existence of this unit. An attempt is then made to reconstruct the original form of the relief on the basis of symmetry, leading to the hypothesis that first, despite differences, the proportions of the figure were governed by simple mathematical ratios comparable with those of Vitruvian Man, and second, the relief facilitated the comparison of the Doric foot with the so-called Attic foot and the Egyptian royal cubit by means of convenient conversion factors. The conclusion reviews the implications with regard to the study of the architecture of the Classical period.*

Ancient art and architecture were steeped in mathematical harmony. Today this issue is either considered tangential to the experience of beauty or is conceived almost exclusively in terms of proportion and geometry. But for the Greeks and Romans, these went hand in hand with measure and number. Only when proportion, geometry, measure, and number acted in unison was it possible to achieve true mathematical harmony, or *symmetria*, literally “the coming together of measure(s).”¹ The question of measure is

especially important to architecture and allied disciplines in which production is governed by design, for this entails instructions that are necessarily expressed in quantities. If logic did not tell us this by itself, the point is amply confirmed by sources as different as Greek constructional specifications and the theoretical writings of Vitruvius. So to understand the design of an ancient building, it is important to know the system of measurement utilized at the time.

The fact that the Roman foot was so widespread, and is so abundantly documented, provides a welcome foundation to the study of design in this period.² All manner of Roman buildings can be seen to display clear patterns of commensuration.³ On the basis of dimensional standardization, it is possible to discern how the majority of imperial architects defined the proportions of Corinthian and composite columns.⁴ And although the question of measure was arguably less important where geometry came to the fore, because the irrational ratios generated tend not to favor dimensional simplicity, disparate geometrical progressions departed from a metrically simple starting point.⁵ Greek metrology rests by comparison on shifting sands. The relation between different types of units is clear enough—for example, that the cubit or elle (*pechus*) is 1½ times the foot (*pous*), these being respectively subdivided into 24 and 16 fingers or digits (*dactyloî*)—but consensus is lacking both about the number of different feet in use and their individual lengths. Whereas Roman metrology can be established by various types of measurement (based principally on measuring rods, representations of the same at full size on architects’ and surveyors’ tombs, and the distances between roadway milestones), none of these are available in the Greek context. Already in the 16th century the foremost architects in Rome knew of excellent approximations to the length of the ancient Roman foot. Baldassare Peruzzi, for example,

* I am most indebted to the Ephorate of Antiquities of Attica for permission to study and measure the subject of this paper (inv. 5352) in the museum at Piraeus. Manolis Korres, generous as ever with his time and expertise, helped make the survey that is reproduced here as fig. 5. I also thank the British School at Athens for hospitality and for the use of the facilities there, and the British Academy

for a financial grant, which made this research possible.

¹ Pollitt 1964; 1974, 14 ff.; Knell 1985, 30 ff.; Gros 1989; Koenigs 1990.

² Hecht 1979; Zimmer 1984; Rottländer 1993.

³ Wilson Jones 2000, esp. ch. 4, 5.

⁴ Wilson Jones 1989a; 2000, esp. ch. 7.

⁵ Jacobson 1986; Wilson Jones 1989b; Hallier 1990, 1995.

lying intentions (as well as the degree to which they came to be modified) can often remain obscure. Conversely in order to understand better the design of the Doric temple we need a solid grasp of metrology, so scholarship remains trapped in a vicious circle, like a dog chasing its tail.

Opinion in recent decades has tended to polarize. On one side is the “reductionist” school, which admits just three main foot units for the Greeks, of 294–296 mm, 325–328 mm, and 348–350 mm.¹⁶ Since they are thought to divide broadly on regional and ethnic lines, by convention—not by any means universal—these units are respectively called the Attic or Cycladic foot, the Doric foot, and the Samian or Ionian foot.¹⁷ On the other side is the “permissive” school, which envisages that many Greek states had their own standards. Jos De Waele goes as far to argue that, in theory at least, every Greek building could have been set out according to its own distinct foot unit.¹⁸

It is tempting to conceive of metrology as an objective science, but it is clear that a substantial dose of subjectivity underlies the interpretative divergence just described. This debate in fact reflects a much wider one over the extent of communality and continuity in the Greek world. Do we see the Greeks as a united people, speaking just three or four main dialects and using just two or three architectural orders, or do we focus instead on the heterogeneity of hundreds of separate political entities, of which dozens potentially had sufficient autonomy to sustain their own system of measures? Historical parallels can be invoked to support either position; on the one hand there are the essentially standardized Egyptian and Roman systems, and on the other the variety associated with the city-states of Medieval and Renaissance Italy, with centers as small as Mantua and Vicenza having their own distinct measures. And since approaches to metrology inevitably reflect thinking about ancient design practice, it is hardly surprising that, for example, De Waele’s interpreta-

tions on this score tend to conflict with those advanced by “reductionists.”¹⁹

An important resource for this debate is the database, set up by Rolff Rottländer, of physical premetric measures (more than 300 at a recent count), typically metal builders’ instruments and reference standards inscribed in stone, although the former are unknown for Greece itself. Rottländer distinguishes between units for Aegina, Crete, Miletos, and Salamis, along with a “common” Greek foot, an “Attic-Olympic” foot (which differs from the usual Attic foot), and a “Byzantine” foot (fig. 2).²⁰ The so-called Doric foot, however, has to date eluded capture. Some Greeks were certainly familiar with major non-Greek units, notably the main components of the pharaonic system. Open to question remains the relevance to the Greeks of an 18-digit foot, in the Roman context called the Drusian foot.²¹ When contemplating the implications of all this, it must be remembered that the physical discovery of a particular unit does not necessarily mean it was used for construction, just as the absence of one, given the vagaries of archaeology, cannot be taken as proof that it was not.

Against this background, research cries out for tangible artifacts. Thus an object now of central importance is the metrological relief discovered in 1985 built into the church of St. Dimitrios at Perivolia on the island of Salamis, and since displayed in the archaeological museum at Piraeus (fig. 3). It is only the second known relief of this kind after the famous one at Oxford (fig. 4).²² With its anthropomorphic design similar to that at Oxford, the new discovery eloquently confirms what is obvious from numerous texts, that ancient units of measure derived—or were thought to have been derived—from the human body. Moreover, the Salamis relief is arguably more important for metrological studies than that at Oxford, which may have had a primarily symbolic function. Although the Salamis relief has also been interpreted in this way,²³ we shall see defi-

¹⁶ Dörpfeld 1882, 1883a, 1883b, 1890; Riemann 1935, esp. 1–6 and the tables; Dinsmoor 1961; Von Gerkan 1940, esp. 141–50; Gruben 1976, 447, s.v. “Fuß”; Büsing 1982; Bankel 1983; Wesenberg 1995.

¹⁷ But see, e.g., Dilke 1988, 290, for another nomenclature: the “short” foot for the 294–296 mm unit, the “long” foot for the 326–328 mm one, with “Attic” given to the 308.3 mm unit mentioned earlier. Meanwhile De Zwarte (1994 and 1996) claims the name “Ionic” for a unit of 298.86 mm and uses “Attic” for the 325–328 mm foot (for which he assigns the value 326.6 mm).

¹⁸ De Waele 1980, 1981, 1985, 1988, 1990a, 1990b, 1995, 1998. Cf. Ceretto Castigliano and Savio 1983; Höcker 1985–1986; 1993, 45–8.

¹⁹ Compare the analyses of De Waele 1990a and Dinsmoor 1985. For a contrasting opinion concerning the Parthenon, see supra n. 12; concerning Sicilian temples, see Mertens 1981; Ceretto Castigliano and Savio 1983; De Waele 1990b; Höcker 1985–1986; 1993.

²⁰ Rottländer 1993, 1994, 1996a. His “common” foot is assigned a value of 316 mm rather than the 308 mm value often cited.

²¹ Dörpfeld 1883b; Kottmann 1992. For its documentation on an ancient artifact, see Dilke 1988, 293; for further comment, see Fernie 1987, 386 ff.

²² Michaelis 1883; Wesenberg 1974; Fernie 1981; Ben-Menahem and Hecht 1985.

²³ Slapšak 1993, esp. 126–8.

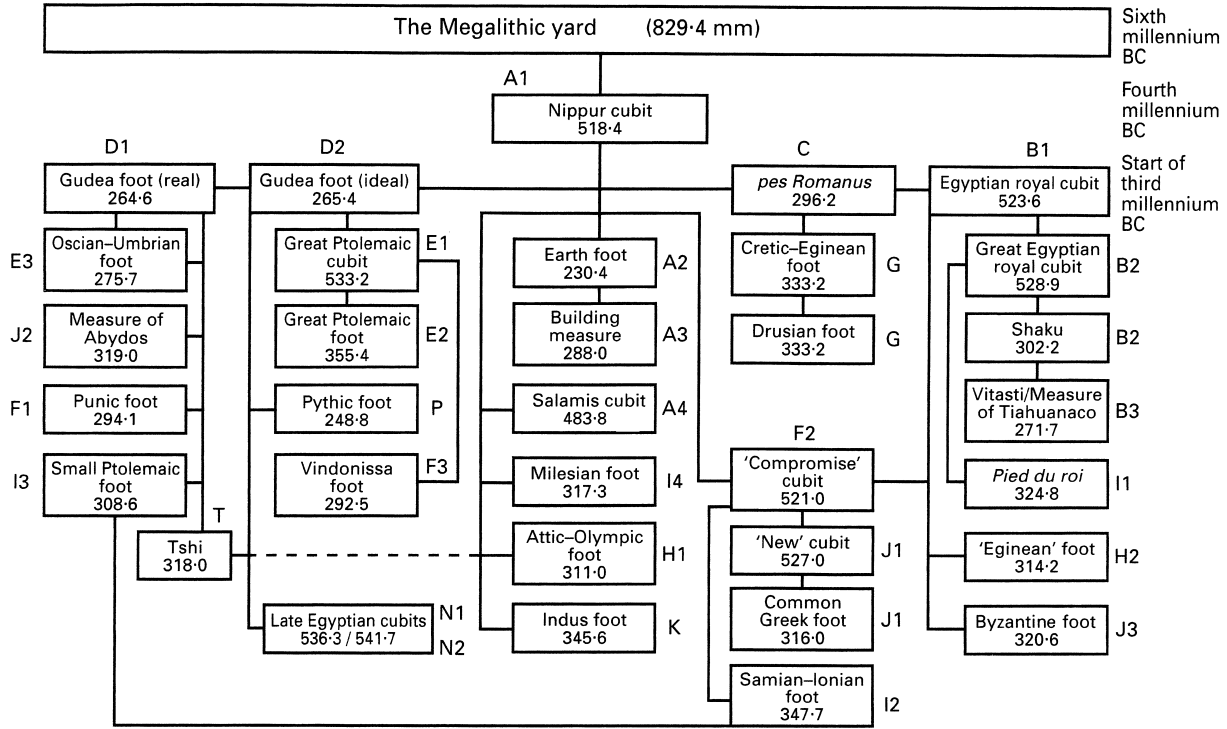


Fig. 2. Chart showing premetric units of length measurement as conceived by R.C.A. Rottländer, with their hypothetical relationship to the Nippur cubit and the Megalithic yard. All numerical values are in millimeters. (Rottländer 1996b, fig. 2)



Fig. 3. The metrological relief from Salamis. (Dekoulakou-Sideris 1990, fig. 2)



Fig. 4. Metrological relief now in the Ashmolean Museum, Oxford. (Courtesy Ashmolean Museum, University of Oxford)

nite evidence of a practical application. In any case, it displays a wider range of standards than its cousin, including not just the fathom (*orgyia*), measured from outstretched fingertip to fingertip, and two types of foot, one anthropomorphic, one in the form of a rule, but also a cubit rendered as a disembodied forearm and a variety of smaller measures associated with the three hand outlines: two half-feet (*hemipodia*), two spans or hands or half-cubits (*spithamai*), and a two-thirds foot measure (*orthodoron*). Nor does the list end here, as we shall see in due course.

Since it was first presented by Ifigenia Dekoulakou-Sideris at the 13th Congress of Classical Archaeology in 1988, and subsequently published in *AJA*, the Salamis relief has been the sole focus of articles by two other scholars, of an excursus to an article on the Oxford relief by another,²⁴ while also being invoked in support of related discussions. As published, it documents none of the traditional triad of Attic, Doric, and Samian units, but rather two or more noncanonical measures. That represented by a straight builder's rule was reported as 322 mm long, which is close to the Doric foot of ca. 327 mm, yet not close enough to be equated with it. Here, it seems, is potential corroboration for Rottländer's conception of a family of measures linking much of the ancient world (fig. 2), for he claims that the Salamis cubit was derived from the progenitor of his system, inasmuch as its length corresponds to 28 digits of a 30-digit "Nippur elle," a cubit known from a bronze measuring standard found at this site that is

datable to the third millennium B.C.²⁵ The recovery of two hitherto undetected units would also seem to be "a key argument in favor of the 'permissive' line in ancient metrology, and a serious blow to the 'reductionists.'"²⁶ De Waele does indeed regard the Salamis relief as crucial support for his arguments, while specifically associating the ca. 322 mm foot with the unit he supposes to have been used for the design of the Hephaisteion in Athens.²⁷ Furthermore, the fact that the 322 mm unit is near to the so-called Doric foot, and yet not actually the same, may be seen as fuel for Rottländer's doubts over its very existence.²⁸

THE SALAMIS RELIEF: ITS UNITS OF MEASURE

In the summer of 1996, I visited the Piraeus museum in the pursuit of unrelated research and chanced upon the recently installed Salamis relief. Being curious to check the veracity of the not-quite-Doric foot rule, I laid my measuring tape over its length and read off, to my great surprise, not the published 322 mm but around 5 mm greater! Here then, after all, was a value entirely consistent with the accepted range of the Doric foot, that is, 326–328 mm. Had Dekoulakou-Sideris made a simple error of measurement or transcription? Well, not exactly; paradoxically, her 322 mm foot was also present. Because of the technique used to carve the relief, the value obtained from any of the representations *depends on the way they are measured*. Unlike the Oxford slab, on which the figure is raised with respect to the rest of the block, here the

²⁴ Dekoulakou-Sideris 1990; Rottländer 1991–1992; Slapšak 1993; Berger 1993. De Waele (1998, 93) lists a forthcoming study by L. Frey.

²⁵ Rottländer 1991–1992, 1996a, 1997.

²⁶ Slapšak 1993, 121.

²⁷ De Waele 1995, 505; 1998, 84 ff.

²⁸ Rottländer 1991, 145–51: "Ekurs 1: Gibt es den dorisich-pheidonischen Fuß?"; 1997, esp. 113.

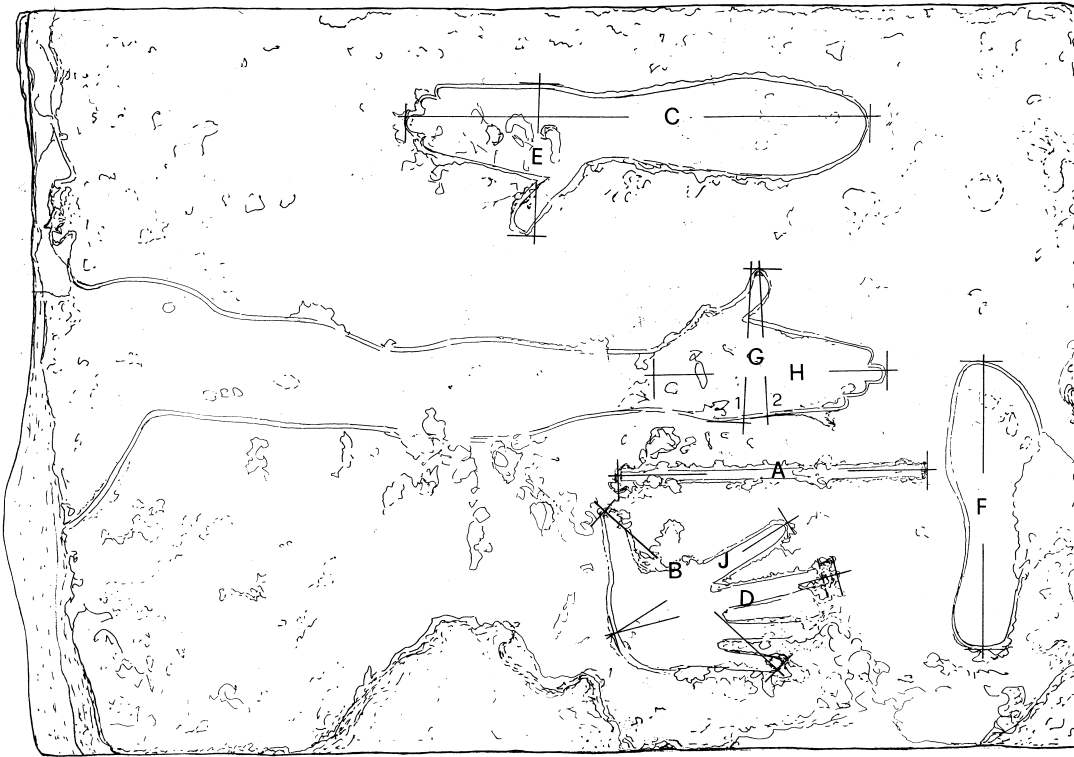


Fig. 5. Survey of the metrological relief from Salamis, scale 1:8, overlaid with letter codes showing the principal probable unit lengths defined. (Traced by Manolis Korres and the author; annotations by the author)

representations are sunk into the surface, with a depth oscillating around 4 mm. The crucial detail is the edge of the cuttings: these are not vertical but bevelled, with the width of the bevel generally varying between 1½ and 2½ mm. This means that the lower, recessed surface of any element measures 3–5 mm less than the point where it meets the plane of the block. Dekoulakou-Sideris's measurements relate to the bottom of the cutting, leaving those in the plane of the block out of account. A review of the literature revealed that this feature had been noticed already, but in the context of a discussion, that only served to confuse matters further.²⁹

To make sense of the Salamis relief, it is necessary to begin with a new survey embracing its detailed characteristics; accordingly, Manolis Korres kindly drafted with me a 1:1 tracing on acetate, an annotated copy of which is reproduced here (fig. 5). Since minor distortions can occur, first in tracing and later in reproduction, the principal recorded measurements are listed in table 1. The units in bold type were cited by Dekoulakou-Sideris, these indeed being the most se-

cure, although damage is such as to render the orthodoron a "guestimate." Further potential candidates have been added in normal typeface: "E," "G," "H," and "J." Of this last group the first two, measured across the hands with bunched fingers, suggest themselves by their rough equality as well as the prominent attitude of the thumbs. But it is difficult to be sure how these units were supposed to be measured; in particular, the one labelled G yields two sets of values according to whether one takes its maximum width (G^1) or that measured perpendicular to the outside edge of the hand (G^2). Nonetheless, it is curious that the former roughly matches half the foot rule (A) while the latter matches half the anthropomorphic foot (F). As for the palm measured from fingertip to the junction of hand and wrist (H), it is impossible to define the transition from hand to wrist with any precision.³⁰

Measuring to the recessed surface does not produce an accurate concordance between the various measures, as Dekoulakou-Sideris herself noted. For example, a cubit can be extrapolated from the foot

²⁹ Slapšak (1993) argued that the spread of possible foot values was so broad that, even if at its top end it does approach the value of the Doric foot, the slab cannot have

functioned as a practical standard.

³⁰ The comparable measurement on the disembodied forearm is too poorly defined for consideration here.

Table 1. The Measures of the Salamis Relief

Ref. on Fig. 5*	Type of unit	Measured internal length	Measured external length	Reconstructed external length where damage prevents direct reading
A	Rule Foot (<i>pous</i>)	322	328	327½
B	Span (<i>spithame</i>) ¾ ft.	240–243?	up to 248	
C	Cubit (<i>pechus</i>) 1½ ft.	487–488	491–492	491½
D	Orthodoron ⅔ ft. alternatively	215?	218?? up to 246	
E	Hand (<i>hemipous</i>) ½ ft.	155	162–63	
F	Footprint Foot (<i>pous</i>)	301½	307	306
G 1	Hand (<i>hemipous</i>) ½ ft.	157??		163??
2	alternatively	150?	153–54	153½?
H	Span (<i>spithame</i>) ¾ ft.		247–253	
J	Orthodoron ⅔ ft.	214?	up to 219	218?

* Units in bold type are those cited by Dekoulakou-Sideris (1990).

rule as ½ times 322 mm equals 483 mm long, or 4 mm shorter than the actual cubit or forearm (C) measured likewise.³¹ The pattern becomes considerably clearer, however, when measurements are taken in the plane of the block. Recalculating the cubit from the rule now yields 491¼ mm, that is to say, almost exactly the same as the forearm. As for the various ways of either measuring directly or calculating the foot (on the basis of the length of the span, half-foot, and orthodoron units), differences are contained within two-thirds of a millimeter except in one case, as shown in table 2. So the inaccuracy that has perplexed students of the relief so far, attributed either to sloppy craftsmanship³² or the theory that it had no practical function,³³ in effect evaporates.

If this improved precision is not enough by itself,

there are other arguments for measuring on the face of the block. First, this is where the mason would have indicated the outlines to be cut at the beginning of manufacture.³⁴ Second, it is only on the front, flat surface that architects and craftsmen could have placed rigid instruments or straight edges for calibration. Reading the size of the recessed cutting presents no problem with modern flexible tapes, but we can be confident that most ancient measuring devices were rigid or semirigid.

Thus the builder's rule (A) and its related units clearly document a foot of around 327 to 327½ mm, or the so-called Doric foot. Here is proof of its existence, confuting those who wish to imagine it away. The other unit (F, G²), of around 306–307 mm (not 302 mm), may represent a local standard,³⁵ or it might be

³¹ Alternatively, the variation can be expressed in terms of the foot values calculated on the basis of the measurements taken at the recessed plane of the cuttings, which are as follows:

A = 322 mm, the assumed foot;

B = 242 mm, yields 322⅔ mm (or 322 + ⅔ mm);

C = 487 mm, yields 324⅔ mm (or 322 + 2⅔ mm);

E/G¹ = 159? mm, yields 318 mm (or 322 – 4 mm?).

³² Dekoulakou-Sideris 1990, 449.

³³ The most puzzling thing about Slapšak's analysis (1993) is the failure to realize the implications of the beveled technique (described pp. 128–9) for the divergences noted (pp. 122–4, 127, 129).

³⁴ Slapšak 1993, 129.

³⁵ A similar unit (305.8 mm) has been induced for the theater at Epidaurus, not far away by boat, on the eastern shore of the Peloponnese; see Rottländer 1991. A 307 mm foot has been induced for the Parthenon, see De Waele 1984.

Table 2. Derivation of the Units on the Salamis Relief

Code	Type of unit	External length	Inferred foot length	Approx. average value*	Approx. difference in mm
A	Foot	327½	327½	327	+½
C	Cubit	491½	327⅔	327	+⅔
E	Half-foot	162½	325	327	-2?
I	Orthodoron?	218?	327?		0?
F	Foot	306	306	306½	-½
G ²	Half-foot	153-154?	307?	306½	+½

* Note that the measurements "B" and "D" have not been used for calculation because of their poor preservation; however, in each case a value of 245-246 mm, or ¾ of a foot of ca. 327 mm, is not out of the question.

equated with the "common" Greek foot mentioned earlier, a possibility that will be discussed below. So while the Salamis relief confirms the existence of one of the traditionally accepted triad of Greek feet, this is not to say that other units did not exist. In short, extreme opinions at both ends of the spectrum require trimming back in favor of a more balanced view.

From what has been said so far, it is evident that the Salamis slab permitted not just the verification of the "Doric" family of units, but also its comparison with at least one other type of unit. Since, however, it has been argued that the Oxford metrological relief had a primarily symbolic and decorative function, such a possibility needs to be addressed for the Salamis relief.³⁶ However, the Oxford slab differs in several respects: the main figure has a raised profile that hinders measurement (the elevation of the chest prevents a straight rule from touching both fingertips); the gabled shape of the slab may suggest that it was originally set up well above eye level and was therefore inaccessible; the artistic work is of relatively high quality.³⁷ By contrast, Roman metrical standards, such as the one set up in the forum at Lepcis Magna (fig. 6) and others found in North Africa, are more obviously utilitarian, with straight elements comparable to the ruler of the Salamis relief.³⁸ And the latter is significantly more serviceable than the Oxford figure as a metrical standard even as regards the anthropomorphic outlines: as mentioned, their sunken profile facilitates measurement, while the pronounced stylization aids definition (note for example the sharply pointed thumbs). We have also

seen how the metrical consistency between the various measures (table 2) lies within reasonable limits of accuracy. So quite apart from any symbolic content it may or may not have had, the Salamis relief was certainly an instrument of practical intent.

The same conclusion is suggested by a fresh line of investigation inspired both by the disposition of the various representations and the measurements of the slab itself. Is it a coincidence that the horizontal axis defined by the center of the foot rule falls 1½ Doric feet from the top of the block, while the axis defined by the fingertip of the extended arm bisects the block almost exactly (fig. 7)? The tolerances are around a millimeter or so, for the ruler and the edges of the block are not precisely parallel. At the same time, the height of the block is near enough to the length of the outstretched arm (L) for them to be presumed equivalent, and therefore nominally 788-790 mm.³⁹ This is a curious dimension insofar as it is neither too long to be 2½ feet of the ca. 306-307 mm foot, nor short enough to be 2⅔ of the 327½ mm (Doric) foot; the nearest fraction is 2⅔ Doric feet, but this is not a whole number of dactyls.

In theory it is possible that there was no significance attached to the block height, but this seems unlikely given that the axis of the rule, a datum already defined as 1½ Doric feet from the top of the block, is also one Attic foot from the bottom (294-296 mm). The possibility of more measures coming into play is further raised by the fact that the block height and arm length are equivalent to 1½ Egyptian royal cubits, a unit length both Burkhardt Wesenberg and Eric Fernie detect in the overall mea-

³⁶ Slapšak 1993, 126-8.

³⁷ Fernie 1981, 259-60.

³⁸ Ioppolo 1967, 98 ff.; cf. Albertini 1920; Rakob 1974, 77 n. 53; Barresi 1991; Hallier 1994.

³⁹ The lack of match is relatively noticeable. The height

of the block ranges from 789 mm (left) to 791 mm (right), with some high spots reaching 792 mm; the arm length, measured from fingertip to armpit, is subject to interpretation due to the rounding of the latter, but can be estimated between 783 and 787 mm.

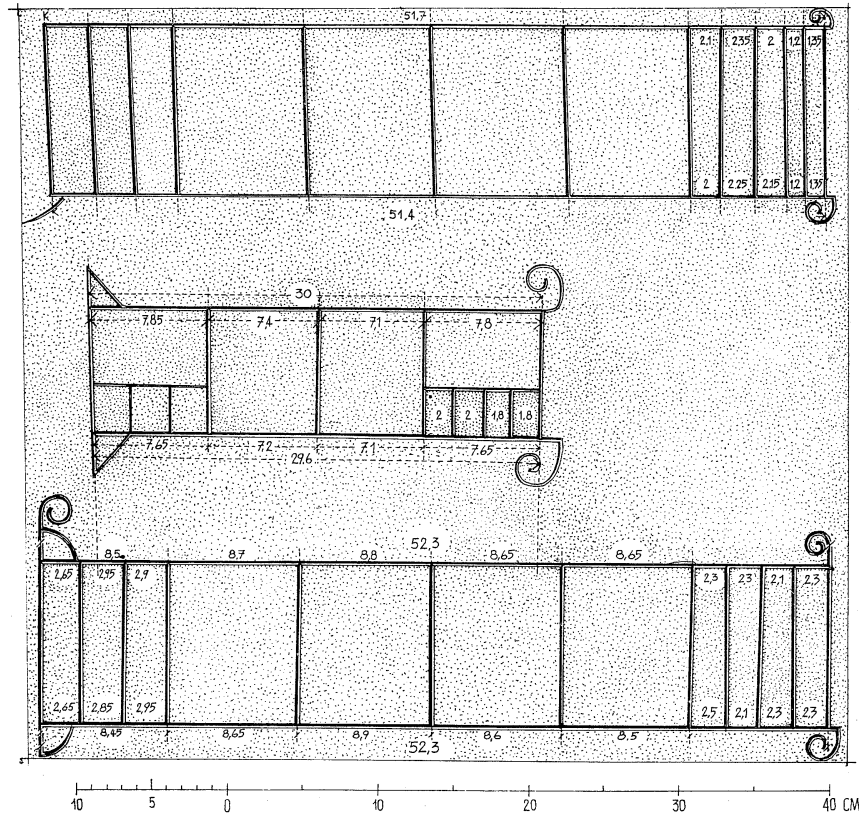


Fig. 6. Metrological relief from Lepcis Magna (Libya) dating from the Roman period, scale 1:5. From top to bottom: the Punic cubit divided into six parts and further subdivisions left and right; the Roman foot divided into four parts and further into $\frac{1}{2}$ parts (inches) on the left and $\frac{1}{6}$ parts (digits) on the right; the Egyptian royal cubit divided into six parts with further subdivisions left and right. (Ioppolo 1967, fig. 3)

surements of the Oxford relief⁴⁰ (and centuries later the royal cubit continued to be juxtaposed with the Roman foot on the Lepcis Magna relief). To confirm and explain such coincidences, however, it is necessary to attempt a reconstruction of the figure as a whole.

THE SALAMIS RELIEF: A RECONSTRUCTION OF ITS ORIGINAL FORM

It is now time to signal a shift of gears. What follows is inherently speculative and, by comparison with what has been said above, far more subject to interpretation. The Salamis relief, being broken, cannot be reconstructed with absolute surety; nonetheless, certain assumptions are almost inescapable. Aside

from the head, a symmetrical composition for the body and the whole relief can be confidently intuited on the basis of the Oxford example. As for the overall armspan, several factors converge on a single value. First, there is the look of the result, for the position of the centerline has to be compatible with a head that is of reasonable width for the body. Second, an estimate for the armspan of around 2 m may be made on the basis of comparison with the Oxford relief.⁴¹ Third, a value of 6 feet is likely, not just because the fathom was a standard Greek measure, but also because the armspan of Vitruvius's metrological man has the same dimension (*De arch.* 3.1); this yields close to 2 m (actually 1.962 m) using the 327 mm unit. Fourth, this particular value of 6 feet brings in its

⁴⁰ Wesenberg 1974. Fernie (1981, 257–9) supports this hypothesis by noting that the ends of the relief measure 261.5 mm tall, or half a royal cubit.

⁴¹ Applying the ratio of arm length to chest width of Oxford Man generates approximately a 2.05 m width for Sala-

mis Man based on his arm length. However, it is clear that the latter must have had somewhat narrower shoulders, for the distance between the face and the high point of the shoulder is substantially smaller relative to that on the Oxford figure.

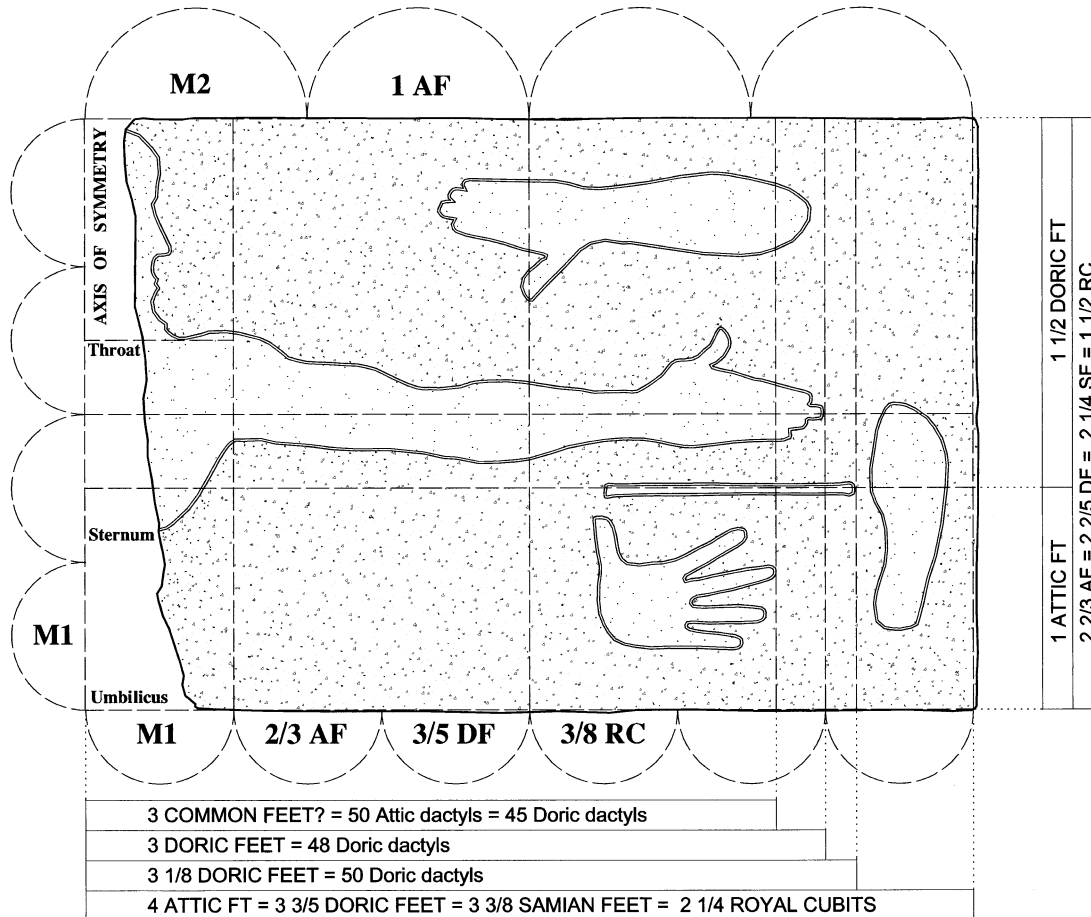


Fig. 7. Analysis of the metrological relief from Salamis, scale 1:10, assuming an axis of symmetry consistent with an overall width of 6 Doric ft. measured from fingertip to fingertip of the outstretched arms, with the precise value calculated on the basis of a foot of 327½ mm (the value derived from the foot, cubit, hemipodia, span, and orthodoron measures highlighted on fig. 5). The annotated dimensions and proportions follow as a consequence.

wake a quite startling series of correspondences, highlighted in figure 7⁴² and listed as follows:

1. The measurement from the central axis to the outside end of the straight rule becomes 50 Doric dactyls (giving a total of 100 dactyls, presuming that bilateral symmetry was maintained on the other side of the body).
2. The arm length becomes two-fifths of the total arm span. This creates a modular scheme in which the 6 Doric feet armspan corresponds to

10 modules of three-fifths of a foot each, with the chest (measured from armpit to armpit) 2 modules and the arm length 4 modules. The height of the block is also 4 modules, which helps explain the otherwise curious dimension of 2½ Doric feet. The accuracy here is somewhat lacking, but the discrepancies remain less significant than those associated with the Lepcis Magna relief.⁴³

3. Thanks to the fact that the margin from the tip of the fingers to the side of the slab is approxi-

⁴² The methodology behind the drafting of the illustrations was conceived so as to minimize the potential for error or manipulation. First, as mentioned, the survey (fig. 5) was traced on acetate, full-size, with Manolis Korres. Next, the result was scanned in a form compatible with computer aided design software (Autocad, release 14), and a line drawing created by “tracing” over the scanned image on another layer. Having then established by eye

the notional ideal height of the block, all the lines and circles denoting the ideal proportions were then generated by the software (using midpoints and endpoints of lines and edges, quadrants and centers of circles, and commands such as “offset,” “copy,” and “mirror”).

⁴³ 2½ × 327 mm = 786 mm. This value compares better with the anthropomorphic arm length than it does with the height of the block; see supra n. 39.

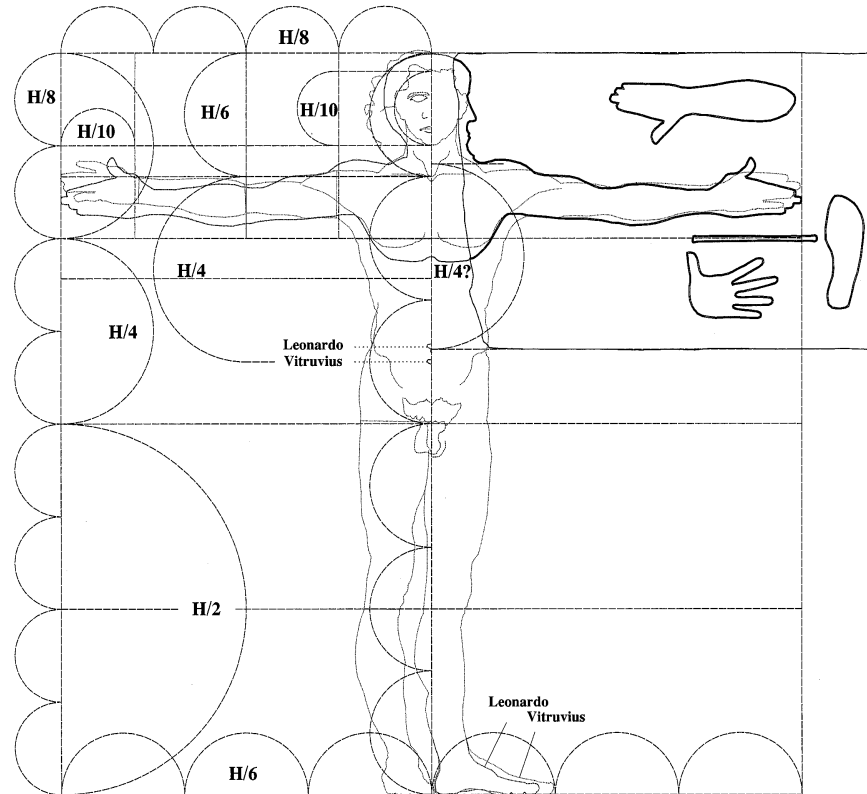


Fig. 8. Comparison of Leonardo da Vinci's adaptation of Vitruvian Man (left) and Salamis Man (right), scale 1:20, overlaid with the principal proportional relationships in terms of a 6 ft. armspan and height (H).

mately 1 module, this scheme generates 12 modules (or $7\frac{1}{2}$ Doric feet) for the overall breadth of the block, that is to say, three times its height.⁴⁴

4. The theoretical overall breadth of the slab translates as 2368 mm, or $4\frac{1}{2}$ times 526 mm, a value possibly identifiable as the Egyptian royal cubit. This theoretical breadth also corresponds to 8 times 296 mm, a value identifiable as the Attic foot, although it is similarly slightly greater than the length usually cited for this unit.
5. It is further possible that the first and second fingers of the open hand marked 3 Attic and 3 "Common" or Salamine feet from the central axis (and hence a total span of 6 feet assuming bilateral symmetry), however the outline of these fingers is too poorly preserved to be certain.

Taken together, these considerations suggest that the Salamis relief embodied an orchestrated metri-

cal scheme for verifying not just the Doric foot and the 306–307 mm unit, but also the Attic foot and the Egyptian royal cubit as well.

Let us now move on to a further level of speculation. Having seen that Salamis Man combined simple ratios with a 6 foot span, and knowing that these are characteristics of Vitruvian Man, it is natural to wonder if the former also responded to a proportional canon involving a total height of 6 feet. I do not propose here to make a detailed comparison between Salamis Man and Vitruvian Man, since this would give an inappropriate emphasis to the latter; there must have been several Greek canons, and Vitruvius gives us a glimpse of only one of them—a glimpse that is likely to be not only a simplified version, but also one that suffers from textual corruptions. Leonardo da Vinci's rendition of Vitruvius's canon makes a useful basis for comparison for our purposes (fig. 8), despite the obvious anachronism, precisely because Le-

⁴⁴ At 203 mm, the margin between the outstretched arm and the side of the block is about 7 mm more than the value predicted by the scheme described. This is substantial, it must be admitted. However, the surplus could have been matched by a corresponding shortfall on the

other side of the complete original block, thus retaining the ideal unit values proposed here. Alternatively, the ideal dimensions of the block were deliberately rounded off to $7\frac{1}{4} \times 2\frac{1}{2}$ Doric feet as to facilitate execution.

onardo made a series of adjustments in order to generate a more lifelike image.⁴⁵ In fact, it is interesting to see that the bottom of the Salamis relief coincides almost exactly with Leonardo's adjusted level for the umbilicus, suggesting that this part of the anatomy could have governed the conceptual limit of the block. The two systems are otherwise similar in some respects, but they differ markedly as regards the size of the hand, the height of the breast musculature, and the level of the shoulders. The width of the torso, measured across the top of the shoulders, is one-fifth of the armspan in Salamis Man, as opposed to one-fourth according to Leonardo (and the Oxford relief, too). Such systems filter the pattern of life for the sake of mathematical neatness, with opinion evidently differing as to the specific ratios chosen. So while Salamis Man cannot be a direct ancestor of Vitruvius's, it is probably an earlier manifestation of the same desire to legitimate a metrical system by reference to a human archetype.

The question of whether the Salamine canon could correspond to a canon used by practicing Greek sculptors goes beyond the scope of this study.⁴⁶ I will confine myself to just one suitable comparison, the famous bronze statue in Athens' National Museum that was recovered from the sea off Artemision and is thought to represent Poseidon or Zeus, or called simply the "God from the Sea" (fig. 9).⁴⁷ Dated to around 460 B.C., this work features a generically similar pose, with the outstretched arms and the bearded head turned to look along one of them. Its detailed characteristics (with the flexed knees and one bent arm), together with the fact that the published drawings are not true orthogonal projections (having been based on photographs), mean that it is impossible to make a rigorous comparison. Nonetheless, as a percentage of the total, the height to the level of the shoulders, the breast muscles, and the navel are close to their equivalents on Salamis Man (assuming him to be 6 ft. tall). Once again, though, the hand of Salamis Man is much larger relative to that of the Artemision statue's. In short, Salamis Man may have corresponded to a sculptor's canon, but this was not necessarily the case. The mathematical neatness tends to suggest that sculptural concerns were subordinated to metrical ones.

Is it possible to say anything about the likely char-

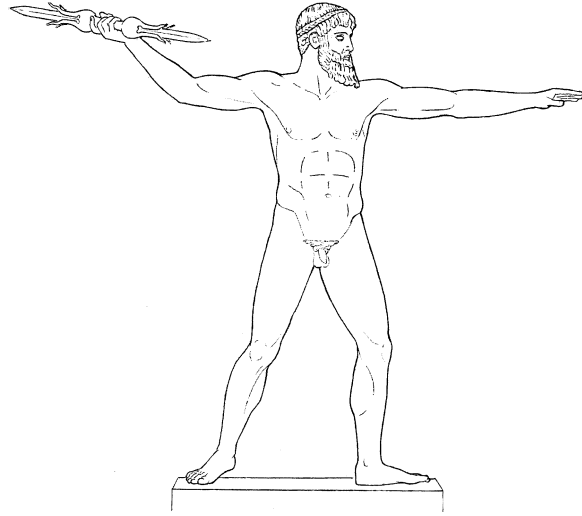


Fig. 9. Line drawing of the bronze statue of a god found in the sea at Artemision, now in the National Museum, Athens. (Wünsche 1979, fig. 17)

acteristics of the Salamis relief in its original setting? It is reasonable to suppose that the various standards of measure had to be readily accessible, that is to say, placed neither much higher than the viewer's head nor below waist level. Therefore, Salamis Man must have stood more or less at eye level with an upright adult man. Acting within this constraint, it would have come naturally for the designer of the relief to fix the top of the block at an elevation of metrological significance. What better than to have located the top of the slab/head 6 feet from the pavement? Of course, very few men attain a height of 6 Doric feet (6 ft. 5 in. in the Anglo-American system), so observers had to look slightly up to Salamis Man. This means that the various small-scale metrical representations (the foot rule, the disembodied foot and hand) lay conveniently displayed within reach, with the observer's arms comfortably inclined either up or down.

The lower part of this hypothetical "metrological monument" would consequently have been a double square with a height equal to $1\frac{1}{2}$ times that of the upper slab, setting in train an extraordinarily comprehensive cascade of metrical relationships (fig. 10). Literally dozens of arithmetical ratios, such as 1:3, 3:4, 4:5, 5:6,

⁴⁵ Vitruvius's text specifies that the distance between the throat and the hairline corresponds to $\frac{1}{3}$ of the total height, but Leonardo judged this measurement to work better using the crown of the head instead. For differences regarding the size of the foot and the placement of the umbilicus, see fig. 7.

⁴⁶ For discussion of the Salamis relief in this context, see Berger 1992, 25–31; 1993. On Vitruvian Man, see Berger 1992, 36–9, and on reception in the Renaissance, see

Zöllner 1987. On Polykleitos's canon, see Berger 1990; Sonntagbauer 1991–1992.

⁴⁷ Karouzos 1930; Mylonas 1944; Wünsche 1979 (the drawing I used for comparison corresponds to fig. 17); Mattusch 1988, 5–6, 151–4; Holtzmann and Pasquier 1988, 166–7 (who give a height of 2.09 m and an armspan of 2.08 m, that is to say, a 1:1 relationship comparable with Vitruvian Man).

M1 = $2/3$ ATTIC FEET, $3/5$ DORIC FEET, $3/8$ EGYPTIAN ROYAL CUBITS
 M2 = 1 ATTIC FOOT, $9/10$ DORIC FEET, $9/16$ EGYPTIAN ROYAL CUBITS, or $3/2$ M1
 M3 = $1\ 1/3$ ATTIC FEET, $6/5$ DORIC FEET, $3/4$ EGYPTIAN ROYAL CUBITS, or 2 M1, $4/3$ M2
 M4 = $1\ 2/3$ ATTIC FEET, $1\ 3/5$ COMMON FEET, $1\ 1/2$ DORIC FEET, or $5/2$ M1, $5/3$ M2, $5/4$ M3

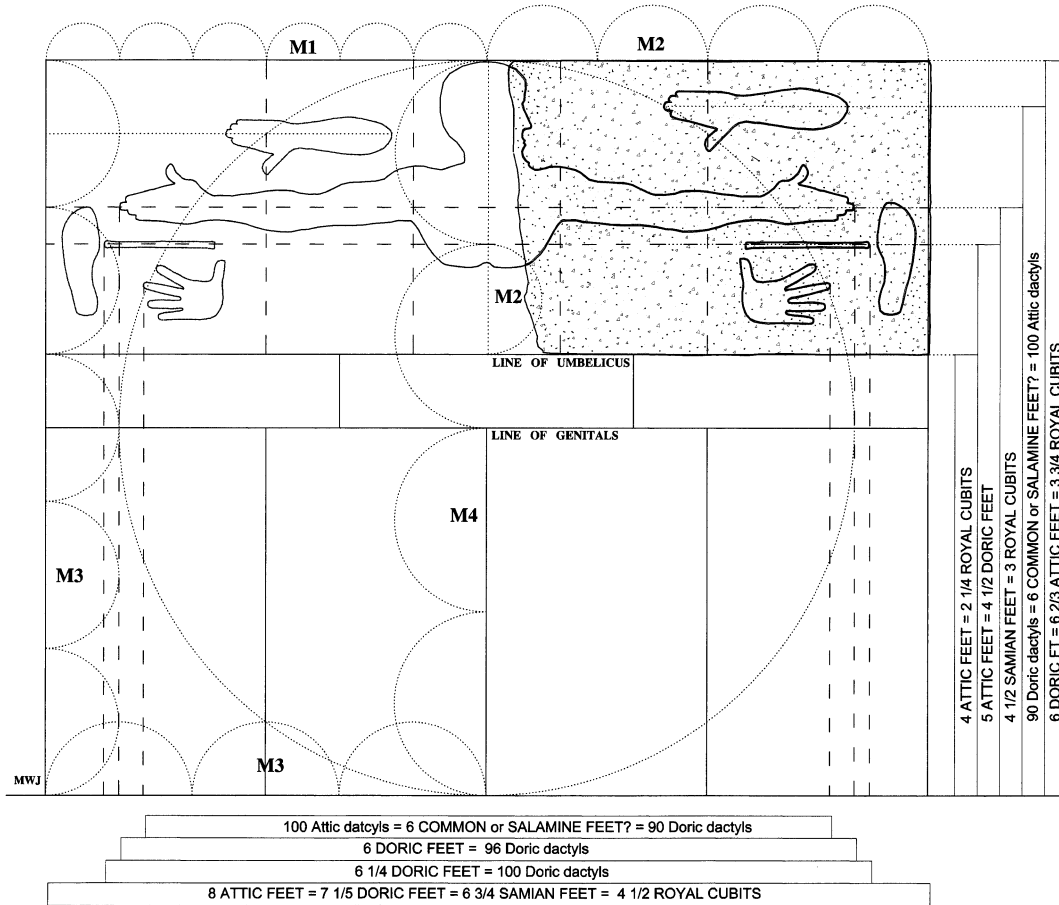


Fig. 10. Reconstruction of the original form of the metrological relief from Salamis, scale 1:20, with conjecture of its placement and context based on the assumption that the height of the crown of the head from the pavement matched the overall width measured from fingertip to fingertip of the outstretched arms. The annotated dimensions and proportions represent the calculated values that follow as a direct consequence.

9:16, and so on, could have been checked using such an instrument. We may reasonably speculate, as did Dekoulakou-Sideris, that other metrical standards were present on the left side of the body, and that these may have defined the family of measures associated with either the Attic foot or the 306–307 mm foot. It is also important to note that the precision attainable from measuring the individual outlines was probably exceeded by that obtained by correctly dividing the larger distances established by their placement.

From the lack of any line representing the silhouette of the torso, it appears likely that the body outline terminated with the chest, floating freely as it were. However, other key anatomical limits could have been delineated in abstract fashion—as mentioned, the bot-

tom of the block marks a plausible level for the navel. We can only guess how all of this was resolved in terms of materials and detailed design, and the possible role played by an explanatory inscription. It is reasonable to suppose that our slab was only a shadow of similar reliefs displayed in the Athenian agora. In such contexts metrological monuments are likely to have been made to more exacting standards of precision, thanks no doubt to the use of marble as opposed to limestone, perhaps incised lines, like those on the entasis template discovered on the marble walls of the Didymaion, and maybe calibrated metal inserts (a technique thought to have characterized the rules sunk into the metrological relief from the Roman period found at Thibilis in Algeria).⁴⁸ The

⁴⁸ Rakob 1974, 77; Hallier 1994. For the Didymaion drawings, see Haselberger 1980, 1983.

vertical joints in the masonry between orthostates or the horizontal joint defined by a fascia could have been of further service, as proposed in my very tentative reconstruction. Perhaps the official Athenian controllers of weights and measures, the 10 *metronomoi* Aristotle mentions (*Ath. Pol.* 51.2), turned to just such a monument for public verification of the tools of their trade.

AN INTERNATIONAL SYSTEM OF MEASURES?

In one sense this reinterpretation of the Salamis relief goes against Rottländer's conception of a Mediterranean-wide network of measures (fig. 2). If the phantom ($1\frac{1}{2} \times 322 = 483$ mm) Salamis cubit was related to the Nippur elle, as he claims, by the ratio 28:30, then presumably the real (491 mm) cubit was not. Nonetheless, the general theory that metrical standards crossed national borders is strengthened, for the Salamis slab does seem to have encapsulated a veritable international metrical convention. If we suppose that the nominal dimensions mentioned above in Doric feet, Attic feet, and Egyptian cubits were those actually intended, then their use in concert confirms a set of relationships long since put forward as possible conversion factors, namely that 8 Doric feet equals 5 Egyptian royal cubits, and that 16 Attic feet equals 9 Egyptian royal cubits (fig. 11).⁴⁹ Since Herodotos (2.168) gave the Samian cubit equal to the Egyptian royal cubit, and since feet correspond to cubits divided by $\frac{3}{2}$, this is the same as saying that 16 Doric feet equals 15 Samian feet. Alternatively, the relation between all four distinct lengths (Attic foot: Doric foot: Samian foot: Samian cubit/Egyptian royal cubit) can be expressed via the following whole number progression: 27:30:32:48.⁵⁰

Having established the most conspicuous relationships embodied on the Salamis relief, one might ask

⁴⁹ Von Gerkan 1940, 141–50; Büsing 1982.

⁵⁰ Taking 327 mm for the Doric foot, this series yields values for the other units that are perfectly consistent with those generally cited: The Attic foot = $\frac{9}{10} \times 327$ mm = 294.3 mm; the Samian foot = $\frac{16}{15} \times 327$ mm = 348.8 mm; the Egyptian royal cubit = $\frac{8}{5} \times 327$ mm = 523.2 mm. Using the $327\frac{1}{2}$ mm value of the Salamis foot rule itself, this yields unit values of 294.75 mm, 349.33 mm, and 524 mm, respectively.

⁵¹ With such an imperfectly preserved artifact it would be illusory to try to decide between these options on the basis of the accuracy of the outlines. Their placement may offer further clues. It seems plausible that the outermost fingertip of the disembodied hand pointed out a fathom in these feet (figs. 7 and 10), but unfortunately the finger in question is too damaged to help us further with this particular inquiry. The axis of the footprint (which has so far eluded explanation) lies about $3\frac{1}{2}$ ft. using a ca. 307 mm foot from the presumed center line. Furthermore, the hori-

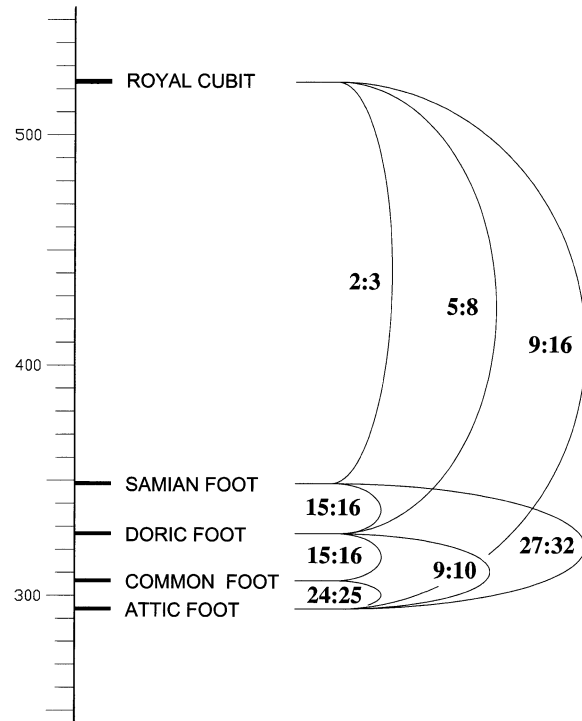


Fig. 11. Hypothetical arithmetical relationships between the principal units of measure associated with the metrological relief from Salamis

if the other foot unit, that of the footprint itself, also engaged in some similar network. A unit of ca. 306½ mm could have fitted one of two ratios with respect to the Doric foot, either 14:15 (in theory yielding 305.66 mm),⁵¹ or perhaps more likely 15:16 (in theory yielding 307.03 mm). While there is the tenuous possibility that a 306–308 mm unit corresponds to the “common” foot that Herodotos mentioned,⁵² it might equally be identified as a local “Salamine” foot.

zontal axis of the disembodied forearm lies 6 Doric digits below the top of the slab, i.e., at a level equivalent to $\frac{1}{6}$ of the total if the proposed reconstruction is correct, which is tantamount to 6 feet of 307 mm. In short, the $\frac{1}{6}$ factor is the most likely option. However, it should also be noted that the alternative $\frac{1}{5}$ ratio would extend the series of interrelationships just mentioned so as to make it 27:28:30:32:48.

⁵² If the $\frac{1}{5}$ ratio applies, then by arithmetic the footprint is also $\frac{2}{24}$ of the Attic foot, this being the ratio which, as we saw earlier, Roman writers used to relate the “Greek” foot to their own, and hence also to the Attic foot, given that the Attic and Roman units are to all intents and purposes the same. In addition, Herodotos (1.178) tells of a “common” Greek cubit that was shorter than the Egyptian royal cubit by three digits. One cubit plus 3 digits equals 27 digits, and 27 digits of the ca. 307 mm unit corresponds to 518 mm; at 5 mm shorter than the royal cubit, the discrepancy is substantial, but perhaps Herodotos’s approximation was accurate only to the nearest whole digit.

It is not my intention to make a claim for a universally valid system. The fact that weights and measures were reformed on different occasions tells us that alternative equivalences must have existed. Another ratio than the one implied here (7:4 and not 16:9) seems to have informed the relationship between the Egyptian cubit measures and the Roman foot on the Lepcis Magna relief.⁵³ The ratio 7:4 is also that between the Egyptian royal cubit and a foot of ca. 299 mm, which now seems to be definitely attested at Didyma.⁵⁴ It may be impossible to establish which factor was dominant when and where, although it remains highly likely that attempts were made to interrelate the glut of ancient metrical standards that exist in the ranges 512–530 mm and 290–300 mm (fig. 1). It might be speculated that the system applied on the Salamis relief was instituted as part of a specific reform; Solon is thought to have carried out one such reform, and later ones have been proposed in discussions of the Oxford relief.⁵⁵

The possibility that the Greeks could have reconciled their metrical system with an important standard like the royal cubit is quite consistent with textual evidence. As already mentioned, Herodotos believed that the Samian and Egyptian cubits were identical. A trilingual building inscription at distant Susa from the time of Darius (522–486 B.C.) demonstrates the international character of the workforce:

The stonecutters who wrought the stone, those were Ionians and Sardians. The goldsmiths who wrought the gold, those were Medes and Egyptians. The men who wrought the wood, those were Sardians and Egyptians. The men who baked the brick, those were Babylonians. The men who adorned the wall, those were Medes and Egyptians.⁵⁶

The various nationalities of builders had to cooperate, and in any such enterprise it made sense to

adopt a common measure, for which the royal Egyptian cubit, with its long ancestry, was eminently suited. We may also imagine that each group tailored its native units so as to relate to it in a convenient fashion. Some degree of dimensional coordination may have taken place already in the seventh or even eighth century in the context of trade associated with the Naukratis emporium, but the participation of Greek military engineers in the campaign of Psammetichus II (595–589 B.C.) in Nubia⁵⁷ would have provided further impetus to do so. At about this time the exploits of Antimedes, serving under Nebuchadnezzar in the Levant, inspired his brother, the poet Alkaios, to write:

You fought alongside the Babylonians and won
great fame, and saved them from troubles,
killing a warrior man
who lacked only a single span
from five royal cubits in height.⁵⁸

Poetic licence apart, would Alkaios have mentioned the Egyptian measure unless it meant something to his Greek audience? The influence of the Orient on Greek art and culture has for some time now been widely acknowledged, and there is also a growing awareness as regards the more technical aspects of building.⁵⁹ A design based on a metrical system derived from the Egyptian royal cubit has been argued for the monumental kouros from Samos now in the Getty Museum, an interpretation that gives some substance to the link between Egyptian and Samian measures that Herodotos mentioned.⁶⁰ And if someone outside Samos had wished at some stage to create new units (or to have modified existing ones) so as to suit the Egyptian royal cubit, what was easier than to have divided it into 16 parts (the Greeks' own feet were divided into 16 digits), and to have taken nine for the "Attic" foot and/or 10 for the "Doric" foot?⁶¹

⁵³ Hallier 1994, 2116. It has also been argued that the 518 mm Nippur elle related to the Roman, or ca. 296 mm, foot, as 7:4; see Rottländer 1996a, 237. In this way the digits are in each case identical, there being 28 of them in the former and 16 of them in the latter.

⁵⁴ Haselberger 1996, esp. 160 ff. Cf. De Zwarte 1994, 1996. It is possible that this ca. 299 mm unit was related, in more or less simple arithmetical terms, to the other units discussed here; calculation generates the following relationships: 4:7, 6:7, 32:35, and 65:64, in terms of the Egyptian royal cubit, the Samian foot, the Doric foot, and the Attic foot respectively.

⁵⁵ Crawford 1972. On the background to the Oxford relief, see Wesenberg 1974, 20–2.

⁵⁶ Kent 1953, 144, s.v. Darius, Susa F. 45–55.

⁵⁷ Austin 1970.

⁵⁸ Alkaios, frag. 350 = 50D, trans. Murray 1980, 218.

⁵⁹ Sharon 1987; Ratté 1993.

⁶⁰ Guralnick 1996, esp. 515 ff. For the application of a

Samian foot (of 349 mm), see Schneider 1996, 27–30; for discussion of Herodotos's connection, see p. 29 n. 39.

⁶¹ Both Pheidon and Solon are candidates for causing this innovation. Pheidon, the tyrant of Argos, was, according to Herodotos (6.127), "the man who established the system of measures for the Peloponnesians and performed the most arrogant action of any Greek, when he turned out the Eleians who manage the Olympic Games and held them himself." The reliability of this tradition has been challenged, particularly as regards the question of coinage standards (see MacDonald 1992, 71), yet Pheidon's foot has long been identified with the ca. 327 mm foot (hence the name 'Doric-Pheidonic' foot) because of its perceived popularity in the Peloponnese and in Peloponnesian colonies. But if Pheidon did fix a foot standard, is the 327 mm foot the right one? Aristotle reports that under Solon "the measures used in Attica became larger than the measures of Pheidon" (*Ath. Pol.* 10), so there is a possible case for identifying the 306–307 mm foot with Pheidon and the 327 mm foot with Solon.

IMPLICATIONS FOR INTERPRETATIONS
OF ARCHITECTURAL DESIGN

For methodological reasons I have avoided so far the analysis of buildings, but it is safe now to confront this problem with the physical artifacts behind us. Even though the Salamis relief by itself proves the existence of the Doric foot, it is yet worth adding reinforcement, given Rottländer's scepticism. Complementary documentation comes in the form of the series of little crosses Dieter Mertens observed on the unfinished temple at Segesta, crosses used for calibrating the upward curvature of the stylobate. Spaced at an average of 3.26 m apart, they lend themselves most economically to intervals of 10 Doric feet.⁶² Then there are specifications and building accounts, where they may be compared with a well-preserved building, as in the case of the Erechtheion. It was on the basis of just such evidence that Dörpfeld was able to converge on the 327 mm foot in the first place.⁶³

The simplest of all groundplans are circular or square freestanding structures, such as tombs or celebrative monuments, for which an important dimension is likely to be the overall external width.⁶⁴ So, for example, it comes automatically to associate the 32.7 m external radius of the tumulus at Belevi near Ephesos with 100 Doric feet.⁶⁵ At a much smaller scale, the roughly contemporary Monument of Lysicrates (fig. 12) in Athens measures 3.275 m wide, or 10 Doric feet. Simple gridded plans of the type that were popular for Hellenistic Ionic temples in Asia Minor are similarly transparent. For example, the column spacing of the Temple of Athena Polias at Priene is 3.54–3.55 m, or 12 Attic feet, while that of Leto's temple at her eponymous sanctuary near Xanthos is 2.95–2.96 m, or 10 Attic feet.⁶⁶ So no doubt the approximately 3.26 m column spacing of Hermogenes' temple at Teos, which fits very much into the same tradition, represented a module of 10 Doric feet.⁶⁷

Of the various lessons that the Salamis relief holds for the architectural historian, one of the most fundamental is the apparent ease with which an array of arithmetical ratios, each simple in itself, is brought together into a complex that is rich in interdependencies. Also important is its testimony in favor of a highly developed, precise, and conscious effort to relate different families of units to one another. This lends credence to analyses that have at times detected the use of two units in a single building (or sculpture),⁶⁸ while at the same time it might explain how it is possible for two or more rival metrological interpretations to seem equally valid.

One possible manifestation of metrical synchronism is the Monument of Lysicrates (fig. 12). While the overall width of the tholos, as mentioned, is 10 Doric feet, that of the podium, excluding the moldings, is 10 Attic feet. The height of the podium is 12 Attic feet, but that up to the base of the columns is 12 Doric feet. The column height is 12 Attic feet, or alternatively 12 Doric feet if it includes the steps immediately under the columns, and so on.⁶⁹ This type of approach demands that the design of profiles, as well as the very existence of "negotiable" elements such as the steps just mentioned, be evaluated according to the metrical game. The combination of as many as a dozen or so distinct units has been read into the Tower of the Winds in Athens (although one has to suppress the unkind thought that the authors could get virtually any unit to fit if they so wished).⁷⁰ In any event, the impetus was sometimes more practical in origin, as in the case of numerous Roman buildings in North Africa that were conceived in terms of the Roman foot but built by local builders using a specification translated into Punic cubits; this is the context in which the relief from Lepcis Magna (fig. 6) had a practical application.⁷¹

The ultimate locus for metrical intrigues is of course the Parthenon. A number of different values for the foot have been proposed, most of which cor-

⁶² Mertens 1984, 34–5, pl. 33, insert 21b.

⁶³ Dörpfeld 1890, 168 ff; cf. Stevens and Caskey 1927, 222; Wesenberg 1995, 205 ff.

⁶⁴ Wilson Jones 1989b; 2000, ch. 4.

⁶⁵ Kaspar 1976, esp. 132 ff.

⁶⁶ Koenigs 1983, 134 ff.; de Jong 1988; Hansen 1991.

⁶⁷ Uz 1990.

⁶⁸ Ahrens 1968–1971; Büsing 1986; Rottländer 1990.

⁶⁹ The following are metric and corresponding foot values for the dimensions cited assuming an Attic foot of 294.75 mm and a Doric foot of 327.5 mm (source: Bauer 1977):

Width of podium (die): 2.940 m (9.98 AF);
Diameter of tholos base: 3.275 m (10.00 DF);
Height of podium: 3.560 m (12.07 AF);

Height up to the columns: 3.945 m (12.05 DF);

Height of columns: 3.520 m (11.94 AF);

Height of columns plus steps: 3.930 m (12.00 DF).

In addition, the lower column diameter equals 0.330 m (1 DF) and the upper column diameter equals 0.295 (1 AF).

⁷⁰ Rottländer, Heinz, and Neumaier 1989, esp. 75. Rottländer and Heinz have similarly invoked various units other than the normal Roman foot for Trajan's column (see Rottländer 1996b, 16 ff.), but this is highly improbable since the use of the usual Roman foot for Trajan's forum as a whole is incontestable.

⁷¹ Ioppolo 1967; Barresi 1991; Wilson Jones 1993, 408, 433; Hallier 1994.

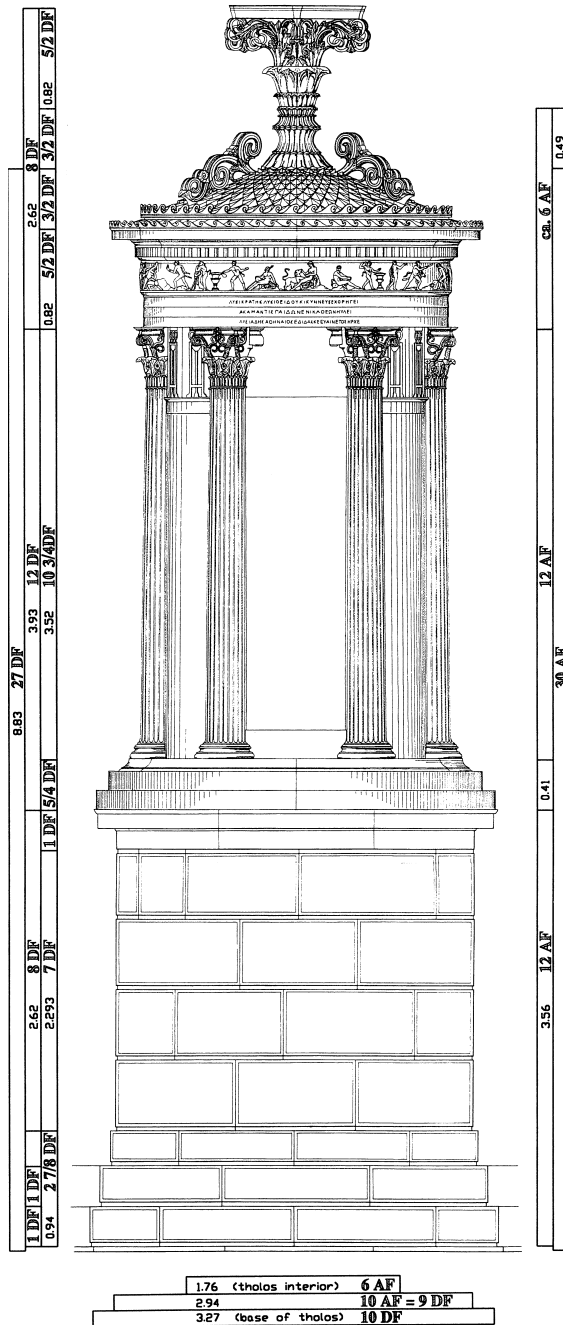


Fig. 12. The Monument of Lysicrates, Athens, ca. 330 B.C., elevation at 1:60, showing the principal dimensions in Doric feet (left) and Attic feet (right). (Bauer 1977, fig. 9)

respond more or less with one of the units already encountered: the Attic foot, the ca. 307 mm (“common” or Salamine?) foot, the Doric foot, and the

Doric cubit; Ernst Berger has singled out a larger “Proportionsmodul.”⁷² There are several instances where important architectural limits match whole numbers in three or four of these units: for example, the height of the order is 16 modules, 28 Doric cubits, and 42 Doric feet, while the height of the facade (excluding the pediment) works out as 30 Doric cubits, 45 Doric feet, 48 “common” or Salamine feet, and 50 Attic feet. Given the diffuse preference for decimal and duodecimal numbers, it is unwise to underestimate the potential impact of chance, but the Parthenon is not an enterprise where this word comes easily to mind. Might such “coincidences” be the deliberate product of just the sort of metrical agility that found expression in the Salamis relief?

Most monuments, however, were probably built using a single unit of measure, which returns us to the problem of appraising different proposals for individual examples. Since it documents more than one type of foot, the evidence of the Salamis relief can in some instances cut both ways, as in the case of the Temple of Juno-Lacinia at Agrigento. Mertens’ analysis is predicated on a Doric foot, which, at 328.7 mm, is a bit longer than the version on the Salamis relief, but recognizable as such all the same.⁷³ Meanwhile, others advocate a foot of around 308 mm on the basis of a neater numerical sequence in some respects, this unit being similarly a little longer than the “common” or Salamine foot represented on the same slab.⁷⁴ So both proposals have potentially equal claim to documentary evidence. Perhaps we can escape from the either/or trap by wondering whether the architect worked with both units. On the other hand, there would be dangers of pushing such arguments too far, that is to say, beyond a few examples such as those cited earlier, which may be assumed to be exceptions to the general rule. The fact that the height and the spacing of the columns at the Temple of Zeus at Olympia are 20 and 10 Egyptian royal cubits respectively⁷⁵ does not, in my view, tell us that this was the unit used for design, nor that the contractors were Egyptian. It is probably just a fortuitous outcome of choosing 32 and 16 Doric feet. This said, we may imagine that the architect, probably conversant with the knowledge displayed by the Salamis relief, enjoyed the metrical “pun.”

In contrast to the Temple of Juno-Lacinia, the evidence from Salamis can lend support to some proposals at the expense of others. A topical example is

⁷² Berger 1984, 123–5; cf. supra n. 12.

⁷³ Mertens 1984, 98–108.

⁷⁴ De Waele 1981; Ceretto Castigliano and Savio 1983;

Höcker 1985–1986, 1993.

⁷⁵ Riemann 1935, 56 ff., table 2.

the Hephaisteion in Athens, inasmuch as two conflicting analyses of its design have been published recently, one by R. De Zwarte and one by De Waele.⁷⁶ Refining slightly the value used by Herbert Koch before him, De Zwarte opted for a foot of 326.6 mm, provoking criticism from De Waele, who instead proposed a value of 322 mm—invoking in support the (incorrect) published length of the footrule on the Salamis relief. In fact, the real value as we now know it better supports De Zwarte's proposal.

Of course, metrology is not the be-all and end-all of interpreting design, but rather one important aspect; there are other qualities to take into account. Strong evidence exists, as I will argue in the sequel to this article (Part 2), that the typical Doric temple of the classical period was inherently modular in character—and a module is not the same thing as a foot unit. From the testimony of written sources it seems that Greek architects associated a design module, or *embater*, with a suitable physical architectural element,⁷⁷ and it is well to question analyses that do not take this lesson to heart. Curiously, most recent interpretations put to one side Vitruvius's advocacy of modular design,⁷⁸ a method generally thought to be applicable, if at all, to buildings of the Hellenistic and Roman periods. Nor has sufficient attention been given to the fact that in his system the module corresponds to the width of a triglyph. In my view this was the key to a method that was well established as early as the middle of the fifth century B.C. While the demonstration of this proposition is to be undertaken in Part 2, it is appropriate to briefly highlight certain metrological aspects that relate directly to problems akin to those already confronted here.

On repeated occasions the metrical units, real or putative, that scholars have induced for Doric temples turn out to be simply related to triglyph modules. A representative example is the Temple of Juno Lacinia at Agrigento mentioned earlier; the common denominator between the competing ca. 308 mm foot and Doric foot is the width of the triglyph, for this is double the former and 30 dactyls of the latter. As for the Parthenon, the real reason why Berger's Proportionsmodul produces such a clear pattern must be its identity with the nominal triglyph module used for the outline design. The fact that the actual triglyphs are in reality about half a digit or 1 cm narrower than the theoretical ideal value (42 dactyls

of a Doric foot a fraction under 327 mm long) should not blind us to this possibility, especially if we remember to make the distinction between *scheme* design and *detailed* design. Minor adjustments were an inevitable part of the notorious problem of resolving the frieze at the corners. The definition of the triglyph module in the first instance seems to have depended on the same metrical climate that generated the Salamis relief, and it is this that explains why the various units it records have been claimed for the Parthenon, each with partial if not complete success.

The importance of modular design may seem to reduce the necessity of identifying the foot units used, but it is an issue that remains nonetheless fundamental, for in the majority of cases the triglyph module was conveniently expressed in terms of familiar units of measurement, of which the most familiar were the Doric and Attic feet. The triglyph widths of medium size temples frequently correspond to either multiples and fractions of these feet (e.g., $1\frac{1}{2}$ or $1\frac{3}{4}$), or round numbers of their respective dactyls (e.g., 20, 25, and 30). Indeed, this is a not insignificant argument in favor of the modular hypothesis; vice versa, if this proposal should come to be accepted, it would represent yet another argument sustaining the diffusion of the Doric foot.

CONCLUSION

To conclude, the metrological reliefs from Salamis and Oxford (whatever the precise purpose of the latter) attest to the use or familiarity in Attica of the so-called Attic and Doric feet, the Egyptian royal cubit and/or the Samian foot, and one other unit (the 306–308 mm “common” or Salamine foot). While this is a tiny statistical sample, it is all we have. On balance, the evidence comes down on the side of the “traditionalist” triad of Attic, Doric, and Samian/Egyptian units, while further suggesting that the interrelations between them were not only well understood but rationalized by means of convenient arithmetical ratios. There is, however, no need to be overly zealous in excluding all other candidates—after all, a fourth (306–308 mm) foot is present on the Salamis relief itself, while there is mounting agreement in favor of a 298–300 mm unit.⁷⁹ No doubt other units did exist elsewhere in the Greek world, but it is likely that for major building projects the involvement of skills and/or materials drawn from outside

⁷⁶ De Zwarte 1996; De Waele 1998.

⁷⁷ Coulton 1989, esp. 86.

⁷⁸ Vitr. *De arch.* 4.3.

⁷⁹ De Zwarte 1994; Haselberger 1996. Cf. Rottlander's

histogram reproduced here as fig. 1, in particular the units of type B1 corresponding to 16 digits of a 28-digit Egyptian royal cubit.

the immediate locality exerted a certain pressure towards the adoption of the “internationally” recognized standards. In short, to return to the historical parallel mentioned earlier, Greek metrology falls somewhere between the standardized ancient Egyptian and Roman systems and the heterogenous experience of Medieval and Renaissance Italy, tending more toward the former than the latter. If the induction of a foot unit from a building’s measurements can be supported by other types of evidence, such as inscriptions or working drawings, then that is all well and good.⁸⁰ Otherwise it is best to be circumspect; no longer is it enough to adopt metrical analysis to conjure up foot lengths that happen to suit preconceived theories about ancient metrology and architectural design.

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⁸⁰ I have in mind here particularly the ca. 299 mm foot identified at Didyma (supra n. 54).

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The Epigraphy of Hellenistic Asia Minor: A Survey of Recent Research (1992–1999)

JOHN MA

Abstract

This is a survey of the last six or seven years' production in the epigraphy of Hellenistic Asia Minor. It covers newly published texts and corpora by region or by theme. It is personal and selective rather than comprehensive; it also hopes to communicate the import and excitement of the field. I examine some aspects taken for granted by epigraphists: the bibliographical situation (specialized publication combined with organs for broadcasting results, the *Bulletin épigraphique* [BE] in *Revue des études grecques* [REG] and the *Supplementum epigraphicum Graecum* [SEG]) and the provenance of documents (excavation and, principally, "epigraphical surveying," a richly rewarding, though nonconceptual, technique). I further attempt to show the importance of some recent findings, under various headings (notably the polis and local history). The material has major contributions to make, not just to specialists of the area and the period, but to ancient history and to classics in general, if epigraphists try to communicate them and classicists listen.*

MANY FAT TOMES . . .

To begin with, a tidbit from the earlier days of epigraphical research; or, more accurately, an early reaction to the idea of such research. Jean Guérin, the Marseilles-born *antiquaire du Roi* at Smyrna in the time of Louis XV, frequently and vainly tried to attract the patronage of the Abbé Bignon, the king's librarian, for various projects (including a grand scheme to buy all the Greek manuscripts from the monasteries on Mt. Athos); one of Guérin's more modest ventures was the collation (by no means unskilled) of inscriptions around Smyrna, for instance, on the (admittedly much-visited) site of ancient Teos (fig. 1). Bignon—courteous, shrewd, learned—was dismissive:

Il a fallu d'abord examiner les inscriptions dont vous m'avez envoyé des copies, les comparer sur celles qui ont paru jusqu'icy . . . il a fallu ensuite approfondir si ces inscriptions pouvoient nous procurer quelques nouvelles connoissances sur l'histoire, la religion, les charges, les moeurs, etc., des différens temps où elles ont été composées. . . . A présent que cet examen est fini, je vous diray que vous mérités des éloges et des

remerciemens de l'application que vous avez donné à tâcher de nous enrichir de ces découvertes, mais que vous pourriés doresnavant vous épargner une grande partie de cette fatigue, parceque ce qu'il y a de plus curieux se trouve déjà donné au public, ou du moins doit l'être incessamment par les Anglois, et que, puisque tout le reste n'apprend que des noms peu importants, ce ne sera que multiplier des notions déjà connues. Toute l'Asie est pleine de pareils monumens, et, si on vouloit copier tout ce qui s'y en trouve, il y aurait de quoy en composer plusieurs gros volumes, dont l'utilité ne seroit pas fort considérable.¹

It was first necessary to examine the inscriptions of which you sent me copies, compare them to those published till now . . . it was then necessary to establish whether these inscriptions could afford new information on the history, religion, offices, customs, etc., of the various periods when they were composed. . . . Now that this examination is over, I must tell you that you deserve praise and thanks for the dedication which you put to the endeavor of enriching us with these discoveries, but that from now on you might spare yourself a great deal of this toil, since the most curious parts have already been published, or will imminently be by the English, and since, as all the rest reveals only unimportant names, this will amount only to multiplying items of knowledge already known. The whole of Asia is full of such monuments, and, if one wished to copy all such material that lies there, there would be the wherewithal to compose many fat tomes whose utility would not be very considerable.

INTRODUCTION: READING ABOUT THE CHATTERING STONES

Ex Asia semper quid novi: Asia Minor, the land of the chattering stones,² continues to bring forth its yearly increase in the body of inscribed texts, a feature that has always been unique to the eastern Mediterranean. This material, though far from negligible for the Archaic and Classical periods (especially the fourth century), really comes to the forefront in the Hellenistic period (late fourth to late first century B.C.). Royal correspondence, official documents of

surveys" and helping me with comments.

¹ Quoted in Omont 1902, 711–2; the reference for the letter is Bibl. nat., ms. fr. 22.234, fol. 277 v^o (*non vidi*).

² The expression comes from Boulanger 1923, 78.

* Many thanks to B. Hitchner and M. Kurtz at *AJA*, and the two anonymous readers for their criticism and remarks; also to S. Herson for improving the text considerably. In addition, I would like to thank A. Chaniotis, J. Lightfoot, F. Millar, J. Ober, and R. Parker for reading this "survey of

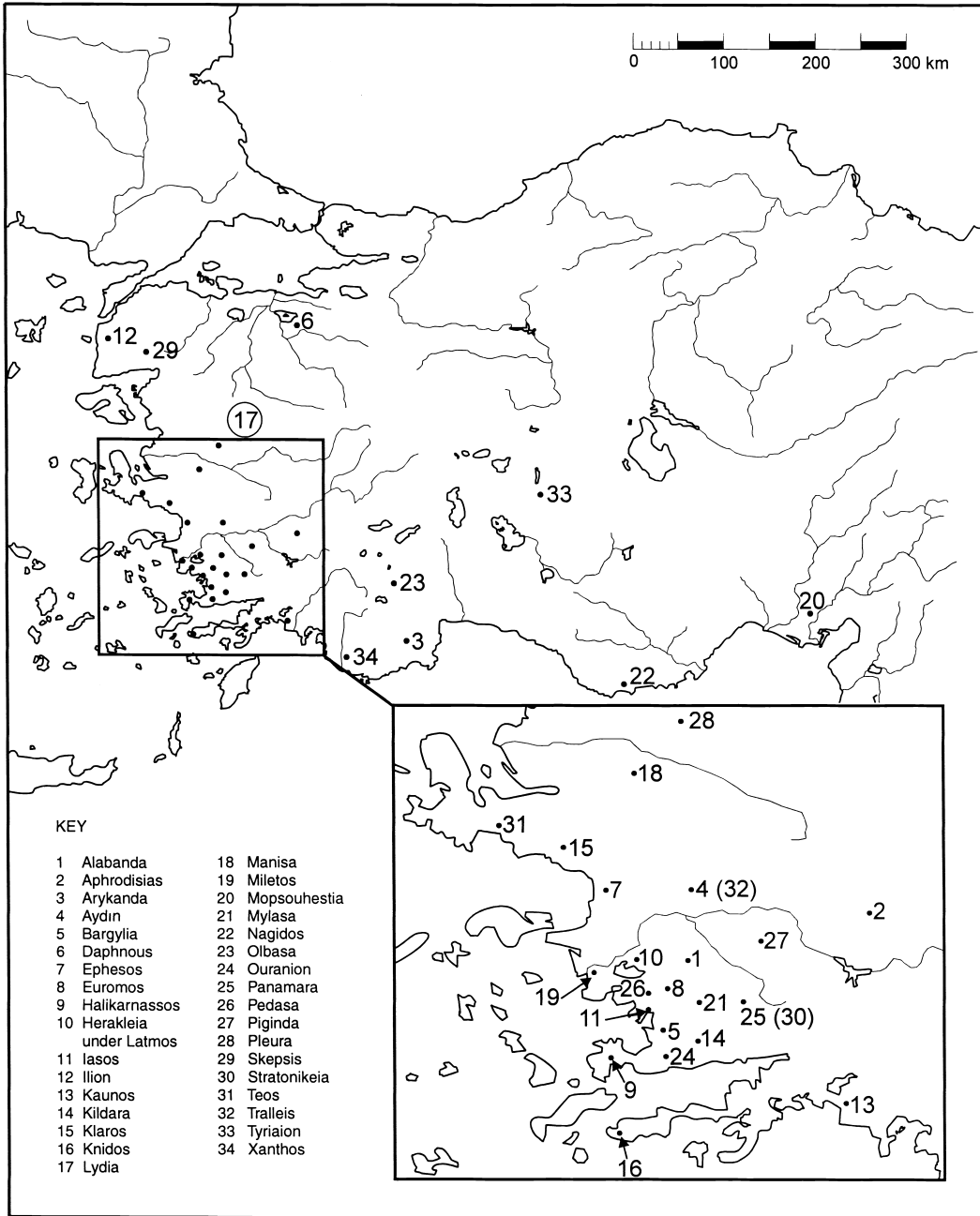


Fig. 1. Map of sites referred to in the text

the Greek cities (by far the largest category), honorific texts (statue bases and/or epigrams), religious ordinances, and funerary texts (epitaphs of varying elaboration)—all these give us a mass of vivid and direct evidence on a wide range of topics and issues. Asia Minor in the Hellenistic period will provide the

focus for this survey article. I aim to review recent research (1992–1999): a bibliography is presented as an appendix, organized by year of publication and by site;³ an alphabetical list of all works cited follows the appendix.

This recent work has been very abundant but

³ The year of publication is the date appearing on the periodical, not the date of actual diffusion (which often lags behind the claimed date: e.g., *EpigAnat* 29 [1997] ap-

peared in late 1998, but documents published there will be cited under 1997).

fairly well-structured: it falls into two main genres. The first class of work is the corpus, a critical, illustrated publication of epigraphical texts, with commentary, most frequently organized by geographical locale. One well-known and convenient series of corpora is the *Inschriften griechischer Städte aus Kleinasien*, which continues to expand; in addition to offering rapid, sometimes summary, republication of all the known texts for a given site (the philosophy of the *Repertorium*), the volumes often include new texts.⁴ The ever-increasing ranks of blue *IGSK* volumes offer a very visible manifestation of activity in the field, but they are not the whole story. For instance, the series devoted to the epigraphy of Miletos has picked up again in exemplary style: P. Herrmann (*Inschriften von Milet 6*) first provides a useful and important survey of the secondary work and the textual progress on the important texts from Miletos (published mostly in *Milet 1.2, 1.3*, and Rehm's *Inschriften von Didyma*), then starts the publication of many new texts from Miletos, mostly funerary. Another case that deserves mention is H. Malay's catalogue of the holdings in the Manisa Museum, one of the richest epigraphical collections in Turkey, registering bibliography for published texts, and giving complete and careful publication for the many new texts. A symptom of the volume of material and of the vital role of an active museum such as the Manisa Müzesi is the rich series of addenda to Malay's catalogue: in the year between the completion of the book and its production, 47 new documents were brought to the museum and added to the catalogue. Other corpora regroup texts by theme and depend heavily on Asia Minor for their material: for instance, S. Ager's *Interstate Arbitrations in the Greek World, 337–90 B.C.*; O. Curty's *Les parentés légendaires entre cités grecques: Catalogue raisonné des inscriptions contenant le terme ΣΥΓΓΕΝΕΙΑ et analyse critique*; and K. Rigsby's *Asyilia: Territorial Inviolability in the Hellenistic World*. Finally, the new PHI 7 CD-ROM of epigraphical texts contains important additions, prepared by a team in Hamburg, ensuring excellent coverage of Asia Minor.

The second place where research appears is journals: the field still derives much of its energy from articles and periodicals, rather than synthetic or ana-

lytical monographs. Apart from the yearly major publications of the archaeological institutions and the preliminary write-ups in the proceedings of the *Araştırma Sonuçları Toplantısı (AST)*, the annual conference in Ankara where all archaeological work (and hence all epigraphical findings) in Turkey must be reported, most of the work appears in a set of specialized periodicals: *Chiron*, *Epigraphica Anatolica (EpiGAnat)*, *Tyche*, *Zeitschrift für Papyrologie und Epigraphik (ZPE)*. H. Malay's *Arkeoloji Dergisi* is a recent and already distinguished addition⁵ to the roster, with the publication of several fascinating documents in the years since its inception as an annual periodical in 1994. Closely related are the *Asia Minor Studien*, produced in Münster, a series that appears frequently and gathers specialized, often epigraphical, studies.

One consequence of this situation is the existence of a forum for the presentation of findings in the manageable form of focused articles, and for ongoing debate and conversations about the material. Both *EpiGAnat* and *ZPE* are published several times yearly, which ensures a constant, occasionally overwhelming, stream of contributions. A striking instance of this speed is the publication in *EpiGAnat* 29 (formally dated to 1997) by W. Blümel of a text found in August 1998. That particular issue of the periodical offers *inter alia* two major documents from Hellenistic Asia Minor (charter of Tyriaion; *isopoliteia* between Latmos and Pedasa), texts found nearly in situ at Stratonikeia, and focused notes on textual issues; this gives a good example of the variety and the richness of recent published work (see also *EpiGAnat* 25 [1995] for a particularly interesting and rich issue of the same journal). An example of continuous debate about the material is provided by a text published in *EpiGAnat* 25, a decree of the Laodikeis found at Panamara: the original publication of the text was quickly followed by a corrective on the identity of the Laodikeis and another on the date of the document and origin of the community that produced the decree (1995: Panamara, with Ma 1997 and Reger 1998).⁶ Generally, the field is still strongly driven by work published in periodicals because such work often brings genuinely new information, in addition to

⁴ C. Brixhe and A. Panayotou (*BE* 94.526), in discussing T. Drew-Bear's review of *I. Mylasa*, examine the issues and problems surrounding the concepts and practices involved in the epigraphical corpus. Corpora with new texts: e.g., *I. Arykanda* (no. 1 is a new Hellenistic sympoliteia treaty), *I. Knidos* (remarkably rich in new texts), *I. Alexandria Troas* (the epigraphy of that city is reviewed by Riel [1995, 7–14]).

⁵ Though often difficult to get outside of Turkey, and hence less well known than it deserves.

⁶ If anyone is still interested, I would observe that the context of the Livian passage (33.18), which allows us to identify the Laodikeis, implies that this community is located somewhere southeast of Stratonikeia, in the Rhodian Peraia proper—perhaps a little too far for an estate of Laodike (Reger 1998)?

interpretations. An initial simple question then arises: how is the work in specialist venues made available to the field in general (classics/ancient history)? How is the nonspecialist, if at all interested, to gain knowledge of this particular material, or keep track of it?⁷

A second, more disturbing feature of this situation is the retreat of published research on the epigraphy of Asia Minor from periodicals not exclusively dedicated to documentary studies (or even documentary studies of Asia Minor, like *EpigAnat*). There are some exceptions: for instance, *Phoenix* (1989, 1993) has published studies by C.P. Jones (with C. Habicht and J. Russell) in the epigraphy of Hellenistic Asia Minor (the republication and historical commentary of an important Ptolemaic document from Kilikia, or, in Kilikia still, the publication of some tantalizing Hellenistic fragments from Nagidos); in the French realm, *REG* or *Revue de Philologie (RPhil)* regularly publish contributions in the field. Nonetheless, the combination of energy and activity in the field, and the restricted arenas in which this energy finds expression, may provoke concern. No doubt the existence of venues for specialist debate has contributed to the coherence, the freeness, and the fluency of debate about matters the specialists know intimately, have strong opinions about, and care for. On the other hand, the concentration of published research in these venues may bring less appealing consequences: communication exclusively directed at specialists and alienation from the rest of ancient history or classics. Who reads (should read) *EpigAnat*? This situation, in a time when the classics have lost their position as a source of authority and cultural capital, and when ancient history and archaeology are struggling to define themselves,⁸ at least raises the question of audience and aims for the field. Put bluntly, what is the study of Hellenistic epigraphy for? What contributions does it make?

To tackle the first, smaller question first: the concentration in epigraphical “trade journals” is fortunately alleviated by the existence of excellent institu-

tions for communicating results to the wider classics community. The first is the fast, yearly review of published work in the “Bulletin Epigraphique,” the descendant of the Roberts’ famed collection of high-powered, often arch reviews of each year’s work: the *BE* is now edited by P. Gauthier heading a team of epigraphists. Items reviewed often receive corrections and comments, and sometimes extensive remarks that amount to small articles on interesting documents or collections. In this respect, the post-Robertian *BE* has retained an essential feature: the didactic vitality of the institution; perusing the five or six hundred items in each year’s offering is always an education. Another similar resource is the *JRS*’s quinquennial survey for epigraphy concerning Roman history; yet another is the “Epigraphical Bulletin” published in *Kernos* by A. Chaniotis, which focuses on Greek epigraphy as a crucial resource for the study of ancient religion. The other great tool is the *SEG*, which republishes (with minimal textual and substantive comments)⁹ the production from each year, with thoroughness and tenacity. As a result, *SEG* appears with a slight delay, a small price to pay for its comprehensiveness: a new volume of *SEG* is always an exciting, if slightly overwhelming, experience. There are plans to convert the format to an electronic one, presumably CD-ROM or online. With both *BE* and *SEG*, the field of epigraphy in general and the subfield of Hellenistic epigraphy are very well served: texts, but also secondary works, are presented or summarized in an easily accessible form. Classical numismatics or papyrology, let alone fields like the epigraphy of the Indian subcontinent, do not benefit from such excellent and convenient tools; the consequence is that the entry price into Greek epigraphy is relatively low. For this reason, the present survey of recent work does not aim at duplicating the efforts made in *BE* and *SEG*. I will not give a comprehensive catalogue-cum-summary of new texts, let alone published work that uses or bears on Hellenistic inscriptions from Asia Minor, but rather a

⁷ As further examples of research published in periodicals and the way in which it constitutes a stream of debate with work both old and recent, see the publication in 1993 of important texts from Euromos, the subsequent discussion and commentary proposed by Gauthier in *BE* 95.523, followed by further corrections and reactions to Gauthier in *EpigAnat* 27 by Herrmann (1996, 54–6) and Blümel (1996, 61–2). Another example: the publication of the bilingual late-fourth-century decree, in Greek and in Karian (1997: Kaunos), elicited an immediate correction on date, by Descat (1998, 187–90).

⁸ On the process, I. Morris, in Morris 1994, 3–47 and Marchand 1996. I know of no similar survey on the field of

epigraphy, its ideological history, and its future; nor is there any study of the topic of Hellenistic epigraphy in Asia Minor in particular, with its precise issues: the place of topographic and antiquarian travel; the occasional Eurocentric or colonial agendas of the travelers; the problematic relation between Hellenism, Asia Minor, and whatever form of Turkish power obtained there—the Ottoman empire or the Turkish Republic—the emergence, in both Ottoman and modern republican Turkey, of archaeological policy and practice.

⁹ But comments by Pleket and Herrmann are always worth reading and pondering.

highly personal interpretive essay (drawing selectively, but gratefully, on those two resources, as I should acknowledge now).

The existence of tools that make the recent work, originally published in specialized journals, so readily accessible, only raises with more insistence the question formulated above: what contribution does this work make? Has it had an impact on the field of classics? Or failing that, does it have the potential to make such an impact? We now have the “many fat tomes” of inscriptions from Asia Minor, which a learned 18th-century gentleman felt compelled to describe as of dubious profit for science (above). So, one of the purposes of the present survey is to address Bignon’s doubts and to chart the incremental increases in our knowledge of Hellenistic Asia Minor, and of the ancient world in general; this will also entail reflecting on how the knowledge thus gained relates to issues and debates in ancient history and classics. More generally, the ambition of this essay is to argue, from a limited test case, that, now more than ever, ancient history and classics have a huge amount to gain from epigraphy.

“THE WHOLE OF ASIA IS FULL OF SUCH MONUMENTS”: EXCAVATION AND EPIGRAPHICAL SURVEYING

Epigraphical documents are texts, and they should be studied as texts.¹⁰ They also are material artifacts from the past, discovered by archaeological processes; hence the constant flow of new texts, unparalleled in the other text-based branches of classics. Some recent publications in fact reflect earlier findings: excavated material (1997: Teos; 1994, 1996: Xanthos), more or (usually) less provenanced discoveries from museum storerooms (e.g., 1993: Aydın; or the new letter of Lucullus to Mopsouhestia, found in the Adana Museum without any record, 1994; a nineteenth-century gift to a museum in Texas, 1996: Ilion), copies or squeezes of now lost stones (1994: Iasos). The situation—the eventual publication of *fonds de tiroir*—is hardly unique to epigraphy, nor is it especially widespread or preoccupying. (Recent, well-meaning Turkish legislation aims at solving this problem by imposing a fixed time limit on publication of new finds.)¹¹ At any rate, texts published after a long delay also originate in the same circumstances as texts published almost immediately: the discovery

of the material support for the words, the inscribed stele or block. The publication of epigraphical texts, laid out in the familiar medium of print on the pages of *SEG*, should not divert our attention from their status as material objects, with their own story and trajectory (like that of every archaeological artifact), from production to use to discovery and interpretation by the archaeologist.

Two archaeological processes are involved: excavation of ancient sites and the venerable practice of “epigraphical surveying.” The first is familiar enough; this section will mention some recent examples of inscriptions found in digs and highlight some general points of methodology and interpretation. The second category, “surveying,” may be less familiar to nonepigraphists; because it is the most common source of epigraphical discovery, I will spend some time illustrating the processes and reflecting on the methodological issues.

To start with excavation: inscribed stones are an important fact of the ancient landscape, so that any exploration of a site, especially in Asia Minor, will produce inscriptions. It is likely that almost untouched sites, like Euromos, Alabanda, Alinda, or the now abandoned Turkish town of Kale (Davas) on top of ancient Tabai, if excavated, would produce epigraphical riches comparable to the major cache of texts found by the Roberts in Amyzon. A dismal confirmation is provided by the inscribed stones left behind by illegal excavation, for instance at Piginda, in the Harpasos valley (1995), or at the rural shrine of Apollo Daphnousios (1993: Daphnous); likewise, an important Attalid administrative dossier was produced by illegal digging, before being rescued (bought from local dealers) and stored in the Bergama Museum (1996: Pleura); fortunately, the provenance (north of Sardeis) is almost certain, the content confirming the dealers’ assertions. A new fragment of the vivid and informative “ox decree” of Bargylia (see below, section 4) was bought to Milás Museum by a (local?) collector (1997: Bargylia).¹² For the major urban sites of Ephesos and Miletos, the urban centers themselves, inhabited and developed far beyond the Hellenistic period, rarely yield Hellenistic inscriptions and then only in extremely fragmentary condition (1998: Ephesos). Largely complete, interesting new finds have emerged from the *margins* of the town area, in the vicinity of the harbor at Ephesos and in

¹⁰ Millar 1983, 98–110.

¹¹ The *favore* the initial application of this rule caused is surveyed in *SEG* 37, preface and no. 956.

¹² This occurrence illustrates how active epigraphists at

least keep some track of inscribed material in the antiquities trade and the collections (if the stones do not leave Turkey). See chapters 17–19, 36–37, of H. Malay’s recent volume of epigraphical research (1999).

the necropolis south of Miletos (1993: Ephesos; 1995: Miletos). In the past, most of the meaty documents from the Hellenistic period have come from sites that did not enjoy the success and long urban history of Ephesos, Miletos, and Smyrna;¹³ this rule seems to hold true nowadays, with the discovery of documents from a number of sites. R. Meriç's excavation of Metropolis (a small Ionian city squeezed between Smyrna, Kolophon, and Ephesos)¹⁴ has produced interesting Hellenistic texts (1999), reused in later contexts. The most spectacular example is Halikarnassos, which has produced a Hellenistic poem celebrating the city (1998; S. Isager published this important text with laudable speed). The two columns of the text were carved on the sidewall of a building and found in situ. Unfortunately, the editor focuses on philological commentary; precise developments on archaeological, topographical, and architectural context, with historical thinking on issues of viewing and reading (such as G. Rogers has produced for Roman Ephesos),¹⁵ would have been more instructive and stimulating historically than Isager's diffuse speculations on reception or context. This information is reserved for future publication; my point is precisely that it should not be treated in this way, but that it is indissociable from the text because it is necessary for its interpretation.

Other texts have emerged in meaningful archaeological contexts. At Stratonikeia, the shrine of Hekate at Lagina has revealed decrees carved on the propylon (1997)—thus showing that the shrine, like so many others in Karia, served as a monumental archive (a phenomenon that deserves a general study). Some honorific decrees have been found nearly in situ, that is, the bases on which they were carved had fallen off a specially built ledge to accommodate a set of statue bases for notables of the same family, an interesting contribution to our knowledge of the visual presentation and presence of the elite of late Hellenistic Stratonikeia.¹⁶ Kaunos has produced several important finds in meaningful contexts. First, a

bilingual decree (Karian and Greek: the first such bilingual text), from the late fourth century, from a terrace in the monumental and sacral center of the city (1997: Kaunos): the physical setup is reminiscent of the terrace of the Letoon, where the "Xanthian trilingual" (Greek, Lykian, Aramaic) was found,¹⁷ confirming the proximity, geographical and cultural, of Kaunos to Lykia. Second, near the findspot of the bilingual stele, the blocks of a late-fourth-century (ca. 300?) exedra, complete with traces of sculpture and epigrams: the remains were extracted from a Byzantine wall but close to the original foundations (both blocks and foundations had already been noticed in the late 1960s). The context (the enclosure of a great civic shrine), the traces of sculpture, and the epigrams describing the statues (representing one Protogenes—the Kaunian sculptor?—and his family) can all be read together to help think about this *sungenikon*, family monument¹⁸ (1997: Kaunos). Third, a circular structure, excavated near the theater, has revealed the inscribed name of two tribes, Rhadamathis and Kranais, carved in small letters above bronze rings to tether sacrificial victims (1997: Kaunos). Another example of excavation revealing inscribed material in context is the shrine of Apollo at Klaros, where a dig has been conducted for ten years by J. de la Génrière;¹⁹ it recently has produced yet more Hellenistic documents (currently under study); two long decrees, found by the Roberts in their earlier dig, were published in 1989.²⁰ A final example: the excavation at Phokaia (1992) has revealed the name of a tribe, the Teuthadeis, in the theater; the inscription, spreading across three blocks in the seating area, suggests that at least one tribe sat together at festivals (and perhaps assemblies?), an interesting piece of information on civic subdivisions in the Hellenistic polis.

Inscribed texts tell us the most when they are found in their original context, as these examples show. Much epigraphical material found in excavations, however, is reused. For instance, most of the

¹³ As examples of "underdeveloped" urban sites that have produced major epigraphical crops, see Priene (*Inscr. Priene*) or Teos (Herrmann 1965, 29–159, editing important texts which Herrmann reproduced in *SEG* 41.1003; in this survey, 1994, 1997).

¹⁴ On Metropolis, see Robert and Robert 1989, 88–91; I have not seen *Metropolis*, the recent monograph by the excavator, R. Meriç (1996); the modest, but surprisingly interesting and varied, epigraphical material from the city has been republished in *I. Ephesos* 7.1.

¹⁵ Rogers 1991.

¹⁶ The phenomenon of the exposition of inscribed

bases in shrines also deserves general consideration, in terms of position, viewing, and creation of meaningful monumental spaces (compare the monumental landscape at Klaros, uncovered by the Roberts and rediscovered by the excavations of de la Génrière [1998]: a combination of sacred spaces and commemorative sites).

¹⁷ Metzger et al. 1979.

¹⁸ On the *sungenikon*, the Roberts in *BE* 49.202.

¹⁹ de la Génrière 1998, 235–68, for a survey of work at Klaros.

²⁰ Robert and Robert 1989.

texts in the Knidos corpus were found reused in Byzantine contexts or scattered in the necropolis area (1992, 1995: Knidos); some new texts from Miletos are *Streufunde*, artifacts found lying around outside any intelligible context (1992: Miletos). Yet another example is the set of important Hellenistic documents from Xanthos, found reused after their Hellenistic date of production (1993, 1996: Xanthos), whereas the isopoliteia between Xanthos and Myra was found not far from its original site (a stoa in the Letoon) and was reerected on its original base (1994: Xanthos). Reuse can be an ongoing process. A stele bearing an important unpublished decree from Teos (the new “pirate decree”) was reused in Ottoman times to build a house in Seferhisar; when this house was demolished, the stone narrowly escaped further service as building material, when the archaeologist (M. Uz) and the *bekçi* (watchman) on the ancient site intervened (1994: Teos). Manned archaeological sites and museums attract casual delivery of inscribed stones with unclear provenances (1994: Aphrodisias; 1993: Nagidos; or H. Malay’s catalogue of the Manisa Museum, 1994).

But the largest source for epigraphical finds is surveying.²¹ The concept needs some examination. This is not the field-walkers’ intensive surveying, which produces results concerning settlement patterns and long-term change, but only rarely inscribed artifacts, let alone texts inscribed on stone (the latter are products of the town, or, in the ancient countryside, concentrated in shrines or cemeteries; at any rate, the stones themselves are often found reused in modern villages and houses). It is true that extensive surveying of territory can produce epigraphical finds. Some examples can easily be given. At Miletos (1997) H. Lohmann found or rediscovered boundary-stones (sacred enclosures of a deme) in situ or nearly so as part of a survey of the extensive Milesian territory; Lohmann has been surveying the *Milesia* since 1990. Many of the findings in southern Karia come from the systematic exploration of that landscape by E. Varinlioğlu and the Centre Georges-Radet of Bordeaux.²² Another similar case would

be the long-term work in the Troad by E. Schwertheim. A long Attalid dossier, recently published by R.A. Kearsley, was found in Pisidia by A.S. Hall in the 1970s (1994: Olbasa). Yet another case is the surveying of Herakleia under Latmos and its world, the granite highlands of Mt. Latmos, by A. Peschlow-Bindokat (1995, 1996, 1997). An earlier, well-known example of such extensive surveying is the exploration of western Karia by G.E. Bean and J.M. Cook.²³

Most findings, however, are made in the context of “epigraphical” surveying. The practice goes back to early modern and modern (19th and 20th century) travel in classical lands. In fact, the word used for the process by the great practitioner of this art, the Frenchman Louis Robert, was *voyage*—romantically redolent of 19th-century learned travelers on horseback, traveling slowly and arduously through the Anatolian landscape, attentive to the land, notebook and squeeze brush at the ready.²⁴ The methodology and even the theoretical tools the practitioner brings to the surveying in practice do not seem to have changed since the 19th century (though the processes are now tightly controlled by the Turkish authorities): journeying (individually, with a collaborator from the Turkish antiquities service, or in a small group) in an area, along modern roads and tracks, with area and itinerary chosen in function of a shared culture of previous, analogous work or determined by philological research. The main stopping points are modern villages, where inquiry is made after inscribed stones or ruins, the former to be recorded carefully and in several media, the latter to be examined and photographed. (For a description of epigraphical survey in action, see the accounts by Blümel for Herakleia, or Jonnes and Riel for Tyriaion, both in 1997.) The process may involve the discovery of new texts or the rediscovery of old friends. Ideally, it should be repeated several times over the same region. In the narrowest sense, the traditional prizes of this sort of activity are the discovery and edition of new epigraphical texts, and the resolution of questions of classical geography and topography, that is, matching sites and ancient toponyms.

²¹ I should add that I have never been on an epigraphical survey, and this is a desk-bound description of field activities as I understand them from published work or from conversation.

²² For southern Karia, the results are alluded to in Blümel 1998, 163–70: one hundred new texts from the Ankara-Bordeaux survey of southern Karia. The recent surveys, conducted by Tuna (1985, 209–23; 1987, 303–57; 1989, 279–94) and Meriç (1986, 301–2; 1987, 247–56; 1988, 385–92), of settlement and territory around Smyrna,

do not seem to have produced any Hellenistic documents.

²³ The results are published in Bean and Cook 1952, 1955, 1957.

²⁴ Robert (1969–1990, 6:673–81) has defended this tradition; he also promised a history of the “voyageurs européens dans toute l’Anatolie” (see Robert and Robert 1954, 53 n. 2). See also D. French, in French 1994, 54, 77: the travelers locate a site in a landscape—and a rapidly vanishing one, the Turkey of yesterday.

Some misgivings might be expressed about an archaeological practice whose techniques and assumptions do not seem to have changed since the time of P. Foucart (who, in the last decades of the 19th century, sent young *Athéniens*, Fellows at the French School at Athens, inscription hunting in the Karian countryside), or of W. Leake, or indeed of Jean Guérin or Cyriacus of Ancona. In essence, “epigraphical surveying” is object-oriented. It does have wider ambitions to historical geography (below), but its position is still anomalous in the field of modern archaeological method: it is hard to imagine archaeologists setting out among villages specifically to look for coins, sculptures, or major architectonic fragments (sometimes taking notes on landscape, vegetation, or occasional sherd finds, as an alibi or a by-product).

But even at its narrowest, this activity, with its low-tech, time-honored methods, has produced tremendous riches. A signal example is the series of repeated trips across Karia (especially western Karia, around Mylasa) by W. Blümel: they have produced many major Hellenistic documents (several will be discussed below) and a constant stream of new texts, improvements to old texts, rediscoveries, from all periods.²⁵ A single epigraphical survey in Lydia by G. Petzl (Kogamos and Hermos valley east of Sardeis, 1996: Lydia) produced 29 new texts (of which only one was Hellenistic); an earlier survey in 1990 by M. Sayar, covering eastern Kilikia, found 300 new texts²⁶ (none Hellenistic; but the campaign also uncovered the important new text on the *asylia* of Mopsouhestia, lying unprovenanced in the Adana Museum). Epigraphical surveying, for all its lack of methodological manifestos or debates (contrast the situation with intensive surveying), produces important results in that it is responsible for the major part of the steady discovery, on material supports, of new texts, and hence new information about the ancient world. It is true that the texts are found devoid of any ancient context; but this is also the case for many texts uncovered in excavation (what difference between a fragmentary inscription found in a modern garden wall and one unearthed reused in a Byzantine *kastro*?). The practice is simple, cheap, and productive; if anything, despite its methodologically low profile, epigraphical surveying should be encour-

aged very widely by the Turkish authorities. For the time being, Turkish law discourages the practice of surveying villages around the ancient sites for which, *stricto sensu*, excavation permits are delivered; this policy ignores the reuse of stones outside ancient sites, and it also severs the link between town and ancient territory. For instance, an epigraphical survey in the Karayük plain, a major *lieu de passage* between the Maeander valley and southern Anatolia, might well add to the small but fascinating choice of texts from the area.²⁷

Another reason why epigraphical surveying plays a vital role is that it intervenes not only in a process of accidental discovery but also in one of destruction of inscribed artifacts. The large number of new texts being constantly found is obviously a function of change across a vast, complex landscape, the modern Turkish countryside. The demolition of old houses (where ancient blocks were used as building material), the massive use of the bulldozer and other means of deep excavation for local construction, and illegal digging²⁸ are responsible for the appearance of inscribed stones; the epigraphical survey, with its emphasis on the modern village and its informants (often named in scholarly publications), is basically a manner of monitoring the impact of modern activity on ancient remains embedded in the landscape (see 1997: Tyriaion, for the account of the discovery—unprovenanced—of a stele with an Attalid letter in a Turkish village). A more systematic, though temporary, application of the same principles is “rescue surveying,” the recording of casual epigraphical finds by scholars, working from museum or academic bases, or within the context of extensive surveying projects.²⁹ *Mutatis mutandis*, this approach is not unlike the field-walkers’ searching for sherds after deep plowing or heavy rain. Because of the increased pace and effect of modern activity, even well-known ancient sites benefit from the epigraphical surveyor passing by. In 1998, an early Hellenistic document was found at Herakleia under Latmos, a site on the tourist track on account of its spectacular fortifications; the inscription (which in fact concerns Latmos, the precursor to the polis of Herakleia) either escaped notice by the many earlier investigators of the area or emerged as a result of

²⁵ A general summary of Blümel’s activities can be found in Blümel 1998, 163–70.

²⁶ The report is in Dobesch and Rehrenböck 1993, 319–27.

²⁷ E.g., Welles 1934, 35–6; Michel 1900, 544; *OGIS* 236; Robert 1937, 362–73; Robert 1962, 105–21, 318–38; 1969–1990, 5:733–42.

²⁸ On these processes, see Robert 1969–1990, 4:242–3 (first published in 1963).

²⁹ E.g., Malay 1987, 7–17; 1992: Ouranion, especially the detailed account of rescue by Varinlioğlu (1992); 1994: Stratonikeia, for a stone saved from a house demolished in the process of strip-mining (again by Varinlioğlu).

modern digging or building (1997: Herakleia). Likewise, a letter from a Ptolemaic minister to the Karian city of Kildara was found in Kuzyaka, a village that L. Robert had visited in 1932: it likely appeared after his passage (1992: Kildara).

“Epigraphical” surveying also has (or should have) the broader ambition of contributing toward the regional history of landscape: this is, or should be, its methodological heart, though there has been little explicitly conceptual writing on this score. Epigraphical findings reflect the modern countryside, settlement, activities—the latest stage of human existence in a specific geographical setting with its own history—just as the reuse of classical *spolia* in Byzantine churches, as uncovered by archaeologists, tells us something about the story of the site. L. Robert’s explorations and voyages were animated by the desire to perceive and think about the landscape (as well as find new texts).³⁰ The “narrative” sections, which are a generic requirement for the publication of epigraphical surveys, attempt to create this sense of place and of history embedded in the land, revealed by texts discovered in the landscape, but also by the experience of the landscape itself.³¹ This attitude was informed by the French school of historical geography, under Vidal de la Blache, who emphasized natural features and their influence on human activity and movement, and the importance of the region as a unit for interaction between people, and between people and landscape. In this respect, the traditional continental European art of epigraphical surveying shares concerns with extensive surveying and its focus on landscape and region (inspired by Anglo-Saxon landscape history). However, it may be legitimate, first, to observe that, for all Robert protested to the contrary, Vidalian insights about landscape are by-products of the pragmatic desire to find and rescue inscribed stones; and second, to wonder whether “epigraphical voyaging” has absorbed recent developments in historical geography and landscape studies. Does it need to? At the very least, it should ideally be integrated into broader projects, in which various methods could combine to provide complementary points of view on regional history (below): thoughtful epigraphical traveling; regional extensive surveying with systematic, rather than casual, observation and sampling of sherds; intensive field-walking surveying; rural excavation—still a rarity in Turkey; scientific study of ecology and land-

scape, with attention to the deep historical dimensions of climate, agriculture, vegetation (rather than romantic travel notes on the current landscape, overwhelming as it sometimes can be in its physicality and presence).

The point of this whole section has been to locate the publication of epigraphical texts in a context of *archaeological* practice and method. Inscriptions are both texts and ancient objects, found archaeologically; their double nature sets them apart from literary texts and affects our efforts to read them in various ways. Their existence as archaeological artifacts explains the constant increase in material. The only parallel is papyrology, with the difference that much new papyrological publication comes from great caches of papyri, or from mummy cartonnage, found and brought to Europe or the United States in the 19th century. The previous pages have tried to chart the several ways in which new inscriptions are being found in large numbers and in meaningful contexts. All inscriptions are also documents: whatever the truthfulness of the information they state (e.g., “King Antiochos is benevolent”), at their most basic, they owe their existence to an ancient decision to monumentalize, represent, and publicize (“Let the demos praise King Antiochos because he is benevolent”). The origin of monumentally inscribed documents means that they are necessarily selective; this qualification has often been made. But just as important is the nature of epigraphical documents as performance: as such, their basic historical value is unfalsifiable, because they embody the actual realization, the result of decisions and gestures made in the past.³² This dimension of inscriptions is true even when we read them in mechanical reproductions, in the pages of *SEG* or the corpora, forms that are not different from an Oxford volume of Aeschylus, a Teubner text of Polybios, or a Budé of Strabo. But the extra dimension of physicality and monumentality means that, for all of these inscriptions, we have the text as actual object and can read it as it was meant to be read, or at least gazed at; for some of these inscriptions, we know the context in which they were set and hence can reconstruct the context of performance, at least as a set of material parameters. It may be possible to use these elements of knowledge to write a history of epigraphical reading: of public writing, monumental communication, and the creation of memory in physical contexts.³³

³⁰ Robert 1969–1990, 6:673–81.

³¹ E.g., Robert and Robert 1948; and 1997: Herakleia.

³² Millar 1992, 632.

³³ See Rogers 1991; also Henderson 1998. I owe the lat-

ter reference to D.P. Fowler. A forthcoming book by C. Hedrick will draw on modern work on reading, theoretical and historical, to examine the epigraphical phenomenon.

MAINSTREAM POLITICAL HISTORY

One contribution that inscriptions from Hellenistic Asia Minor have traditionally made is to the political history of the Hellenistic world: the high political history of kings and battles, and also the study of empire in its administrative structures. The last few years have not been disappointing in supplying new evidence, which extends our knowledge and sharpens our focus. Some examples follow, in chronological order.

A recent finding at Kapıkırı, the site of Herakleia under Latmos, is the convention of *sympoliteia* (political and, in this case, physical union) between Pedasa, a small community in Mt. Grion (the long mountain SE of Miletos), and the Latmioi, a community later refounded as Herakleia (1997: Herakleia): the document can be dated between 323 and 313 B.C. because the measure seems to have been sponsored by Asandros, the satrap of Karia in those years. Along with details about the process (some familiar, others surprising, such as the provision that Pedasians will marry Latmian women and Latmians Pedasian women, for six years), the inscription provides the earliest documentary example for Hellenistic *sympoliteia* imposed from above (the famous *sympoliteia* between Teos and Lebedos, imposed by Antigonos Monophthalmos, is half a dozen years later, at the earliest).³⁴ The document thus illustrates the dynast-like power enjoyed, at least in the very early Hellenistic period, by a satrap: he is seen reengineering the local geography of poleis, presumably without reference to any effective higher authority (lacking in these years); he is honored by the newly created community with a tribe called Asandris. The overbearing relation between master and local community and the influence on the forms of the polis are important themes in the political history of the period. Asandros was expelled by the dominant figure of these years, Antigonos Monophthalmos, in 313. A trace of Antigonos might be found in Mysia, where Roman-era dedications attest a cult of Zeus Antigoneios, perhaps a trace of colonization by Antigonos in the area (1994: Manisa).³⁵ From Euromos, an honorific decree is dated by Pleistarchos, the dynast, and honors a Macedonian officer: another piece of

evidence for this particular dynast, and for the links between Macedonians and local communities in the post-Alexander moment (1993: Euromos).³⁶

Other recent findings have contributed to our knowledge of the third century, the “high-Hellenistic” period.³⁷ A letter from the Ptolemaic minister Tlepolemos to the Karian city of Kildara (1992) is an interesting addition to the dossier pertaining to the “Laodikeian War” (246–241 B.C.). A document from Teos (1994), attesting the occupation of the harbor by pirates and the ransoming of the city, may indicate the general insecurity and lack of clear authority in Asia Minor during the decades that followed the war. The incursion of Philip V into Asia Minor (201 B.C.) is documented by an honorific decree from Euromos (1993), for Alexandros Admetou, one of the king’s officers, who “regained the city for King Philip, as we pray for.” The expedition of Antiochos III in 197/6, which started in northern Syria and ended in Thrace, is documented by two inscriptions at either geographical end of the campaign, published (or to be published) by M. Sayar: one at Aigeai,³⁸ a dedication for the king’s safety by Themison (an officer known by a reference in Polybios), and one from Perinthos, an alliance between the king and the city. Other finds are relevant for the “administrative” history of the kingdoms in Asia Minor: a fragment from Nagidos (1993) seems to allude to the dispatch of citizens from an old Greek city to a Seleukid colony (a process documented at length in *OGIS* 233); a Ptolemaic letter at Euromos (1993) bears on the Ptolemaic province in western Karia and its administrative structures. On the subject of cities and Antiochos III, the work of C. Crowther, rereading or redating inscriptions, implies that the king, ca. 196, sponsored the dispatch, to various cities in his newly consolidated dominion in Asia Minor, of “foreign judges,” arbitrators drawn from another polis—an acceptable way of ensuring social peace in the aftermath of war and conquest.³⁹ A fragment from Euromos (1993) seems to describe constitutional changes, also in the aftermath of takeover by Antiochos III.

For the earlier second century, several new inscriptions relate to Attalid activity in Asia Minor, some

³⁴ Documented in Wells 1934, 3–4.

³⁵ Malay suggests a Macedonian king, but Antigonos Monophthalmos is the only figure who would have held sway in this area. Rigsby (1996, 169) prefers a cult founded by a private individual.

³⁶ For a parallel, see the Macedonian contributors to the rebuilding of Kolophon’s walls ca. 307: Maier 1959–

1961, no. 69.

³⁷ I have reproduced and commented on many of these documents in Ma (forthcoming).

³⁸ Aigeai: the text is due to appear in a volume of *Asia Minor Studien* (personal communication). Perinthos: Sayar 1998, nos. 3a and 3b.

³⁹ Crowther 1995, 91–138.

showing continuity with the Seleukids (1996: Pleura; Tralleis), or conscious divergence, as the dossier from Tyriaion (1997). Eumenes II, upon petition by the *katoikoi* (a military colony?), granted the settlement the status of polis, with its own laws and *gymnasion*, consciously contrasting the vanished Seleukid power with his status: he holds rule “legitimately, from the Romans, who conquered both in war and in treaties.” This document gives us the view of Eumenes II, immediately after the Peace of Apameia—profoundly and overtly aware of Roman power, and of the dependence of his own authority on Roman dispensation—thus completing dramatically the literary evidence on this historical moment. It illustrates how consciousness about the shifting realities of high politics and diplomatic language could be transmitted from ruler to ruled, percolating into the channels of “royal correspondence.” It also directly documents the process of colonization and urbanization by the Attalids in post-Apameia Asia Minor, often using Macedonians, that is, left-over Seleukid colonists. Another Attalid dossier illustrates the Pisidian war of Attalos II—and the situation of a city, Olbasa, during this war (1994). The soberly composed honorific decree of the villagers of Daphnous (1993), on the shores of Lake Apolloniatis (Uluabat), for a *strategos* and a *doryphoros*, is probably Attalid, reflecting, as many documents do in Lydia, the relations between settlements in the countryside and Attalid officers. Finally, several texts published by H. Malay (1999: nos. 3, 170, 182) illustrate Attalid themes: a donation of land by Eumenes (I) to the shrine of Apollo Chresterios at Aigai, a decree of Tabala for a royal officer-cum-military governor, a decree of Philadelphia offering cultic honors to an Attalid friend (incidentally confirming a prosopographical reconstruction by C. Habicht).

The later second century and the first century B.C. saw the transition from an autonomous “Hellenistic history” to the history of the “Greek East,” the eastern spheres of Roman power. A newly published document from Teos (1997) completes *SIG*³ 655, about Teian assistance to their kin-city, Abdera, in their embassy to Rome, shortly after the Third Macedonian War. Blümel has produced a new text of the Bargylietan decree for Poseidonios, a notable in the city at the time of the Romans’ war with Aristonikos, in which the Bargylietans were involved, supplying soldiers (1994: Bargylia). Likewise, the Lykians

fought in the First Mithridatic War against Mithridates: an inscription, set up by the Lykian forces, honors their general, Krinolaos, *strategos autokrator*, for commanding a relief force sent to the Rhodians and for defending Kos (1995: Patara). In the first century B.C., a letter of Lucullus confirms the asyilia of Mopsouhestia, according to the precedent of earlier Roman autokratores; a measure confirmed by Sulla (1994: Mopsouhestia).⁴⁰ Finally, *I. Knidos* (51–61), along with documents known earlier, includes the inscriptions from a monument to C. Iulius Theopompos and his family, one of the “nouveaux évergètes,” the notables who mediated between their cities and the Roman power.⁴¹

What sort of new information does this new evidence bring? At first sight, the broad outlines of the picture have not changed very much: the evidence for narrative, high political history falls into categories familiar from E. Will or even J. Beloch; neither the administrative history nor the angle on the third century B.C. has changed significantly from the picture in the authoritative works of Bickerman or Bagnall, Rostovtzeff or Robert. For instance, it is nice to know from the letter at Kildara that the little king at Antioch, the son of Berenike and heir to Antiochos II, and pawn in the dynastic war that followed his birth, was called Antiochos (1992: Kildara), but the fact was not completely unexpected. Likewise, to know that Nagidos probably sent colonists to an Antiocheia is interesting, but this confirms a phenomenon documented more copiously in a long-known inscription (*OGIS* 233), a decree of Antiocheia in Persis recognizing the Leukophryeneia of Magnesia on Maeander on the grounds of kinship, that is, the sending of colonists to the new Seleukid foundation. Or again, the discovery at Kaunos (1993) of a slab with the inscription Ἄρσινόςης Φιλadelphou, from an altar to Arsinoe II,⁴² documents Ptolemaic power in the area (which we already knew about). It also attests a cult for Arsinoe II: the slab probably faced a mud-brick altar, for sacrifice by households during festivals for the queen. The practice, though previously unknown at Kaunos, is well documented in the islands and at Miletos; and it was commented on by L. Robert.⁴³ The questions do not seem to have changed much: the redrawing or confirming, through documentary sources, of the familiar maps (“The Hellenistic Empires, ca. 270”) defined long ago by scholars such as E. Meyer.⁴⁴ In addition, the great

⁴⁰ See also Gordon et al. 1997, 209.

⁴¹ Robert 1969–1990, 5:561–3.

⁴² *SEG* 43.895 (Pleket).

⁴³ Bagnall 1976, 98–9 (Kaunos); Robert 1969–1990, 7:616–34, esp. 626–30 (cults of Arsinoe II).

⁴⁴ Meyer 1925.

gaps in our documentation for the political history of Hellenistic Asia Minor are still the same: the imperial map in the 260s and 250s, the turbulent years 240 to 220 B.C., inland Asia Minor, for which most of the documentation dates to the Roman period. In general, the amount of Hellenistic material is still paltry compared to the Roman material: the proportions are perceived at a glance in H. Malay's catalogue of the Manisa Museum (1994); likewise, among the 219 new texts published by Malay (1999), a small proportion is Hellenistic, and only a handful comes from the third and second centuries B.C.

Nonetheless, the steady increase in documentary material has changed the writing of high political history in this period. The process amounts to more than just a case of having more evidence for familiar phenomena: this evidence, if closely read, brings new information and furthers interpretation of earlier known material, as can be illustrated from the letter of Tlepolemos to Kildara. It documents the activity of a Ptolemaic official, the member of a great Xanthian family with a tradition of Ptolemaic high office⁴⁵ (just as the city of Aspendos produced a line of Ptolemaic officials),⁴⁶ thus adding to our knowledge of this particular family and drawing attention to the local recruitment of some members of the Ptolemaic elite. The situation of Kildara is also interesting: in exchange for loyalty to the Ptolemaic cause in 246,⁴⁷ it obtained substantial concessions from Ptolemy III: alleviation of taxation, and perhaps exemption from a "harbor tax"—no doubt levied on goods that this inland community had to procure through one of the nearby harbors. If so, the passage documents the interrelation between empire and the control of economic outlets—and the way in which this control could be experienced as oppressive. Smyrna at the same period also obtained privileges from Seleukos II,⁴⁸ in exactly the same situation: the need for the Hellenistic ruler to ensure local loyalty in a context of superpower conflict. As should be well known (though recent textbooks and popular treatments of the Hellenistic period often overlook this), the Laodikeian War and the ensuing complicated decades were times when some Hellenistic cities, at least, changed the balance of power in their relation with their "masters"; the Kildara letter

adds details, and hence depth and nuance, to our perception of this theme.

The adjustments brought by new evidence have redrawn parts of the political map since the time of E. Meyer's *Die Grenzen der hellenistischen Staaten in Kleinasien* (1925) and D. Magie's *Roman Rule in Asia Minor* (1950); they also amount to gradual shifts in emphasis and the definition of new areas which we can talk about in detail. One such area is Pisidia and Pamphylia, which thanks to surveying has gradually emerged as a region with a vigorous political history in the Hellenistic period.⁴⁹ A border settlement between Termessos near Oinoanda and Tlos, found at Xanthos, adds another piece to the puzzle of political history in the region, in the broad sense—Pisidia, Kibyrtis, northern Lykia (1996: Xanthos, a preliminary presentation rather than a full publication of the document). In general, the epigraphical evidence is defining the second century B.C. as a period of development, including the Hellenization of inland regions, such as Mysia (1993: R. Meriç's survey), and complicated local narratives. This part of the Hellenistic age deserves more attention (whereas most scholarly work has focused on the third century) because of the increase in evidence, and because this evidence shows that, in spite of the gradual (or sometimes not so gradual) processes of Roman hegemony, the second century still had a political history of its own.⁵⁰ The transition from "high Hellenistic" to the second century is an important preoccupation for many of the essays in the recent *Stadt- und Bürgerbild* collection; a whole colloquium was devoted to the topic of Asia Minor in the second century, under the auspices of the Centre Georges-Radet in Bordeaux (proceedings forthcoming). A related topic is Attalid rule in Asia Minor after 188 B.C.: since the time of R. Allen's useful treatment of the topic in 1981, the evidence has increased greatly; I listed above some of the most recent items.

Two items deserve particular attention. First, the administrative dossier from Pleura (1996). This document, in essence a list of *mystai* of Apollo Pleurenos, is prefaced by the administrative pieces that authorized this gesture of local piety: a petition by the priest of Apollo Pleurenos to an Attalid official, the "high-priest" Euthydemos, and part of the bu-

⁴⁵ Robert and Robert 1983, 168–71.

⁴⁶ Jones and Habicht 1989, 317–46.

⁴⁷ Rather than rallying to the Ptolemies in that year, as Blümel writes? On the issue, Gauthier, *BE* 94.528; for further views see Kobes 1995, 1–6.

⁴⁸ The documents illustrating this process are *OGIS* 228, 229 (*I. Magnesia am Sipylus* 1, *I. Smyrna* 573).

⁴⁹ Brandt 1992; J. Coulton and S. Mitchell, in Matthews 1998, 225–36 and 237–53. The only recently found Hellenistic documents are 1995: Oinoanda, and 1993: Xanthos, a decree from Angeira in Pisidia for foreign judges from Xanthos).

⁵⁰ This is a possible, Hellenocentric, way of interpreting Gruen's thesis on the period (Gruen 1984).

reaucratic response. The document illustrates the tightness of administrative control that the Attalid state could impose over local shrines—a feature inherited from the Seleukids, since the Attalid “high-priest” succeeded the Seleukid *archiereus* Nikanor, known from a copy of his “letter of appointment” by Antiochos III (*SEG* 37.1037). The petition from the priest had first gone before Nikanor, before being granted—by his Attalid successor, probably soon after the Peace of Apameia. The Pleura dossier definitely establishes that Nikanor, the Seleukid “high priest of all the shrines on this side of the Taurus” was not a priest of the state-sponsored ruler-cult, but some sort of high religious official with authority over local shrines, a powerful symbol of state power and involvement. The document also embodies administrative continuity between the defeated Seleukid state and the successful Attalid kingdom: even though Hellenistic kingdoms have often been described as patrimonial states (the king’s own *pragmata*, affairs), the apparatuses of administration seem to have an autonomous, rather Weberian existence of their own.

The second document that deserves attention is contemporary: the dossier from Tyriaion (1997). This stone, with its two Attalid letters, is a rare direct document on Hellenistic Phrygia under the Attalids⁵¹ and is in fact the most significant Hellenistic document from the great inland swathe of Phrygia. It shows Eumenes II, probably in the immediate aftermath of the Peace of Apameia, touring his new Anatolian acquisitions—the moment when the inhabitants of Tyriaion petitioned him for city status. His favorable reply is preserved, containing the actual performative speech act⁵² granting them this status (so that his next letter, immediately after the first, is addressed not to the inhabitants, but to the *boule* and the *demos* of the Toriaecitai). This document is thus the first known Hellenistic city charter; it might be compared to the letter addressed by the governor Thraseas to the refounded colony of Arsinoe in Kilikia (*SEG* 39.1426) or the grant by Constantine of *civitas* status to Orkistos, five centuries later.⁵³ E. Bickerman had deduced the existence of such Hellenistic charters, but they have not been documented until now (the letter of Antiochos III concerning Jerusa-

lem is not a “charter” but a piece of Seleukid internal correspondence).⁵⁴ Eumenes II granted Tyriaion the right to a consolidated *politeuma*, its own laws (ἴδιοι νόμοι), civic offices, and a gymnasium (which he then proceeded to endow). The combination is fascinating and shows what the grant of polis status to the Hellenizing Jews of Jerusalem under Antiochos IV might have looked like, complete with the gymnasium that would offend the traditionalists: “some of the people showed zeal, and went to the king, and he gave them the permission to practice the privileges of the Gentiles. And they built a gymnasium in Jerusalem, according to the habits of the Gentiles” (1 Macc. 1.13–14; see also 2 Macc. 4.12). The Attalid document and the Jewish historical account can be compared, as differing viewpoints on the same sort of transaction between local community and ruler (in rather different contexts, Hellenized Phrygia, and Judaea, where Hellenization was part of a problematic debate on Jewish culture). Finally, the presence of the gymnasium for the *neoi* in a newly created city-state raises the issue of the gymnasium’s nature, as social or as political institution within the polis,⁵⁵ and the pertinence of the distinction between social and political in the Hellenistic city-state. More generally, the Tyriaion charter raises the issue of what a polis is in this period, what its constituent parts are, and how a polis comes into existence.

These issues illustrate how Hellenistic inscriptions, even those which at first sight are directly linked with the political history of the period, document much broader questions of social and ideological history. Part of the challenge of Hellenistic history has always been the study of these questions, beyond the drawing and redrawing of political maps, to write the multiple stories that the period seems to demand. A few possible themes, as defined and enriched by recent epigraphical discoveries from Asia Minor, are outlined below—starting with the Hellenistic polis.

THE POLIS IN WORDS⁵⁶

A large proportion of the epigraphical material is produced by the polis, often in honorific contexts; along with documents of the kingdoms, such texts form the core of Hellenistic epigraphy. This material—

⁵¹ Note also Buckler and Calder 1939, 173 (from Apameia in Phrygia), an honorific decree passed under the Attalids (text improved in *BE* 39.400).

⁵² “Performative speech acts” are utterances that do something through the language itself: I bet, I promise, I christen this ship the *Joseph Stalin*. See Austin 1975; Millar 1992, 632; Bertrand 1990, 101–15.

⁵³ Calder 1956, 305; on Orkistos and its charter, see Millar 1992, 410, 544.

⁵⁴ Bickerman 1980, 44–85.

⁵⁵ On this issue, Gauthier 1995, 1–13.

⁵⁶ The title is inspired by Farge (1989), who speaks of police archives as giving a picture of “le peuple en mots.”

an official, monumental literature of the city-state—serves to dispel views about the “demise of the polis” at the end of the Classical period, by showing continuity (and development) in important areas: civic identity, democratic values, practice and politics, strong institutions (magistrates, venues for collective interaction, civic militias, patriotic subscriptions), civic elites integrated by communal rituals and shared values into the communities they lead in often difficult circumstances, polis rite and religion, local pride, vibrant interpolis diplomacy.⁵⁷ All these features are widely attested, and the recent years have added amply to the material. New documents attest the density of contact between cities along fixed institutional forms (1992: Miletos; 1993: Xanthos; 1994: Iasos). Civic fortification is documented at Stratonikeia (1994) and in *I. Alexandria Troas*; this aspect has been treated by P. Baker and I. Pimouguet.⁵⁸ For civic institutions, recent texts from Knidos offer fascinating examples (1992, 1995). The recent collection of essays edited by M. Wörrle and P. Zanker brilliantly covers many of these topics, in thematic essays or test cases.⁵⁹

An exceptional example is the recently found decree from Bargylia (1995, 1997), “increasing the honors” of Artemis Kindyas in that Karian city by dedicating a silver fawn (worth 1200 drachmai) and by instituting a yearly contest for the finest ox, to be chosen out of animals reared by each tribe on public funding. A later rider involved the city’s metics, who, like the citizens in their tribes, received money to raise and present cows to the goddess; on the fixed day, all the animals processed and were sacrificed, to be consumed in a public feast uniting all the citizens, and in which metics were allowed to participate. The document illustrates the vitality of civic religion as a collective institution, and the way in which a polis could distribute money and channel it through the civic body to give visible shape to the community, and to produce social goods.⁶⁰ It also illustrates the ambiguous position of the city’s metics, excluded

from political participation but involved in communal activities, in a form that both bridges and measures the gap between citizen and noncitizen (we make a point of allowing you to participate, as if you were a citizen, but in a grouping separate from those official groups that constitute the citizen body).

The implications of this material—the continued existence of the city-state as an important form of human organization and political experience—are worth emphasizing, in view of recent, often badly documented, restatements of the older view or its unthinking adoption as contextual information by scholars working on Hellenistic topics. This is one area where the epigraphy of Hellenistic Asia Minor has always had direct and important contributions to make because of the abundance of the epigraphy, the constant increase of the material, and the dense distribution of poleis in the western part of Asia Minor. Recent finds have located cities or revealed the existence of totally unknown ones—1992: Ouranion;⁶¹ 1993: Xanthos (for a newly attested city, Angeira); 1995: Piginda;⁶² 1998: Suneta. The challenge is to offer new models and interpretations for the Hellenistic polis, which might contribute to debates on the period and on the polis in general. This is the period when the polis is widely attested, in long, articulate texts, which purport to be the words of the community itself. These texts can enrich and contribute to our interpretations of the city-state (citizen-state) in the Classical period and in general. M. Hansen’s Copenhagen Polis project, whose preliminary studies appear in a relentless stream of *Historia Einzelschriften*, often draws on the epigraphy of Hellenistic Asia Minor, that land of poleis, even though the material falls outside the strictly defined boundaries of the project (the “Classical” polis). In this respect, the Tyriaion dossier (1997), which is explicitly on the creation of a polis, will be directly relevant. The contribution of the epigraphy goes beyond the institutional, to concern issues of ideology and representation (so important in the recent cultural his-

⁵⁷ E.g., Robert 1969–1990, 5:561; Gauthier 1984, 82–107; Will 1988, 329–52; A. Giovannini, in Bulloch et al. 1993, 265–86; Gruen 1993, 339–54.

⁵⁸ Baker 1991; on the military aspect of the ephebate, Gauthier, in Wörrle and Zanker 1995, 4–5; Pimouguet 1995.

⁵⁹ Wörrle and Zanker 1995; see review, Reger 1997, 418–9; Reger’s recent *BMCR* reviews of works on the Hellenistic period also constitute an important chronicle and body of thinking on the period.

⁶⁰ *SIG*³1025 (the provision of oxen by tribes at Kos) is very similar. The circular structure found at Kaunos (1997) with rings for sacrificial animals and the inscribed

names of tribes could reflect the same practice as in Kos and Bargylia (though Ehrhardt [1997] observes that the tribes appear in the nominative, rather than the genitive; he suggests a cultic monument to the tribes personified).

⁶¹ The site, now located thanks to two new texts, is surprisingly close to another polis, Keramos (a few km distant): a good illustration of the density of cities in western Asia Minor.

⁶² A decree of Piginda, dating to the second century B.C., is shortly to be published in the forthcoming proceedings of a conference in Bordeaux on second-century Asia Minor.

tories of Greece): a forthcoming paper by J. Ober on democratic representations of tyrant-slaying (Kritias and Nesiotes group, Aristophanes' *Lysistrata*) gains from drawing on Hellenistic documents, such as the long antityrannical law from Ilion, or a decree from Erythrai, in which the citizens in a restored democracy decided to refurbish the statue of a tyrannicide, whose pose had been made less menacing during a period of oligarchy (the oligarchs had removed the statue's sword). At least, this is the version the city chose to display in a public inscription, celebrating the potency of democracy's symbols to strike fear in its enemies and to inspire action from its citizens.⁶³

One instance of the contribution that the epigraphy of the cities can make is to document the high culture of the period, in relation to which supposedly "avant-garde" Alexandrian poetry should be read. The recently discovered praise-poem for Halikarnassos (1998) gives an instance of local Hellenistic poetry: learned, obscurely allusive (epithets), and intensely patriotic, combining in a catalogue myth, foundation legends (no less than three), and a catalogue of Halikarnassian literary luminaries. A fragmentary chronicle from Chios⁶⁴ offers a parallel: it documents a rich, multilayered local tradition about the mythical founder of Chios—which can be contrasted with the few items that made their way into authors such as Pausanias. Such examples raise the question of the relation between local learning, with its patriotic specificity, and the use made of local detail by Alexandrian literary production.⁶⁵ The vitality of local culture and learning (itself a function of civic identity) makes problematic some of the concepts widely used to comment on Alexandrian poetry, such as antiquarian learning, reconditeness of allusion, or "obscurity."⁶⁶ For a much later period, R. Kaster has brilliantly and movingly evoked the importance of local contexts for literary culture and learning: *Guardians of Language* starts with a reflection on a Kappadokian city in late antiquity, Anazarbos, with its local identity and civic pride, and its men of letters who played a crucial role in shaping this cul-

ture, in local contexts but also in the form of communication and movement between cities.

Generally, the inscriptions offer a powerful image of the city in words: an articulate political culture, which produced monumental texts about civic values enacted. The main vehicle, at least in the preserved record, is the honorific decree, by which a community acknowledges services from an individual, praises him, and publicly decides to honor him with (usually) standardized rewards.⁶⁷ The language of exchange and reciprocity between polis and benefactor expresses civic values and communally grounded moral norms, in a discourse that locates the constitution of identity and worth in the city, because the city controls the terms of recognition. This discourse is used to address big men within the community; it also serves to reward, and build links with, notables from other communities. Recently found examples illustrate the processes involved, their uniformity and wide diffusion. It is striking that in the case of four communities, the first decree ever to be found is honorific (1992: Ouranion; 1994: Manisa, no. 517, for a decree of Tabala;⁶⁸ 1995: Mylasa, for a decree of the Olymians, formerly a polis, at the time of the decree a subdivision of Mylasa; 1995: Panamara, for Kallipolis and the *koinon* of the Laodikeis).

The uniformity and spread of the honorific language across Hellenistic Asia Minor, and indeed the Greek world, is a historical phenomenon that needs explaining (as a result of, or an incentive to, "Hellenization"?). Other documents illustrate the reception of this discourse from the elite itself: the prevalence of honorific crowns, carved on funerary stelai, with the name of the body that granted these, shows the importance of civic honors for the individuals who considered them as part of their self-image (for a recently found example, 1996: Lydia, the only Hellenistic document in Petzl's east Lydia survey; also 1993: Meriç's survey of similar material). A more elaborate example is the stele for one Mokazis (1995: Tarseia). This document, found in Bithynia, looks back on the life of a civic notable in the second century B.C.: his eminence is proved by prowess in hunt-

⁶³ Ilion: *OGIS* 218 (*I. Ilion* 25); Erythrai: *SIG*³ 284, with Gauthier 1982, 215–21.

⁶⁴ Condoleon 1949, 1–9.

⁶⁵ A related example is the use made by Ovid (*Met.* 8.611–724) of what seems like a local legend from Magnesia under Sipylus: none other than that of Philemon and Baucis (Jones 1994, 203–24, developing a suggestion of L. Robert); the intermediary between the myths and cults of Sipylus and the Roman poet was probably a Hellenistic writer, perhaps a mythographer from Troizen (Robert) or Nikandros of Kolophon (Jones).

⁶⁶ On the documents and the issues, Chaniotis 1988, 40–1 for the Chios text, and for texts attesting performances of poetry concerned with local myth, 348–50; Chaniotis is preparing further work on the topic.

⁶⁷ On the institution, Veyne 1977 and Gauthier 1985.

⁶⁸ But Rigsby (1996, 169) prefers to see the document as an honorific inscription from Stratonikeia, with a copy sent to Tabala. The first securely dated decree is no. 181 in the volume of texts collected by Malay (1999), an honorific text from 63/62 B.C.

ing but also in fighting for his city. Both activities are represented on the relief, as well as celebrated in the epigram. After portraying these manifestations of eminence, the poem imagines the dead man transformed into a benevolent daimôn protecting his *πάτρα* (the polis of Tarseia in Bithynia). The Mokazis epigram illustrates how the identity and distinction of the elite were continuously defined in terms of service (and specifically service in war) to the community. This stele is a “private” document; that it reflects, along with many other funerary monuments, the dialectical relation between city and elite shows how the city retained a monopoly on the granting of honor, and hence remained an important venue for the elite’s self-imagination as a *civic* elite, as opposed to a nobility of birth, wealth, or leisure.⁶⁹

The existence of this civic discourse of honors, attested in overwhelming abundance and detail, imposes severe qualifications on any hasty views about disembedded, indifferent elites or the erosion of communal ties in the Hellenistic period.⁷⁰ It should matter for Greek historians, whose agenda, both in teaching and in research, is heavily dominated by the polis. Another discipline that should be affected by the polis in words is the study of Hellenistic philosophy. Recent work has focused on practical philosophy, social and political philosophy.⁷¹ The epigraphy of the Hellenistic polis is relevant because it shows communities enacting, and monumentalizing, the practical norms and shared understandings that shape conduct and allow corporate judgment on individuals’ behavior and character. Especially in the second century B.C., honorific decrees for great citizen benefactors became a discourse on character, *bios*, and morals; that these were related to the community—and could be judged and sanctioned by the community—is taken for granted in the decrees.⁷² The large and steadily increasing body of honorific epigraphy forms the necessary parallel material for any Skinnerian reading of Hellenistic philosophy, in a strong contextualization of texts within its environment (lexical, stylistic, and ideological practices)—the elaboration of such an interpretive

practice is more important than finding out whether the civic discourse influenced, or was influenced by, philosophical theory.⁷³ At the very least, the continued existence and the self-confident articulateness of the Hellenistic polis must modify some of the views on Hellenistic political philosophy that have been based on the unexamined premise of “political thought in a world without politics.”

The problem with the official *littérature d’Etat* constituted by the honorific decrees is their image of the city as a monolithic group of unanimous citizens: important as a representation, but deliberately simplifying the polis as society.⁷⁴ Some epigraphical evidence modifies this picture. Below the level of the decision-making institutions of the polis,⁷⁵ there existed within the cities associations, often religious in purpose, which found their own means of epigraphical self-expression: the honorific decree, often long and florid (for recently found examples, 1993: Ephesos, decree of the Aphrodisiastai; and 1995: Miletos, for decrees by *τεμενίζοντες*, funerary associations organized around a burial precinct), or honorific inscriptions on statue bases (1993: Ephesos). This *phénomène associatif* in the Hellenistic polis might be interpreted as a civil society mirroring the institutions of the city⁷⁶ and constituting civic consciousness; but the evidence also suggests the existence of groups (often noncitizens) that created their own venues for corporate life, decision making and agency, needs which could not be satisfied by the narrowly based citizen-state. It is significant that the recently found documents mentioned earlier come from Ephesos and Miletos, large, diverse city-states, which may have existed as complex societies, with their own subcultures. Another angle on diversity in the polis is suggested by the family monument of Protogenes at Kaunos (1997): this highly visible ensemble of sculpture, architecture, and inscribed epigrams commemorated one individual, his family, and his “lovely companions” (*ἄσπασίων τ’ ἑτάρων*). Family relations (male pride, female tenderness and reproductive capacities) are pointed out to the viewer, alongside the mention of civic religion and office: the Protogenes

⁶⁹ On the civic style of the elites in the Hellenistic polis, see Veyne 1977, Gauthier 1985, and Wörrle, 1995, 241–50; all three scholars agree on this fundamental aspect, in spite of differences in interpretation.

⁷⁰ E.g., Gallant 1989; Bryant 1996. For a corrective, Gauthier 1985 and *BE* 94.194.

⁷¹ E.g., Schofield 1991; Erskine 1991; Annas 1993; Schofield and Laks 1995.

⁷² On the communitarian-moralizing discourse of the honorific decrees, Wörrle 1995, 241–50.

⁷³ Tully 1988.

⁷⁴ I owe my awareness of this point, and its implications, to discussion with M. Austin and P. Derow (in an examination room). On the polis as society, Ober 1996, 161–87.

⁷⁵ On these, note the recent collection of decrees in Rhodes with Lewis 1997; reviewed by Gauthier (*BE* 98.104).

⁷⁶ For a parallel, Osborne (1989, 267–93) on civic subdivisions in classical Athens; N. Jones 1999.

monument suggests that Hellenistic elites entertained more claims to distinction than simply civic recognition; in fact, civic discourse increasingly had to accommodate these alternate sources of identity.

Beyond these contributions that recent epigraphical finds make to the study of the Hellenistic polis, and to classics and ancient history in general, the question arises whether the history of individual cities might be written. When considering the letter of Lucullus to Mopsouhestia (1994), we can notice that this is Lucullus's first epigraphically attested letter or comment on his relations to Sulla and on the elements of continuity between Hellenistic kings and Republic officials.⁷⁷ Another path is to think about the history of Mopsouhestia, its role and increasing autonomy in the last years of the Seleukids, and the grant from Lucullus as the last in a series of negotiations between ruling power and local community (see 1994: M. Sayar's commentary on the document). Likewise, the series of Hellenistic documents from Euromos can be considered as pieces of evidence for high political history (kings, battles, treaties, etc.). For this reason, Errington published and commented on the alliance between Euromos, then called Philippoi, after takeover by Philip V (*SEG* 36.973); the other documents from the city received much later, and much more perfunctory, treatment (1993: Euromos). But these inscriptions, spanning the Hellenistic age (from the late fourth to the late second century B.C.), can also be read in their local context, illustrating the story of one community and its dealing with interlocutors across a variety of periods and from a variety of backgrounds, far and near. In the latter category, one document seems to attest depredations by a neighboring city, against which sort of attack the Euromians depended on forts, φρούρια, as shown by another of the new Euromian documents.⁷⁸ This story was monumentally recorded by inscription on the great civic shrine of Zeus Lepsynos, celebrating the permanence of the city throughout political change and ordeal.⁷⁹ A final example of local readings of documents is the commentary given by C.P. Jones for a second-century funerary epigram from Aphrodisias (1994), on the horizons and cultural self-image of a citizen (Graeco-Persian in ancestry, Hellenic in literary culture) in this new city.

But can we write the history of a single city in the Hellenistic period? The traditional, restrained genre

of the city monograph or corpus, gathering all the texts, the *testimonia* (literary, archaeological, geographical), at least gestures in that direction: the Roberts' *Amyzon*, the recent volumes in the *IGSK* series, the large and beautiful volume on Perinthos by M. Sayar (1998) offer thought-provoking examples of the genre and its possibilities. M. Spanu's examination of the archaeology of Keramos, *Keramos in Karia*, combined with the epigraphy (*I. Keramos*) and the regional perspective (both at the level of western Karia, and of the north shore of the Ceramic Gulf; 1992: Ouranion), gives an interesting insight into the history of a Karian city through the ages, and notably of urban (and hence social) changes in the Roman imperial period. One particularly rich example is the corpus from Knidos (*I. Knidos*, 1992), with its careful inclusion of plentiful evidence across a very broad range. Literary evidence; art history (the famous Aphrodite Knidia, but also artifacts on the site such as the "Altar of the Nymphs"); the long-standing archaeological exploration of the Knidian peninsula, the urban site, the amphora workshops (whose product was diffused widely, with implications for Knidian agriculture and economy); the texts carved on stone, ranging from private epitaphs to long public texts—all these sources of information, old and new, combine to raise the possibility of writing not just the standard "city monograph" but a real city history. The evidence might not enable any meaningful political narrative (such as an ancient local historian might have provided), except for an outline; but it might allow for essays covering various aspects of the city's life, and of individual experience in a particular city. *Montaillou* lies beyond the ancient historian's grasp; but can we write work on, say, Priene, to match the complexity and subtleness of work on Pompeii? The flow of new evidence, archaeological and epigraphical, and the earlier information at least argue for a rehabilitation of the project of local history, once so decried by M.I. Finley as antiquarian in concept and practice.⁸⁰

REGIONS

Another way of doing local history is to focus on the region. Here, too, a particular area, Asia Minor, and a particular type of evidence, Hellenistic epigraphy, have a long tradition. The discovery of inscriptions in the Anatolian landscape lead to the pin-

⁷⁷ A parallel is the memorandum of the priest of Men Askenos at Sardeis, asking for the restoration of civic funding to the cult: the priest mentions "royal gifts" among the shrine's privileges (1999: Malay, no. 131, A.D. 188/9).

⁷⁸ On local warfare in the Euromis, Robert 1962, 59–60;

1978, 514–8.

⁷⁹ On epigraphy as local history writing, Boffo 1988.

⁸⁰ Finley 1987, 60–6; contra, Reger 1994. Primary research on Priene continues apace, with ongoing excavation and a new corpus of inscriptions promised by W. Blümel.

pointing of ancient sites on the map and solving problems of classical topography.⁸¹ This scholarly activity continues: a recently discovered honorific decree from Ouranion (1992) forces a reevaluation of the topography of the Keramic Gulf and the Myndos peninsula (around Halikarnassos), and the surrounding historical context: Ouranion was not on the Myndos peninsula and hence not synoikized into Halikarnassos by Maussollos;⁸² rather, it was attributed by Alexander to Halikarnassos, as a subject community, before breaking free. The same document also illustrates another aspect of historical topography in the area. It provides the first epigraphical attestation of a polis called Eunai, previously known only from Stephanus Byzantius, just like Piginda (1995). The existence of Eunai is established, but not its location: the dense implantation of poleis across Asia Minor is far from having been exhaustively charted. Another, related concern of historical topography is the limits of city territories and hence the relation between cities. The document concerning the synoikism between Pedasa and Latmos (1997: Herakleia) might imply that the two cities had contiguous territories at the time (ca. 320 B.C.), just as Teos and Lebedos did when Antigonos Monophthalmos attempted to unite them. However, in later years, the territory of Miletos came between Pedasa and Herakleia, the city that succeeded Latmos: the Milesians owned a settlement, Ioniapolis (Ionopolis), at the corner of the Latmian Gulf (a harbor linked with Miletos town by a ferry, and the site of marble quarries).⁸³ It seems that Miletos acquired or was given (perhaps by Ptolemy II?)⁸⁴ this particular area: the Milesian ownership of the “Ionopolitis,” easy to consider as a given of historical topography, is part of the complex story of intertwined civic competition and imperial reengineering of settlement and territory in this particular area, a history which stretched at least into the 180s B.C.⁸⁵

Organization by region is also one of the principles in which inscriptions can be made to yield interpretations (for corpora, see above, section 1). There might not exist quite the quantity of evidence to provide very detailed histories of any single polis

(though I tried to qualify this view in the previous section); but the collocation of documents from neighboring sites within the same region allows patterns to appear. P. Herrmann’s corpus for Lydia (*Titulii Asiae Minoris* [TAM] 5) allows a variety of related themes—Hellenization, colonization, religion, settlement patterns, cities, their territory, and their neighbors—to be explored on the ground, in the same area.⁸⁶ Likewise, the ever-increasing flood of material from Karia, though not organized in a corpus or series of corpora, when read together suggests the possibility of a local history of Karia. Furthermore, the epigraphists’ “region” is linked, conceptually and concretely, to the production of new inscriptions, as outlined above (section 2): it forms the geographical basis for their inquiries. Epigraphical research combines with surveying or makes an important contribution in completing the evidence derived from surveying; there is a sense in which epigraphical research *is* surveying. Apart from Karia, similar patterns of research, leading to regional histories, are emerging from other areas. One such area is the Troad, where work around Alexandria Troas has examined the relation between settlements and revealed interesting inscribed material. Another interesting area is Lykia, which was organized as a regional polity, koinon (e.g., 1994 and 1996: Xanthos). A final example, alluded to earlier, is Pisidia, in close relation with Pamphylia.⁸⁷

Toward a history of regions/region? Some questions, however, might be asked. The first set of questions bears on the whole notion of “region”: what is a region, and how is it defined? The concept can be found in our ancient literary sources (notably historical and geographical, such as Strabo): the Troad, Mysia (or the Mysians), Lydia (or the Lydians), Ionia (or the Ionians), Karia (or the Karians), Pisidia (or the Pisidians). It is clear that region both helps define ethnicity or regional identity (as a natural unity inhabited by people) and is defined by ethnicity (as the physical, geographical manifestation of a certain people in a certain place); certainly, both region and ethnicity remained current usage throughout the Hellenistic period.⁸⁸ How well de-

⁸¹ This is clearly illustrated in the survey of Karia by Bean and Cook (1952, 1955, 1957).

⁸² Bean and Cook 1955, 143–55.

⁸³ Robert 1978, 502–14; Peschlow 1977–1978, 131–6; 1981, 157–86, on quarries of Miletos, Herakleia, Euromos. *Inschr. Delphinion* 149, line 45; 150, lines 103–105; *Inschr. Didyma* 40, line 16.

⁸⁴ An often-discussed line in a list of Milesian *stephanophoroi* mentions the gift of “the territory” to Miletos by Ptolemy II in 279: *Inschr. Delphinion* 123.

⁸⁵ Another possibility is that Miletos owned the Ionopolitis at the time of Asandros: the latter would then have detached the region from Miletos, to give it to the newly increased city of Latmos.

⁸⁶ Debord 1985, 345–58.

⁸⁷ For the latter, see Brandt 1992; Levick 1995, 114–6 (review).

⁸⁸ On some of these issues, Syme 1995 and Levick’s (1995) review of Brandt.

fined these various “regions” are is not clear. For instance, where does Karia end in the east? What does the Turco-French team mean when it speaks of “la Carie du Sud”? Even less clear is the extent to which we must consider these appellations as defining experience and activity.⁸⁹ A counter-example is the rich material collected in the Manisa Museum (1994) or the 219 texts discovered and published by H. Malay (1999); and the perspectives that this material opens when read in bulk. The catchment area of the museum does not coincide with an ancient region: it straddles Lydia, Ionia, Aiolis, Mysia. But in the Manisa collection (with provenanced stones and the stories these provenances tell), we can see, better than through the inert labels of ancient regions, the paths of communication, the articulation of geography, and the texture of contact: mountain crossings, highlands and the routes toward the river valleys, the confluence between valleys and plains. At the very least, the example of the Manisa “epigraphical halo” shows that an ancient moniker is not enough to justify treating an area as a unified “region”—there must be other unifying factors to relate the various parts and communities.

It is in fact the study of these relations that constitutes the interest of regional history (as well as, ideally, the “region” itself). A second set of questions can be asked at this point: What is the intended contribution of regional history to classics/ancient history in general? What ambitions might regional monographs fulfill (such as the Roberts’ initiated, but never completed, *La Carie* or the promised *Les hautes terres de la Carie du Sud* of the Bordeaux team) beyond the usual contributions—an edition of epigraphical sites, a gazetteer of sites, a historical introduction, a collection of testimonia, and (not always informative to the initiated, let alone the uninitiated) black-and-white photographs of Mediterranean landscapes with Turkish toponyms in the captions? Any answers to these questions must be provisional, since the trend toward regional focus, though gathering momentum, has not yet produced many synthetic works.⁹⁰ One result will be the writing of local narrative histories. Two examples of such history have already been mentioned: the expansion of Pisidia in the third and second centuries B.C.; and the complicated, palimpsestic history of the imbricated communities in western Karia, the coast from Priene to Keramos (Euromos, Miletos, Mylasa, Herak-

leia under Latmos, Pedasa are all repeatedly involved). These local political histories, with their accounts of war and territorial expansion, are an important part of the multipolar Hellenistic world (just as the Lelantine War or the war between Athens and Mytilene over Sigeion are a part of Archaic history); they matter, and were felt to matter by contemporaries, because they show how the Hellenistic world was a complex layering, in the same geographical space, of several types of interaction and experience.

Another feature of the study of regions in Hellenistic Asia Minor should be to provide specific, concrete instances of themes and issues in this period, such as the economy, the relation between city and countryside, “Hellenization” and ethnic identity, city elites and their relations with their communities, individuals and families, and their horizontal contacts at the scale of the region. For instance, I assume that the unprovenanced stele, now kept in Aydın (1993), mentioning a woman named Alindis, attests human contacts—marriage? migration?—between the Maeander floor (where Tralleis lay) and the Marsyas valley (near which the site of Alinda was to be found). These specific examples should have the virtue of modifying the models and interpretations offered synthetically for such topics as the ancient economy (regional production and exchange of surplus offer important contributions to the “primitivist” etc. debate) or Hellenization. The working out of local instances does not just “illustrate” the general models: it qualifies these models by offering the detail and complexity that they, by their very nature as idealized, heuristic devices, cannot provide. Regional studies should contribute to using these models to examine local solutions and outcomes in a concrete context; ideally, in striving to achieve the happy realism of a Louis Robert,⁹¹ they should bring to classics one of the potentially great contributions of Hellenistic and Roman Asia Minor to the discipline: a feeling for diversity and a sense of place.

CONCLUSION: “QUELQUES NOUVELLES CONNAISSANCES SUR L’HISTOIRE, LA RELIGION, LES CHARGES, LES MOEURS, ETC.” (BIGNON)

At this point, I need perhaps do no more than outline some of the themes that inscriptions, and specifically the constant renewal of the evidence, allow us to study; many of these themes and documents, have

⁸⁹ Lacoste (1985, 43–73) argues against the “région-personnage,” the personified and essentialized region.

⁹⁰ A conference held in 1997 by G. Reger and H. Elton examined the issues surrounding regionalism and sur-

veyed a few cases; the proceedings are forthcoming.

⁹¹ I owe the expression “happy realism,” as applied to L. Robert, to a paper by R. Lane Fox.

been mentioned or discussed in the previous sections. In the domain of religion, new inscriptions cast interesting light on sacred personnel. First, a Kolophonian decree from Klaros (1992), published by the Roberts, honors the *chresmologos* (oracular interpreter) of the oracle: apart from informing us that this sacred official is from Smyrna and not a citizen, the decree praises him in a language that is not civic but religious.⁹² The decree shows the relation between a polis and a noncivic religious official (chosen *imprimis* by the god himself). Second, newly found decrees honoring Leon, son of Chrysaor, the priest of Hekate at Lagina (1995: Panamara), illustrate the local influence of the shrine: the priest acted as an arbitrator in cases involving oaths (by Hekate?) and is honored for his actions by neighboring communities (Kallipolis, the Laodikeis). Finally, the “ox decree” of Bargylia (1995, 1997), commented on in section 4 above, helps to imagine the vividness and pungent realities of small town paganism (with its *comices agricolae*-style jollities) in the Hellenistic period.⁹³

Other themes could be broached: the countryside;⁹⁴ the economy;⁹⁵ literature and culture.⁹⁶ Special mention must be made of the Kaunos bilingual, a short decree in Greek and in Karian (1997), which confirms the efforts of earlier scholars (notably J. Ray) to decipher Karian. Equally, it should be clear how personal this essay has been: another reader of the production might have produced a very different essay, defining other themes, focusing on different documents, or even the same documents; that is all for the good, a tribute to the richness of the material. After all, it is not difficult to read through *SEG* and *BE* and to reorganize the material by themes and research: everyone can and should do so.

The richness of possible interpretations is a direct function of the profusion of new material. It is quite possible that the pace of development in Turkey, especially in the west and in coastal areas, but slowly spreading inland, will make the next 10 or 20 years as rich in new material as the late 19th century, when the European traveling epigraphists first started systematically exploring Anatolia.⁹⁷ Those decades pro-

duced the great regional tomes, as well as the “working corpora” of Hellenistic and Roman inscriptions from the Greek world (*SIG*³, *OGIS*); the renewal of the material would allow us to produce greatly enlarged and enriched versions of these venerable institutions. This moment is quite exhilarating, the continuation and broadening of the stream of chatter from the land of the chattering stones. In the preceding sections, I have chosen some ways of imposing order on this new information, by defining themes and areas, and commenting on the contributions made by certain new documents.

But many documents are not so spectacular, unusual, and informative as the new praise poem to Halikarnassos or the charter of Tyriaion. Rather, they fall into known categories that are already well illustrated. When a new honorific decree is found and published, by its nature, it speaks in a stereotypical language and in stereotypical shapes. An inscribed base from Alabanda (1995) honors a local citizen-woman, Abas, for her own qualities and her status as daughter of a benefactor; the genre is well known. The site of Skepsis has provided two new, but highly fragmentary, Hellenistic decrees (1996), both honorific, one for a benefactor, in return for a foundation (the word “loan” appears, probably describing the investing of the funds given by the benefactor); the second for “foreign judges,” though the text is too fragmentary to determine where these arbitrators were from. What do we learn, then, when the content of new documents contributes familiar items of knowledge? Foreign judges, for instance, are an extremely well-documented institution and specifically attested at Skepsis. Yet no inscription, even if it belongs to a familiar genre, is ever quite the same, and even banality is interesting, in showing the pervasiveness and institutionalization of political language in this period, a feature which created the political culture of the poleis (above, section 4). Likewise, a Xanthian decree for foreign judges from Angeira, in Pisidia, is perfectly banal in its formulary; what is unusual is to see a Pisidian city participating in the network of Asia Minor poleis (1993). Most importantly, the accumulation of the familiar thickens

⁹² Pointed out by Gauthier in *BE* 92.456.

⁹³ The officials who will judge the finest ox were the same as those elected to judge *euandria*, the finest-looking man among the tribes.

⁹⁴ 1993, for the cultic and communal life of a settlement, the katoikoi of Daphnos, around their shrine of Apollo Daphnousios; 1997: Tyriaion, for a set of villages and a town about to become a polis.

⁹⁵ 1992: Mylasa (also 1995) for the economy of shrines and land around Mylasa; 1995: Mylasa, for an honorific de-

creed from Olymos, mentioning *pragmateuomenoi*, probably Roman businessmen rather than Seleukid or Ptolemaic officials as Blümel thinks (the verb can also designate the activity of literary composition, notably by itinerant *littérateurs* [*BE* 59.330], but this seems unlikely here).

⁹⁶ 1994: Aphrodisias; 1998: Halikarnassos.

⁹⁷ Whether the recent earthquake, “Körfez depremi,” will have a significant impact on development and hence on the emergence of ancient material remains to be seen.

the dossiers we have on various themes and provides the knowledge of typicality or even something approaching linguistic competence in official phraseology: this competence underlies the epigraphists' *ars restorandi*, the art of finding restorations backed up by exact or closely analogous parallels. A feel for typicality also enables synthesis and analysis based on the epigraphical material, which has been increasing at a rapid pace in the last 10 years.

There are recent large-scale treatments of Asia Minor: S. Mitchell's *Anatolia* and M. Sartre's *L'Asie Mineure et l'Anatolie d'Alexandre à Dioclétien*; much of their attention, however, focuses on the Roman period, where the majority of the evidence lies, especially for inland Anatolia. Nonetheless, the Hellenistic-era material from Asia Minor has contributed to a remarkable number of syntheses or general works appearing in the last few years, in addition to the corpora of texts organized by themes (see above, section 1). The great survey of Greek decision-making institutions in *The Decrees of the Greek States*, by P. Rhodes with D.M. Lewis, is followed by analyses showing the persistence of democratic institutions in the post-Classical Greek world in Asia Minor and elsewhere (especially Athens). Several other works have examined the post-Classical city. R. van Bremen examines female notables in the Hellenistic and Roman cities of Asia Minor in *The Limits of Participation: Women and Civic Life in the Greek East in the Hellenistic and Roman Periods*. The collection of essays *Stadt- und Bürgerbild* is particularly important because it tries to raise consciousness about the broader issues of civic identity in the Hellenistic polis and because it represents an effort at interdisciplinary collaboration between archaeologists and epigraphists. A large-scale examination of notables and elites in the post-Classical city is provided by F. Quass's *Die Honoratioren-schicht in den Städten des griechischen Ostens: Untersuchungen zur politischen und sozialen Entwicklung in hellenistischer und römischer Zeit*.⁹⁸ Political history is covered by R. Kallet-Marx, *Hegemony to Empire: The Development of the Roman Imperium in the East from 148 to 62 B.C.*, and C.P. Jones, in *Kinship Diplomacy in the Ancient World*, studies an important topic in interpoladic relations, mostly attested in epigraphical documents. The polis, high political history; no doubt other thematic syntheses will follow; at least, the material is approaching critical mass in a number of subfields.

The recent spate of synthetic treatments and the yearly riches to look forward to in *SEG* and the *BE* make the field of Hellenistic epigraphy from Asia

Minor as exciting as during the Roberts' reign. The production of syntheses and monographs may hint that the abundance of evidence is getting the attention and thought that it deserves: at least at the level of these general treatments, there is a genuine possibility for communication with the rest of the discipline beyond the sometimes sparse publication of new texts or specialized debates taking place in the journals (above, section 1). At any rate, there could be no harm in speeding the process a little. Along with the usual (or ideal) rules of epigraphical publication—"genetical" *lemmata* that explain clearly the history of the text, intelligible apparatuses, translation, photographs of stone and squeeze—epigraphists should perhaps start to add to their publications a few words (a paragraph or three would suffice) drawing attention to some of the broader conclusions or issues that follow from their new text or new observations. It would certainly do good to the subject: it might shed light on things for the practitioners themselves, and it would make them communicate, if not to skeptical old Bignon, at least to other classicists, archaeologists, ancient historians, even literary critics and philosophers, why all this matters, and why *they* might care.

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Appendix Inscriptions Mentioned in the Text

1992

Kildara

W. Blümel, *EpigAnat* 20 (1992):127–33 (*SEG* 42.994).

Letter of Tlepolemos to the city, 246 B.C.

Klaros

J. Robert and L. Robert, *BCH* 116 (1992):279–91 (*SEG* 42.1065). Decree of Kolophonians for the *chresmologos*, Menophilos of Smyrna, early second century.

Knidos

W. Blümel, *I. Knidos* (*IGSK* 41).

Miletos

W. Günther, *EpigAnat* 19 (1992):135–43 (*SEG* 42.1072). Athenian decree for Milesian *theoroi*, early second century.

⁹⁸ For a different perspective, Habicht 1995, 87–92; also Gauthier, *BE* 94.194.

Mylasa

W. Blümel, *EpigAnat* 19 (1992):5–15. New texts found in Milās (SEG 42.999, 1002, 1003–1006).

Ouranion

A. Bresson, P. Brun, P. Debord, R. Descat, and E. Varinlioğlu, *REA* 94 (1992):155–74 (SEG 42.1019–1020). Two decrees found near site of Ouranion (E. Varinlioğlu, in *Asia Minor Studien* 8:7–22, gives vivid description of process of finding the stones), ca. 200 B.C.

Phokaia

Ö. Özyigit, *KST* 14.2 (1992):1–22. See also G. Marcone, *Annali della Facoltà di Lettere e Filosofia, Università degli Studi della Basilicata* (1992–1993):259–72; *non vidi*, though I did see the inscribed blocks, still forlornly in situ (SEG 43.873). Inscription in *cavea* of theater, second century.

1993

R. Meriç, *ÖJh* 62 (1993):57–75. Survey of funerary stelai from Asia Minor, especially in second century.

Aydın

W. Blümel and H. Malay, *EpigAnat* 21 (1993):135–6. Epitaphs found in museum (SEG 43.734–735).

Daphnous

C. Tanrıver and S. Kütük, *EpigAnat* 21 (1993):99–102 (SEG 43.879–884). SE shore of Lake Uluabat (Apolloniatis Limne). Dedications and honorific inscription from rural shrine (found after illegal excavation), second century.

Ephesos

D. Knibbe, H. Engelmann, and B. Iplikçioğlu, *ÖJh* 62 (1993):214–30 (SEG 43.773–774). Honorific texts by associations, second century.

Euromos

R.M. Errington, *EpigAnat* 21 (1993):15–32 (SEG 43.703–709). Hellenistic documents from the temple of Zeus Lepsynos, fourth to second century.

Kaunos

C. Marek, *AST* 11 (1993):86–96. New finds from Kaunos (SEG 94.890, 895, 896): list of donors; inscription for Arsinoe II; honorific for Roman demos, second century.

Nagidos

C.P. Jones and J. Russell, *Phoenix* 47 (1993):293–304 (SEG 43.998). Decree mentioning Seleukid colony, early third century.

Xanthos

J. Bousquet and P. Gauthier, *REG* 106 (1993):12–23. Decree from Angeira (Pisidia) honoring foreign judges from Xanthos (SEG 43.986), second century.

1994

Aphrodisias

C.P. Jones and R.R.R. Smith, *AA* 1994:455–61 (SEG 44.865). Funerary epigram, late second or first century.

Arykanda

S. Şahin, *I. Arykanda (IGSK 48)*.

Bargylia

W. Blümel, *Arkeoloji Dergisi* 2 (1994):110–5, no. 45 (SEG 44.867). Republication, from old copy, of decree for Poseidonios, late second century.

Iasos

C. Habicht, *Chiron* 24 (1994):69–74 (SEG 43.715). New text of *I. Iasos* 72 (Samothrakian decree for *theoroi* from Iasos) from squeeze of Robert, with additional text, ca. 250.

Manisa

H. Malay, *Greek and Latin Inscriptions in the Manisa Museum* (review by K. Rigsby, *AJP* 117 [1996]:167–9).

Mopsouhestia

M. Sayar, P. Siewert, and H. Taeuber, *Tyche* 9 (1994):113–30 (SEG 44.1227). Letters of Sulla (85 B.C.) and of Lucullus (86 B.C.) on asyilia of shrine of Isis.

Olbasa

R.A. Kearsley, *AnatStud* 44 (1994):47–57 (SEG 44.1108). Letter of Attalos II to the city, 159 B.C.

Stratonikeia

E. Varinlioğlu, *REA* 96 (1994):189–91 (SEG 44.917). New military inscription (city quarter), late third century.

Teos

S. Şahin, *EpigAnat* 23 (1994):1–40 (SEG 44.949). “Pirate decree” (decree concerning payment to pirates; list of contributors); later third century. Comments by Gauthier, *BE* 96:53.

Xanthos

J. Bousquet and P. Gauthier, *REG* 107 (1994):319–61 (SEG 44.1218–1219). *Isopoliteia* treaty between Xanthos and Myra; subscriptions for the Letoon; later second century.

1995

Alabanda

W. Blümel, *EpigAnat* 25 (1995):59–60. Statue base for Aba, mother of an euergetes (SEG 45.1499).

Bargylia

W. Blümel, *EpigAnat* 25 (1995):35–9. “Ox decree” on cult measures for Artemis (SEG 45.1508), later second century.

Herakleia under Latmos

A. Peschlow, *AST* 13 (1995):211–24. Temple at Bagarcık.

Knidos

W. Blümel, *EpigAnat* 25 (1995):62–5. List of victors in boys' contests, alliance between Knidos and Lyttos.

Miletos

W. Günther, *Chiron* 25 (1995):43–53. Two new lists of members in funerary associations (*temenitai*) (SEG 45.1606–1607), early second century.

Mylasa

W. Blümel, *EpigAnat* 25 (1995):40–53. New inscriptions from environs of Mylasa, including an honorific decree from Olymos, new land leases (SEG 45.1537–1555), second century.

Panamara

M.Ç. Şahin, *EpigAnat* 25 (1995):83–6. Two new decrees, for Leon, priest, second century (with J. Ma, *EpigAnat* 28 [1997]:9–10 and G. Reger, *EpigAnat* 30 [1998]:11–7).

Patara

C. Marek, *Lykia* 2 (1995):9–21. Honorific inscription for Krinolaos Artapatou, of Patara, general of the Lykians in First Mithridatic War (SEG 45.1825).

Piginda

F. Ölmez, *Arkeoloji Dergisi* 3 (1995):165–6. Honorific inscription for Aristodemos, priest of Zeus Pigindenos (SEG 45.1515), first century.

Tarseia

R. Merkelbach and W. Blümel, *EpigAnat* 25 (1995):67–9. Funerary epigram for Mokazis (SEG 44.1010).

1996

Ilion

M. Harriman, K. Mayer, S. Murphy, and R. Pianka, *ZPE* 113 (1996):255–6. Hellenistic base bought in 1894 and given in 1898 to the library of the University of Texas at Austin.

Lydia

G. Petzl, *EpigAnat* 26 (1996):1–29. Survey of eastern Lydia (continued in *EpigAnat* 28 [1997]:69–79).

Pleura

H. Malay and C. Nalbantoğlu, *Arkeoloji Dergisi* 4 (1996):75–81. Administrative dossier concerning the *mystai* of Apollo Pleurenos, ca. 189 B.C.

Skepsis

E. Schwertheim, *Asia Minor Studien* 22: 100, no. 1: fragmentary decree for euergetes; 102, no. 2, decree for foreign judges.

Tralleis

H. Malay, *Arkeoloji Dergisi* 4 (1996):83–6. Funerary chest of family of Attalid officials, second century.

Xanthos

P. Gauthier, *REG* 109 (1996):1–34. Decree of the *neoi* for Lyson, 196 B.C.; decree of the *neoi* of Kandyba (found reused), first century.

C. Le Roy, *CRAI* 1996, 961–80. Arbitration on territory between Termessos Minor and Tlos, later second century.

1997

Bargyilia

W. Blümel, *EA* 28 (1997):153–5 (SEG 45.1508, text B). New fragment of the Bargyilia religious decree.

Herakleia

W. Blümel, *EpigAnat* 29 (1997):135–42. *Sympholiteia* between Latmos and Pedasa, between 323 and 313 B.C.

Kaunos

P. Frei and C. Marek, *Kadmos* 36 (1997):1–89. Bilingual Karian-Greek decree (immediate corrective on date, by R. Descat in *REA* 100 [1998]:187–90; *Kadmos* 37 [1998] whole issue on this inscription), late fourth century.

C. Işık and C. Marek, *Das Monument des Protogenes in Kaunos* (SEG 44.893); also R. Merkelbach and J. Stauber, *Steinepigramme aus dem griechischen Osten*, 1: nos. 09/02–06. Full publication of *sungenikon* of Protogenes, late fourth century.

N. Ehrhardt, *AA* 1997, 45–50. Tribe inscriptions from *Rundbau* near theater, second or first century.

Miletos

H. Lohmann, *AA* 1997, 299–304. Survey of Milesian territory, boundary-stones.

Stratonikeia

M.Ç. Şahin, *EpigAnat* 29 (1997):86–7. Bases from propylon, second century.

Teos

C. Marek, *Tyche* 12 (1997):169–77. Abderan decree for Teos, ca. 167.

Tyriaion

L. Jonnes and M. Riel, *EpigAnat* 29 (1997):1–29. Charter granted by Eumenes II to Tyriaion, ca. 188 B.C.

1998

Ephesos

M. Büyükkolancı and H. Engelmann, *ZPE* 120 (1998):65–82. Material found reused on Ayasoluk hill.

Halikarnassos

S. Isager, *ZPE* 123 (1998):5–23; new text by H. Lloyd-Jones, *ZPE* 124 (1999):1–14; also in R. Merkelbach and J. Stauber, *Steinepigramme aus dem griechischen Osten*, 1, no. 12/02. Praise poem for the city, second century.

Suneta

A. Chaniotis, *AJA* 102 (1998):248–50. List of names under the mention of Zeus Sunetenos, second century (?).

1999

H. Malay, *Researches in Lydia, Mysia, and Aiolis* (1999). *Metropolis*

H. Engelmann, *ZPE* 125 (1999):137–46. New inscriptions from R. Meriç's excavation.

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Luigi Bernabò Brea (1910–1999)

CAROLINE MALONE AND SIMON STODDART

Luigi Bernabò Brea was born on 27 September 1910 in Genova and died on the island of Lipari on 5 February 1999. He was the natural successor to Paolo Orsi (1859–1935) in a number of important respects:¹ he was a northern Italian who made Sicily his home; he was a polymath who was as at ease with the material culture of the Paleolithic as he was with the Classical; he was a prehistorian who worked back from the historical sources, employing the ancient authors to give names to the framework he created from material culture. Furthermore, he was always tempted to find in myth and legend a close connection with archaeological evidence.² Yet he clearly advanced Mediterranean archaeology beyond the tradition of Orsi, developing a methodological approach to deep stratigraphy and even to landscape archaeology that can be perceived most emphatically in his work on the Lipari islands.³ His aim was to create a history of the past in the tradition of Childe, a scholar he admired⁴ and who inspired him to a vision of unusual breadth. In terms of his fieldwork, his reach extended from Arene Candide in northern Italy,⁵ to Poliochni on Lesbos to the east,⁶ and to Sicily in the south.⁷ In terms of interpretation, his breadth led to diffusionist links that would now be considered unfashionable by many. His review of John Evans' *Malta* reveals this trait, since he could not accept Evans' definition of prehistoric Maltese society as inward looking.⁸ Although there were interdisciplinary elements to his work, the main building blocks were carved out of the security of material culture, with some hesitant assistance from radiocarbon dating. His publications are lavishly and expensively furnished with the details of material culture, and remain central sources of information for Mediterranean prehistory. He was also an archaeologist well-known out-

side his country because of his generosity in showing others his discoveries on location,⁹ through reports supplied to *Antiquity* and *Ampurias*, and, in most detail, through his contribution on Sicily to the Ancient Peoples and Places series.¹⁰ The high esteem in which he was held by his contemporaries is revealed in the reviews of his books¹¹ and comments in the editorials of *Antiquity*.¹² Mellaart congratulated the author for his book but remarked on its excessive price (£50), the product of a marketing strategy that "L'Erma" di Bretschneider still maintains in the age of the Internet! Crawford remarked that "a rich harvest is awaiting those who bring modern techniques to the excavation of sites, especially inhabited sites, in the Mediterranean lands. . . . Professor Bernabò Brea, Director of Antiquities in Sicily, has already led the way at Arene Candide and more recently at the citadel of Lipari. . . ."

After graduation in archaeology at Rome University in 1934, he studied for three years at the Italian School of Archaeology in Athens (1936–1938). At the end of 1938, he was appointed inspector at the National Museum, Taranto, where he was mainly involved in classical archaeology. He was made Soprintendente of Antichità di Liguria in July 1939 and spent two years excavating Arene Candide. At the end of 1941, he was transferred to Sicily, where he was Soprintendente of Eastern Sicily and head of the National Museum of Archaeology of Siracusa, which he reorganized after the war. His doctorate of 1948 was in Paleolithic archaeology. He undertook excavations at Poliochni on Lesbos beginning in 1951. However, it is for his long association with the Lipari islands that he will be best remembered. These islands are now known in greater detail than any other islands of comparable size in the Mediterra-

¹ Tusa, V., 1999, 2–3. For the dates of events we principally follow the account recorded in this obituary.

² Bernabò Brea 1985.

³ Bernabò Brea and Cavalier 1980, 1992; Bernabò Brea et al. 1995.

⁴ Guidi 1988, 98.

⁵ Bernabò Brea 1946.

⁶ Bernabò Brea 1964, 1976.

⁷ Bernabò Brea 1956.

⁸ Bernabò Brea 1960, 132–6.

⁹ Daniel 1959, 157–8. The March 1959 course inspired many British students to develop a career in ar-

chaeology. (On the Lipari field trip were: John Evans, Glyn Daniel, Stuart Piggott, and students David Trump, Bridget Trump, Gladys Pike, John Scantlebury, Euan Mackie, Nick David, Rose Thompson, Judy Wilkins, Ian Stead, and Charles Higham).

¹⁰ Crawford 1955, 194–5; Bernabò Brea 1953–1954, 137–236; 1957.

¹¹ Cook 1958, 282: "Professor Bernabò Brea has given devoted service to the archaeology of Sicily and students of antiquities of that island should be grateful for this compendious book." Cf. Mellaart 1967, 162–3.

¹² Crawford 1954, 130.

nean, thanks to the continuous work of Bernabò Brea and his second wife and longer companion, Madeleine Cavalier. It was their brilliance that established the importance of these islands as a barometer of the pre-Roman Mediterranean, first for their obsidian resources and then for their strategic importance.

Bernabò Brea was a passionate and yet modest archaeologist.¹³ His bright blue eyes would light up as he spoke of the seas and compared the travels of his father, a Genovese grain merchant, to those of the Mycenaean. In his late 70s he would still lead tours from the front at breathless pace. These were tours over the volcanic slopes of the Lipari islands to the sites he had personally discovered, where he would describe with great energy the particular details of his work over the preceding decades.

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¹³ Tusa, S., 1999, 255–8.

Emeline Hill Richardson, 1910–1999

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Emeline Hill Richardson, who has been described as the doyenne of Etruscan studies in the United States, was born in Buffalo, New York on 6 June 1910, the eldest daughter of William Hurd and Emeleen Carlisle Hill. She was educated at Radcliffe College, receiving her A.B. in 1932, A.M. in 1935, and Ph.D. in 1939. Although as an undergraduate she majored in geology, she had decided early in life to become a classical archaeologist, a determination that followed on her mother's reading to her of a child's version of the *Odyssey*. Consequently, in the fall following her graduation from Radcliffe, she went to the American School of Classical Studies at Athens. Shortly after her arrival there, however, she came down with an especially virulent amoebic dysentery, which required her to be hospitalized. Her parents, who were traveling in Egypt at the time, were summoned back to Athens, and eventually Emeline was evacuated to Rome, where in the spring of 1933 the disease was cured but she was advised not to return to the Mediterranean for at least five years.

Thus Emeline returned to study at Radcliffe and received her A.M. in 1935. In 1935–1936 she went to London to study with Bernard Ashmole at the University of London, who directed her to the study of Etruscan votive bronzes, which was to occupy her through the rest of her life. She then returned to Radcliffe to take her Ph.D.; while there her chief mentors were George Chase and George M.A. Hanfmann, the latter freshly arrived from Germany and destined to become a close friend and long-time associate in Etruscan studies. Her dissertation was an initial study and classification of Etruscan bronze votive figurines.

In 1941 she took a teaching position at Wheaton College in Norton, Massachusetts, where she remained until 1949. In 1949 she won a fellowship to the American Academy in Rome and the following spring became a member of the excavation staff working at Cosa in central Etruria, work that she pursued in the field until 1955. She thereafter continued to work on this project for more than a decade, being responsible for chapters in the Cosa reports for both temples on the arx and the buildings of the forum. In 1952 she married Lawrence Richardson, another member of that team.

After the couple's return to the United States in 1955, Emeline held teaching appointments in the departments of classics and history of art at Yale University and in the spring of 1962 was visiting professor in the department of classics at Stanford University. Following her husband's move to Duke University in 1966, she was visiting lecturer at the Institute of Fine Arts of New York University in 1967 and Professor of Classical Archaeology at the University of North Carolina at Chapel Hill from 1968 to 1979. In 1976–1977 she was Norton Lecturer for the Archaeological Institute of America and in the summer of 1979 director of a National Endowment for the Humanities Summer Seminar for College Teachers at the American Academy in Rome.

Emeline lectured widely in the United States and abroad on a range of subjects but almost always with a focus in Etruscan art. She was also an active member of several learned societies: the Archaeological Institute of America, of which she was a member of the board of directors from 1965 to 1967; the American Philological Association; the German Archaeological Institute (corresponding member); the Istituto Nazionale di Studi Etruschi e Italici; and the American Academy of Arts and Sciences. She was the recipient of the medal of the Radcliffe Alumnae Association in 1966, of the title Dignitaria dell'Ombra della Sera at Volterra, Italy in 1980, of the centennial medal of the American Academy in Rome in 1994, and of the gold medal of the Archaeological Institute of America in 1994.

Emeline wrote numerous books and articles, including contributions to the *Encyclopedia Britannica*, the *Princeton Encyclopaedia of Classical Sites*, and the *Dictionary of Art*. She was proudest of her two-volume work *Etruscan Votive Bronzes: Geometric, Orientalizing, Archaic* (Mainz 1983), a definitive catalogue of the types and their periods, and was engaged on a sequel to this on bronzes of the Classical period at the time of her death. Emeline died on 29 August 1999 in Durham, North Carolina.

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BOOK REVIEWS

AN ENCYCLOPEDIA OF THE HISTORY OF CLASSICAL ARCHAEOLOGY, edited by *Nancy Thomson de Grummond*. Vol. 1: A–K: pp. xxiv + 654; Vol. 2: L–Z: pp. xxiv + 676; b&w figs. 127. Greenwood, Westport 1996. \$225.00 (set). ISBN 0-313-22066-2 (set, cloth).

This substantial work claims to be the first encyclopedia of the *history* of classical archaeology, not an encyclopedia of classical archaeology as such. Geographically, although Greece and Rome represent its central focus, it includes manifestations of those cultures outside their homelands as well as selected aspects of other cultures (e.g., Etruscan tombs but not the Scythians). Chronologically, although centered upon the classical periods, it also covers important Late Bronze Age sites and the study of antiquity in medieval and modern times.

To illustrate this coverage, it may be helpful to survey the 119 entries, covering 106 pages, that begin with “B.” Material culture is covered in entries on important regions (e.g., Bosphorus Cimmerius), sites (e.g., Baalbek, Baiae, Bassai, Bath, Beneventum, and Byzantium), monuments (Basilica Aemilia and baths of Caracalla), and artifacts, both categoric (*buccheri*) and specific (Belvedere “Antinous”). Modern investigations and interpretations are explored in entries on scholars, ranging from philologists (Bembo, Budé) to travellers and cartographers (Buondelmonti), antiquarians (Blouet), archaeologists (Banti, Becatti, Becker, Blegen), art historians (Beazley), numismatists (Babelon, Beger, von Bahrfeldt), historians (Beloch, Busolt), and epigraphists (Böckh). The cultural legacy of Greece and Rome is discussed in entries on artists (Bandinelli, Bartoli, the Bellini family, Botticelli), architects (Brunelleschi), and writers (Bulwer-Lytton, Boccaccio, Byron). And public institutions are covered in essays on museums (Benaki Museum, Berlin Antikensammlung, British Museum) and schools (British Schools at Athens and Rome). Some of the other foreign schools in Athens are also included, although the volume lacks entries for either the 101-year-old Austrian Institute or those younger than the Swedish Institute, founded in 1946.

Themes not represented in the alphabetic sequence from Baalbek to Byzantium, but readily exemplified elsewhere, include benefactors (Cotton, Loeb), expeditions (Minnesota Messenia Expedition, *Expédition de Morée*, but not Napoleon III), maps (*Tabula Peutingeriana*), as well as its eponymous 16th-century owner), and modern statesmen (Hitler, though surprisingly not Mussolini). Finally, there are general articles on themes and classes of objects, including computers in classical archaeology, epigraphy, forgery, funerary iconography, glyptics, Greek vases, guidebooks, museums, the obelisk, portrait iconography, and Roman wall painting.

There are minor errors in detail, such as placing the Menelaion north of Sparta, but these can be expected in any large work and do not significantly detract from the encyclopedia’s usability. In other technical aspects the book

does not always hit the mark. The provision of alternative headings is inconsistent: for example, there is an entry for “Akropolis,” but no help for the reader who searches first for Acropolis; similarly, we find “Ciriaco of Ancona” but not Cyriac, “Greek vases” but not Vases, “Hephaisteion” but not Theseion, “Roman sarcophagi” but not Sarcophagi, “Temple of Olympian Zeus” but not Olympian Zeus or Olympieion. The generous, 73-page index partly fills the gap by covering both headings (whose page numbers helpfully appear in bold in the index) and references to subjects within other entries. Even here, however, some data are missing (e.g., under “Vespasian” the page number for the entry on the “Temple of Vespasian” does not occur), its alphabetical ordering does not always conform to that of the main text (“Al Mina” here comes before “Alaas” rather than after “Alma-Tadema”), and long strings of page numbers (e.g., the 41 citations under “Belvedere Apollo”) ought to have been subdivided.

The range of the material is impressive, though, and as with any work of reference, every reader will have particular bones to pick based on their own interests and expectations. This reviewer could hardly have failed to notice that, while Rhodes, Samos, and Chios appear, Lesbos does not (though Winifred Lamb makes a welcome appearance, alongside a significant number of other female scholars). Among giants in the field, Rostovtzeff is duly present but not W.W. Tarn or A.H.M. Jones. Recently deceased scholars who are omitted, intentionally or otherwise, include Moses Finley, Louis Robert, and Otto Mørkholm; happily, Manolis Andronikos squeezes in. At the same time, a number of relatively minor scholars of the 20th century are somewhat surprisingly included. The book’s long gestation may also explain why the select bibliography (strictly limited to 100 entries so as not to intimidate new visitors to the classical domain) stops at 1992, while citations in articles rarely extend even beyond the mid-1980s.

A particularly art-historical definition of “classical archaeology” is assumed, with barely a nod in the direction of specializations such as field survey and underwater excavation. I confess to an uneasy feeling that the selection of historical personalities leans rather heavily towards Italian art history, and that the choice of scholars favors German-speakers of the late 19th and earlier 20th centuries to the disadvantage of other traditions. Despite the emphasis on art and architecture, however, the illustrations are somewhat sparse (comprising in large part old portraits and photographs of scholars, and early drawings and paintings of monuments). One looks in vain for articles on individual mythological figures, on ancient authors such as Pausanias, Pliny, and Vitruvius, on additional classes of artifacts with an important afterlife (such as Hellenistic royal portraits), and on explicit themes such as the antiquities market, antiquarianism, archaeology, classicism, connoisseurship, and the Renaissance.

These quibbles, however, should not detract from the inherent interest of such a diverse collection of entries. Scholars and general readers in every area of ancient studies will enjoy the sketches of their predecessors (isn’t it time we

had a one-volume, English-language biographical dictionary of classical scholarship?) and the information about distinguished research institutions. Interesting connections spring off almost every page, leaving one keen to know more and inducing a proper humility in the face of the achievements of earlier generations. James Loeb, one learns, was at least as important as a benefactor of archaeological research as for the series of translations he founded. Ludwig Ross was not only a traveller, but also served as archaeological ephor of Greece soon after its independence. Karl Otfried Müller was a pupil of Böckh and teacher of Ernst Curtius, and as early as 1817 he was urging that all varieties of evidence should be combined to give a rounded view of antiquity—an insight that more recent enthusiasts have sometimes thought original to themselves. These perspectives are worth putting in front of any student of ancient culture.

In comparison with similar works, these volumes measure well. For libraries that can afford them, they will be a valuable adjunct to the teaching of art history and the theory of material culture. The juxtaposition of world-famous artifacts and buildings with the researchers, artists, and public figures who have shaped our view of ancient culture makes an important statement about classical antiquity. Many of the articles illustrate perfectly the way in which, when we first look at the classical world, we see a post-antique construct that has exploited and refashioned the artifacts and values of Greece and Rome for a wide variety of cultural and political purposes. This encyclopedia will certainly inspire those students who have the wit to explore its pages systematically or browse it in a creative and open-minded spirit.

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THE CONQUEST OF ASSYRIA: EXCAVATIONS IN AN ANTIQUE LAND, 1840–1860, by *Mogens Trolle Larsen*. Pp. 404, figs. 56, color pls. 8, plans 2, map 1. Routledge, London 1996. £40. ISBN 0-415-14356-X (paper).

Some years ago, while working on cuneiform tablets in the British Museum, a colleague took me motoring to Lacock Abbey, the ancient home of William Henry Fox Talbot, known today as the father of modern photography. The information in the small museum at Lacock described him as “philosopher, classicist, Egyptologist, mathematician, philologist, transcriber and translator of Syrian and Chaldean cuneiform texts, physicist, and photographer.” Looking through Talbot’s varied papers and notes, I was reminded of George Steiner’s observation that the Victorians were different from us, as they seemed to do so much in their lives. Larsen’s fascinating book on the first two decades of archaeological excavations in western Asia confirms that view. His story begins in 1842 with a chance

meeting in Mosul on the Tigris between two extraordinary men, the 25-year-old Englishman Austin Henry Layard and the much older Frenchman Paul Émile Botta. Within a few years, these two were to rediscover a whole new ancient world by excavating two Assyrian capitals, Botta at Khorsabad and Layard at Nineveh. Others were to follow in their footsteps, Henry Rawlinson, Victor Place, and Hormuzd Rassam among them.

The story of these early excavations has been told before, but never in such detail. Earlier accounts of the history of exploration in the Near East have rushed from beginning to modern times, but Larsen has concentrated on a mere two decades, investigating the actual digs and providing us with the historical and cultural background of the early interest in ancient cultures of the area. Larsen is one of the finest Assyriologists of our times and therefore has an advantage over his predecessors. He truly understands what was found and what was missed, but he is also a cultural historian and so wants to understand the motivations of the people who left their comfortable homes and risked their lives in a dangerous “antique land.” The cities of Assyria and Babylonia had been little more than names from the Bible and from Hellenistic accounts; they held a fascination that was soon to be mixed with nationalistic pride, as France, England, and later Germany competed for the glory of discovery and the provisioning of their national museums.

It has been observed that imperialism was the mother of Near Eastern archaeology. Fair enough, but imperialism bred extraordinary people, and one comes away from this book fascinated by the individuals whose lives Larsen reveals. Of these, Layard is the best known; his life has been the subject of biographies, and he figures prominently in all accounts of early archaeological exploration. Others, such as Botta, have been forgotten. Part of this is due to Layard’s own enterprising spirit: he was the author of numerous books, some of which were best sellers and were translated into many languages. His 1854 book, *A Popular Account of Discoveries at Nineveh*, an abbreviated version of his monumental *Nineveh and its Remains* (1852), was published as part of Murray’s “Railroad Reading,” a series advertised as “Containing Works of Sound Information and Innocent Amusement, printed in a large readable Type, suited for all Classes of Readers.” One hardly finds such volumes in airport shops these days. Larsen writes vividly about Layard, but he also gives us important new information on the less prominent, but in many ways no less important, participants in the grand adventure.

Nineteenth-century archaeology is often described today, as it was in Stalinist times, as a handmaiden of imperialism or, worse, of orientalism. Be that as it may, now that social scientists have discovered that humans act as individuals—brilliant theoretical insight legitimized by the label “agency”—we can, without guilt, admit to a fascination with the men who are the subjects of Larsen’s book. These were not mere agents of states or of an ideology; to the contrary, they were misfits in their own societies—dropouts, opium addicts—men who did not quite fit in and who tried to find a purpose in adventure and discovery in a different society. The crumbling Ottoman Empire was hardly the ideal Orient imagined by European poets and painters.

Layard found himself there almost by accident, while Botta, after an extraordinary career of adventure, came there as the French consul in Mosul.

One of Larsen's great contributions in this volume is his portrait of Paul Émile (Paolo Emilio) Botta, whose work has not been properly appreciated outside of a narrow circle of specialists, and whose life has remained unchronicled. An Italian-born medical doctor, naturalist, diplomat, and archaeologist, Botta traveled around the world by ship collecting botanical specimens and observing many habits, including opium smoking in Canton. He became an addict, and upon his return to France he wrote his doctoral dissertation on the smoking of the drug. He left once again to become a military doctor in Egypt and, after many experiences, ended up in the French diplomatic service, posted to Mosul. Botta's archaeological work at Khorsabad filled the Louvre with treasures and was a crucial point in the re-discovery of Assyria. He lives on as Marigny in the autobiographical novel *Contarini Fleming* (New York 1870), written by his friend Benjamin Disraeli.

Having worked through numerous archives of notes, letters, and memoirs, Larsen describes in detail the methods used in the excavations of Assyrian palaces. The best preserved information pertains to the work of Layard and his companions at Nimrud and Kuyunjik, the modern name of Nineveh, the last great capital of Assyria. In Nineveh the British discovered one of the great treasures of the day, approximately 200,000 clay tablets from the libraries of king Assurbanipal, baked in the conflagration that engulfed the city when it was sacked by Median and Babylonian forces in 612 B.C. The story is told against the background of contemporary historical events in Europe and in the Middle East, and it is a good tale, one that includes personal and national rivalries as well as friendships, disasters as well as great triumphs. As much as we may decry the tunnels drilled into the mounds of Khorsabad and Kuyunjik, the lost and undocumented information, and the inadequate recording techniques of these well-meaning ancestors, the material they managed to unearth laid the foundations for all aspects of Assyriology. Much of our present-day knowledge of Assyria still rests on these foundations, and many of the artifacts they unearthed, especially the inscribed tablets and monuments, remain unpublished in the museums of London and Paris. To understand their context we must, by default, rely on what little is known of the excavations of the time, and Larsen has done more than anyone else to document all of this in a coherent fashion. This book is an important addition to any Assyriological library, but it is also of great significance to anyone interested in the history of archaeology and of museums, or in Victorian intellectual history. Larsen has collected some fascinating illustrations for the volume, including rare portraits and never-before-seen early photographs. Most important, he tells a very good yarn.

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AN INTRODUCTION TO OPTICAL DATING: THE DATING OF QUATERNARY SEDIMENTS BY THE USE OF PHOTON-SIMULATED LUMINESCENCE, by *M.J. Aitken*. Pp. x + 268, figs. 103, tables 24. Oxford University Press, Oxford 1998. \$130.00. ISBN 0-19-854092 (cloth).

The role of archaeological science in archaeology continues its rapid expansion. Classical archaeologists rely both on scientist colleagues and on summary volumes to assess where scientific techniques can be of value. This book is an important and up-to-date reference on a dating method that is playing an increasing role in dating sediments of archaeological interest. Most archaeologists are familiar with thermoluminescent dating of ceramics. Optical stimulation methods are very similar.

Briefly, optical dating methods applied to sediments rely on sunlight to bleach feldspar and quartz sediments, thereby setting the clock to zero. Those quartz and feldspar grains are then buried by geologic processes. Once buried, radiation provided by radioactive thorium, uranium, and potassium in the surrounding sediments send electrons into "traps" in the crystal structures of the quartz and feldspar minerals. Optical stimulation procedures release these electrons. The length of time that has elapsed since bleaching and burial is measured by the number of electrons accumulated in the traps.

Aitken has set out to offer an understanding of the basic principles and procedures in optical dating, as well as its scope and limitations. He has succeeded in doing so for those who may have only a minimal background in physics. There are no mathematical equations except in the sections with technical notes that end each chapter, and most principles and procedures are illustrated with a figure.

Archaeological scientists will study this book from cover to cover, but traditional archaeologists will find it useful mainly for its excellent archaeological and geological examples that illustrate how and where these methods can be applied. This book, especially considering its cost, is probably not a candidate for the personal library of the excavation archaeologist, but it is an absolute necessity for every university and research library. It would be unwise for anyone in archaeology to consider optical dating methods without consulting this book. For example, understanding correct sample collection procedures is critical.

This book is encyclopedic in its coverage. Those archaeologists who want simply to browse should read chapter 5, "Some Applications." This chapter has 33 pages of examples, including many from archaeology. The examples show the wide range of sediment types for which optical dating has been used, including dune sand, loess, colluvial and alluvial sediment, organic-rich sediment, paleosols, and even the mud of wasps' nests. Dunes of the last thousand years have been dated, as have those more than 100,000 years old.

Archaeological examples include a sedimentary sequence at Bruchsal Aue, Germany, where a pit contained Bandkeramik pottery; sand filling from a rock shelter relating to the arrival of humans in northern Australia (60–70,000 B.P., beyond the range of radiocarbon); and wasps' nests overlying rock art. Chapter 5 also notes applications other

than sediment dating, such as archaeological ceramics, burnt stone, and volcanics.

The main application of these methods has been with aeolian (wind-blown sand) deposits, in part because it is in these deposits where there is the greatest confidence in the adequacy of bleaching. Finally, this book represents the latest word, but not the last word, on optical dating, as wider applications become available to archaeologists.

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LICHT AM ENDE DES TUNNELS: PLANUNG UND TRASSIERUNG IM ANTIKEN TUNNELBAU, by *Klaus Grewe*. Pp. 218, figs. 299. Philipp von Zabern, Mainz 1998. DM 78. ISBN 3-8053-2492-8.

For several decades Grewe has investigated and published on tunnels in antiquity, beginning with Roman aqueducts in Germany and then widening his topic geographically with his *Planung und Trassierung römischer Wasserleitungen* (Wiesbaden 1985). The present book extends his scope, being a comprehensive (though not exhaustive or cataloguing) treatment of all manner of tunnel construction in Mediterranean antiquity. The focus throughout, as the title suggests, is on the art of planning and surveying the tunnel, although topics such as the digging tools, organization of labor, training of engineers, historical background, and the politics of engineering are necessarily touched on and come to the fore in the case of unexplorable or vanished tunnels, such as the drainage tunnel for the Fucine Lake, obliterated by its 19th-century replacement. Grewe's background in the science of modern surveying and his careful exploration, measurement, and documentation of numerous tunnels, combined with a clear narrative style that also acknowledges his fascination with what is difficult, have resulted in a book that will be of interest to both a general audience and specialists.

The book sensibly begins with chapters on terminology and the techniques of ancient surveying. The treatment of surveying instruments is abbreviated and standard, in contrast to the more detailed chapter on the planning of tunnel courses and the various strategies to ensure that tunnels bored from opposite sides of a mountain meet. After a discussion of the technology of qanat construction, presented with lengthy quotations from a handbook on the subject written by Al Karagi, an 11th-century Arab mathematician, Grewe devotes the bulk of his book to individual tunnels, organized chronologically with sections on Israel, Greece, Etruria, and Rome. Within the section on Rome (fully half of the book), the overarching chronological arrangement gives way to organization by type, according to whether the tunnel served as a drain, a diversion for a stream, a passage for a road, or an aqueduct. Further subdivision within each of these Roman categories is geographical.

Grewe gives the famous tunnels of antiquity their due, including the Hiskia tunnel in Jerusalem, the aqueduct tunnel of Samos built by Eupalinos, and Claudius's Fucine

Lake tunnel, but he is equally interested in lesser-known tunnels. Some are visually impressive, such as the massive Titus tunnel in Çevlik, Turkey, which was built to divert a stream that otherwise carried debris into Antioch's harbor; others illuminate the variety of construction problems and engineering responses, as in the case of the tunnels down-channel of the Pont du Gard, and the "Drover-Berg" aqueduct tunnel in Germany (ancient destination unknown). Grewe has investigated most of the tunnels himself, looking for the clues, especially tool marks, swerves, course adjustments, and reroutings that, in lieu of direct evidence, allow him to infer the strategies of the tunnel builders. Where there is written evidence, Grewe makes the most of it; his analysis of the lengthy inscription by Nonius Datus chronicling his difficulties with the Saldæ tunnel is excellent. Curiously, the aqueduct tunnels for the city of Rome receive less than a page. Grewe explains that most of them are impassable, but he neglects even those in which his trained eye might have provided new insights; one would like to have heard his explanation for the indirect course of the Aqua Virgo or for the seemingly redundant Anio Novus tunnel under Mount Arcese. The brief sections at the end of the book on tunnels used in military operations (especially Caesar's) and on the post-Classical inheritance of ancient technology might also have been informed by the long and colorful history of the Aqua Virgo tunnel. Those interested in the Campagna, however, will appreciate Grewe's treatment of the Etruscan *cuniculi* north of Rome and his illuminating discussion of the Etruscan-style Roman drainage projects for the crater lakes in the Alban Hills, which not only stabilized the level of the water inside the craters, increasing agricultural production, but delivered water to the outer slopes for irrigation.

Those familiar with the Philipp von Zabern publications of the Frontinus-Gesellschaft will find the same high production qualities in this book. Photographs (most in color), maps, old drawings, and ground plans abound and are put to good use in the text. Fortunately, Grewe has an eye for the wider topography and includes numerous landscape shots that illustrate not only the scope of some of these engineering achievements, but also reveal their function, especially in the case of drainage and stream diversion. Although Grewe generally steers clear of guidebook directions to the tunnels under discussion, the maps and descriptions are sometimes detailed enough to locate the tunnels in the modern landscape.

The book does contain a few minor gaps: as in the case of the *Wasserversorgung* series, there is no index to help the reader make cross-connections in the book's case-by-case format; this lack is mitigated by the perspicuous arrangement of the book's contents. The English summary of the book, while helpful for those with no German, is awkward and in a few instances misleading. Perhaps only specialists will miss the absence of an overt dialogue with other contemporary scholars (although Grewe cites Bessac's exhaustive study of the Nîmes aqueduct tunnels, he digs a parallel tunnel through the evidence). In general, however, Grewe has an impressive command of the bibliography associated with the projects he discusses, and he does a thorough job of documenting his ancient sources. He has written a book that certainly belongs in research libraries (its audience will be much broader in German-speaking

countries), and those who teach ancient civilization and technology courses at the undergraduate level will find it to be valuable and dependable.

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SARDINIAN AND AEGEAN CHRONOLOGY: PROCEEDINGS OF THE INTERNATIONAL COLLOQUIUM "SARDINIAN STRATIGRAPHY AND MEDITERRANEAN CHRONOLOGY," TUFTS UNIVERSITY, MEDFORD, MASSACHUSETTS, MARCH 17–19, 1995, by *Miriam S. Balmuth* and *Robert H. Tykot*. (Studies in Sardinian Archaeology 5.) Pp. 403, figs. 166, tables 24. Oxbow Books, Oxford 1998. \$75.00. ISBN 1-900188-82-1 (cloth).

Confronting chronological issues in any region of the world offers a serious challenge to archaeologists. In the Mediterranean, this challenge is compounded by the frequent and ongoing reluctance to accept radiocarbon dating, particularly when such dating challenges received wisdom. And far too much received wisdom exists in Mediterranean prehistoric archaeology today.

What happens when you bring together specialists from two distinct regions of the Mediterranean, one (the Aegean) whose prehistorians frequently have been trained in more traditional, often Classical approaches to archaeology, the other (Sardinia) whose practitioners have a more eclectic approach to the discipline, but one also clearly influenced by Classical archaeology? More to the point, *why* bring together these two regions, and why do so from the perspective of Sardinian *stratigraphy* and Aegean *chronology* (the theme of the conference from which these proceedings stem)? Some would say the very term "Sardinian chronology"—with its typo-chronological focus, its reliance on external artifacts, and its lack of sound published stratigraphies—is meaningless. I approached this volume with certain misgivings that arise from these questions and concerns; I finished it equally perplexed by the same issues, and many more.

Before proceeding, I must also state that I am no fan of chronology—neither pottery sequences nor historical dates; neither astronomical dates nor star sightings; not even radiocarbon dates (conventional or AMS). I hold out some hope for dendrochronological calibration of AMS-dated short-lived samples (which offer direct data for age contemporary with use) but feel that the Cornell database (Kuniholm) has to become more comprehensive before we achieve the precision (through direct east Mediterranean dendrochronology and calibration) that most scholars simply assume. In the meantime we must rely on relative chronology, itself immensely complicated but crucially important in making social or historical inferences from archaeological data (as Betancourt emphasizes in this volume). It is a source of wonder to observe how faithfully Aegean prehistorians seem to believe in astronomical

dating systems that, in effect, offer no less than three different sets of chronologies: high, middle, or low, in the past compounded by an ultrahigh, and now by Bietak's ultralow, chronology. Those who propose these different chronological schemes not only swear by them, but even spend entire academic careers defending and building upon them with immense (and increasingly precious) grant resources (witness the massive Web project recently launched by Bietak to defend his ultralow chronology, "The Synchronization of Civilizations in the Eastern Mediterranean in the 2nd Millennium B.C.," <http://www.nhm-wien.ac.at/SCIEM2000/>).

I sit at the opposite end of the spectrum: I believe we operate, at best, within a margin of ± 50 years in the prehistoric Mediterranean. Thus we can be 100 years off in our estimates, and for the moment no chronological system or dating scheme can challenge that fact. In my opinion, Manning, Betancourt, and the proponents of an Aegean high chronology continue to maintain the most coherent position, as Jack Davis maintained in a review some years past (*AJA* 99 [1995] 733). They continue to produce a wide range of chronometric data, based on high precision dates *and* calibration, that encompasses the problematic Late Minoan IA period and leaves little room for maneuvering down to a low chronology; most recently R. Housely et al. (*JAS* 26 [1999] 159–71) propose a much tighter date range of about 1570/40–1525/1490 B.C. for the LM IB destruction horizon. The often confounding Egyptological positions that revolve around the later, Third Intermediate Period provide further grist for the mill of the converted; like the even less tenable positions of Peter James and associates (trotted out once again in this volume) calling for a reduction of 250 years in *any* traditional chronology, these Egyptological dialogues increasingly seem directed inward and unwilling to engage the radiocarbon realities of contemporary world archaeology (witness K. Kristiansen, *Europe before History* [Cambridge 1998] 34, the latest Europeanist to observe the close fit between the high Aegean and European-wide radiocarbon chronologies).

So, where does all this leave our volume? In it we find the usual array of authors lining up the predictable spread of data to argue much the same points, with a minimal Sardinian twist. One clear exception is the article by Sturt Manning, who rightly points out that archaeologists working in the central or western Mediterranean typically use Aegean material in local contexts to provide local chronological schemes and correlations, and thus compound the circular reasoning that envelops eastern Mediterranean chronologies. In contrast, Manning proposes to use conventional radiocarbon dates from Sardinia together with high precision dendrochronological calibration to gain another perspective on Aegean chronologies. This is a very clever case of reverse diffusionist logic, and despite the inevitable outcome (confirming the high Aegean chronology), it reveals a unique effort to make a direct contribution to the theme of this volume.

Other, more conventional Aegean prehistorians (Warren and Wiener), or those who deal consistently with issues involving the prehistoric Aegean (Bietak), have used this medium simply to reiterate their views on Aegean materials and chronology. Wiener, for example, offers a lucid and informative discussion of the absolute chronology of the

LH IIIA period, but the many asides (e.g., on the Kamid el-Loz clay tablets, or Egyptian chronology), and the several “personal communications” with other Aegean specialists, will seem tedious and irrelevant to anyone working in the central Mediterranean. Warren puts on parade the usual evidence (largely directed to Egyptian connections or contexts) to dismiss the high chronology. He also makes an issue about the dismissal by Zielinski and Germani (*JAS* 25 [1998] 279–89) of tephra from the GISP2 ice core as being of Theran origin; had he waited long enough to see Manning’s response in the same journal, he would have learned that this tephra is in fact quite similar to the Theran. Moreover, until it can be demonstrated that tephra compatible with that from Thera is either missing from all the other annual layers between about 1700–1450 B.C., or else positively identified in a mid-lower 16th-century B.C. layer, the dismissal of a Theran provenance is irrelevant, another classic provenance debate where partial data are essentially meaningless.

Bietak, finally, offers an “extracolloquial note,” included by the editors at the author’s request because his work at Tell ed-Dab’a is so frequently cited, and because he wishes optimistically to resolve the debate on the high/low/ultralow chronology in two pages. Bietak’s argument is that because all Cypriot White Slip I bowls at Dab’a can be shown to belong to early 18th Dynasty levels, and because in his idiosyncratic chronology that Dynasty is argued to begin about 1530 B.C., Thera’s LC IA destruction horizon—with its single White Slip I bowl (not two as Bietak maintains)—cannot possibly date to 1628 B.C. But what if White Slip I ware was popular in Thera at the time of its earliest production and only came to Egypt at a much later date (or indeed was kept as heirlooms and only buried in the 16th century B.C.)? What if, as *any* Levantine archaeologist would argue, this chronology is impossible for the regions surrounding Egypt? Bietak seems almost gleeful: “Therefore I see little or no chance for the high Aegean chronology to last. . . . It will give me great pleasure to have the lines above read in 10 years” (322). I can only agree, but feel that the debate will no longer concern this dialogue with the deaf.

Chronological contributions related to first millennium B.C. materials and contexts in Sardinia or the western Mediterranean make the important point that Greek pottery is too often used as if it is chronologically sacrosanct, when in fact these dates are derived from western Asiatic destruction levels that may correlate with any number of historical events (S. Morris). J. Papadopoulos argues similarly that Greek/Aegean pottery is an unreliable chronological yardstick, as well as a misleading and inadequate indicator of sociohistorical reality.

If, then, the papers on chronology, in particular the relationship between Aegean and Sardinian chronologies, prove to be problematic or irrelevant (which in itself tells us something), what of the other themes or emphases in the volume? The two sections on pre-Nuragic Sardinia contain several interesting papers, including one by P. Sondaar arguing for a human presence on Sardinia some 20,000 years ago. This mid-Pleistocene date has no chronometric basis, and so raises the same problems as Sondaar’s earlier efforts to single out Sardinia as somehow unique in Mediterranean island colonizations. Hurcombe and Phillips examine a

sample of 448 obsidian artifacts from Sardinia, using various techniques (SEM, microwear, and residues analysis), to demonstrate an increased use of obsidian, more blade production, and technological improvements over time; what they failed to show, most interestingly, was that the superior Conca Cannas (SA) source at Mont Arci was exploited more frequently when Neolithic farming ventures spread throughout the island. Vigne’s study of the exploitation of Corsican animal resources during the pre-Neolithic period reveals an insular reliance on small mammals and birds as well as coastal fishing, with lesser use of shellfish. Finally, Contu’s lengthy and detailed synthesis of stratigraphic sequences as bases for Sardinian chronology is impressive, as are Tanda’s arguments for three phases of the Early Neolithic, but the charts and tables evince a somewhat conventional, dated quality and show a less-than-satisfactory incorporation of radiocarbon data.

There are long sections on “Chronological Contributions from Architecture and Sculpture” and “Chalcolithic: Developmental Changes as Chronological Criteria,” but most of these deal with Sardinian material culture at a level of detail that I am unqualified to critique. In these sections, specialists will find stimulating discussions of familiar monumental or artifact types (e.g., *domus de janas*, *bronzetti*), all seeking to engage with the problematic parameters of Sardinian chronology. Similarly, in the section on “Aegean Chronology and Sardinia,” Licia Re produces a very useful catalogue of Bronze Age Aegean finds in Sardinia.

The final section, “Roman and After,” contains only two papers. The first, by C. Tronchetti, sagely treats the problems of production, local imitations, and arrival dates of Roman pottery in Sardinia. The second, by G. and M. Webster, proposes a new Nuragic phase (VII) during the early Medieval period, when certain *nuraghe* continued in use until the time of the Arab invasions.

Conference proceedings are never perfect, and the present volume is no exception with its several annoying editorial oversights. Given that some three and a half years have passed between the conference and the actual publication, however, we might have expected better. The coverage is wide, and there is something for everyone, from earliest prehistory to the Medieval period. The price of the volume may seem high, but this is a handsome book and with over 400 double-column pages you would be hard pressed to find better value for numbers. But the issue of numbers is a salient one: there is a marked increase in the number of conference proceedings—often with substandard papers—being published today (in no small part the output of presses like Oxbow Books). Is it not time to reassess this compulsion to see every conference paper into print? Would it perhaps be more useful to have such quantities of material appearing on the Internet, and reserve the higher quality, peer-reviewed, in-depth revisions of conference papers for publication in reliable journals? Or is this too much to ask for a polysemic, postmodern archaeology of the 21st century?

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EXCAVATIONS ON THE ACROPOLIS OF MIDEA: RESULTS OF THE GREEK-SWEDISH EXCAVATIONS UNDER THE DIRECTION OF KATIE DEMAKOPOULOU AND PAUL ÅSTRÖM, VOL. 1 IN 2 VOLS.: THE EXCAVATIONS ON THE LOWER TERRACES 1985–1991, by *Gisela Walberg et al.* (*SkrAth* 4°, 49:1:1; 49:1:2.) Vol. 1.1: pp. 364; vol. 1.2: pp. 7, pls. 144, pocket maps 3. Paul Åström, Stockholm 1998. SEK 650. ISBN 91-7916-039-5 (cloth).

ΓΛΆΣ 2: Ἡ ἈΝΑΣΚΑΦΉ 1981–1991, by *Spyridon E. Iakovidis*, with an appendix by *J. Tomlinson*. (Βιβλιοθήκη τῆς ἐν Ἀθήναις Ἀρχαιολογικῆς Ἑταιρείας 173.) Pp. xxvi + 364, figs. 81, pls. 63, col. pls. 10, plans 9, tables 4. The Archaeological Society in Athens, Athens 1998. \$64.00. ISBN 960-7036-75-1 (paper).

These two publications document recent work at two partly contemporaneous but rather different Mycenaean fortified sites. The first volume publishes work done at Midea in the Argolid. Excavations under a Greek-Swedish collaboration began in 1926 with the exploration of the nearby cemetery of Dendra. Work on the citadel itself began in 1939, but only small areas were explored before the work was interrupted by World War II. In 1963 a brief exploration of the fortification walls was undertaken, and in 1983 work was resumed within a larger segment of the citadel. The remains of impressive Mycenaean fortification walls have long indicated the presence of an important Mycenaean center. This splendid volume, written by Gisela Walberg with contributions by her students and colleagues, publishes the work undertaken in the lower terraces from 1985 to 1991, and it makes an important contribution to our understanding the site. It establishes that habitation on the site began in the MH period and continued throughout the rest of the prehistoric era. Confirmation of the LH III B and C phases is important since these phases are missing from the cemetery. Walberg is preparing a second volume on the lower terraces that will discuss the work done after 1991, and other volumes concerning the excavations in the areas of the west and east gates are planned.

This first volume presents a detailed description of the stratification of the trenches. The lowest levels produced MH pottery, a tomb, and remains of a floor and wall. Traces of other MH walls were disturbed in subsequent periods, and, although the pottery indicates that the site continued to be inhabited in LH I through III A, no walls datable to those periods could be safely identified. The fortification walls were constructed in LH III B. In the area of the lower terraces, part of a megaron with three adjacent rooms and stairway of LH III B date was uncovered, and in another terrace, adjacent to the fortification wall, parts of three more rooms were found. The areas described were not large enough to reveal coherent plans, but later work has added additional information. These buildings were severely damaged by an earthquake soon after the middle of LH III B and reconstructed in later LH III C, producing an unfortunate gap in the sequence. A second mid-IIIC destruction

was followed by another reconstruction and continued habitation. The site appears to have been abandoned at the end of III C, though the heavy overlay of Roman remains obscured the evidence of the final prehistoric phase. There followed a brief Archaic period and a much longer Roman and Byzantine phase.

Additional sections of the book and appendices deal with zoological and botanical remains, the geological formation of the site, and the numerous lead objects. Changes in the vegetation in the Early Bronze Age suggest geological changes, and clay beds for the manufacture of pottery may have been identified. The small finds are published in a separate chapter that includes a brief discussion on the possibility of a glass workshop on the site. The discovery of two small fragments from two separate large wheel-made figurines lead to the suggestion that there was a shrine nearby. A nodule inscribed with a Linear B sign and ideogram imply palatial record keeping. The existence of a shrine and a palatial administration would seem to be rather grandiose deductions based on very little evidence, even though the existence of such activities somewhere on this site can probably be assumed from parallels with other large Mycenaean centers. A brief discussion of 22 fragments of Mycenaean roof tiles is a welcome addition to the general discussion on the problems of roofs in the Mycenaean period.

The major portion of the book deals with the pottery, which is said to have local Midean characteristics not found at Mycenae or Tiryns, and to have undergone a chronological sequence that is not exactly duplicated at the other two sites. This detailed section, written by a variety of authors, who sometimes seem to contradict each other, is definitely for the specialist and is sometimes deceptive to the unwary reader. For example, the claim (100) that Midea has produced the fourth largest corpus of Mycenaean pictorial pottery after Mycenae, Berbati, and Tiryns, may be factually correct, but the sherds of this group, said to represent at least 40 different vases (pls. 66–7), are for the most part disappointingly small and uninformative. The statement that sealed deposits can contain sherds that foreshadow innovative elements of the next phase (128) follows K. Kilian's troubling suggestion ("The Mycenaean Up to Date," in *Problems in Greek Prehistory*, ed. E. French and K.A. Wardle, [Bristol 1988] 118) that strata be dated not by the latest sherds but by the majority of sherds. The bulk of the pottery may well be dated by percentages, as Kilian suggested, but the actual sealing of the deposit—and hence the architectural phase that caused the sealed deposit to be formed—must surely be dated by the latest sherds. Clearly there is a need for a stricter definition of the characteristics of each phase for a greater understanding of how the pottery relates to the architectural phases, and for a recognition that variations in the pottery style exist in different sites. Walberg recognizes this (177), and further work and publication on this site will undoubtedly help to clarify these problems.

The new volume on Gla, the second in this series, presents the excavations conducted by S.E. Iakovidis for the Greek Archaeological Society between 1981 and 1991. Work at Gla began in 1893–1894, when F. Noack visited Gla and drew plans of the visible remains. This work was supplemented by four trenches dug by A. de Ridder in 1893, but the details of the site remained only partially understood

until 1955–1961, when J. Threpsiadis undertook new excavations. Iakovidis published this material and reevaluated the earlier conclusions in 1989 in the first volume of the Gla series. The first volume described in detail the fortifications, gates, northern residence (referred to as a palace in the earlier publications), and the buildings along the western side of the large central enclosure. Christos Bouloitis is preparing a third volume on Gla's wall paintings.

In this new volume, Iakovidis publishes the work done on the eastern side of the central enclosure. These buildings, which served primarily as warehouses, are unique for their period, and Iakovidis's careful description is a useful addition to our knowledge of different Mycenaean building types. An English summary at the end of the book is a welcome addition for the beginning student. A more careful attempt to tie the English description of the buildings with the illustrations in the Greek text would have been useful.

The central area of Gla consists of four major buildings, the two on the west parallel to the two on the east. The southern building on the east side, building H, duplicates the plan of the south building on the west side. These four-room structures, each divided by a central corridor, were used for storage, as is evident from the quantities of charred wheat and assorted large vases found within. Fragments of cooking vessels and an elaborately decorated room in building H suggest, in the reviewer's opinion, the possibility that one of these rooms had been converted into a living area. To the north there is a very long structure along the east side, ca. 150 m in length, which consisted of five storerooms of varying size (K 1–5), three rooms that served either as workrooms or as a residence (N 1–3), an open area (N 4), and finally at the north end a residence (M 1–4), which presumably served as the domicile for the official in charge of the structure. The various units of this structure shared a common west facade, facing the building along the west side of the enclosure (B, E, Z). The plan of the building on the west differs from that of the building on the east, but both appear to have served as storage areas and both contained at least one residence. The five storerooms on the east are entered from the west by way of two wide doorways with sloping ramps. The other units of this structure, which are much smaller in size, were entered from the east and appear to have been used in a different way. Fragments of wall paintings and broken cooking pots suggest that they were, at least in part, work areas or residences. The plan of unit M consists of a large dominating room (unfortunately called a kitchen by the author, but perhaps better identified as the main room or megaron of the unit), which was entered by way of a vestibule with a wide doorway facing the exterior, and secondary rooms aligned on an axis parallel to the axis of the main unit. These rooms duplicate the central elements of a Mycenaean house.

The buildings at Gla were built at the beginning of LH III B and were burned and abandoned before the end of that period. Pottery found within the buildings was carefully recorded and has been presented in detail. Most of it was unpainted, but among the decorated sherds are two examples of monochrome kylikes, a type associated with the LH III C period on other sites. An appendix by J. Tomlinson reports the results of neutron activation analysis, which demonstrates that the pottery from Gla, Thebes, and Tanagra came from three different workshops. This

evidence indicates that pottery sequences did vary from site to site (see above, regarding Midea).

An examination of the construction of these buildings has produced interesting results concerning the formation of the mud bricks used for the superstructure of the buildings. Gla's 137 pan tiles and 23 cover tiles are a great addition to this class, and they suggest once again that some buildings in the Mycenaean period had pitched, tiled roofs, although the roofing system used at Gla was not necessarily universal throughout the Mycenaean world. The pan tiles, like the mud bricks, consisted of a thick layer of clay smoothed over a flat surface and cut into appropriate dimensions, whereas the cover tiles, made of much finer clay, were thrown as cylinders on a wheel and afterwards divided vertically in half. Unlike the mud bricks, the tiles were fired.

Taken together, these volumes on Gla and Midea present significant additions to our knowledge of the Mycenaean period. They are particularly important in that both recognize the need to separate pottery sequences by site as well as by period. We anticipate additional volumes in both series with pleasure.

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EUBOICA: L'EUBEA E LA PRESENZA EUBOICA IN CALCIDICA E IN OCCIDENTE: ATTI DEL CONVEGNO INTERNAZIONALE DI NAPOLI, 13–16 NOV. 1996, edited by *M. Bats* and *B. d'Agostino*. (Collection Centre Jean Bérard 16; *AION* Archivio Storico Antico 12.) Pp. viii + 432, figs. 257. Centre Jean Bérard, Naples 1998. ISBN 2-903189-56-0 (paper).

This volume, dedicated to the memory of Ioulia Vokotopoulou, is a major contribution to the archaeology of Greece and Magna Graecia in the Early Iron Age, one that will quickly become an important reference work. Twenty-seven papers, followed by interesting discussion (395–419), deal with the theme of Euboea, and Euboeian presence, in Chalkidike and the "West." Individual contributions can be broadly grouped under two categories: historical or archaeological overviews, and material from individual sites or regions. Much of the strength of the volume is in the detailed presentation of previously unpublished material; in this respect the contributions by Mazarakis-Ainian on Oropos, Sapouna-Sakellaraki on Kyme, Moschonissioti on Mende, and Frasca on Aiolian Kyme, stand out. Of the papers dealing with excavated material, five (or six) specifically concern sites in Euboea (the paper on Kyme; four on Eretria, by Huber, Blandin, Bérard, and Andreiomenou; and Knoepfler's paper on Narkittos and Eretria). Five deal with sites or material in the Aegean (that on Oropos, plus papers by Kourou on Euboea and Naxos, Soueref on central Greece, Tiverios on Anchialos-Sindos, and Moschonissioti on Mende), and seven cover material in Italy (Coldstream on Pithekoussai, Doria on Cuma, de Caro and Gianella on Ischia, d'Agostino and Soteriou on Kephallenia and Campania, Modesti on Pontecagnano, Lentini on

Sicilian Naxos, and Bacci on Zancle). Only one paper (Frasca's) deals with material from the west coast of Turkey. Collectively, these contributions—written in Italian, English, and French—present much new material.

Among the more synthetic contributions, however, most deal with themes previously explored by their authors. Thus David Ridgway returns to his cheese-graters, Morgan to the Corinthian Gulf, Mele to the thorny comfort of Chalkis and Chalkidike, Lemos to her omnipresent Euboians in the Aegean, de Polignac to the place of cult, in this case Hera, and Malkin to the familiar ground of Ithaka and Odysseus. There is little that is unexpected here, though some papers are more astute than others. Of the remaining contributions, Morel returns to a favorite French hunting ground (Marseilles and the Phokaian enterprise in the western Mediterranean), while Cassio tackles the issue of the Euboian complexities of early epic poetry and Homer in particular. This was a subject judiciously covered by Martin West, and in a much longer, though not necessarily more fruitful, discussion by Barry Powell. Bucking the trend, Cassio concludes, *inter alia*, that it is impossible to prove that the Euboian dialect exerted any significant influence on epic language.

As for geographical developments, Ithaka assumes a more pivotal role than in previous scholarship, as does western Greece more generally, including Kephallenia (see the papers by Malkin, Morgan, d'Agostino, and Soteriou), a noteworthy fact in a volume dedicated to Eubolia. Boiotia—Eubolia's nearest neighbor—continues, however, to be neglected, and Chalkidike itself, which is a central focus of the book, still has a great deal to offer; much remains to be written on these regions. Also overlooked are other areas of the north Aegean, mainland and insular, not least of which is Lemnos.

The focus of the volume is very sharply on the central Mediterranean; the Euboian presence in the East is touched upon only briefly, and indigenous populations in Italy and Chalkidike are often overlooked. A consequence of the strongly Hellenocentric tone of the volume is that a significant factor in the history of the Mediterranean in the Early Iron Age has been swept under the carpet: the Phoenicians, as well as eastern involvement more generally (e.g., Cypriot, North Syrian). This is a shortcoming, particularly as there is mounting evidence for Phoenician presence in Eubolia itself.

Of the papers dealing with archaeological material, pottery continues to take pride of place (two-thirds of the figures illustrate pottery). Nevertheless, it is ironic how little Euboian pottery there is in south Italy, Sicily, and Chalkidike. Indeed, one of the few tables in the entire volume (295) shows that there are 2,790 Corinthian imports, 26 Euboiocycladic, and a mere 6 Euboian pottery imports in Apulia in the ninth and eighth centuries B.C. (Euboian is similarly outnumbered elsewhere, even at Pithekoussai). Perhaps more surprisingly, there is little penetrating discussion as to why a Euboian pot or sherd necessarily equals a Euboian trader or colonist, and there is no serious attempt to tackle the more pressing methodological problem: Can colonial origins or socioeconomic influence be accurately reflected on the evidence of pottery alone? Moreover, evidence for colonization is presented in clear-cut terms. There is no discussion of ambivalence, "hybridization," or "creolization" in a colonial setting, no mention of how objects become

"entangled" against such a backdrop, to borrow the term used by Nicholas Thomas, and there is a neglect of much enlightening anthropological bibliography on colonialism and culture contact.

The quest for Euboian material ultimately rests on our literary sources, and it is for this reason that many of the more text-oriented historical papers appear early in the volume. In this there is a methodological concern that contributes to the current schism between history and prehistory. By insisting on the primacy of the testimony of later authors in order to determine the ethnic origins of, or influences on, a colonial setting several centuries earlier, social, political, and economic realities of the historic era are allowed to infiltrate and thus define the prehistoric past. The resulting problems, well treated by Kent Lightfoot ("Culture Contact Studies," *AmerAnt* 60 [1995] 199–217), include the continued practices of using historical records as direct historic analogues, of privileging written documents over archaeological material, and of implementing different research agendas and strategies whose results are not comparable in prehistoric and historic contexts. Much of the blame rests with archaeologists, as they all too often accept at face value the historical text, sometimes tailoring archaeological material to accord with the literary evidence. The question, however, is not whether historical documents should be used by students of the Early Iron Age Mediterranean, but rather *how* these sources should be employed most effectively in archaeological research. Here there is much room for maneuver, and a lot remains to be done on the early history and archaeology of the Aegean and south Italy. With so many varied and stimulating contributions, incorporating a wealth of archaeological and bibliographical material, accompanied by numerous illustrations, *Euboica* will provide much fuel for ongoing discussion.

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MAKRON, by *Norbert Kunisch*. 2 vols. (*Kerameus* 10.)
Pp. xii + 259, pls. 176. Philipp von Zabern, Mainz
1997. DM 398. ISBN 3-8053-1890-1 (cloth).

Makron is the most prolific vase painter known and one of the great Late Archaic Attic red-figure cup-painters; to have a thorough, well-illustrated study of this important artist is a great *desideratum*. Kunisch has now given us this welcome study with the 10th volume of the *Kerameus*, a series devoted primarily to studies of individual vase painters, but the result is not entirely satisfactory and the question, Is this a good book?, can best be answered by the German *jein*.

Let us start with the positive. The quality of the photographs is superb, perhaps the best in the entire series, which is made all the more impressive by the fact that most of the 610 vases and fragments catalogued and assigned to Makron are illustrated. Supplementing the 176 gorgeous black and white plates are several photomontages interspersed in the text; composed of smaller images, they focus on specific details of the painter's figures and scenes. So,

for example, figure 19 allows a comparison of heads from 12 different vases, and figures 28–33 give the objects and ornament found underneath the handles. These photomontages are a great help in trying to understand how the painter drew, and with the wide availability of computer scanners and photograph manipulating software, this type of illustration should become standard in studies of individual vase painters. I have only one substantial complaint with the plates: unlike the captions for complete vases, those for fragments do not usually give their location and inventory number (e.g., pls. 47–48 and 133). Such information allows for the quick identification of the piece illustrated without having to refer back to the catalogue or list of plates.

The text of the book is a different matter, for it is not always well written or comprehensive. Many of the standard areas of investigation are covered, including stylistic phases of the artist's work, ornament, iconography, and style of drawing, but while individual sections often begin in clear and straightforward prose with reasoned conclusions, they turn rapidly into psychological evaluations of the artist that are highly speculative, rhetorically expressed, and difficult to understand. Time and text would have been better spent on gleaning from the vases the information they provide. For example, much more could have been done with a proper study of shape. Makron worked extensively with Hieron, who signed 56 of Makron's vases, including more cups than are signed by any other potter working with any one artist; these provide a rare opportunity to compare the shapes of signed vases. Instead, Kunisch recites Bloesch's comments on the potter and gives several observations that appear to be based on only a few profile drawings, mostly of fragmentary vases in Bochum, the author's former home base; the few remaining drawings are all derived from other scholars. A proper study of the profiles of Makron's vases, as well as those by related painters, could have told us much more about Makron's workshop and, therefore, the artist. Recent studies of vase painters have demonstrated how important it is to look at the workshop as a whole, not just the main painter or painters.

Another instance where the author's discussion falls short is his description of the painter's drawing style. For example, no real attention is paid to how the artist drew much of the *realia-antiquaria* in his scenes, or how his drawing of specific items sometimes changed during his career—such details can help determine the chronological arrangement of an artist's oeuvre. One that caught my eye in the plates, but is not discussed in the text, is how Makron's rendition of a hanging sponge changed during his second period, Kunisch's "Hauptwerke I" phase, from one consistently shown in a profile view to one rendered frontally (compare the sponges on nos. 42, pl. 19, and 124, pl. 43, with nos. 179, pl. 64, and 233, pl. 77).

Another problem with the text is that the author often forgets that he is writing for a learned, specialized audience, not the general public or interested lay person. Surely in a scholarly series such as *Kerameus*, for example, the location of the picture field of a cup does not need to be described, nor do we need to be told that the lip of the cup is its upper border (81).

Despite these criticisms, however, there is much useful information and many excellent observations in this vol-

ume. The author's analysis of the figure types used by the painter and the accompanying drawings add substantially to our understanding of how the painter worked. Particularly praiseworthy is Kunisch's thorough analysis of the compositional schemes used on the outside of the cups, which he divides into three types: the half-circle, circle, and omega schemes. His chronological arrangement of the painter's work, although fluid, as he himself admits, is a real advance on the minimal efforts in prior scholarship to assign vases to different periods of production. Particularly well-coined is his description of Makron as the *Gesellschaftsmaler par excellence*.

This will be the standard monograph on Makron for many years to come; it is a study useful in many ways, and we should all be grateful to have it. Nevertheless, with regard to future studies of vase painters, this book is *kein Vorbild*.

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CORPUS VASORUM ANTIQUORUM: USA 33: THE J. PAUL GETTY MUSEUM, MALIBU 8, by *Mary B. Moore*. Pp. xii + 174, figs. 44, tables 4, pls. 76. The J. Paul Getty Museum, Malibu 1998. \$100.00. ISBN 0-89236-134-4 (cloth).

As Marion True, the J. Paul Getty Museum's Curator of Antiquities, points out in her preface, the vases included here represent the heart of the Bareiss collection, acquired in 1985–1986. The entire collection is to be published in a series of six *CVA* fascicles. Five have appeared so far, the first two devoted to Attic black-figure pottery, one to South Italian and other wares, and one to Attic red-figure closed shapes. This latest fascicle presents 107 Attic red-figure drinking vessels, most of them cups of type B. Roughly a quarter have been published elsewhere, particularly vases attributed to major painters as well as a few vases of exceptional iconographic interest. Most, however, are either entirely new or have received only brief notice in earlier publications.

On the whole, Moore has dealt with the difficult task of establishing the text, that is, providing a descriptive account of the vases, with intelligence and consummate skill. She gives the specialists all the essential technical information they require, but does not drown them in endless detail. The descriptions of the figural scenes are lively, elegant, and enlightening. Her reconstruction drawings help visualize in the original composition fragments that might otherwise remain illegible. Profile drawings are collected at the end of the text.

The commentaries that follow the descriptions pay careful attention to matters of style and typology, and offer a well-chosen selection of comparanda. One might single out as especially useful the analysis of cup no. 38, convincingly placed near Apollodoros, and the analyses of patterns at nos. 60 (palmette border) and 98 (lozenge pattern). There are many new attributions to known painters or their manner, including Euergidean and Epeleian cups, one by Epiktetos, one by the Dokimasia Painter, and several by the Penthesilea

Painter. Previous attributions are accepted for the most part, but all are reexamined and discussed. Again, specialists concerned with classification and authorship will appreciate this rich apparatus of parallels and detailed observations, and will draw upon it for years to come.

Students of iconography are also well served, although less consistently and thoroughly. There is a fresh discussion of the Ajax cup, and a few of the entries offer valuable mini-essays on subject matter: the “woman tippler” on an early Classical skyphos (no. 5), and Onesimos’s retching komasts (nos. 43, 44). One is grateful but left wishing for more.

In that spirit, a few notes on matters of iconography are offered here. With regard to number 29 (p. 20), the aulete on fragment 86.AE.330 seems to wear a himation drawn over both shoulders, rather than a chiton; if so, it may be male; conversely, the aulete on 86.AE.331 may be female, since the vertical lines under the himation are likely to be folds of a chiton rather than the figure’s legs. On number 55 (39–40), in addition to the article by Kurtz and Boardman cited here, note two other major contributions to the literature on the “Anakreontic” komasts: F. Frontisi-Ducroux and F. Lissarrague, *AnnArchStorAnt* 5 (1983) 11–32 (the Bareiss cup at p. 26 and figs. 12.2, 13.2), and S.D. Price, *GRBS* 31 (1990) 133–45 (analysis of the Bareiss cup *passim*, illustrations at pls. 4–5). On number 61 (45–46), regarding women in a sword dance, the Amazons who founded the cult of Artemis at Ephesus comes to mind, and the armed dance they performed for the goddess (Callimachus, *Hymns to Artemis* 237–47); see also C. Bron, *GettyMusJ* 24 (1996) 69–83. Regarding number 72 (53), the suggestion that the subject of the exterior is a comic chorus was made by E. Simon, *The Ancient Theatre* (London 1982) 14, as well as by J.R. Green, *Greek Vases in the J. Paul Getty Museum* (Occasional Papers on Antiquities 3, Malibu 1985) 105 n. 7, and Price (cited above at no. 55) 164, pl. 10b. On number 90 (63), the image of the oriental archer in short chiton is typical of the sons of Eurytos, as they appear, for instance, on a vase by Douris published by M. Robertson, *Greek Vases in the J. Paul Getty Museum* (Occasional Papers on Antiquities 7, Malibu 1991) 75–86. Finally, in number 99 (68), the object the satyr holds in his right hand is indeed a fan, comparable to the one on an amphora stand in Toledo, 58.69b (*CVA USA* 17, Toledo 1, pl. 16).

In contrast to the high standard of accuracy in the description of the figures, the treatment of the painted inscriptions is puzzling and unhelpful. In current practice, dipinti are either given in facsimile and transcribed, or simply transcribed following the Leiden system. In either case, lacunae are marked and, whenever possible, filled. As Beazley did, some employ a transcription format in all capitals that allows particular forms of some letters, so that the presence of a four-barred sigma or a dotted delta may be noted. (On this long standing practice, see P. Herrmann’s review of *IG³, Gnomon* 56 [1984] 32). In no way, however, does this format purport to reproduce the inscription. The convention adopted here appears to be a contamination of facsimile and the latter form of transcription, made possible by “an inscription-Greek font created for these fascicules” (ix). This font transcribes the dipinti into signs—some of which are Greek capitals, while others belong to no alphabet—that are a rough approximation of the way the painted letters may look to an uncomprehending eye.

The dipinto in the tondo of an Epeleian cup (no. 24, p. 17), for example, becomes KNIOC; HO/ΑΙΣ. But the first word, visible in the photograph (pl. 400), is plainly *καλός*. One has little trouble understanding an alpha whose verticals fail to meet at the apex and the curvy three-barred sigma that has lost its third bar; the short leg of the lambda is clearly marked. On fragment number 21, the text at page 16 reads † O, but the predictable HO of *ho* [παῖς] is visible in the illustration at plate 399. The faintly visible *παῖς* on number 47 (pl. 417) is transcribed as ΓΣ on page 32. Perfectly legible inscriptions thus become jumbles of letters. Because most dipinti are not visible in the illustrations, the reader is rendered unable to distinguish words that make sense from genuine nonsense, such as (probably) the dipinti on a cup by the Tarquinia Painter (no. 73). It does not help that the same sign is used for different letters or sounds (e.g., † is used for *pi* on no. 24 and for *gamma* on no. 68), and that spaces separating words are inconsistently acknowledged.

A different flaw in this otherwise painstaking account is the omission of any record of provenience. Perhaps in most cases it would be impossible to trace a vase further than the art market—but not always. For instance, the fragments of cups by Onesimos (no. 44) and by the Penthesilea Painter (no. 75), which join fragments in the Louvre, likewise should come from the Campana collection. This small fact may be of interest to readers interested in the distribution of Attic pottery, as well as readers who work on the history of collections. And there is surely information to be had about the origin of the great kylix with scenes of the tragedy of Ajax (no. 49), if nine new fragments were added to it after 1986 (p. vii). Indeed, the addition of so many new pieces raises questions about the ethics of such work-in-progress. The Bareiss collection took substantial shape in the 1950s and 1960s, in a climate that made it possible to overlook the destruction caused by clandestine excavations and the illicit trade in antiquities. That all changed with the resolution passed by the AIA Council on December 30, 1970 in support of the UNESCO convention aimed at curbing the illegal traffic in cultural property (*AIA Bull* 62 [1971] 43–4). Provenience has hardly been a neutral issue since 1973, when the Council passed a second resolution asking museums not to purchase objects of undocumented origin (*Archaeology* 27 [1974] 127). Since then it has been the policy of the *AJA* to reject publication of such objects, a policy restated by its current Editor-in-Chief, R.B. Hitchner (*AJA* 103 [1999] 1). Now, in addition to the vases that have been in the Bareiss collection for a long time, this fascicle contains 15 pieces that have no history beyond a notice in *GettyMusJ* (1986) 121, no. 21, recording the anonymous gift of 447 fragments of ancient vases in 1985. Of 39 more, all that is known is that they were accessioned into the Museum with the Bareiss collection in 1986. When and how were they acquired? Striking the rubric of provenience off the *CVA* format is one way of saying that the question is irrelevant and the manner in which an object was procured and its archaeological context are of no consequence. This is a view that has its supporters, but it is well to remember that this format was drawn up by the USA *CVA* Committee (ix), which is, after all, a standing committee of the AIA.

The decision to publish the Bareiss vases as an integral

whole draws attention to the fact that a collection is itself an artifact, bearing witness to the collector's individuality: witness the many pieces with imagery that invites curiosity and reflection beyond the usual parade of athletes, komasts, and warriors. In several respects, both the collection and this *CVA* also reflect habits of collecting that took shape at the beginning of the century, uniting patrons, art dealers, and scholars in the common practice of connoisseurship. At the scholarly end, these practices have fostered skill in visual analysis and increased our ability to restore accurately, classify, and date vases. These are all good things. The practice of connoisseurship may also have the less desirable effect of reducing the object to *objet*, ultimately in need of no explanation other than its own existence. In this perspective, provenience may be ignored without qualms, and function, subject matter, and iconography become secondary, if worthy, concerns. Nothing in the mission of the *CVA* mandates such an approach, as is demonstrated by those fascicles that address, within reason, all aspects of the vases. One can only hope that the USA *CVA* Committee will reexamine its policy and encourage its authors to take a more comprehensive approach to their task.

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Η ΘΡΑΚΗ ΣΤΗΝ ΑΤΤΙΚΗ ΕΙΚΟΝΟΓΡΑΦΙΑ ΤΟΥ
5ΟΥ ΑΙΩΝΑ Π.Χ., by *Despoina Tsiafakis*.
(Παράτημα Θρακικής επετηρίδας 4.) Pp. 403,
figs. 8, pls. 80. Center for Thracian Studies, Ko-
motini 1998. ISSN 1106-3823 (paper).

What do Orpheus, the prototypical singer, Boreas, the north wind, Phineus, the blind seer, Bendis, the huntress, Thamyras, the bard blinded by the Muses, and Tereus, the brutal rapist of the Athenian princess Philomela, all have in common? All these mainstays of Greek myth and (in some instances) of Athenian cult were thought to come from Thrace. Why this preponderance of Thracian figures in Athenian myth, religion, literature, and art in the fifth century B.C.? This is the question Tsiafakis sets out to answer in this, the first comprehensive study of Thracian iconography in Athenian art, primarily red-figure vase painting of the fifth century B.C. The book started life as a Thessaloniki University dissertation; for the published version, sponsored, appropriately enough, by the latter-day Thracians of Komotini, the exceptionally thorough bibliography and notes have been brought up to 1998.

Orpheus receives pride of place and occupies roughly half the book, with three episodes popular in red-figure: charming the Thracians with his music; his death at the hands of the Thracian women; and his severed, oracular head. Strangely, his love and loss of Eurydice, so poignantly depicted on the Three-Figure relief of the late fifth century, never appears on vases. By the mid-fifth century, with music increasingly central to the cultural life of Periklean Athens, the vases introduce several more singers and musicians, all associated with Thrace: Thamyras, Mousaios, and Eumolpos. Of these, only Thamyras was associated with

Thrace already in Homer. The rest, including Orpheus, Tsiafakis argues, first acquired their Thracian origins only in the fifth century, under the influence of closer relations between Athens and Thrace, culminating in the alliance between Perikles and the Thracian king Sitalkes on the eve of the Peloponnesian War.

The interpretation of vase iconography against its historical-political background is one of the strong points of this thoughtful book. The cult of Boreas in Athens began as a thank offering for the god's help against the Persians in 480 and inspired the series of vases depicting his pursuit of the Athenian Oreithyia, while that of Bendis, brought to Athens in the decade 430–420 B.C., is interpreted here as a response to the alliance with Sitalkes. Tsiafakis suggests that Tereus, the husband of Prokne and thus son-in-law of the Athenian King Pandion, was also first "Thracianized" as a gesture to Sitalkes, whose father was named Teres. Would the king be flattered by this association with a vicious rapist? One might as well ask why the Athenians commemorated Prokne's murder of her son Itys, in the aftermath of Philomela's rape, with a statue on the akropolis (likewise to flatter Sitalkes, according to Tsiafakis).

Three other useful chapters go beyond standard iconographical studies. One is on the painters and workshops that favored Thracian themes (though it may be a stretch to say that the Brygos Painter, whose name sounds Phrygian, brought these subjects with him "from home"). A second explores Thracian subjects so far unattested in Attic art but known elsewhere (e.g., Rhesos on the splendid Chalcidian amphora in Malibu, pls. 76–78). The third discusses Thracian figures who do not appear in Greek art at all. The latter two chapters raise the issue of Athenian selectivity, and Tsiafakis is able to show that every motif depicted was associated with Athens through personal, political, or religious ties.

This handsomely produced book is completed by an excellent and generous selection of illustrations that will reward even readers whose modern Greek is a bit shaky. A comprehensive English summary also serves as a useful point of entry. Even better, the author will soon present a survey of her results in English, in *Not the Classical Ideal*, ed. B. Cohen (Leiden, forthcoming). Meanwhile, this important monograph shows how the venerable study of Athenian vase iconography can be reinvigorated by looking at familiar themes and material from a new angle.

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ARCHAIC GREEK EQUESTRIAN SCULPTURE, by *Mary Ann Eaverly*. Pp. 141, pls. 22. University of Michigan Press, Ann Arbor 1996. \$39.50. ISBN 0-472-10351-2 (cloth).

Horsemen play a leading role in Greek art, but they are relative latecomers to its repertoire of large-scale statues. In the first half of *Archaic Greek Equestrian Sculpture*, an ex-

pansion of her Michigan doctoral dissertation, Mary Ann Eaverly addresses the origin of the genre and explores the identities and iconographical significance of the riders. The second half of the book catalogues the 18 fragmentary stone examples of these statues that she has identified.

Incontrovertible evidence of identification and interpretation is scanty. Few pieces survive, and none can be firmly connected with its dedicator or its exact original location. Therefore, to understand the equestrian statues in their political and cultural contexts, Eaverly considers external evidence, for example, vase paintings, coins, inscriptions, and statue bases, as well as the extant sculpture itself.

Chapter 1 introduces the study (an editing error, p. 3, allows the incorrect identification of the chapters, which seem to have been renumbered after the introduction was written). Chapter 2 treats the chronological and geographic distribution of the sculpture, identifying it as beginning in Athens in the mid-sixth century and flourishing in Attica and Athenian-controlled Delos for the following six or seven decades. Chapter 3 identifies components of the equestrian statues, considers regional styles, and distinguishes characteristics beyond scale that set the statues apart from statuettes. Chapter 4 explores the meaning of the Archaic equestrian type. Discounting the chthonic element as irrelevant to archaic representations, Eaverly opts instead for a general connection with class and statues and, wisely, given the absence of compelling evidence, identifies some of the horsemen with mythological figures only “tenuously and with some trepidation.”

Eaverly accepts the close ties between politics and art in sixth-century Athens argued by Boardman, Shapiro, and others; references to Peisistratos and his “horsey sons,” Hippias and Hipparchos, weave throughout her text. She identifies two periods in which equestrian statues were erected on the Acropolis and links these with two main periods of the occasionally interrupted Peisistratid rule. The Peisistratids may well have had a hand in developing and promoting large-scale equestrian statues in Athens, but since the chronology of both sixth-century Athenian political history and sixth-century Athenian sculpture remains imprecise, a connection between the Peisistratids and the birth and flowering of large-scale equestrian statues must merely remain a tantalizing possibility. Eaverly’s proposal raises other stimulating questions: Were personal names connected with horses more frequently among the Peisistratids than among rival Athenian families? Were these names, now identified as “horsey,” considered so by contemporary Athenians, or were they viewed independent of their etymology? Were horsey names more common in Athens than elsewhere (one immediately thinks of Hippokrates of Kos and Hippodamos of Miletos)? Were horses more potent socio-political icons in Athens than in Greek city-states, where elite citizens were similarly designated *hippeis* (as in Boeotian Orchomenos and Eretria), *hippobotai* (Chalcis), or *hippogretai* (Sparta)? Were horses more closely related to Athens than to places famous for their breeding (e.g., Thrace, Macedonia, Boeotia, or southeastern Sicily)? And are other types of large-scale sculpture also specific to Athens and Delos (where, perhaps not incidentally, the two largest deposits of Archaic sculpture have been found), or is this concentration of equestrian sculpture more dependent on survival than on ancient preference?

The catalogue collects and describes the fragments that survive from large-scale stone equestrian statues made during the sixth and early fifth centuries B.C. (No unbroken ones exist today.) All fragments assigned to the same statue are collated, so each of the 18 entries represents a separate statue. All extant pieces are made of stone, although the author points out that inscribed statue bases from the Athenian Acropolis (e.g., A.E. Raubitschek, *Dedications from the Athenian Acropolis* [Cambridge, Mass. 1949] nos. 77, 88, and 147) indicate that Archaic sculptural representations of riders and horses also existed in bronze, and there are several large-scale architectural terracotta equestrian figures in the Syracuse Museum.

The disappointing quality and number of the illustrations necessitate the use of other books and periodicals, since the 22 plates, printed in faint impressions with minimum contrast, provide little information. Eight of the catalogued monuments are not illustrated in the book, and of these no pictures are available at all for three of the Delian statues catalogued (cat. nos. 15, 16, and 17; Delos A4098, A41092, and A4099), which the excavators have not yet published. The reader who cannot go to Delos, therefore, must depend only upon written descriptions for fully one-sixth of the corpus.

Twelve of the monuments that Eaverly identifies as equestrian include evidence for both horse and rider. Of the others, an upper torso with head (cat. no. 16, Delos A4102) can be accepted, despite the lack of published illustration, on the basis of the author’s persuasive description, which follows similar identifications by others, including M. Robertson (*A History of Greek Art* [London 1975] 89) and B.S. Ridgway (*The Archaic Style in Greek Sculpture* [Princeton 1977] 140).

Readers may wonder whether to accept five disembodied heads as riders. Eaverly includes them following the lead of Humfry Payne, who observed that in Archaic equestrian statues the rider’s head turns away from his frontal torso (*Archaic Marble Sculpture from the Acropolis* [London 1936] 7), a fact he used to join the Rampin Head in Paris (Louvre 3104) to the mounted torso in Athens (Acropolis 490). Two of the heads Eaverly includes surely can be accepted as horsemen: a small head from Eleusis long recognized as a rider (cat. no. 3, Athens National Museum 61) and a defaced head on Delos with elaborate coiffure, formerly identified simply as a bearded head (cat. no. 18, Delos no. A4108). Less certain but probable is the head (cat. no. 13, Acropolis 663) that W.-H. Schuchhardt called a rider (“Rundwerke ausser der Koren,” in H. Schrader, ed., *Die archaischen Marmorbildwerke der Akropolis*, [Frankfurt 1939] 245) and that G.M.A. Richter recognized as problematic but still classified as a kouros (*Kouroi* [London 1970] 121). Eaverly includes two heads identified by other scholars as riders but about which she wisely expresses reservations. In the first of these, the “Head of a Rider (?)” (cat. no. 4, Acropolis 617), too little below the chin survives to give sufficient evidence for a definite identification of the body; various suggestions propose it as a representation of a sphinx, a woman, or a rider, but none is persuasive. And second, the neck of the colorful “Head of a Mounted Warrior (?)” (cat. no. 10, Acropolis 621) does project forward, but the twist to the proper left is too slight to be conclusive; furthermore, if the six fragments Schuch-

hardt (*Marmorbildwerke*, 231–3) attributes to the same figure do belong with it, the leg would argue against an identification as a rider because the foot stands out at the stiff angle of a weight-bearing limb, not a relaxed leg of a horseman. Deleting these two highly questionable heads from the catalogue would decrease the total number of Archaic large-scale stone riders to 16 but would not significantly affect the arguments or conclusions drawn from the corpus.

Important ideas and stimulating questions raised in this book should lead to further discussions about relationships between politics, religion, and art, and about the multiple layers of meanings that statues carried in Archaic Greece. In addition, Eaverly's catalogue will prove a useful source for the study of Greek sculpture of the Archaic period and equestrian monuments of any date.

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AMAZONES VOLNERATAE: UNTERSUCHUNGEN ZU DEN EPHESESCHEN AMAZONENSTATUEN, by *Renate Bol*. Pp. 284, pl. 154. Philipp von Zabern, Mainz 1998. DM 235.00. ISBN 3-8053-2317-4 (cloth).

In her book on the wounded Amazons, Renate Bol investigates sculptures that have been connected with the tradition of a fifth-century contest to depict a wounded Amazon for Ephesos, a city in whose foundation myths Amazons figure strongly. This book, originally a *Habilitation* dissertation for the University of Mainz, builds on Bol's investigation of the sculptural program of the nymphaeum of Herodes Atticus at Olympia (1984), and her study of the Polykleitan Amazon in H. Beck, P.C. Bol, and H. Bückling eds., *Polyklet: Der Bildhauer der griechischen Klassik* (Mainz 1990).

The wounded Amazon type has long occupied an important place in discussions of fifth-century sculpture. Modern interpretations have undergone a considerable shift since B. Ridgway seriously questioned the authenticity of the ancient contest in 1974. Although Ridgway's ideas seemed too revolutionary for some at the time, they represent continuing adjustments in understanding Classical Greek sculpture and the development of serious evaluations of Roman sculpture. Moreover, Bol's book follows an avalanche of studies on Amazons since the 1970s. Readers will therefore appreciate Bol's efforts to compile a complete photographic, historical, and bibliographic record in this volume on the Sciarra, Sosikles, and Mattei Amazon types, which will form the basis for future discussion.

The book begins with a review of ancient literary sources and the history of scholarship. Discussion of early restorations and the reconstruction of each type make valuable contributions. The sculptures are thoroughly treated, using the method of *Kopienkritik*, supported by detailed catalogue entries with Roman dates. Photographs are mostly excellent and include the tops of some heads, otherwise seldom reproduced.

Further chapters present the analysis of formal prin-

ciples and the development of contrapposto in the Polykleitan Amazon. Certain features of the Amazons are examined: their history in Herodotus, their hubris, wounding and onset of death, their symbolic Hellenization, and their right of asylum at Ephesos. The Amazons' reception in Roman art is investigated, including their use as city personifications and as *opera nobilia* in architectural assemblages.

As Bol points out, the main problem with such "copies" is that they are too readily treated as substitutes for the original. She argues for use of the *Kopienkritik* method, comparing all repetitions of a type closely together, citing as a model Kreikenbom's catalogue for the 1990 Polykleitos study cited above. A large number of wounded Amazon types survive, so the analysis of adaptations to different situations and periods is fruitful. For instance, the head of the Petworth Amazon does not belong to the body, since they are of different marble and belong to different statuary types. Bol does not directly engage the arguments of Ridgway or Harrison against a fifth-century contest, or on dates for some types, but emphasizes a common conception, in size, theme, material, drapery, and stance, in arguing for a common origin.

Other issues considered include the wounded Amazons' relationship to fifth-century and Roman sculptures, depictions of women, development of female nudity, and eroticism. The wounding and dying themes represent the basic meaning, achieved by the leaning pose and turn of the head. The image emphasizes the figure's isolation, standing without their attackers, and it also refers to the Greek custom of honoring the fallen. They represent the first monumental freestanding depiction of approaching death, recalling the Aegina pedimental figures. Amazons often appear in funerary art, and as they stand for the punishment of hubris, so they are likened to the deaths of the Niobids. Their association with death leads to their influence on funerary art, as in the Stele of Melite. References to sexual-erotic aspects of female subjects begin with the wounded Amazons. Bol takes into account contrasts between male and female hubris, the dying opponent and her fate, the Amazon's arete, her androgynous aspect, and the theme of inner thought.

Amazons were known in Greek times as founders of the sanctuary of Artemis at Ephesos, founders of other cities in western Asia Minor, and donors of the Ephesian cult statue. They thereby have an especial affinity to Artemis, as seen in their iconography. Though Ephesos is the only place they do not go to war, they remain the Other. In the Sanctuary of Artemis they represent asylum for foreigners. Bol sees them as political monuments, representing the politically free aspect of Ionian Ephesos.

Formal changes by the copyist in the Roman period are not accidental but related to meaning, and there is a total change of meaning, since there is no approaching death. Rather, the Romans use Amazons in triumphal symbolism. They are reinterpreted as the *Virtus Augusti*, standing for the emperor's prowess in battle. Often *Virtus* and *Roma* can hardly be distinguished. They may also signify activity and unceasing battle or the triumph of battle, as the pelta is a symbol of *Virtus* on coins. But the real content, related to the asylum of the Ephesos sanctuary, is lost in the Roman period. As with the Spada reliefs, they give a nonepic presentation of the myths, showing them without action so as to symbolize the human condition and conflicts.

Some important scholarship, especially that in English, should have been included in Bol's discussion; some has appeared since. On myth related to history, see J. Boardman, "Herakles, Theseus and the Amazons," in D. Kurtz and B. Sparkes, eds., *The Eye of Greece* (Cambridge 1982) 1–28; and H.A. Shapiro, "Amazons, Thracians, and Scythians," *GRBS* 24 (1983) 105–14. For niobids from Greece, and particularly reliefs from the Poseidon Sanctuary on the Isthmos, see M.C. Sturgeon, *Isthmia* 4 (Princeton 1987) 82–3, 94–6, 109–13. On fifth-century sculpture, see J. Hurwit, "The Kritios Boy," *AJA* 93 (1989) 41–80; and W.G. Moon ed., *Polykleitos, the Doryphoros, and Tradition* (Madison 1995). On the costume of Artemis and Amazons, see M. Sturgeon, "The Corinth Amazon," *AJA* 99 (1995) 483–505. On Augustan art, see K. Galinsky, *Augustan Culture* (Princeton 1996). On nudity and gender, see A. Stewart, *Art, Desire, and the Body in Ancient Greece* (Cambridge 1997) 1–34 and 118–9. On Amazons and gender studies, see M.Y. Goldberg, "The Amazon Myth and Gender Studies," in J. Hartswick and M.C. Sturgeon, eds., *Stephanos* (Philadelphia 1998) 89–100.

In summary, Bol's treatment of the Ephesian Amazons is thorough and well informed, and it makes an important contribution to scholarship on Greek and Roman sculpture. Her study emphasizes many kinds of context, always bringing the focus back to the sculptures themselves.

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AGORA 31: THE CITY ELEUSINION, by *Margaret M. Miles*. Pp. xxii + 233, pls. 40, plans 3. American School of Classical Studies, Princeton 1998. \$60.00. ISBN 0-87661-231-1 (cloth).

In this recent volume, Margaret Miles provides an invaluable analysis of the archaeological and epigraphical evidence for the City Eleusinion, the sanctuary of Eleusinian Demeter located to the southeast of the Athenian agora. This sanctuary served as the urban terminus for the Eleusinian mysteries, one of the greatest festivals of Athens and indeed the entire ancient world, and is also connected with a variety of other Athenian festivals, including the Panathenaia and possibly the Thesmophoria. The site was partially excavated by the Agora staff in 1936–1939 and 1959–1960, although much of it still remains buried under modern Plaka to the east. The current publication was made possible by the meticulous documentation of the earlier excavations in the notebooks and records kept by Arthur Parsons, Margaret Crosby, and Eugene Vanderpool. These materials have been supplemented by Miles's detailed review of the architectural remains and associated finds, particularly the pottery, which has enabled her to reconstruct the stratigraphy and history of the excavated portion of the sanctuary. The significance of this sanctuary for the study of Greek religion amply justifies this publication, although many of the interpretations that Miles offers remain provisional, since so much of the area remains to be uncovered.

The volume is arranged chronologically for the most part, tracing the development of the sanctuary from the seventh century B.C. to the late fourth century A.D. The introduction reviews the literary evidence for the location of the Eleusinion and surveys the archaeological and epigraphical evidence for the identification of the area south-east of the agora as the site of this sanctuary. As Miles notes, the abundant finds of inscriptions, sculpture, and special cult vessels from the excavations in this area solidly establish the identification of the site.

The first chapter of the book describes the topographical setting of the sanctuary and identifies four major areas of the excavated portion; from north to south, these are the lower, middle, and upper terraces, and the so-called section 2. It then reviews the features of the early sanctuary of the seventh century B.C. in the upper terrace, including several deposits of terracotta offerings and the "Rocky Outcrop," a raised portion of bedrock that Miles plausibly suggests was a cultic feature of the early sanctuary, similar to the "Mirthless Rock" at Eleusis. Miles concludes from the early terracotta figurines, predominantly of a columnar female figure, that the early cult had "feminine characteristics" and so, like the later cult on this site, was also dedicated to Eleusinian Demeter. This interpretation seems highly speculative to me, since the figurines could have been dedicated to any divinity, although probably a female one, and if that divinity were Demeter, she was not necessarily the Eleusinian goddess.

Chapter 2 examines the peribolos walls of the sanctuary from the sixth to the fifth century B.C. The first wall, constructed in the first half of the sixth century, enclosed the upper terrace. In the second half of this century, nearby wells were closed and houses on the middle terrace were cleared to allow for the construction of a new peribolos wall and a temple. Miles rightly casts doubt on earlier speculations that the elder Peisistratos was involved in the changes to the City Eleusinion in this period.

Chapter 3 surveys the evidence for the temple on the middle terrace. Miles argues that this temple was constructed in the second quarter of the fifth century on foundations laid ca. 500 B.C. She reconstructs the superstructure of this building as a tetrastyle amphiprostyle Ionic temple in white marble. On the basis of two passages in Pausanias (1.14.1–4 and 1.38.6–7), she identifies this temple as the Temple of Triptolemos. The identification seems possible but unproven, since Pausanias does not identify the structure he mentions as dedicated to this hero, but simply notes that it contained his statue. This chapter concludes with a survey of the iconography of Triptolemos on Athenian artifacts, and Miles points out that a renewed emphasis on this hero in fifth-century Attic vase painting coincides with the construction of his temple in the Eleusinion and indicates his importance as a symbol of Athens' cultural leadership in this period.

Chapter 4 examines the minor changes to the sanctuary made in the Classical period, including the construction of an altar, monument base, and possible adjunct shrine in the fifth century, and modifications to the walls and entrances to the sanctuary in the fourth century. This chapter also includes a survey of inscriptions important for the understanding of the history of the Eleusinion, including the famous Attic stelai pertaining to the profanation of the mys-

teries by Alcibiades and an analysis of dedications to Demeter and Kore throughout the history of the sanctuary.

In chapter 5 Miles describes the important additions to the sanctuary during the Hellenistic period, including a new stoa and propylon on the upper terrace, dated to the second century B.C. She also reviews the evidence for the mysterious circular building constructed in section 2 during this period and suggests it may have been used for ritual dining, comparable to the Tholos in the agora and the rectangular dining rooms in the sanctuary of Demeter and Persephone in Corinth. A closer parallel, I suggest, may be found in the round ritual dining chambers from the Kabeirion at Thebes, site of another mystery cult. In addition to the similarity in plan, these structures have associated deposits of ritual vessels, kantharoi, similar to the deposits of plemochoai around the circular building in the City Eleusinion.

Chapter 6 surveys the changes to the sanctuary in the Roman period, including the construction of four rooms in the lower terrace, which Miles plausibly suggests may have been storage chambers for grain controlled by the officials of the Eleusinion, like the granaries found at Eleusis. The other major construction project of this period was an inner propylon, which Miles reconstructs as similar to the inner propylaia at Eleusis, with karyatids framing a marble gateway decorated with emblems of the Eleusinian cult. The end of this chapter surveys the evidence for the later history of the site down to its probable destruction at the end of the fourth century A.D.

The final chapter discusses the plemochoai, the ritual vessels associated with the Eleusinian cult. These vessels were used for libations on the final day of the mysteries at Eleusis, for ceremonial processions, and possibly for purification rituals, since some of these vessels have fenestrated lids, presumably for burning incense. Miles suggests that since some of these vessels were found in graves and mines, they were also used for offerings to the dead and chthonic divinities. This chthonic connection might explain the proliferation of these vessels in the City Eleusinion, particularly around the circular building, where Miles suggests that rituals in honor of the chthonic divinity Plouton were performed.

This volume represents a fine contribution to the Agora series. From an archaeological standpoint the book is excellent, although students of Greek religion might have hoped for more discussion of the rituals associated with the City Eleusinion and of its relationship to the main sanctuary at Eleusis. A minor problem is the organization of the book, which is a bit confusing in its mixture of a chronological approach imperfectly integrated with topical sections. Listing the topical sections, such as the survey of dedications from the sanctuary in Chapter 4, as subheadings in the table of contents might have alleviated this problem. Overall, the book is a major contribution to our understanding of this important sanctuary and makes the reader all the more anxious for the rest of the sanctuary to be excavated.

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DEVINS, DIEUX, ET DÉMONS: REGARDS SUR LA RELIGION DE L'ÉTRURIE ANTIQUE, by *Jean-René Jannot*. Pp. 208, figs. 96, pls. 18, map 1. Picard, Paris 1998. FF 250. ISBN 2-7084-0523-3 (paper).

The author of this excellent monograph modestly claims that it is intended for a general audience and for first-year university students, both of which audiences will profit; it is also, however, a sensitive and careful book on a subject which is at once so obscure and so tempting that it has encouraged less than cautious approaches in the past. Jannot has given us the best introduction to Etruscan religion currently available and a lesson in methodological integrity, and it deserves a wide readership.

Jannot makes good use of the Roman literary sources, where they exist, and the work is heavily and attractively illustrated so that archaeological material is easily accessible. There is a full account of Etruscan religious buildings and a careful treatment of individual deities. Three major divisions of material may be identified: death, ritual, and the nature of the gods.

Etruscan burial evidence has been much studied, but Jannot's real contribution is to focus on elements of change and development in attitudes to the dead over time. It does seem possible that we can trace the outline of a Hellenizing influence from at least the fourth century, which nevertheless leaves the Etruscan approach to the afterlife still distinctive. This developmental approach has some parallels with, for instance, the work of C. Sourvinou-Inwood (*"Reading" Greek Death to the End of the Classical Period* [Oxford 1995]) and deserves further study.

Ritual is complex to unearth, with little remaining of the undoubtedly extensive literary material that informed and guided Etruscan officials, but Jannot clearly presents the evidence we have, such as the Piacenza liver, the ritual texts, such as the Zagreb and Capua calendars, and the Magliano lead invocation of chthonic deities. He considers the possibility that the Etruscans at least knew of a period of human sacrifice, and discusses in detail on the area of both funerary ritual and private dedication, both of which have inspired considerable recent interest. The models for central Italian religious experience are becoming more satisfyingly dense and complex.

Jannot does raise an interesting set of questions about the relationship between the Etruscan disciplines of dividing and organizing the world and seeking out its secrets through observation, and questions of free will and determinism, which later were of intense interest to Seneca. This subtext connects interestingly with his careful discussion of the Etruscan deities, and the chronology and extent of Hellenization. He develops a model of originally impersonal deities, whose operation would not have clashed with the destiny observable through divination, but who gain more personal characteristics before also acquiring Greek or Hellenized characteristics. Another way of reading this development is that Etruscans apply to their own religion a mythological, or narrative, treatment, perhaps learned from the Greeks in early contacts, before they systematically begin to syncretize the religion; to some extent this matches the appearance and popularity of narrative in imported and imitated pottery.

Jannot is correct to stress the complexity of Etruria's relationship with the Greek world, and also the necessarily incomplete nature of the syncretism of Greek and Etruscan deities. However, he also contrasts this complexity with a simpler Roman reality (191), with foreign gods completely turned into Roman deities, and with a strong state. It seems surprising that, after such a sensitive reading of Etruscan religion, Jannot seems unsophisticated in this comparison, but it may reflect his allusive treatment of external influence on the area. Nevertheless, this leaves us now with the interesting challenge of developing an account of archaic Roman religion as subtle and accessible as this is for the Etruscan world.

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ART AND TEXT IN ROMAN CULTURE, edited by *Jas Elsner*. Pp. 401, figs. 44. Cambridge University Press, Cambridge 1996. \$75. ISBN 0-521-43030-5 (cloth).

Ut pictura poesis: how do art and artistic text work, that we may compare them? Elsner convokes literary and art specialists to meditate on that relationship between language and form that preoccupied antiquity as it does moderns. The authors in this volume add an interesting historiographic emphasis on modern representation and installation. Interdisciplinary multi-author volumes cut partially across fields; their virtue is not the monograph's single panorama, but to hint at the richness of many possible panoramas.

In two essays that address imperial commemorative, M. Koortbojian, "In Commemorationem Mortuorum" and J. Elsner, "Inventing Imperium," assess epigraphy as a visual monument whose "text" signs, not just by content, but also by its format, its physical relationship with other visually communicative forms, and its occupation of assigned space in a larger topography. Elsner discusses the intention and function of Augustus's funerary self-portrait in the *Res Gestae*, which was inscribed at his mausoleum, with a copy in Asia. His essay joins an international discussion about the translation, dissemination, and replication, from Mérida to Aphrodisias, of the imperial persona in image and cult and of Rome's unique images and architectures, practices, and official texts.

In this fine pendant to his *Myth, Meaning, and Memory on Roman Sarcophagi* (Berkeley 1995), Koortbojian looks into the collages of carved images, inscriptions, and architectures in Rome's suburban "streets of the dead," and examines the complementary modes of portraying citizen and city in funerary art.

Koortbojian and Elsner delineate how viewers fused prior, exterior knowledge to the visual clues to deduce a monument's intended impact. To me, that contrast between applied and supplied knowledge is implicit in Laird's compari-

son of epic fiction to short poetic documentary; compare Vergil's lengthy description of Aeneas's shield and Propertius's panegyric to the assemblage of images at Augustus's sanctuary of Apollo Palatinus.

Three essays treat the visual structure of one or two well-known monuments. J. Henderson, "Representation in the Villa of the Mysteries," explicates thematic/formal patterns in Clarke's seminal description of the great fresco at the Villa of the Mysteries (*Houses of Roman Italy* [Berkeley 1991] 98–105). His telling observations about this room's focus on conversation, musical performance, and the decoding of information from a displayed object or book emphasize the need for similar studies of other Hellenistic and Roman illustrations.

S. Curries, "The Empire of Adults," looks at the imagery of Roman, Italian, and barbarian children on Trajan's column and the arch at Benevento, emphasizing how the imperial ideology of *alimenta* to Italy is linked to that of the family. It is doubtful, however, that Romans saw the children presented by Trajan to Italia and Mars as analogues to sacrificial victims; compare the figures on the Anaglypha Traiani. Curries discusses convincingly how the visual rhetoric of Trajanic workshops distinguishes the civilized citizen and subject from the conquered "Other" by costume and gender opposition (see also my *Dynasty and Empire in the Age of Augustus* [Berkeley 1995]).

Huet discusses the distorted illustrations of the Column of Trajan in models and books from the Napoleonic era onwards; we should listen to her plea to subject the column of Marcus Aurelius to the same scrutiny. She then discusses the narrative structure of one of the two Boscoreale cups (why not both?) and suggests its use to pour libations to the emperor (cf. Horace *Ode* 4.5).

In "Statues, Mirrors, Gods," Y.L. Too discusses Apuleius, a second century A.D. Greco-African, and his apostrophe to the sculpted and seen world (*Florida* 16 and the *Apology*). She suggests that Apuleius fears and eschews the distortion or death of self in a public portrait; he says, however, that he wants a perfect one (add *Florida* 146), teasing his audience with its Platonic impossibility.

D. Fowler, "Even Better than the Real Thing," describes African reactions to *ekphrases* on history painting cycles. He elegantly discusses the canonical response text by Vergil of Aeneas's weeping at Dido's temple paintings on the Trojan war that he had just escaped (see, too, M. Putnam, "Dido's Murals and Vergilian Ekphrasis," *HSCP* 98 [1998] 243–77), and he compares it to a little-studied passage in the *Punica* of Silius Italicus, where Hannibal visits a temple at Linternum, in whose picture cycle the *summi viri* of Rome's Punic wars humiliate his people; he makes war on this history by burning its images and "paints" his own counter-images for Carthage to display when he shall have sacked Rome. Other examples could be brought into this discussion, such as the sculptures that the African Bocchus put up for Sulla depicting his own *submitio* and the Sassanian rock reliefs at Naqsh-e Rostam, where captured Roman artists carved a scene of Roman submission.

A. Sharrock, "Representing Metamorphosis," and H. Morales, "The Torturer's Apprentice," both discuss how Roman audiences translated into their own cultural terms the stories and images of ancient Greece. In a discussion of

art's technical and ethical limits, Morales focuses on the epigram by Parrhasius in the Greek Anthology concerning his torture of a slave to serve as a model for his depiction of Prometheus. Her novel evidence for Roman disapproval of looking at represented pain can shed light on Roman taste in display art, as in the contrast between the violence at Sperlonga and the roughly contemporary serenity at the Villa dei Papiri.

Sharrock surveys the powers and limits of images and texts (mostly those of Ovid) and contrasts art's easy depiction of man-beast hybrids with the more visually difficult rendering of metamorphosis. We need more Roman images here, though she is interesting on the Pompeian paintings (e.g., Iphigenia in Aulis from the House of the Poet and of Myrrha, tree-woman birthing a baby, at the House of the Dioscuri).

This book will probably be required reading for courses in Roman art; the generally sparkling tone will make readers wish to know more, and the frequently pyrotechnic prose will impress. But the general lack of comparanda and critical historiography is frustrating (Koortbojian provides welcome relief), and translation is often loose.

With his earlier book, *Art and the Roman Viewer* (Cambridge 1995), Elsner joined the Greco-Roman art historians who theorize about the generic strategies and syntax of visual and verbal languages. Such a focus characterizes studies of Hellenistic and Roman political monuments and historical relief, copies and replicas, sculpture programs, and the house arts of fresco, mosaic, and landscape design. The long and valuable art-historical conversation about Greco-Roman narrative is largely absent from most of the essays in the present volume. Only Henderson and the art historians Koortbojian and Elsner cite works in other languages than their own and use the ancient sources; *LIMC* and the *Lexicum topographicum urbis romae (LTUR)* would have assisted many essays.

So much for the art historians. Literature-based scholars usually reach out to texts that specifically address the made world, but without looking at it (here, however, I commend Sharrock). Often they do not look at texts in different genres (but brava, Morales); thus, poetry experts like Fowler and Laird do not consider related prose. But literary analysis that wants its historical reconstructions believed needs to emulate the fields of archaeology and art history, their emphasis on the social and historical nature of all cultural artifacts, and the nature of historical proof. One can do anything with one or two examples pulled like a plum from a pie, but to persuade a reader to believe a theory on Roman thought, practice, and event, the single literary passage must systematically accrue comparison (as does Too on Apuleius). If historians and archaeologists are displeased at how often literary criticism claims cultural truth without physical evidence, we should be stirred to more, not less, dialogue with our sister disciplines, and to more projects like this one.

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DIE SKULPTUREN VON FIANELLO SABINO: ZUM BEGINN DER SKULPTURENAUSSTATTUNG IN RÖMISCHEN VILLEN, by *Christiane Vorster*. (Palilia 5.) Pp. 124, figs. 32, pls. 43. Ludwig Reichert, Wiesbaden 1998. DM 48. ISBN 3-89500-053-1 (paper).

The relationship of Roman art to Greek art during the final centuries of the Republic has long been regarded as a topic essential to the very definition of Roman art. As the wholesale sack of captured Greek cities in the third and second centuries B.C. gave way to commerce, Greek artists increasingly produced works for the Roman market in Italy and elsewhere in the Mediterranean. Prestigious monumental commissions from renowned artists dominate past scholarly treatment of this material, but in recent decades attention has shifted away from the public sphere to the private realm of the villa and *domus* (e.g., Zanker and Neudecker). Vorster's exemplary study of the sculpture collection belonging to a Republican villa at Fianello Sabino fits squarely into this trend, even as it seeks to inject a more explicitly archaeological approach to traditional art history by considering context, material, and technique along with style and iconography.

Fianello Sabino lies in north Latium, in a rich agricultural zone dotted in antiquity by *villae rusticae*. Although hardly a pulsing cultural center, it was not an isolated boondock either: Agrippa and Appius Claudius Pulcher both had villas in the vicinity. At Fianello some 20 statues and numerous pieces of marble furniture were discovered in 1950; nearly a half century later they can be recognized as the largest and oldest known ensemble of Hellenistic sculpture from a Roman villa in Italy, thanks to Vorster's convincing dating between the late second and early first centuries B.C.

Notwithstanding its early date, the Fianello statues conform to the typical mid-rank (as opposed to luxury) Roman art collection as we know it from later examples at Antioch or Pompeii. The bulk of the sculptures are underlifesize and range in subject from goddesses to Dionysiac figures, athletes to statesmen. Some figures are standardized to the point of seeming mass-produced, yet there are no close copies of well-known works. A marble statuette of Hercules does reproduce the figural type of the colossal bronze hero in the Palazzo dei Conservatori, but the fact that it miniaturizes a larger work puts it in the realm of creative reinterpretation rather than strict copying.

The patron's willingness to experiment can also be seen in his selection of six exquisitely carved marble lamps ("Prunklampen"). Very large, they each originally measured nearly a half-meter in diameter, extremely rare in the genre of marble furniture. Vorster is surely correct that they represent a single purchase from a specialized workshop and that, like most of the freestanding statues, they were acquired specifically for this villa. The villa owner's buying patterns evoke Cicero's bulk purchases, but in fact the Fianello collection contradicts the general picture of Roman art collecting that we get from Cicero's writings in two significant aspects: some of the statues are Bacchic, a theme the orator disliked, and most appear to have been made not in Athens but in Delos. Citing many stylistic and technical parallels between the Fianello sculptures and known contemporary works from Delos, Vorster makes a convinc-

ing argument for the island as the source of the Fianello statues; long seen as a crucible for realistic portraiture, Delos thus seems also to have played a major role in the transmission of other Hellenistic sculptural genres to Republican Italy.

Although a small corpus, the Fianello statues broaden our picture of Hellenistic sculpture in Italy beyond Rome and Magna Graecia. Vorster believes that Hellenistic ideal statues survive on Italian soil in numbers comparable to those from the early Imperial period, but that they go unrecognized; on historical grounds, this seems debatable. If indeed there are previously unrecognized Hellenistic pieces lurking in museum storerooms, however, Vorster's thorough catalogue descriptions and excellent photographs show us in general terms what we should be looking for.

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UNTERSUCHUNGEN ZU DEN KAISERZEITLICHEN TOGASTATUEN GRIECHISCHER PROVENIENZ: KAISERLICHE UND PRIVATE TOGATI DER PROVINZEN ACHAIA, Creta (ET CYRENE) UND TEILEN DER PROVINZ MACEDONIA, by *Felicitas Havé-Nikolaus*. (Trierer Beiträge zur Altertumskunde 4.) Pp. x + 204, pls. 22, tables 2. Philipp von Zabern, Mainz 1998. DM 80. ISBN 3-8053-2354-9.

The reception of Greek art in the Roman world is a standard topic in classical art and archaeology; Havé-Nikolaus is interested in the reverse: the history of Roman motifs in Greece. Specifically, her work concerns portrait statues in Greece depicting men wearing the Roman toga. Two questions drive the study. How did Greek sculptors deal with this specifically Roman motif? What links can be identified between togate statues in Greece and the historical circumstances? The results are mixed; this is a solid and useful publication of many togate statues found in Greece, but the historical and cultural discussion is problematic.

First, a note on what is included and what is not: Havé-Nikolaus discusses togate statues from much of modern Greece, hence the focus on ancient Achaia, with some treatment of the southern parts of ancient Macedonia. Modern Albania and most of the Greek islands are excluded; Crete is discussed but Cyrene is not. Contabulated togas are not included. This is the revision of a dissertation completed in 1989, but despite the book's 1998 publication date, only two citations are later than 1989. The book is accordingly best read as a work of the late 1980s; it does not take into account the past decade's surge in scholarship on Roman Greece.

The work is divided into two parts: a historical and sculptural analysis, and the catalogue proper. The author begins by arguing that the togate statues found in Greece were for the most part sculpted there, a plausible but oddly argued thesis. Havé-Nikolaus first theorizes that statues made of a single block are more likely to have been made in Greece than statues with inset heads. The numbers of each prove to be almost identical, and the two techniques

occur in closely related pieces. Second, "misunderstandings" of the toga formula might betray a lack of familiarity with how the garment was, in fact, worn; however, the author does not discuss mechanisms of transmission, including the possible circulation of three-dimensional casts. Third, "Graecisms"—motifs and details particular to togate statues in Greece—are detected in the elaboration of certain folds among several of the statues; the author proposes that this characteristic distinguished portraits of emperors in particular.

Dates and findspots provide more substantive results. No togati in the round are securely attested in Greece before the Augustan period. The known material falls into three distinct groups, with scattered additional examples. Ten emperor portraits and 16 non-imperial statues date to the Julio-Claudian period; these come from Macedonia, Achaia, and Crete. Thirteen headless statues from the Peloponnese and Attica cluster in the late Hadrianic and Antonine periods. Five togate statues date to the end of the second century A.D. and into the third; these are all from the south, from Crete and Pholegandros. For the first century, Havé-Nikolaus proposes that the togati testify to an imperial "Repräsentations- oder Propagandawille" expressed in particularly Roman terms (24), for several portraits of emperors appear among the Julio-Claudian exemplars, and togate statues are most numerous in the administrative capitals of Corinth and Gortyn. In the second century, by contrast, she links togate statues to the interests of private benefactors with Greco-Roman identities; here, she understands Herodes Atticus as the predominant agent and model.

The book's third section addresses particular features of Greek versus Roman togate statues. No cohesive provincial style is found to characterize the Greek material; the author understands the "Graecisms" and variations in quality and workshop in terms of local treatments of a foreign motif rather than a self-conscious adherence to a regional stylistic tradition. In statues of children as togati holding birds, she sees an assimilation of the ceremonial toga form to self-conscious traditions of Hellenistic genre sculpture. A very different kind of cultural confrontation emerges from her study of togati with covered heads. In a departure from contemporary practice in Italy, the subject of every togatus *capite velato* in Greece can be identified as a member of the imperial house; at the same time, no togate statue of an emperor from first century Greece shows the head uncovered. The author interprets these *capite velato* statues as propagandistic representations of Roman ritual practice.

This historical and cultural section is weakened by moments of speculation, arguments from silence, and a narrow view of what might be considered relevant information. Historical discussion focuses on famous individuals known from ancient textual sources. The presence or absence of togate statues is taken as a direct index of Roman interest in a given city (30). Categorizations of identity and motivation are simplistic, referring to "Roman," "Greek," or "propaganda" as terms needing no further exploration or nuance. Two serious drawbacks result. First, the book does not assess the semantic value of a togate statue in Greece—why and how this form of representation was significant for its patrons and viewers. Second, the statues do not emerge as historical and cultural documents in their own right, capable of stimulating new insight into Roman Greece.

The catalogue is the longest and most substantial portion of the book. Each entry includes information about provenance, current location, state of preservation, and prior publication, and offers an analytical description of the piece. The author's approach to stylistic dating is balanced and firmly based on well-dated comparanda; she does not apply rigid formal criteria but takes into account potential variations among contemporary sculptors and places. The plates at the end are closely linked to these catalogue entries; they have little to do with the earlier analytical discussion. A helpful supporting apparatus includes a glossary of terms, a collection of tables and concordances, and several indices.

The focus—and strength—of the catalogue is thus the provision of detailed descriptions and good photographs of individual statues. At the same time, this traditionally-structured catalogue limits the author's ability to address her initial questions, for little or no attention is given to the original spatial settings of the statues, the relationship among sculptures within a given context, or the ways in which they will have been seen in those spaces. Rather, the catalogue's organization reifies each sculpture as an object distinct from its spatial and social context and creates a distance between the author's stated interest in cultural-historical themes and the substance of her work.

Havé-Nikolaus's book does not answer the questions it sets out to explore. It does, however, collect and present useful descriptions, analyses, and photographs of many togate statues from Greece and as such is a useful addition to specialized publications of Roman sculpture.

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GRIECHENLAND: DIE GRABDENKMÄLER MIT PORTRÄTS AUS MAKEDONIEN 3.1, by *Maria Logogianni-Georgakarakos*. (Corpus Signorum Imperii Romani.) Pp. 125, figs. 7, pls. 66, map 1. Academy of Athens, Athens 1998. ISBN 960-7099-68-0 (cloth).

STELE ROMANE IN PIEMONTE, by *Liliana Mercado and Gianfranco Paci*. (*MonAnt* serie miscellanea 5.) Pp. 345, figs. 8, pls. 150, map 1. Bretschneider, Rome 1998. Lit 600,000. ISBN 88-7689-128-5 (paper).

The undertaking of any comparative study of ancient epitaphs and tombstones often entails exhaustive searches through numerous volumes of *AEpigr* or dusty editions of *NSc* or other archaeological journals. Therefore, compilations of grave stelai are always welcome, as are these two additions to the study of Roman customs of death and commemoration. Each book, however, has different strengths. Logogianni's *Grabdenkmäler* is a traditional catalogue with succinct entries and corresponding photographs. Art-historically oriented, it presents the bare facts and leaves the evidence to be evaluated by other scholars. By contrast, Mercado and Paci's *Stele Romane* transcends mere cataloguing.

It not only offers a wealth of evidence, but also provides extensive commentary and analytic parallels. It is especially useful to scholars of Roman social history.

Grabdenkmäler has 160 entries. Each focuses on an assortment of stelai, grave altars, urns, and sarcophagi, many of them with inscriptions. Unfortunately, these are not reproduced in the text as facsimiles of the manner in which they appear on the stelai. The gravestones date from the first century B.C. to the fourth century A.D. Although the corresponding photographs are generally useful, the details of the epitaphs are often lost, due to the small size of some of the pictures and the difficulty of photographing shallow incisions on marble.

The stelai and grave altars mostly portray family groups, as the inscriptions confirm. Particularly interesting are the gravestones that depict the busts of six or seven family members clustered around a central figure (e.g., table 4, fig. 15). The portraits may be crude and even schematic, but they are clearly intended to represent individuals. On one of these (table 82, figs. 82a and b), the stoneworker apparently was either dissatisfied with his first effort, or the tombstone was reused, because both sides have been carved with the same family group, but the depiction on the back of the stone is upside down.

If there is a major criticism of this book, it is the tendency of the author to dwell on the intricacies of hair and clothing styles, which show clearly in the photographs, and to assume that readers (who may be approaching the topic via Western [i.e., Latin] commemorative customs) will be familiar with the epigraphic traditions of the Roman East. Furthermore, other than a list of personal names, there is no epigraphical index, nor is there sufficient commentary on the content of the inscriptions. For instance, what parallels are there for the recurrent formula $\epsilon\kappa\ \tau\omicron\nu\nu\ \acute{\epsilon}\xi\iota\nu\omicron\upsilon\ \kappa\omicron\pi\omega\nu\ \mu\nu\epsilon\iota\alpha\varsigma\ \chi\acute{\alpha}\rho\iota\nu$? This formula occurs on the epitaph that Kleonike dedicated to Aphrodisios, her sweetest child (no. 48). It is repeated as $\epsilon\kappa\ \tau\omicron\ \kappa\upsilon\nu\omega\ \kappa\omicron\pi\omega\nu\ \mu\nu\iota\alpha\varsigma\ \chi\acute{\alpha}\rho\iota\nu$ (sic) on the plaque commissioned by Amia for Georgios, her sweetest husband (no. 92). The use of this formula deserves some comment, if only on the grammar and spelling of the latter inscription. Instead, the reader is told only that the name, Kleonike, is found often in Macedonia, and that of Amia is found only twice in Thessaloniki and is usually spelled Ameia or Ammia. Similarly, what parallels are there for the use of the epithet *heros* for departed females (nos. 21, 27) as well as for males (21, 25)? Likewise, what correlations are there for the recurrent motif of human hands, the palms of which face the viewer, seemingly in an apotropaic position? The motif is not evident on tombstones in the vicinity of Rome. What do these gravestones and epitaphs tell us about the funerary practices and commemorative customs of the people of Macedonia? Such questions are left for the reader to ponder and for further scholarship to investigate.

Happily, Mercado and Paci's *Stele Romane in Piemonte* provides us with ample discussion of its commemorative markers, not only within their Piemontese context but also within the broader context of the first and second century Roman empire. Especially interesting and important is the evidence of the historians, antiquarians, and artists from the 16th through 18th centuries, whose detailed descriptions and sketches provide modern scholars with an invaluable account of epitaphs that are no longer extant.

Stele Romane is particularly “scholar-friendly” in its organization. Not only does it begin with lengthy and thorough analyses of the nature of the evidence, but the 229 individual monuments are organized according to their iconography and subject matter: portraits (nos. 1–42); professions (e.g., wine and cloth merchants, muleteers, shoemakers, barge tenders) (nos. 43–59); genre scenes (e.g., banquets, dice players, farewells, sacrifices) (nos. 60–67); weapons, soldiers, and gladiators (nos. 68–95); mythological themes (e.g., Andromeda, Bacchantes, Ganymede, Medea, Silvanus) (nos. 96–128); the Roman urban import of wolf and twins (nos. 129–33); animals and hunting scenes (nos. 134–59); and garlands, floral, and other simple decorative motifs (nos. 160–221). Finally, there is a section on unusual memorials, such as the large marble tholos of Umbrina Polla (221), a first-century monument of a type common in Adriatic cities, such as Aquileia, but unique in Piedmont. Such excellent organization according to subject provides a ready reference for the study of the proliferation and distribution of funerary customs and thematic motifs throughout the Roman empire.

The outstanding commentary and sharp photographs enable us to study the inscriptions, which the authors reproduce exactly as they appear on the stelai (e.g., with slashes marking the end of lines). They also furnish us with ample evidence of local variations on traditional motifs. For instance, the conventional Hellenistic banquet scene (or *Totenmahl*), found frequently in the provinces, such as the Rhine area, but rare in Piedmont, depicts not only the reclining deceased (sometimes accompanied by his wife) before the usual tripod table, flanked by half-size slaves, but also portrays companies of drinking companions and slaves wielding fans to cool the participants or torches to light their revels. On one such relief (table 74) with four banqueters reclining on one couch, the prosperity of the house is indicated by the accompanying depiction under the inscription of a brood of chickens and chicks rushing after a strutting rooster, and beneath this a flock of grazing sheep. Bucolic themes, such as the milking of goats, are frequent. Another ubiquitous motif is the rabbit—a common theme on the grave altars and colimbarium wall paintings in the city of Rome—either nibbling at clusters of grapes or being driven by hounds into the nets of hunting *amorini*.

At the hands of provincial artisans, however, the conventional often becomes delightful. An example is the elegant first-century stele of Domitius Virilis (from Vienne), which was commissioned at some expense by two *conliberti*, Domitius Atticus and Maturus (table 78). The stodgy bloated Gorgon (who coincidentally bears a strong resemblance to Pompey) on the tympanum is flanked by two parrots with beribboned cymbals dangling from their beaks. Beneath this, framed by candelabra and crowned by chirping birds with flapping wings, is a desert scene (marked by a palm tree) that depicts an *amorino* clinging for dear life to the tail of a ferocious lion who is, in turn, closing in on a terrified antelope. At the base of the stele, amongst a plethora of unrelated motifs (including hippocamps, and Romulus and Remus being suckled by a particularly fierce wolf), are dice players seated at a table. Their flailing arms demonstrate both their enthusiasm and the intensity of the game. Behind one of the players lean two kibitzers, offering advice.

The thorough descriptions and commentaries of the authors, Mercado and Paci, are augmented by outstanding subject indices, organized according to the following rubrics: provenance, iconography, antiquarians and artists of the past, epigraphy, *nomina*, *cognomina*, tribes, gods and goddesses, priesthoods, geographical names, magistrates and municipalities, military organization, professions, and the employment of unusual words. Altogether, this book provides insightful access to a rich material for study, as well as an extraordinary glimpse into the commemorative customs of the “nobodies” who spent their insignificant but eventful lives at the foothills of the western Alps.

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THE INCE BLUNDELL COLLECTION OF CLASSICAL SCULPTURE 1: THE PORTRAITS; 2: THE ROMAN MALE PORTRAITS, by *Jane Fejfer*. Pp. xiv + 238, figs. 56, pls. 117. Liverpool University Press, Liverpool 1997. £60.00. ISBN 0-85323-832-4 (cloth).

Since no study devoted to Henry Blundell's Roman sculpture collection has been made since Bernard Ashmole's *A Catalogue of the Ancient Marbles at Ince Blundell Hall* in 1929, these works have been largely overlooked for decades. The sculpture, located today in Liverpool, will now return to center stage, thanks to a new set of publications that sheds valuable light on the history of collecting, taste, and restoration in the late 18th and early 19th centuries. Jane Fejfer's study of the Roman male portraits is the second in the series, following her book, coauthored with Edmund Southworth, on the female portraits from Ince Blundell Hall (1991). One needs to turn to that earlier volume to see how Blundell began to collect only in middle age, upon the urging of his fellow Catholic, Charles Townley, who also lived in Lancashire; and to learn about Blundell's home at Ince, with its Garden Temple and Pantheon, both built to house his burgeoning collection of antiquities. This new study of the male portraits is particularly valuable as an analysis of an 18th-century collection, most of whose pieces have been heavily restored.

The introduction to the book, especially the section on the collection in its 18th-century context, is essential reading for anyone interested in the practice of restoration, and in the distinction between fakes and modern copies among the restorers' trade at that time. So many Roman portraits in museums in Europe and the United States have been restored that issues of restoration ought to be the business of everyone interested in Roman sculpture.

Although not a scholar, Henry Blundell was among the more savvy collectors in the late 18th century. The sculpture he gathered for Ince Blundell Hall from dealers and restorers in Rome, and from sales of other collections in Britain, was a vast assemblage, but one that was typical of the collections put together by wealthy connoisseurs who had been on the Grand Tour. What is not typical is the survival of Blundell's own extensive notes and commentary on his collection in two publications: *An Account of the Statues*,

Busts, Bass-Reliefs, Cinerary Urns, and other Ancient Marbles and Paintings at Ince (Liverpool 1803), and *Engravings and Etchings of the Principal Statues, Busts, Bass-Reliefs, Sepulchral Monuments, Cinerary Urns etc., in the Collection of Henry Blundell, Esq., at Ince 1–2* (Liverpool 1809–1810). These unique personal records and commentaries, based in part on the scholarship of Ennio Quirino Visconti, serve as important documents to elucidate our understanding of his views on ancient sculpture.

Although Blundell was probably more aware of the roguish behavior of the restorers, copyists, and dealers in Rome than most of his contemporaries, his own observations need to be taken with a grain of salt: some of his provenances are suspect, since dealers may have made up the findspots in order to sell the items more easily; and his identification of heads, while often correct, was sometimes mistaken because having a statue with a name attached to it made it seem more worthy. Fejfer describes the pastiches that are characteristic of Blundell's collection in this way: "Mere fragments were restored into whole busts, modern heads were restored on ancient busts, modern busts were restored with ancient heads, ancient heads were combined with alien, ancient busts and statues, and copies, fakes, or pieces inspired by the antique were made as counterparts to ancient pieces" (8). As for forgeries, Fejfer points out the tricks of the trade, including the carving of shallow grooves that look like ancient breaks (cat. 55).

The most prolific restorer of the day was the Roman sculptor Bartolomeo Cavaceppi. Fejfer discusses his sources, including numismatic portraits, and shows how he worked. She identifies typical features, such as the carving of details of hair and a particular manner of making bases, which is convincingly shown in photographs of busts from the back. The author points out that a good copy by a modern sculptor working "after the antique" was considered more desirable than a mediocre original. In 1776, for example, Blundell commissioned Carlo Albacini, a pupil of Cavaceppi, to copy a colossal head of Lucius Verus, when he still could buy fine examples of ancient sculpture on the market.

The catalogue itself consists of 58 entries, ranging from full length togati to herms to heads, and includes 18th-century copies and fakes. Fejfer clarifies what is original, restored, overworked, or cleaned, and provides a full history of each piece with accounts from Blundell's own records as well as an overview of earlier and modern scholarship. Her knowledge of Roman sculpture, combined with acute observations on the history of each work and its place as a record of 18th-century taste, makes for fascinating reading. Each work is illustrated with five views, usually showing the front, back, two profile views, and a close-up or overall view, as appropriate. The photography, by David Flower, is superb and especially successful because the author spent months working with the photographer to get the most descriptive pictorial analysis. In addition, the catalogue is peppered with Blundell's engravings, as well as modern drawings that show which parts are restored. A full bibliography and several indices, including comparanda and provenances, add to the usefulness of the volume. A somewhat dense section in the introduction discusses research on official Roman portraiture since Visconti. Other than that, this beautifully written and illustrated book is highly acces-

sible to a wide audience and of great importance for the study of Roman sculpture and its modern afterlife.

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THE ARCHITECTURAL ORNAMENT OF DIOCLETIAN'S PALACE AT SPLIT, by *Sheila McNally*. (BAR-IS 639.) Pp. viii + 77, figs. 99, drawings 14. Tempus Reparatum, Oxford 1996. £28.00. ISBN 0-86054-823-6 (paper).

Diocletian might be gratified to learn that the palace that he built for his retirement, near Salona in Dalmatia, is now a UNESCO World Heritage Site. The major restorations that are intended to celebrate its 1700th anniversary in 2005 have served as the occasion for the work published in this volume. For its preparation, both the author and the Croatian colleagues who assisted her deserve particular congratulations, especially in the face of the difficult circumstances of recent years in the territories of the former Yugoslavia.

"No other Roman monument has a comparable amount of carved ornament from a single building campaign still in place" (3): a large claim, but the last seven words provide the justifying factors. In the context of the book, "monument" might be qualified as "integrated complex of monuments," since an important feature of this study is the variety of treatment it gives to different component structures within the palace complex. This is not simply, or even primarily, a stylistic analysis. As stated, the book aims to consider the functions of the ornament in its structural context and to examine what ornament has to say about the ways in which men worked together in this clearly defined time period at the beginning of the fourth century.

After an introduction that reviews scholarship on the ornament at Split, starting with Alois Riegl's *Stilfragen* (Berlin 1893), the book is arranged in two main sections. First, there are chapters on the palace and the roles of ornament within it, on the local vocabulary of architectural ornament (three charts show the different combinations of what was used where), and on the decoration in context. There follows a register describing the architectural ornament of the different parts of the palace, with photographs and appendices on the frieze inside the mausoleum and on the vault coffers of the Temple of Jupiter.

The study of the ornament still in its original position illustrates its variety of visual significance for the spectator. The seaward side was intended to be viewed from a distance: the upper floor was given unity by a continuous arcade with engaged columns, which was saved from monotony by larger, triple openings with a central arcuated lintel, one in the center and two beside the corner towers. The lack of ornamentation of the central door, which interrupts the otherwise blank wall of the lower floor, implies that no one was expected to enter there in style. That contrasts with the main gates; in the Porta Aurea the arches over the

niches at the upper level have plain moldings, the column capitals and stringcourse below the arches have acanthus and spiral foliage, and the richest decoration comes lower down in the consoles that carry the columns, the arch over the gate, and the sills of the niches to either side. The ornament emphasizes the gate's purpose for ceremonial entrance by the hierarchy of its arrangement.

The interior of the residence of the palace has relatively little carved ornament; decoration may have been colorful and two-dimensional (mosaic, marble veneer, and opus sectile), but there is little evidence of it. The palace was entered through one of Split's familiar features: the tetrastyle facade with a centrally arched pediment at one end of a peristyle courtyard. The most magnificent profusion of architectural carving in Split was reserved for the two monuments on each side of the peristyle. McNally's study of their ornament in relation to their function is of particular importance.

The identification of the octagonal eastern building, now the cathedral, as Diocletian's mausoleum, and of the rectangular vaulted building opposite as a temple of Jupiter, is widely accepted. As her detailed discussion (30–4) shows, the sources on which these identifications are based are by no means conclusive. It is accepted that Diocletian died and was buried at Split, but where is unknown. Several medieval sources equated the Temple of Jupiter, rather than the octagonal eastern building, with the cathedral. McNally shows, however, that the internal ornament of the present cathedral is entirely in keeping with an original purpose as a mausoleum, with winged erotes racing, hunting, and holding garlands under masks. These subjects all occur frequently on sarcophagi but have no relevance to the cult of Jupiter. The decoration of the vaulted building lacks such specific references but is equally profuse. The cornice over the door has a sima decorated with luxuriant palmettes, supported on consoles carrying heads with leafy beards, and the door itself is framed by three different bands of vine-scrolls or volutes. Though eagles and victories decorate some of the consoles, there is no specific commemoration of Diocletian's historical achievements. The profusion of nature would seem instead to symbolize the prosperity of Tetrarchic rule more generally. McNally cites similar ornament from Galerius's complexes at Thessalonike and Gamzigrad as comparisons.

The vaulted structure's association with Jupiter remains uncertain, but it seems clearly to be a Roman temple, one of the last to be built. The coffering of the vault illustrates a feature of Split's architectural decoration that scholars have found both puzzling and unsatisfactory: its disparities. All 64 coffers are ornamented, with much variety in choice of motif and execution, and with no apparent system in the distribution pattern of the boss motifs (mainly heads or rosettes).

McNally interprets it as a positive reflection of the diverse origins and careers of the workmen, although previous scholars have criticized this variety as the result of carelessness or lack of refinement: "the decorators brought (the complex's) parts to life, and gave them personality with their boisterously hybrid forms" (39). Inconsistencies were an intentional part of being nonclassical. To identify where the men came from, however, remains problematic: Proconnesos, Nicomedia, Miletos, and Side are among sites that

have produced comparanda for some (but only some) features, and multiple origins seem probable. A detailed study of the stylistic variants of specific motifs, which in previous scholarship has indicated such links, may no longer be appropriate in identifying a workshop's practice if consistency was not the aim of late Roman architectural ornament. In her study of this unique body of evidence at Split, McNally has set herself more profitable aims.

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MARBLE STUDIES: ROMAN PALESTINE AND THE MARBLE TRADE, by *Moshe L. Fischer*; with contributions by *Ze'ev Pearl* and *Tziona Grossmark*. (Xenia 40.) Pp. 323, pls. 224, b&w photographs 13, drawings 9, graphs 6. Universitätsverlag Konstanz, Konstanz 1998. DM 158. ISBN 3-87940-547-6 (paper).

"Marble studies are currently fashionable." So states Moshe Fischer at the beginning of his useful book on how marble was imported and employed in the Roman province of Palestine. A spate of recent scholarship has shown how the use of marble for architectural and sculptural decoration in the Roman empire symbolized the very essence and success of a region's aspiration to be "Roman." The artistic and economic consequences of a "Marmorstil" had long-lasting influence throughout the Roman empire, even in a lesser province such as Palestine. However, little research has been done on the marble trade's economic consequences in any particular province, and even less in Roman Palestine. Historically, it was not one of the more important areas of the Graeco-Roman world. Indeed, as Fischer speculates, if it were not for Roman interest in the area due to the Jewish wars of the late first and early second centuries A.D., little might be known about it at all. This study of the province's use of marble is part of a larger research project currently underway by the author concerning types of architectural decoration used in Israel during the Hellenistic, Roman, and Byzantine periods.

Palestine has no native marble sources. All was imported, a striking fact that underlies this examination of white marble artifacts in the context of Roman Palestine's sociopolitical development and increasing economic involvement in the imperial marble trade. While this study concentrates mainly on the west coast of Palestine, four sections concern related subjects: a chapter on the more limited use of marble in the neighboring provinces; a chapter on marble and marble workers in late Roman and Byzantine Palestine (there was a marked revival of its use in the fifth and sixth centuries A.D.); an appendix by Grossmark on "Shayish" (marble) in rabbinic literature; and another appendix, coauthored with Pearl, on the scientific analyses of the objects catalogued in this book.

Palestine did not begin to use marble in any substantive way until the second and third centuries A.D. While monu-

mental architecture and art is known from the Hellenistic and Herodian periods, marble was not used. Here, as in other provinces lacking marble sources, the region's integration into the Roman empire was the main reason for its use of marble. Marble artifacts are most common in places given city-status by the Romans, such as Caesarea, Ascalon, and Scythopolis. While the number of imperial building projects begins to rise in the Hadrianic and Antonine periods, it does not reach its full peak until Severan times, when the reorganized and renamed province of Syria-Palestine underwent great changes. Marble was mainly used by the urban and suburban elite who linked it explicitly to the Romanization process. Fischer discusses how this usage grew and developed over time, and how it relates to pre-Roman building traditions as well as to traditions of display in the nonpagan Jewish culture.

The heart of this study is a catalogue of 224 items, divided on a typological basis into three parts (each accompanied by a short introduction and summary of pertinent statistics): architectural decoration (pedestals and bases, architraves with friezes, friezes, cornices, capitals, but not revetment slabs); sculpture (large statues, busts, heads, statuettes, reliefs); and sarcophagi according to type: Roman, Phrygian, Asiatic (garland or column), and Attic. Not all catalogue entries are equally complete.

Architectural marbles appear to be used exclusively for public projects. Most of the stylistic influences, as well as varieties of marble, come from Asia Minor. Local tastes preferred certain architectural styles (e.g., the use of Corinthian rather than Composite style, and peopled scrolls as frieze decoration). The island of Marmara (Proconnesus) was the most important supplier, while other stone was imported from Afyon, Carrara, Penteli, Aphrodisias, and Thasos.

Sculptures are made of a larger range of marbles than architecture (Paros, Penteli, Thasos, Proconnesus, and Afyon/Aphrodisias), but the emphasis remains on Asia Minor and, stylistically, the Aphrodisian School. The civic center at Ascalon is a notable example of imperially charged iconography, with its representation of Victoriae, Isis-Tyche, and a cuirassed statue of an emperor. Moreover, pagan sculpture could be the target of political protest in Palestine. Fischer relates (39) that Herod Agrippa must have set up statues of his family, since the people of Caesarea and Sebaste behaved in a hostile fashion after his death towards some of these statues (Josephus *AJ* 19.9.1). Images of the king's daughters were evidently carried off to local brothels, where they were set up on the roofs and subjected to insult.

Sarcophagi were typically imported in a nearly finished state; most carry the style of decoration native to the area that produced their marble. The sarcophagi were mainly purchased by the elite; in the necropolis of Beth She 'arim, wealthy Jewish patrons commissioned marble sarcophagi with pagan mythological scenes, seemingly without concern for their own religion's aniconic proscriptions.

Fischer's study, while not exhaustive, shows that the number of marble objects found in Roman Palestine is small in comparison to other parts of the Empire, such as western Europe and North Africa. Marble was used selectively, typically in harbor towns such as Caesarea and Ascalon. Some items show evidence of final completion by local artisans, but in general Roman Palestine was mainly an importer of finished or almost finished marble items. No local schools have been identified as production centers for regional

copies in marble, although some sarcophagi were copied in local stones. While the number of quarries represented is limited, certain percentages are consonant with those known elsewhere in the eastern Mediterranean. Proconnesian accounts for about 50–60% of the total marble recorded, used mainly for architecture (80% of all catalogued) and sarcophagi. Greek marbles (Pentelic, Thasian, Parian) are most commonly employed for sculpture and sarcophagi, with Pentelic the most popular. Carrara marble apparently was used exclusively in architecture; no sculpture of Carrara marble has been identified conclusively.

Fischer's study shows that Roman Palestine was a committed, if limited, customer of imported marble in the mid-to late Imperial period. While not one of the more important or affluent provinces in the Roman Empire, Palestine does reflect, on a smaller scale, the patterns of usage seen in other areas. The author's clear presentation of the data, coupled with his solid overviews of the social and historical issues pertaining to the area's marble trade, make this a valuable resource for anyone studying Roman art and socioeconomics.

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ROMAN VILLAS: A STUDY IN SOCIAL STRUCTURE, by *J.T. Smith*. Pp. xxxiii + 378, figs. 76. Routledge, New York 1998. \$100.00. ISBN 0-415-16719-1 (cloth).

J.T. Smith's analysis of the remains of Roman villas of the northern part of the Empire differs significantly from the two existing empire-wide studies (A.G. McKay, *Houses, Villas and Palaces in the Roman World* [London 1975]; and J. Percival, *The Roman Villa* [London 1976]). Part I presents his aims and methodology with excessive brevity. Smith wishes to create a typology through detailed analysis of villa plans that will also reveal how they served their inhabitants. Smith believes that analysis of plans alone—without attending to questions of elevations, style, or decoration—carry enough information to interpret the social organization of the house and the relations of the owner(s) with others. Among the matters ignored for lack of sufficient information are the villas as architecture (i.e., as three-dimensional structures), texts, and chronology. Smith's definition of a villa is quite broad: the house of a farm, the entire establishment, land and buildings (11). His sample includes 1,100 plans. Plans of villas from Britain, Germany, and France each make up one fourth of the sample, with those from Spain, Portugal, Switzerland, Romania, Bulgaria, Hungary, Holland, Belgium, Luxembourg, Austria, and the former Yugoslavia making up the final fourth of the total.

Having eliminated the features that most people identify with living and working spaces (walls, roofs, windows, mosaics, wall paintings, artifacts, and surroundings), the author forces the reader to concentrate on his project of squeezing as much information as possible from the lines on the page that represent walls and, when there is evidence, doorways, and sometimes column footings of porti-

coes or pavilions. His work contains only plans, no photographs. F. Oelmann's article on the rustic villa at Stahl (*Germania* 5 [1921] 64–73) provides a justification for Smith's approach. Just as Oelmann stripped away later accretions from a group of villas to prove that their central space was not an open yard but a hall, so Smith attempts to demonstrate that the "basic elements of facade, baths and core rooms (Kernbau) could be treated separately and more fruitfully. . . ." (14).

Since admittedly no single plan in its final form is like another, Smith peels back successive partial rebuildings to find similar kernels, depending on parallels with British late medieval and early modern houses where owners rebuilt only part of an existing house at any single moment. Rebuilding reflects social change after the conquest, as locals adopt Roman architectural forms, although classical symmetry and axiality are conspicuous by their scarcity in Smith's sample.

Smith argues that natives of any conquered area in his survey chose one of two basic forms: the hall type or the row type; in part 2 he devotes considerable space to elaborating this point. In its rudimentary form, the hall type conjures images of relative squalor, even though Smith dismisses the possibility that both humans and animals lived under its roof and found warmth from its hearth and oven. Roman amenities, such as baths, brighten this picture a bit. He conjectures different activities and different levels of prestige from the placement of the hearth in relation to the entryway, the relative size of the hall, and its covering system (aisled, ridge-post, wide-nave). He concludes from their relative size that hall-type buildings housed one or more nuclear families and their servants with little or no internal architectural division.

Row-type houses, as the opposite of hall-type houses, are those that lack a large dominant room or hall. Generally five rooms make up the row, and the center one, larger than the rest, Smith calls the living room or representational room. He pushes the notion that more than one household occupied a row-type house. I find it puzzling that he makes no reference to the clear Italian models for the row house: the second-century A.D. Garden Houses at Ostia Antica in particular and the so-called *medianum* house in general. Although they are city houses, they at least provide evidence for a parallel development in their desire to use space and building materials in a more rational fashion than the domus or domus-with-peristyle.

From this core, Smith marches onward through all possible variations on row and hall. With a sample as large as this, the reader may lose the thread—or even the point—of the typology. His chapter on problematic house types is an exercise in devolution, including a subsection entitled "One-Room Buildings: Houses or What?" The two following chapters discuss the porticus-with-pavilions in a bewildering array of variations.

When he broadens his perspective to look at the elements of entire villa complexes, Smith raises more questions than he answers. His discussion of the yards that contained the various buildings of a complex notes the baffling variety of their shapes and leaves the matter there. His brief account of palaces, peristyle houses, and luxury villas provides useful morphological comparisons from a variety of sites. The first part of figure 47, where he compares Domitian's Domus Flavia with Fishbourne, using the same 1:1000 scale,

provides a notion of how large a provincial Roman palace had to be, but the remaining plans vary in scale on the same page. Curiously, this is the only use Smith makes of any Italian material.

It is only with chapter 12 that Smith abandons his atemporal, trans-European comparisons to look at a specific region: southeast Europe, where he notes several formal differences that lead him to the (circular) conclusion that there was both a similar social structure throughout Europe and varied architectural forms.

The author devotes part 3 to exploring how the villa system changed over time. After examining a number of plans that suggest to him different modes of Romanization, he presents a useful hypothesis in chapter 16, "A Model for Development." Villas appear in Britain within 20 years of the conquest, suggesting that kin groups quickly regrouped and built villas with an agricultural base to curry favor with the new power and to preserve prestige through inheritance. They consolidated settlements using existing houses to give architectural form to their desire for prestige and stability. Citing Welsh inheritance law for purposes of comparison, he proposes that ultimately many of these conglomerates became the property of one man. He rightly resists the anachronistic explanation that villa owners were profit-oriented entrepreneurs producing for a "market."

Smith's is a difficult book with a single-mindedness of method (comparative morphology coupled with comparative sociology) that makes it ponderous reading. Yet his insistence on looking at all the differences within all of his types has the virtue of raising important questions, many unanswerable. This is a book for specialists, especially architectural historians and archaeologists who have encountered the perplexing variety of Roman domestic architecture in the north.

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SAN GIUSTO: LA VILLA, LE ECCLESIAE: PRIMI RISULTATI DAGLI SCAVI NEL SITO RURALE DI SAN GIUSTO (LUCERA), 1995–1997, edited by *Giuliano Volpe*. (Scavi e ricerche 8.) Pp. xii + 355, color figs. 35, figs. 325. Edipuglia, Bari 1998. Lit 90,000. ISBN 88-7228-200-4 (cloth).

Volpe's work at the site of this late Roman villa and Paleo-Christian church sets a standard for excellence in archaeological investigation and publication. Practicing archaeologists will marvel at his ability to organize diverse specialists and conflicting local groups into an exemplary effort produced in an astonishingly short period of time.

San Giusto lies in the region of Puglia, southeast Italy, within the *comune* of the agricultural town of Lucera, and northwest of the city of Foggia. A regional consortium, with the endorsement of the Soprintendenza Archeologica for Puglia, planned in 1985 to dam the local torrents, Cellone and Lorenzo, to produce an artificial lake. But by 1995 traces of a sizeable Roman villa were recognized in the

center of the proposed project and required immediate attention.

A three-year rescue operation was formulated in the University of Bari's Department of Classical and Christian Studies, and Giuliano Volpe, the local Roman and Daunian scholar, was called in. With a team of 24 specialists and about the same number of student workers, he unearthed a site of considerable archaeological importance.

Some scanty pottery ("ceramiche a vernice nera") and an inscription imply the presence of a simple farmhouse of the first century B.C. or A.D., of which little physical evidence otherwise remains. The first substantial occupation came in the form of a first-century A.D. Roman villa that lasted into the sixth century. Only small sections of it are preserved, including a *pars urbana* (quarters for the *dominus* or patron of the villa), and a *pars rustica*, the work area where the numerous slaves would also be housed.

Within the villa was a rather well-preserved *cella vinaria*, wine storage area, characterized by storage jars sunk into the earth. These dolia were still coated with pitch, which made them impermeable, necessary for the fermentation process. There is also a *calcatorium*, or crushing area for the grapes, and a *lacus vinarius*, or basin for the fermentation of the must. Volpe's crew determined that production declined some 30–40% in the early sixth century.

Mosaics, possibly dating to the third century, were found at the borders of the winemaking area, creating an odd juxtaposition of the *pars urbana* and the *pars rustica* that cannot be adequately explained. One wonders if the *dominus* was such a wine lover that he wanted to integrate that part of the villa and its marked aromas into his own more luxurious quarters.

The finds from the villa, which the excavators document thoroughly, are of interest mainly to specialists and have a wretched look that characterizes rural sites. A battered, presumed Hercules and a truly hideous Aphrodite Anadyomene will serve as examples.

In the fifth century church A was built, 18 × 30 m, along with a sizeable baptistery, a narthex, and some additional rooms. The excavators found fallen gray granite columns that had formed two rows of six in the nave. This discovery and the appearance of various architectural members allow a reasonable estimate of the character and elevation of the church, facilitating striking computer reconstructions. Burials were found surrounding the apse, which was probably installed in the second half of the fifth century, not long after the construction of the church. Analysis of the bones revealed that for the most part the dead were people who were fairly well off, not common laborers. A small horde of low-quality copper-alloy coins was recovered, datable between A.D. 530 and 540, along with small bronze weights and evidence for hanging lamps.

The church is remarkable for having preserved a surprising amount of polychrome geometric mosaics that resemble tapestries and combine stylistic elements from both the western and eastern Mediterranean and North Africa. They date between the fifth and early sixth century. The mosaics are of interest not only for their quality and quantity, but also because they have no religious images and therefore would have been as appropriate in a pagan or domestic structure as in a church. Such aniconic decoration suggests an iconoclasm that must be significant for this

area. The mosaics feature graduated color effects, the tesserae varying discretely in color in each pattern. This is shown to striking effect, despite traces of burning, in the marvelous color photographs.

Another church (B) was added, apparently in the sixth century, to make a full ecclesiastical complex, and the narthex in front of church A was prolonged to unify the two structures. Church B is less well preserved but contained 78 burials. Church A was abandoned in the second half of the sixth century, after its collapse following a massive fire that also damaged and discolored the mosaics. There was no attempt to rebuild the fallen structure, but church B struggled on into the seventh century, when there were numerous burials of poorer individuals.

After three years of emergency excavation, Volpe's book was published quickly, only one year later, possibly a record for a work of such extraordinary quality. The maps, plans, and general organization are exemplary. Volpe's own final interpretive essay separates hypothesis from fact in a straightforward manner. Even scholars who do not read Italian well will find the book profusely illustrated enough for easy comprehension. The photo reproduction, particularly the color processing, is of high quality. The only criticisms concern the excessive shadows in a few of the photographs and some unnecessary repetition, but this is a minor complaint.

Archaeologists understand that villa sites such as these are difficult to interpret. Ceramic evidence is often meager, similarities in wall construction, and poor general preservation all make sequential phasing extremely difficult. But Volpe has done a masterful job of setting forth a coherent and plausible story of how the villa and ecclesiastical complex prospered and declined over the centuries.

Best of all are the computer-generated reconstructions of each complex. The mosaics are included in these reconstructions in full color and must have been time-consuming to create, but the results are stunning. Viewers get a vivid and convincing idea of what these structures must have been like.

But one more question about this site must be raised: What are they going to do with it? Although it is not preserved well enough to attract casual tourists, it has a Paleo-Christian church with important mosaics. Must the area be submerged, or will it become an archaeological island in the middle of an artificial lake? Whatever happens to San Giusto's villa and churches in the future, one must be grateful to Giuliano Volpe and his dedicated team for the complete documentation of the site in this beautiful book.

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THE JEWS AMONG THE GREEKS AND ROMANS: A DIASPORAN SOURCEBOOK, by Margaret H. Williams. Pp. xii + 236. Johns Hopkins University Press, Baltimore 1998. \$50.00 (cloth); \$19.95 (paper). ISBN 0-8018-5937-9 (cloth); 0-8018-5938-7 (paper).

JUDAISM AND CHRISTIANITY IN FIRST-CENTURY ROME, edited by *Karl P. Donfried* and *Peter Richardson*. Pp. xiv + 329, figs. 5. Eerdmans, Grand Rapids 1998. \$24.00. ISBN 0-8028-4265-8 (paper).

At first reading, *The Jews Among the Greeks and Romans* can give the false impression that its contents are well known and available elsewhere, and that it lacks a critical apparatus. The work covers the period from Alexander's death in 323 B.C. to the end of the Jewish patriarchate in A.D. 420, or roughly 750 years. This is an enormous time span. Although there already exists a critical reference work for what Greek and Latin authors wrote about Jews and Judaism, Stern's *Greek and Latin Authors on Jews and Judaism* (3 vols., Jerusalem 1974–1984), the purpose of Williams's work is to present evidence "to show what real Jews were like in antiquity and how they interacted with Greeks and Romans, both pagan and Christian" (xi). It is this stated goal that makes Williams's work unique and also distinguishes it from the similar work of D. Noy, *Jewish Inscriptions of Western Europe* (2 vols., Cambridge 1993–1995), and W. Horbury and Noy, *Jewish Inscriptions of Graeco-Roman Egypt* (Cambridge 1992).

While this is a handy reference work, one might be inclined to think that it is not a work of significant scholarship because of the absence of a real introduction and the brevity of commentary in its seven sections: "The Jewish Diaspora in the Hellenistic and Early Roman Imperial Periods"; "Life inside the Jewish Diasporan Community"; "Diasporan Jews and the Jewish Homeland"; "Jewish Interaction with Greek and Roman Authorities"; "The Jews among the Greeks"; "The Jews among the Romans"; and "Pagans and Judaism and Real-life Responses." But there is a wealth of information here relating to classical sources and inscriptions, both within the commentary on individual sections and inscriptions, and in the footnotes and bibliography. But it is the concordance of sources and indices that make the volume both useable and extremely helpful. Moreover, if any text appears in Stern, Noy, or elsewhere, its presence is noted in the introductory statement. The scholar who wants to consult other works is given the references to the main collections at the outset. Of special help is the listing of Latin or Greek words in the general index, alongside proper names, places, and other technical terms. If one turns to the entry "women" in the index, for example, one finds 44 separate entries, including titles that women held. Or if one wants to find which pagan literary texts have been consulted, one can turn right away to the concordance of sources (217) and find out.

A subtopic of particular interest and importance is Jewish-Christian relations in the Greek East and Roman West, and both have entries. Williams is careful to note that until the so-called triumph of Christianity under Constantine, Jewish relations with Christianized Greek speakers in both East and West are notoriously difficult to document. In selecting items for the reader, Williams indicates the different kinds of interaction, peaceful and otherwise, that might have taken place between Jews and Christians. The range of interaction in the East includes Jewish hostility to Christians, Christian aggression towards Jews, and cooperation and conflict between Jews and Christians. For the

West, Williams also includes such topics as Christian use of Jewish magical expertise, Christian disruption of synagogal worship, and epigraphic evidence for the conversion of Jews to Christianity. From the time of emperor Theodosius I in A.D. 379, Jewish-Christian relations everywhere took a decided turn for the worse, and while Williams has listed a good number of items from that time until A.D. 420, the vast number of entries concern the earlier periods, which may not be characterized in such a manner. The book could well serve an upper-level undergraduate course but probably is most easily put to use by graduate students in Classics and Judaic studies, and possibly theology.

Judaism and Christianity in First-Century Rome is a collection of some of the papers delivered to the SNTS (Studiorum Novi Testamentum Societas) between 1990 and 1994. For *AJA* readers P. Richardson's essay, "Augustan-Era Synagogues in Rome," is especially illuminating. In it he suggests ways to date synagogues that are known only from literary texts and inscriptions. The practice of naming synagogues after high-status individuals, he says, occurred precisely at a time when Jewish privileges were being reevaluated. On the basis of the evidence, he suggests that the early synagogues in Rome were buildings and not communities or houses.

L.M. White, "Synagogue and Society in Imperial Ostia," examines the data from Ostia to offer a new chronology for the synagogue beginning with the middle of the second century, when it resembled a collegial hall or community center. From the late second to the early third century, the synagogue was renovated through the patronage of Minidius Faustus, and the inscription bearing Faustus's name supports the idea that the Jews of Rome and Ostia had close social and economic links to the non-Jewish population.

G.E. Snyder, "The Interaction of Jews with Non-Jews in Rome," takes up the theme of enculturation. Studying Jewish inscriptions from Rome and the symbols associated with them, he concludes that "Jewish enculturation of the Roman world was negligible," though confirming an active Jewish participation in aspects of Greco-Roman culture.

L.V. Rutgers, "Roman Policy toward the Jews: Expulsions from the City of Rome during the First Century C.E.," points out that Roman magistrates responded only to individual situations concerning the Jews, and that the *senatus consulta* were only intended to resolve certain disputes. Roman policy vis à vis the Jews must therefore be considered on an ad hoc basis as the Romans responded to specific disruptions of law and order.

The remainder of essays in this collection are in one way or another tied to early Christian texts mainly in the New Testament: "The Formation of the First 'Christian Congregations,'" by R. Brändle and E.W. Stegeman; "Jewish and Christian Families in First Century Rome," by J.S. Jeffers; "The Oral World of Early Christianity in Rome," by C. Osiek; "Romans, Jews, and Christians," by J.C. Walters; and two essays by C.C. Caragounis on the formative development of the early Christian church in Rome. A general interpretive essay by K. Donfried introduces the entire volume.

The combination of archaeological studies and social-historical studies based on texts is a wonderful idea, especially for the fast-developing field of New Testament archaeology. The Jewish and Christian communities of first-

century Rome are of enormous significance to students in many disciplines, and in significant ways this volume breaks down the walls between classicists and religionists. How the government of Rome dealt with these two communities is the focal point for this collection of essays, and there can be little doubt that we know a great deal more about that situation as a result of this book. The SNTS and editors are to be congratulated for publishing some of the best papers of a very important five-year seminar.

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THE ARCHITECTURE OF OBODA: FINAL REPORT, by Avraham Negev. (*Qedem* 36.) Pp. 214, figs. 27, photographs 294, b&w pls. 5, color pls. 2. Institute of Archaeology, Hebrew University of Jerusalem, Jerusalem 1997. \$44.00. ISSN 0333-5844 (cloth).

Avraham Negev is the patriarch of Nabataean studies in Israel, and his contributions to the subject range broadly, including epigraphy, numismatics, religion, and other aspects of their culture. Oboda represents the initial stages of his scholarship, and this report is tinged with the romanticism of passing years. Negev's work began at Oboda in 1958 and lasted until 1961, with a final campaign in 1989. After an introduction, where he provides his interpretation of the history of the settlement, the discussion proceeds with a sketch of prior research on Oboda (from U. Seetzen in 1807 to T. Wiegand in 1916), followed by six chapters on the various phases (Nabataean, Late Roman, and Byzantine periods), and a collection of brief reports on architectural decoration (by Negev), reused architectural elements in subsequent phases (S. Szidat), a one-page report on 21 coins ranging from the Nabataean king Aretas IV (9 B.C.–A.D. 40) to Constantius III (A.D. 421) provided by A. Kindler (submitted in 1958), and an analysis by R. Rosenthal-Heginbottom of human and animal bronze figurines, jewelry, and other objects. Reports have already appeared on the so-called potter's workshop (1976) and the late Hellenistic and early Roman pottery at the site (1986), but the archaeological history of the site is still little known. In spite of the fact that this volume is entitled a "Final Report," it lacks the expected discussion of stratigraphy with locus references.

In its place, Negev advances his peculiar hypotheses and interpretations, based on circumstantial and negligible evidence, insensitive to criticisms expressed about his conclusions that appeared earlier. In Negev's view, king Obodas III is considered the founder of the settlement (although some evidence exists for an earlier foundation) as part of the establishment of a trade network between Petra and Gaza. The settlement was named after its deified royal founder and prospered until its destruction in the middle of the first century A.D., including the abandonment of the military camp. King Rabbel II then transformed it into an agricultural center, and the settlement continued to flourish until its final destruction during the

Arab conquest. Much of this view rests on the discovery of a possible tripartite temple in 1989 associated with Obodas's initial foundation and dated to 20 B.C. But all that is preserved of the "temple" are the gates and large porch, and its identification is based on the discovery nearby of inscriptions, altars, and reused architectural fragments. The rest of the building presumably was used in the construction of the nearby "North Church" in the fourth century.

Even this schematic interpretation of the site is far from certain: the period before Aretas IV is "obscure," "late 1st and 2nd century Oboda is regrettably little known," and "Oboda of the 2nd–3rd centuries has not yet been investigated" (3–4). It is also disturbing that there is no report on the military camp at Oboda (investigated with Rudolph Cohen in 1975–1977), which Negev persists in calling Nabataean and dating to the first century A.D. Recent excavations by the Israel Antiquities Organization at the military encampment have already suggested a later date. These crucial elements in the history of the settlement suggest the need for further investigation.

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THE SHAPE OF THE HOLY: EARLY ISLAMIC JERUSALEM, by Oleg Grabar, with contributions by *Mohammad al-Asad*, *Abeer Audeh* and *Said Nuseibeh*. Pp. xiv + 232, color pls. 78, plans 6. Princeton University Press, Princeton 1996. \$65. ISBN 0-691-03653-5 (cloth).

This stimulating book concerns Jerusalem from the Muslim to the Crusader conquest (7th–11th centuries), before the invasions of the Banu Hilal (11th century) and the Mongols (13th century) reshaped almost all of the Islamic world. This is the period when Muslim conceptions of Jerusalem gained their distinct features. Grabar devoted a good part of his life to Jerusalem studies and is without doubt among the masters in his field.

The book opens with "The Period and Its Sources" (3–20). Grabar emphasizes that the four centuries under discussion end a longer period that opened with the Roman destructions in A.D. 70 and 132. His aim is to understand the influences of Islam on the architecture of a city that earned its living from the piety of its inhabitants and visitors. He divides the sources into six categories. The first three are "remote" written sources, Jerusalem-centered sources, and local documents, categories that overlap in many details. Archaeology does not provide much information—excavations have not been carried out "in ways that meet even minimal standards of archaeological practice." The most important excavations are those south of the Haram and at its southeast corner, and those that cleared the Western Wall Tunnel. Grabar unfortunately includes under his sources both scholarship and visual evidence, the latter defined as "the web of visual associations and spiritual memories," but these are very subjective.

In "The Formation of an Islamic City" (21–51) he first outlines the Byzantine city around 600 (21–44). Hills and valleys make the city geographically more easily entered from the north, but visually more accessible from the south. The rigid layout of Roman streets emphasizes that Jerusalem is a Roman city. In the sphere of religion, the ruins of the Temple declare the city's Roman character, while the Church of the Holy Sepulchre and the Mount of Olives overlooking these ruins declare its Christian character. Everyday life is structured around the liturgy of its many churches by markets, houses, and the center of imperial administration. Conceptions of a mythical and eschatological Jerusalem inform the city, as "events in Jerusalem were transformed into myth, and the myths of Christianity required a setting in Jerusalem."

In the first decades of their rule (A.D. 637–692) the Muslims developed their own conceptions of the city (44–51). Grabar divides these into five categories: the authoritative and almost moral quality of what has happened here, the Temple, the direction of Jewish and early Muslim prayer towards Jerusalem, Muhammad's night journey and ascension, and eschatological events.

He then discusses, in "The Dome of the Rock" (52–116), the goals of the Omayyads (A.D. 692–750) and uses the building itself as the most reliable source. The inscriptions there form the oldest continuous texts of the Koran. Grabar considers their aim eschatological, missionary and exhortative, liturgical and expository, and he sees their main function as that of helping Muslims experience the building. Mosaics are thus arranged so that visitors standing at the gate perceive them in concentric circles, on the octagonal and the circular arcade, on the drum, and again on the circular and the octagonal arcade, and they see a column of light suspended over the invisible Rock (fig. 25–26). Grabar describes the mosaics carefully and illustrates them with some breathtaking photographs. Since the building is quite high, Grabar suggests that visibility may be more important than accessibility—this is a building to look at. The placement of the building is defined by the five traditions mentioned. The architects obviously use, both in mosaics and shape, a well understood language to say something new, but Grabar does not tell us what they say.

"The Haram and its Buildings" (117–34) concerns other Omayyad places. There is a break in the history of the Aqsa Mosque, which in Grabar's opinion corresponds to the Abbasid (A.D. 750–969) and Fatimid (A.D. 969–1099) periods. He discusses the role of the building within the whole Haram, but comes to no definitive conclusion. Grabar suggests that excavation may help determine the size of the Haram with its wall and gates, and the size of the central platform. The Omayyad places have to do with the special political and religious status the city has in the Omayyad empire; they have been excavated, but we await the excavation reports. The chapter ends with remarks on the Dome of the Chain and a summary.

Next, "The Fatimid City" (135–69) discusses the change from the Omayyad to the Fatimid city. In an introduction (135–7), Grabar suggests the existence of a permanent work force responsible for construction. He then describes the Fatimid city based on Nasir-i Khusraw (137–61). The whole city with its gates is thoroughly reshaped by the Fatimids themselves. The smaller size of the Church of the

Holy Sepulchre mirrors the fact that the city is dominated by Muslims at this time, though it plays as well an important role in Jewish thought. On the Haram the traditions connected with Muhammad's night journey gain importance, and they are officially acknowledged in the mosaics of the Aqsa Mosque.

He attributes these important changes to three developments: the political patronage of the Abbasid and Fatimid caliphs, a change in piety that localizes traditions at certain spots, and the coexistence of different groups of Christians, Jews, and Muslims.

In the concluding section, "The Shape of the Holy" (170–3), Grabar summarizes the two main features of the city in these centuries. This is now a city where many groups claim exclusive knowledge of truth, but nonetheless live side by side and develop similar conceptions of the world. And this is a place where concentrated architectural power "leads to the transformation of a hallowed place into a work of art."

Two appendices discuss computer-aided design (CAD) programs by Mohammed al-Asad (175–83) and present the text of the Dome of the Rock inscriptions (184–6), a list of abbreviations (187–8), notes (189–218), a bibliography (219–25), and an index (227–32).

Most of the figures throughout the text have been created by CAD. They do not add much to our knowledge, and the inflexibility of the computer program presents two major problems. Details are shown even where details are unknown, for example, the western wall (figs. 14, 16), the west staircase to the Haram (fig. 74), and houses (fig. 75). And the illustrations do not emphasize clearly what needs to be stressed. For instance, the position of the Temple remains, between the Church of the Holy Sepulchre and Mount of Olives, is convincingly explained in the text but not illustrated in the plates.

Proofreading has been superficial. The map inside the cover contains many errors. The Muslim reconquest (3, 216) was in 1187 (not 1183). And al-Muqaddasi did not document Fatimid rule from Egypt as an "enthusiastic, if hardly fanatic, supporter" (11), but decided to write his book in Shiraz—and there is no evidence for his support of the Fatimids. A comparison with other texts makes it clear that he is not a source for the Fatimid city, but rather for the Abbasid city of his youth. Nasir-i Khusraw does mention the markets (139) (see the 1922 edition by M. Ghanizade of the text [29]), and his text concerns mihrab-i khalq, not mihrab-i khuda (146, 213). Samaritans are not Jews (144). The first appendix has figures 3–6 but not 1–2; the second is a careless copy of van Berchem and Kessler, and even drops all vocal signs. Figure 68 (131) lacks a column. Cross-references are often imprecise.

Bibliographical references are defective as well. The names of authors are often misspelled: Meir (not Meyer) Ben-Dov (13), Marmardji (not Marmarji), Bagatti (not Bogatti) and Cecchelli (not Ceccheli) (193–5), Herbert (not Hubert) Donner (201), Allan (not Allen) (206), Schwabe (not Schwab), Reinink (not Reininck), Bahat (not Bahkat) and Schefer (not Scheffer) (210–3). Titles often have minor errors and references are occasionally missing, for example, for Busse (49), the gates of al-Muqaddasi (139), Ousterhout (192), Sharon (206), and excavations west of the Gate of the Chain (213). Brunswick's "Studies . . . Pre-

sented to Leon Nemoj" appear in Ramat-Gan (not Bar-Ilan) (201, 217). Grabar's "al-Azraqi" appears in *Muqarnas* 3 (not 5), 1985 (216), Rabbat on al-Wasiti in *Muqarnas* 10 (not 19), 1993 (216), and Kuechler's Aphrodito papyri in *ZDPV* 107, 1991 (12). German, Arabic, and French words suffer a lot.

But such errors are trivial in a work that is above all thought-provoking. Clearly, we are indebted to Grabar for another very stimulating book.

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CONTINUITY AND CHANGE IN NORTHERN MESOPOTAMIA FROM THE HELLENISTIC TO THE EARLY ISLAMIC PERIOD, edited by *Karin Bartl* and *Stefan R. Hauser*. (Berliner Beiträge zum Vorderen Orient 17.) Pp. 463, figs. 73, pls. 8, tables 12, plans 30, maps 33. Dietrich Reimer, Berlin 1996. DM 79. ISBN 3-496-02607-3 (paper).

In this volume the editors have collected critical new evidence that needed to be considered and synthesized. The occasion was a colloquium held in the Seminar für vorderasiatische altertumskunde of the Freie Universität in Berlin, which brought together the foremost specialists working in this region and, more remarkably, produced a speedy publication. The colloquium was enhanced by access to the collections of the Museum für islamische Kunst, facilitated by its director, Michael Meinecke, who died soon afterwards. In a tribute to his generosity and inspiration to both colleagues and students, this volume has been dedicated to him.

The first section concerns the Hellenistic through Sasanian periods and sets the intended agenda of the colloquium, which was the presentation of ceramic evidence from excavated contexts and syntheses for specific periods. Thus, ceramic evidence of the Seleucid/Roman and Parthian periods is described from Tell Beydar (R.M. Galan) and Tell Shaykh Hamd (C. Römer), two sites on the Khabur river. S.R. Hauser summarizes our current understanding of Parthia (or Arsacid) ceramic production, based on recent research at Ashur. S.J. Simpson makes a similar contribution for Sasanian ceramics and glass, using new materials from Nineveh, the Saddam Dam Project, and other sites in the Jazirah. Finally, petrographic and chemical analyses are presented for the glazed and plain wares from Nineveh by M.I. Eiland, and for glazed and "brittle" wares by G. Schneider. Unfortunately, the analysis of technological characteristics too often jumps to chronology, making arguments somewhat tautological.

M. Meinecke introduces the Islamic section with a general article on early Islamic planning principles and stucco decorations based on the German excavations at Rafiqqa (Raqqqa); the article includes a brilliant explanation of the famous "horse-shoe" plan in terms of the circular plan of

Baghdad (fig. 9). C.-P. Haase, a former student of Meinecke, moved north of Raqqqa to excavate another early Islamic foundation, the site of Madinat al-Far, probably identified with Hisn Maslama (see Bartl, below). E. Savage discusses Abbasid coinage and finds "that not all numismatic puzzles are within modern reach"; rather disappointingly, this article has nothing specific on the coinage (and mints) of the region in question.

Mayadin (Ra'ba) was a city of importance on the Euphrates with a long Islamic occupation. On the one hand, M.-O. Rousset attempts to synthesize the results of early, unpublished excavations; her site plans, apparently inherited from these predecessors, are remarkably vague and harken back to much earlier archaeological efforts. On the other hand, the results from Bijan Island in Iraq, where earlier Assyrian through Parthian levels were also found, are limited to the glass corpus of the last two phases. A. Reiche divides these materials into pre-Samarran and Samarran collections, while M. Daszkiewicz augments this with a chemical analysis of these collections, clearly illustrating the potential of such studies. The publication of Islamic sites is often limited to that of particular artifact classes that are difficult to assess without the broader frame of reference.

The study of Islamic archaeology has, for better or worse, made constant reference to the excavations at Samarra. The present volume is fortunate to include A. Northedge's synthesis of the long, multivariant research there. In this succinct piece he summarizes the various excavations and what they suggest about the development phases of this immense site; this latter historical reconstruction is also available in graphic form in the Tübinger Atlas map of Samarra. Northedge then uses this information to assess the ceramic collections Sarre published, including a presentation of findspots and potential significance. These data are compared with those of the Iraqi excavations of the 1930s in order to evaluate ceramic periods from this important site.

Two Islamic sites present evidence for the reoccupation of ancient settlements in the Zangid/Ayyubid periods, the 12th to 14th centuries. S. Heidemann has studied al-'Aqr, the Islamic name for Assur. He deftly weaves the numismatic evidence from the site with fragments from geographers, historians, and travelers to reconstruct the medieval role of this famous city. His work also explains the enigmatic province that the 10th-century geographer al Muqaddasi called 'Aqr. One of the clearest maps in the volume enhances this article, an asset that is sadly lacking in other articles (an introductory map might have been advisable). C. Tonghini describes the corpus of fritware pottery (11th–12th centuries) found during limited soundings in the island of Qal'at Ja'bar on the Euphrates. She inadvertently reminds the reader that the ceramics of Raqqqa are conspicuously absent in regional archaeological literature, though the publication of British and German research may soon fill this lacuna. Though beyond the volume's stated limits, the inclusion of the Seljuq/Ayyubid period is unavoidable. Middle Islamic occupation is found on most sites and certainly with great frequency in surveys, attesting to the economic prosperity and political importance of these turbulent times.

The third section, entitled "Survey," begins with a single essay representing research in the upper Euphrates dam projects in Turkey. C. Gerber presents the region around

Lidar Höyük, on the caravan route from Raqqa to Samsat, from the Hellenistic to early Islamic periods. The survey of the Balikh valley by K. Bartl is limited to a presentation of late Roman/early Byzantine and Islamic ceramics, with their settlement and historical contexts, a short précis of her impressive dissertation, *Frühislamische Besiedlung im Balih-tal/nordsyrien* (Berlin 1994). An interesting result of this survey was her observation that settlement density during the early Islamic period was almost twice that of the early Byzantine period. Another feature is the exclusively Abbasid character of the two largest settlements, including Madinat al-Far (BS 187); clearly this preliminary work requires further investigation. B. Lyonnet's survey of settlements on the upper Khabur is wide ranging and detailed, though its methodology is not clearly explained. F. Dorna-Metzger describes the Hellenistic and Parthian ceramics from this survey and A. Guerin discusses the Islamic ceramics from Nasibin.

The last two articles in the survey section move eastward. The first is R. Bernbeck's analysis of evidence for sedentary and nomad populations in eastern Syria, in the marginal 'Aḡḡ region. He finds evidence of camps and more permanent settlements in two phases, the Davawiya (third to fourth centuries) and Sali' (seventh to ninth centuries), and postulates the historical relevance to Roman, Sasanian, and early Islamic regional activity and tribal relations. The article is exceptional and once again suggests that a peripheral area can present new and clear models for more complex regions. Likewise, W. Ball discusses the

Zammar region (part of the Saddam Dam salvage project) while focusing on the Tell al-Hawa excavations.

The final article presents the historian's view of anthropological aspects of this region in the early Islamic period. It is clear that either Robinson has not assimilated the implications of the previous papers, or, perhaps more accurately, he is caught in a historian's quandary as to how to evaluate so much raw data. He fails (like many of his peers) to understand the nature of an archaeological report. Robinson glimpses the current ferment of Islamic history by turning first to the nature of tribes and nomadism (two terms curiously equated in his article) and the nature of early Islamic history, as witnessed in the positions of Donner, Landau-Tesseron, and Crone.

This last article reflects current misconceptions and misinterpretations that historians often have of archaeologists and their work. It is crucial for archaeologists to develop social historical interpretations of their evidence. Bartl and Hauser seem to be aware, as suggested in the very title of their book, "continuity and change," that the great quantities of archaeological data need not only presentation but also contextualization in regional and historical terms. This volume makes important contributions to both of these ends.

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ADAMS, RICHARD E.W. *Río Azul: An Ancient Mayan City*. Pp. xx + 238, figs. 51, color pls. 8, tables 8. University of Oklahoma Press, Norman 1999. \$34.95. ISBN 0-8061-3076-8 (cloth).

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STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Act of August 12, 1970, Section 3685, Title 39, United States Code). 1. Publication title: *American Journal of Archaeology*. 2. Publication number: 0002-9114. 3. Filing date: 20 December 1999. 4. Issue Frequency: Four times yearly in January, April, July, and October. 5. Number of issues published annually: Four. 6. Annual subscription price: \$68.25 (domestic individual); \$89.25 (foreign individual); \$136.50 (domestic institution); \$157.50 (foreign institution). 7. Complete mailing address of known office of publication: Archaeological Institute of America, located at Boston University, 656 Beacon Street, Boston, MA 02215-2006. 8. Complete mailing address of headquarters or general business office of publisher: Archaeological Institute of America, located at Boston University, 656 Beacon Street, Boston, MA 02215-2006. 9. Publisher: Archaeological Institute of America, located at Boston University, 656 Beacon Street, Boston, MA 02215-2006; Editor: Professor R. Bruce Hitchner, Archaeological Institute of America, located at Boston University, 656 Beacon Street, Boston, MA 02215-2006; Managing Editor: Mark R. Kurtz. 10. Owner: Archaeological Institute of America, located at Boston University, 656 Beacon Street, Boston, MA 02215-2006. 11. Known bondholders, mortgagees, and other security holders, etc.: None. The Archaeo-

logical Institute of America is a nonprofit, scientific, and educational corporation chartered under a special act of Congress; as such, the Institute has no shareholders, bondholders, or individual owners. 12. The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes have not changed during the preceding 12 months. 13. Publication name: *American Journal of Archaeology*. 14. Issue date for circulation data below: October 1999. 15. Extent and nature of circulation: Average during the preceding 12 months: a. Total number of copies printed: 4058; b. Paid and/or requested circulation: 1) Sales through dealers and carriers, street vendors, and counter sales: None; 2) Paid or requested mail subscriptions: 3255; c. Total paid and/or requested circulation: 3380; d. Free distribution through mail: 43; e. Free distribution outside the mail: None; f. Total free distribution: 43; g. Total distribution: 3298; h. Copies not distributed: 1) Office use, etc.: 760; 2) Returns from news agents: None; i. Total: 4058; Percent paid and/or requested circulation: 99%. Single issue published nearest to filing date: a. 4056; b. 1) None; 2) 3084; c. 3084; d. 43; e. None; f. 43; g. 3127; h. 1) 760; 2) None; i. 4056; Percent paid and/or requested circulation: 99%. I certify that all information furnished above is correct and complete: R. Bruce Hitchner, Editor-in-Chief.

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