His main conclusion, justifying the essentially generic account of Old Babylonian mathematics he has given, is that "the resulting body of mathematics is sufficiently homogeneous to demonstrate the existence of some kind of formal or informal coordination" (p. 359).

Besides his technical analysis of the arithmetical operations of Old Babylonian mathematics, Høyrup also presents evidence for an argument that the general shape of Old Babylonian mathematics derives from a fusion of scribal Ur III mathematics with a nonscribal tradition based in mathematical riddles.

Høyrup first described his ideas at length in the ground-breaking paper [Høyrup, 1990a]. Since then he has refined and extended his analysis. *LWS* represents the culmination of his work. Much that appears in this volume can be found (albeit with some difficulty) and often with more detail in earlier publications that were meant for specialists. Complete publications of the central texts BM 13901 and YBC 4714 can be found in [Høyrup, 2001]; the "finer structure" chapter largely summarizes and recapitulates the more extensive presentation in [Høyrup, 2000], and his view of the surveyors' tradition was first propounded in [Høyrup, 1990b]. Here, Høyrup has drawn together and updated the key insights of his intellectual journey of the past 15 years and presented them in one unified, handsomely produced volume. *LWS* is not an easy read, but it contains a wealth of information and can be mined by the interested reader for years to come. It is a worthy testament to a career of deep scholarship.

References

Høyrup, J., 1990a. Algebra and naive geometry: An investigation of some basic aspects of Old Babylonian mathematical thought. Altorientalische Forschungen 17, 27–69, 262–354.

Høyrup, J., 1990b. Sub-scientific mathematics. Observations on a pre-modern phenomenon. History of Science 28, 63–86.

Høyrup, J., 2000. The finer structure of the Old Babylonian mathematical corpus. Elements of classification, with some results. In: Marzahn, J., Neumann, H. (Eds.), Assyriologica et Semitica, Festschrift für Joachim Oelsner anläßlich seines 65. Geburtstages am 18 Februar 1997. Kevelaer, Neukirchen-Vluyn, pp. 117–178.

Høyrup, J., 2001. The Old Babylonian Square texts—BM 13901 and YBC 4714: Retranslation and analysis. In: Høyrup, J., Damerow, P. (Eds.), Changing Views on Ancient Near Eastern Mathematics. Dietrich Reimer Verlag, Berlin, pp. 155–218.

Netz, R., 2004. The Works of Archimedes: Translation and Commentary. vol. 1: The Two Books On the Sphere and the Cylinder. Cambridge University Press, Cambridge, UK.

Neugebauer, O., 1935–1937. Mathematische Keilschrifttexte, III. Springer-Verlag, Berlin.

Neugebauer, O., Sachs, A., 1945. Mathematical Cuneiform Texts. American Oriental Series, vol. 29. American Oriental Society, New Haven, CT. Reprinted in 1986.

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Euclid's Data: The Importance of Being Given

Translated and annotated by Christian Marinus Taisbak. Copenhagen (Museum Tusculanum Press). 2003.
ISBN 87-7289-815-1. 288 pp. Euro 48, £30, US $42

Despite two modern translations, the collection of theorems in geometrical analysis known as the *Data* has remained a largely unstudied text [McDowell and Sokolik, 1993; Thaer, 1962]. Although its central role in the field of ancient geometrical analysis has been pointed out and sketched, very little effort has been made to show how the theorems themselves functioned and what techniques they provided the ancient geometers. Algebraic interpretations, which have prevailed until recently, may provide some insight into underlying structures that can be found in the objects described in the text, but they are no help if we want to read the *Data* to gain insight into the thoughts and practices of the ancient geometers. Taisbak has taken important steps to remedy this situation. His book includes a reprinting of Menge's text, a sound translation into English, and a careful commentary that stays close to the text, gives much insight, and raises important problems [Menge, 1896]. Moreover, an appendix contains the second modern translation of the ancient Marinus' *Commentary on Euclid's Data*, and the first in English [Michaux, 1947].

After a short introduction dealing with some issues of nomenclature and the logical structure of the text, Taisbak divides his book into 14 chapters, which group the theorems by subject. Each chapter is concluded with tables that exhibit the logical structure of the text. Most of the chapters contain annotations that give background material and serve to set the theorems of the *Data* into the context of Greek mathematics in general. The advantage of Taisbak's commentary is that he does not stray from the text and he works within the context of the knowledge base and practice of ancient mathematicians. In many places, Taisbak makes note of algebraic interpretations that have been advanced and shows how far they are from representing the material in the text. It is unfortunate that only Chapter 14 (pp. 212–224) shows how a theorem of the *Data* can be related to other parts of the ancient Greek mathematical corpus. This is, however, more a misfortune of the preservation of early Greek texts containing analyses than a fault of Taisbak's book. The commentaries raise more questions than they answer but, given the state of scholarship on the *Data* and Greek geometrical analysis in general, this is appropriate. The *Data* is a problematic text and a modern reader does well to ask why the theorems were seen as interesting and what purpose they served.

The *Data* is the fundamental text of Greek geometrical analysis and it seems to be an attempt to give theoretical foundation to a group of techniques that were used in more advanced problem-solving work. The goal of the *Data* is to show that if certain mathematical objects are assumed as *given* then other objects can be shown from these to be *given* as well. Objects may be called *given* in various ways: *in magnitude*, *in form*, and *in position*. Beginning with his treatment of the definitions, Taisbak shows that the concept of given is problematic and it is not made much more precise by its function in the theorems. The *Data* treats *given* as a purely geometric characteristic and, although it is acknowledged to be the most basic text for geometrical analysis, it remains unclear how many of the theorems can have been seen as interesting or useful to the Greek geometers. Taisbak's commentary helps us understand the role of some of these theorems in the text itself and makes it clear how little we know about the use of many theorems in more general applications.

The *Commentary* by Marinus Neapolitanus, head of the Neoplatonic Academy, is a short discussion of the terms used by mathematicians in various definitions of *given* and the utility of the *Data*. The *Commentary* is not very useful for reading the *Data* but it does make some interesting statements about the views of Apollonius, Diodorus, and Ptolemy on the concept of *given*. It is not clear how many of these statements are actually found in the mathematicians' writings. Marinus may simply be making inferences based on their mathematical practice.

On the whole, Taisbak's translation is quite good; however, he chooses simply to transliterate certain technical terms. In particular, he transliterates the operations on ratios that are expressed in the instrumental dative. This is no better than Heath's practice of translating these operations into Latin. For readers of the ancient languages such devices are unnecessary and for everyone else they are unhelpful. These macaronic expressions, instead of making clear that a step of the argument is carried out by means of a common operation, give a vague sense that something alien and perhaps not altogether wholesome is afoot. This book would also have been well served by a copy editor who reads both Greek and English and would be willing to follow all of the arguments, since there are a fair number of typos. Because of the technical nature of the text, a few of these typos affect the sense of the mathematical argument.

Although much work has been done on Greek geometrical analysis in recent times, only a fraction of this has been based firmly in the mathematical texts themselves. Much more work is needed and *Euclid's Data* will serve as a good foundation for further efforts. It is a book of both breadth and detail, serving at once as a basic reader's text and a fundamental study. It is the culmination of many years of studying the *Data* and reveals insights gained over most of a lifetime of studying the Euclidean corpus. It is sure to be the standard work on the *Data* for many years to come.

References

McDowell, G.L., Sokolik, M.A., 1993. The Data of Euclid Translated from the Text of Menge. Union Square Press, Baltimore.
Menge, H., 1896. Euclidis Data cum commentario Marini et scholiis antiquis. Teubner, Leipzig.

Michaux, M., 1947. Le commentaire de Marinus aux Data d'Euclide. Bibliothèque de l'université de Louvain.
Thaer, C., 1962. Die Data von Euklid nach Menges Text aus dem Griechischen übersetzt. Springer-Verlag, Berlin.

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A Discourse Concerning Algebra: English Algebra to 1685
By Jacqueline A. Stedall. Oxford (Oxford University Press). 2002. ISBN 0-198-52495-1. 294 pp. $116

The Greate Invention of Algebra: Thomas Harriot's Treatise on Equations
By Jacqueline A. Stedall. Oxford (Oxford University Press). 2003. ISBN 0-198-52602-4. 322 pp. $136

Some years ago, at the Institute for the History of Mathematics and Its Use in Teaching, speakers Helena Pycior and John Fauvel sparked my interest in 17th-century British algebra with their tales of the mysterious Thomas Harriot (1560?–1621) and John Pell (1611–1685), and the prolific and inventive John Wallis (1616–1703). A few years later, during my first visit to England to study manuscripts of 16th- and 17th-century British algebraists, I was guided by a remarkably thorough and insightful series of papers by a scholar who had completed her Ph.D. dissertation with Fauvel, Jacqueline Stedall. Stedall has now written a book on English algebra through 1685 that includes work from these papers and much more. Readers of this review may recognize 1685 as the year in which John Wallis published his *Treatise of Algebra* and indeed Stedall's *A Discourse Concerning Algebra*: *English Algebra to 1685* takes Wallis's treatise as both its topic and its organizing principle. Since Wallis's book was a history as well as a manual of English algebra,[1] this allows Stedall to recount the entire history of English algebra to 1685, analyzing Wallis's account and shedding new light on it from her own research. That Wallis focused on 17th-century English algebra means that Stedall's book also concentrates on the English algebra of that period. The reader thus has the benefit, not only of a leading 17th-century mathematician's perspective on the algebra up to and of his day, but also of a modern scholar's analysis and extension of it.

Wallis's *Treatise of Algebra* contained 100 chapters, the first 14 of which covered the history of algebra from ancient times up to about 1600, with emphasis on English mathematicians and how algebraic ideas entered England. Chapters 15–29 are on the algebra of William Oughtred (1573–1660), Chapters 30–56 on that of Thomas Harriot, Chapters 57–72 deal with the work of John Pell, Chapters 73–97 cover Wallis's own work in his 1656 *Arithmetica Infinitorum* and the work Isaac Newton based on it, Chapters 98 and 99 focus on work of William Brouncker (1620–1684) in number theory, and Chapter 100 serves as the conclusion. Stedall follows Wallis's outline very closely, with Chapters 2 through 7 covering, respectively, algebra up to about 1600, Oughtred, Harriot, Pell, Wallis and Newton, and Brouncker. Stedall claims her book to be "a new contribution, based on Wallis's foundations, to the study of early modern algebra" (p. 17), and indeed it is, with every chapter providing new revelations, or at least clarifications or corrections of past scholarship, about the featured mathematician(s).

In Chapter 2, Stedall focuses on Wallis as historian, a role for which he is less well known, highlighting both the strengths and weaknesses of his historical research. She shows how he used original sources to trace the introduction to England of Indo-Arabic numbers, which he called "Numeral Figures," and argues that in this, unlike in much of his

[1] Its full title was *A Treatise of Algebra, both Historical and Practical. Shewing, The Original, Progress, and Advancement thereof, from time to time*; *and by what Steps it hath attained to the Heighth at which now it is*.