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## Contents

- 7 REBECCA WORSHAM, MICHAEL LINDBLOM & CLAIRE ZIKIDI | Preliminary report of the Malthi Archaeological Project, 2015–2016
- 29 PETER M. FISCHER & TERESA BÜRGE | The New Swedish Cyprus Expedition 2017: Excavations at Hala Sultan Tekke (The Söderberg Expedition). Preliminary results. With contributions by M. Ausiayevich, B. Placiente Robedizo, V. Barrera Alarcón, L. Recht & D. Kofel
- 81 MICHAEL LINDBLOM, GULLÖG NORDQUIST & HANS MOMMSEN | Two Early Helladic II terracotta rollers from Asine and their glyptic context
- 97 GINA SALAPATA | Tokens of piety. Inexpensive dedications as functional and symbolic objects
- 111 SIGNE BARFOED | The use of miniature pottery in Archaic–Hellenistic Greek sanctuaries. Considerations on terminology and ritual practice
- 127 KATIA MARGARITI | Painting early death. Deceased maidens on funerary vases in the National Archaeological Museum of Athens
- 151 SUSANNE BERNDT | The hand gesture and symbols of Sabazios
- 169 CHRYSANTHOS KANELLOPOULOS & MANOLIS PETRAKIS | Cella alignment and 4th century BC Doric peripteral temple architecture in Mainland Greece
- 201 Book reviews
- 211 Dissertation abstracts 2017–2018



K. Wellbrock, *Die innerstädtische Wasserbewirtschaftung im hellenistisch-römischen Pergamon* (Schriften der Deutschen Wasserhistorischen Gesellschaft—DWhG—e.V., Sonderband, 14), Siegburg: DWhG 2016. 370 pp., 80 pls. ISBN 978-3-86948-521-8.

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Kai Wellbrock's book is an impressive and detailed treatment of the water management systems found during the *Stadtgrabung* (city excavations) in Pergamon, covering an area of c. 1.5 ha occupied predominantly by private dwellings and a small number of public structures. The study is based on the author's Ph.D. thesis, defended less than half a year before the publication of the book, at the Fakultät Architektur, Bauingenieurwesen und Stadtplanung, Brandenburgische Technische Universität Cottbus-Senftenberg. Primarily, Wellbrock's book is focused on the terracotta pipes, cisterns and drainage, and the function of these elements, each of which is treated separately, in relation to other water installations and in their architectural context.

The book contains three sections (*Einführung, Ergebnisse* and *Zusammenfassung und Diskussion*: Introduction, Results and Summary and Discussion) divided into ten chapters. The first section, *Einführung* (pp. 2–33), contains four chapters which are introductory in nature. Chapter one presents the research questions and aims, stating that the study is focused on the hydrotechnical installations in the area of the *Stadtgrabung*. The author is also interested in the quantity of water made available and whether the water management systems developed in tandem with the urban structure. Wellbrock further aims to test the capacity of the drainage system based on modern modelling. Chapter two is devoted to the methods employed and contains basic information on the work towards a typology for the terracotta pipes. The focus is, however, on the presentation of mathematical equations used for hydraulic calculations, e.g. how much water that can flow through a pipe given certain conditions. Chapter three contains a brief overview of the history of Pergamon and its water supply, while chapter four presented precipitation data used later in the study.

The second section, *Ergebnisse* (pp. 36–299), is divided into chapters five to seven and forms the bulk of the study. Chapter five presents typologies for the treated components of the water management system. The bulk of this chapter is focused on the terracotta pipes while the cisterns (previously treated by G. Garbrecht and W. Brinker) receive less attention and other water installations almost none. Throughout this chapter an impressive amount of material is made available and described in detail. The importance of this careful treatment is difficult to overstate as individual components of water supply systems are seldom treated separately. The descriptions

tend, however, to become fairly repetitive. The chronological framework constructed seems sound overall, but the evidence supporting it could have been articulated more clearly. Chapter six treats each individual part of the water management system in order to establish how it functioned within its architectural context. The analysis in this chapter relies heavily on the typology presented in chapter five. In addition, or as a complement to this contextual analyses, chapter six also presents the results of modelling to conclude the volume of water made available by some of the cisterns. This is an interesting and important avenue of research, but the model used would have benefitted from being further developed, especially in terms of basic assumptions. Chapter seven contains a description of the drainage channels similar to the method in chapter five and thus includes a chronological discussion as well as a model for estimating the capacity of the drainage system. The technical complexity of the model with a large number of factors involved and many (albeit necessary) assumptions make it difficult to ascertain how accurate the method is. Even so, the results are interesting and point towards a highly effective drainage system.

The third section, *Zusammenfassung und Diskussion* (pp. 321–349), is formed by chapters eight to ten which are probably the most useful parts of the study for scholars who are not specifically interested in terracotta pipes, cisterns or urban drainage. Chapter eight is a summary of the different phases of the water management and chapter nine sets the water management in Pergamon in its larger chronological context. While informative, the latter is brief and hardly innovative. This is also the only section of the study which incorporates, albeit very limited, comparative material from other sites. Finally, chapter ten is a brief final remark largely reiterating the phases of the water management system.

There can be no doubt that the detailed description of the empirical material is the strength of this study. This is very welcome for all three major elements discussed: terracotta pipes, cisterns and the drainage. Especially the latter element is important due to the lack of studies on urban drainage in the Greco-Roman world. It is also worth mentioning that the book includes a large number of very useful tables and figures. The author should also be praised for the 80 plates with ten essential fold out plans and hundreds of excellent photographs used to illustrate the text.

One important and somewhat problematic aspect of the study is that it assumes and heavily relies on the notion that a clear typological development of the terracotta pipes took place at Pergamon. By doing so, it is largely supposed that there were not different workshops producing different varieties during the same or overlapping periods. The author, however, never establishes the validity of such a linear typological development for the terracotta pipes and a methodological

discussion would have greatly benefitted the study and paved the way for future work both in Pergamon and at other sites.

The study is unfortunately limited in the sense that it incorporates almost no comparative material except during the first half of chapter nine (pp. 321–345). Moreover, even in this short discussion the comparanda are distinctly limited in terms of origin and painted in very broad strokes in stark contrast to the detailed treatment of the Pergamon material in this volume. John Camp's still important Ph.D. thesis *The water supply of ancient Athens from 3000 to 86 B.C.* (1977) is not cited, the many cisterns at Delos are not mentioned, and no material from the German excavations at Kerameikos is used. The lack of outside views is also manifested by a large proportion of the references being internal to the work. Moreover, referring to the (sub)chapter instead of the relevant pages makes it difficult to navigate the book. Another issue is that human actors in the area of the *Stadtgrabung* are conspicuous in their absence. Interpretation only stretches as far as to how the water management functioned technically; the effects of humans using water is not taken into consideration. Finally, there are some typographical errors in the book, the most serious being that Table 5-6 is a duplicate of Table 5-7 and Figure 6-25 of Figure 6-26.

Wellbrock provides a unique and highly useful study of the water management in a section of a Greco-Roman city. The level of detail, the sheer amount of material made available, as well as the reconstruction of the development is well executed and laudable. The lack of a human component and comparative material, however, lowers the overall value of this otherwise important contribution to the study of ancient water management.

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R. Fleischer, *Die Felsgräber der Könige von Pontos in Amasya* (Istanbuler Forschungen, 56), Tübingen: Ernst Wasmuth 2017. x + 155 pp., 122 figs. ISBN 978-38-03-01777-2.

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The rock-cut chamber tombs of Anatolia are found in many different provinces and are of rather varying types. Those of Pontus have not received much interest and have never been the subject of a concise treatment. The most important ones from Pontus, the five in the capital Amasya dealt with in this book, have a unique position inasmuch they are mentioned

in ancient literature. Strabo, who was a native of the city, says rather laconically that “within this circuit are both the palaces and monuments of the kings”, monuments (*mnemata*) being a common word for tombs. Amasya and its tombs have been well known for many years. Dozens of travellers in the 19th and 20th centuries, and some before that, have mentioned the tombs in their accounts, sometimes with mistaken information but sometimes also with interesting reflections.

After a short description and a commentary of Strabo's text the book gives a thorough research history with comments on all references from previous travellers. Then follows a thorough and detailed description of the five tombs A–E. These are thought to be the royal tombs belonging to the kings from Mithridates I, who created the kingdom in about 302 BC in the turmoil after the division of the realm of Alexander the Great, to Pharnaces I who moved the royal residence to Sinope after conquering it in 183 BC.

Besides the five royal tombs, four more are dealt with, three of them in Amasya and the fourth at Laçın in western Pontus. These are not the only other tombs in Pontus, but the reason for their selection here is the clear affinity with the royal tombs, especially with Tomb E.

Then follows over a dozen short chapters on subjects such as tomb owners, stepped tunnels, façades, dowel-holes, chambers, technical processes, and later fate. The book ends with a short conclusion, abstracts in English and Turkish, an index, and an ample bibliography. It is a thorough and well-documented study with excellent illustrations and almost without misprints.

Among the previous travellers the three-man expedition of G. Perrot is conspicuous. It visited Amasya in 1861 and made a thorough exploration of the tombs in a remarkably short time in bad weather, managing to produce good drawings despite the conditions. Following that expedition, the tombs were visited and mentioned many times, all referred in the book, but nothing of importance has been added to our knowledge of them: on the contrary details that were observed by Perrot seem in some cases to have been overlooked in the intervening years and had to be rediscovered. The idea of the present study on the royal tombs was conceived already in 1976 but not accomplished then; the scheme was renewed in 2001 and performed by a three-man group with aid of a photogrammetric examination, with ample photographic and drawn documentation.

The tombs that can be approached from one side from one tomb to another are designated A–E from right to left, and it is suggested that the chronological order should be ACBDE instead of ABCDE, with the tomb of the third king crammed in between A and C where there was barely room for it. It is no doubt correct, and it means that when two tombs, including the last one, have an archivolt instead of a gabled roof it can be seen as a return to Anatolian tradition from Greek influence.