Count Like an Egyptian: A Hands-On Introduction to Ancient Mathematics by David Reimer

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Count Like an Egyptian is an engaging and beautifully illustrated book that deals with the basics of ancient Egyptian mathematics, set in the wider context of other ancient mathematical systems.

The book consists of eight chapters bearing simple titles. ‘Numbers’ introduces the reader to numbers and simple operations. ‘Fractions’ explains in a clear and effective way how to deal with ancient Egyptian fractions, now called ‘unit fractions’ (fractions with 1 as numerator, e.g., $^1/_3$). The third chapter, ‘Operations’, offers a practical interpretation of some geometric and arithmetic operations. ‘Simplification’ deals with ways to simplify calculations and procedures. ‘Techniques and Strategies’ analyzes the mathematics associated with a number of practical and symbolic issues. ‘Miscellany’ addresses geometric problems as well as geometric and arithmetic series. The seventh chapter, ‘Base-Based Mathematics’, moves the focus to other ancient mathematical systems (prehistoric, Mayan, Roman, Sumerian, and Babylonian). ‘Judgment Day’ compares the ancient Egyptian system with modern mathematics. The book ends with ‘Practice Solutions’, a series of examples and exercises referring to some of the issues discussed in the previous chapters.

The text is visually animated by the presence of color illustrations on every page: operations expressed in numbers are printed against backgrounds in the shape of unrolled papyrus scrolls or tablets; fractions and subdivisions are represented by compositions of coins, bricks, cubes, or even slices of pizza; practical operations are explained thanks to simple representations; the addition of small schemes, of representations of the gods mentioned in the text, and other simple objects all contribute to the comprehension of the text and, at the same time, make it pleasant reading.

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Reimer's book definitely fills a gap in the modern study of ancient Egyptian mathematics. Its starting point is the fact that ancient Egyptian mathematics was based on a system and followed rules that are sometimes very similar to their modern counterparts and sometimes so different as to appear incomprehensible. Even a slight shift in our modern point of view can help us enter the ancient system on a path that veers from our modern mentality but affords a glimpse of a consistent and efficient method nonetheless.

The focus of this book is, therefore, the difference between modern and ancient mechanisms: it is neither a history nor an analysis of mathematical sources. Instead, it represents the first comprehensive effort to explain the basic mechanisms of ancient Egyptian mathematics—an important step if we wish to improve our understanding not only of the ancient system but also of the mentality that lay behind it and manifested itself in other fields, such as administration, arts, and architecture.

Extant mathematical documents are few in number (a dozen or so). The majority date to the Middle Kingdom (2055–1650 BC) and the remaining to the Ptolemaic and Roman Period (332 BC–AD 395), with a gap of over 1,000 years between the two groups. The Middle Kingdom sources mainly come from an educational context: the most important is the Rhind Mathematical Papyrus, probably a manual for a late Middle Kingdom teacher that was translated for the first time in 1877 and then again in the 1920s [see Peet 1923; Chace, Bull, Manning, and Archibald 1927–1929]. The other main documents were all translated for the first time between 1898 and 1930 [see, e.g., Glanville 1927, Struve 1930]. More recently, they have appeared again in specific publications [Robins and Shute 1987] and in a number of sourcebooks [Clagett 1999, Katz 2007].

The small number of original sources and their nature suggest caution, as we clearly have a limited perception of the subject. Nevertheless, these sources are consistent and do offer the chance to discuss implications and interpretations.

Only a few monographs have so far appeared on the subject of ancient Egyptian mathematics [Gillings 1972, Couchoud 1993, Imhausen 2003]. The first monograph to be dedicated to the subject was Gillings' *Mathematics at the Time of Pharaohs*, published in 1972. The subsequent evolution of both the comprehension of ancient Egyptian language and of mathematical studies highlighted faults and inconsistencies in some of Gillings' interpretations. But his attempt to understand the mechanisms behind operations and procedures opened the way to an interesting and productive line of investigation, which in fact culminates in Reimer's book.

The number of articles and book chapters dedicated to specific aspects, instead, is far greater. Listing them all is impossible here. Some are chapters in books on the history of mathematics [e.g., Ritter 2000, Imhausen 2007], while the majority focus on specific issues or problems.[1] Many of these publications are extremely specialized and meant for experts in the field [e.g., Pommerening 2005].

Discussions of the interpretation of specific mathematical problems (as one might expect) have a relatively restricted public but their implications have a wider impact. Egyptology is nowadays a huge field, including specializations very different from one another. The subject of ancient Egyptian mathematics has struggled to gain a prominent place for the reasons stated by Reimer in the introduction:

> Egyptian mathematics has an alien feel to it. Most math historians refer to it as primitive or awkward. Even worse, many simply ignore it except for a passing reference. They look at this system and feel uncomfortable because it's so different. [ix]

Luckily the situation is changing. This is important not only within the circle of historians of mathematics but also for Egyptologists working on other aspects of this ancient civilization: mathematics was in fact involved in so many aspects of daily life that ignoring its mechanisms means leaving out an important part of the picture.

Certainly the most evident merit of this book is its approach, which brilliantly dismantles any resistance to the subject by the most recalcitrant and mathematically-impaired reader. The author's skill is shown not only in his presenting one subject at a time in a clear and down-to-earth way but also in his slowly penetrating the otherwise baffling system of ancient Egyptian mathematics. The reader is led to discover mechanisms and to appreciate details, and eventually to gain a new perspective on the subject. Finally, the method of setting ancient Egyptian mathematics within the wider context

[1] Just to mention a few: Gunn and Peet 1929, Fletcher 1970, Gerdes 1985, Imhausen 2002, and Rossi and Imhausen 2009.

of other ancient mathematical systems usefully draws attention to the basic mechanisms of each system and to their differences and similarities.

I am a little surprised by Reimer's choice not to include bibliographical references. After all, the book presents itself as a possible textbook for university courses. Moreover, its subject is connected with many fields (such as administration, arts, and architecture) within the huge subject of Egyptology. If the author's conclusions find correspondence to other, contiguous areas of research, it would have been extremely useful to see the links and how they were made. Otherwise, this is a brilliant and entertaining book that can be enjoyed by academics as well as interested readers of various backgrounds.

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