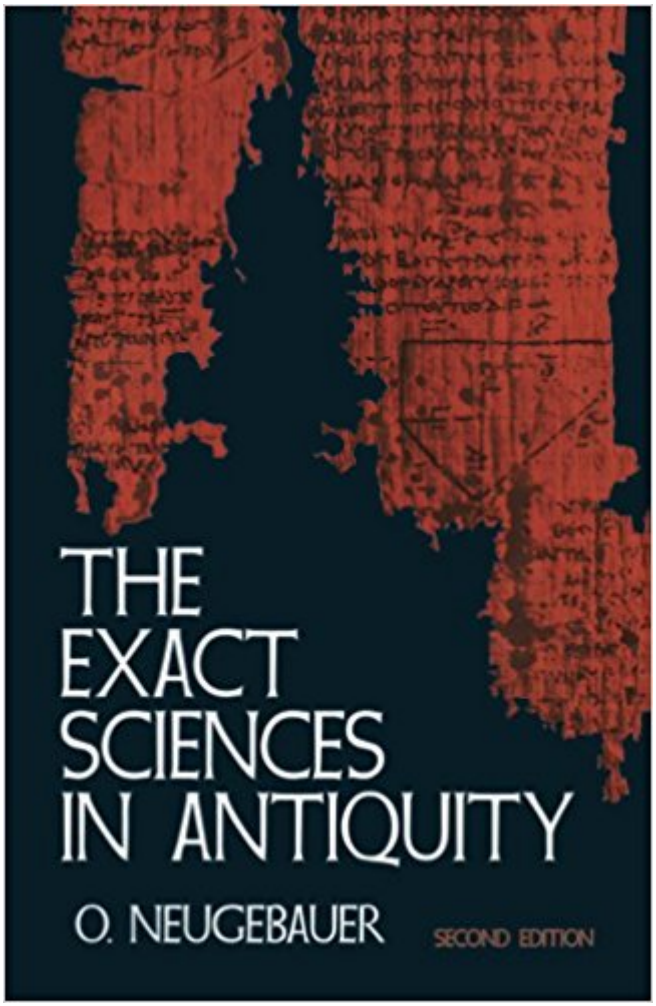
The Exact Sciences In Antiquity



Synopsis

Based on a series of lectures delivered at Cornell University in the fall of 1949, and since revised, this is the standard non-technical coverage of Egyptian and Babylonian mathematics and astronomy, and their transmission to the Hellenistic world. Entirely modern in its data and conclusions, it reveals the surprising sophistication of certain areas of early science, particularly Babylonian mathematics.After a discussion of the number systems used in the ancient Near East (contrasting the Egyptian method of additive computations with unit fractions and Babylonian place values), Dr. Neugebauer covers Babylonian tables for numerical computation, approximations of the square root of 2 (with implications that the Pythagorean Theorem was known more than a thousand years before Pythagoras), Pythagorean numbers, quadratic equations with two unknowns, special cases of logarithms and various other algebraic and geometric cases. Babylonian strength in algebraic and numerical work reveals a level of mathematical development in many aspects comparable to the mathematics of the early Renaissance in Europe. This is in contrast to the relatively primitive Egyptian mathematics. In the realm of astronomy, too, Dr. Neugebauer describes an unexpected sophistication, which is interpreted less as the result of millennia of observations (as used to be the interpretation) than as a competent mathematical apparatus. The transmission of this early science and its further development in Hellenistic times is also described. An Appendix discusses certain aspects of Greek astronomy and the indebtedness of the Copernican system to Ptolemaic and Islamic methods.Dr. Neugebauer has long enjoyed an international reputation as one of the foremost workers in the area of premodern science. Many of his discoveries have revolutionized earlier understandings. In this volume he presents a non-technical survey, with much material unique on this level, which can be read with great profit by all interested in the history of science or history of culture.

Book Information

Paperback: 288 pages
Publisher: Dover Publications; 2nd ed. edition (June 1, 1969)
Language: English
ISBN-10: 0486223329
ISBN-13: 978-0486223322
Product Dimensions: 5.4 x 0.6 x 8.5 inches
Shipping Weight: 11.2 ounces (View shipping rates and policies)
Average Customer Review: 4.9 out of 5 stars 9 customer reviews

Best Sellers Rank: #304,627 in Books (See Top 100 in Books) #274 inÃ Â Books > Science & Math > Mathematics > History #1741 inÃ Â Books > Science & Math > History & Philosophy #3884 inÃ Â Books > Textbooks > Science & Mathematics > Mathematics

Customer Reviews

Otto Neugebauer: Exacting HistoryNeugebauer's The Exact Sciences in Antiquity became an instant unique classic of scientific literature when first published in 1951 in the United States and in Copenhagen where he had lived and worked for some years after having been forced out of Germany because of his opposition to National Socialism. At the start of World War II, Otto Neugebauer (1899Ã¢â ¬â œ1990) left Europe for Brown University where he founded the History of Mathematics Department. Years later a colleague at Brown recalled Neugebauer's eloquent summary of the dark years in Germany: "If you never heard the sound of Nazi boots below you in the street, you cannot understand the history of the period." In the 1980s he moved to the Institute for Advanced Study in Princeton. He wrote several books and many articles in addition to The Exact Sciences in Antiquity. His monumental three-volume History of Ancient Mathematical Astronomy (1975) is the definitive work on the subject. Dover reprinted The Exact Sciences in Antiquity in 1969. Critical Acclaim for Otto Neugebauer:"Otto Neugebauer was the most original and productive scholar of the history of the exact sciences, perhaps of the history of science, of our age. He began as a mathematician, turned first to Egyptian and Babylonian mathematics, and then took up the history of mathematical astronomy, to which he afterward devoted the greatest part of his attention. In a career of sixty-five years, he to a great extent created our understanding of mathematical astronomy from Babylon and Egypt, through Greco-Roman antiquity, to India, Islam, and Europe of the Middle Ages and Renaissance. Through his colleagues, students, and many readers, his influence on the study of the history of the exact sciences remains profound, even definitive." Ã¢â ¬â ¢ N. M. Swerdlow

Rather than the endless tomes containing nothing but what individuals think the ancients did this one actually shows pictures of some of the source tablets and mathematical tables the concepts in the book were translated from. The sources are direct, well researched, well documented, and extremely reliable. I first bought this book a couple of decades ago but discovering it missing from my library after a move I still treasured it enough to purchase it again. For someone in search of a time when the mathematics of music, time, and space were one it is most rewarding and worthwhile.

Old book, of course is Neugebauer, but very good introduction to mathematics in the antique babylonian and greek civilization.

This is the real deal, not a gee-whiz popular book. It’s nicely written and easy to read, if you want to read it; but it really gives the whole story, with nitty-gritty detail, of exactly what these ancient mathematicians and astronomers did. The next step from here is pretty much going to be reading the original texts themselves.I was interested in where science comes from, and how people ever managed to figure out a lot of the basic stuff that we take for granted, but that really isn’t obvious at all. This book was a real eye-opener. It’s one thing to read a sentence in a popular article that tells you the ancient Egyptians were clever or that the Ptolemaic model for the solar system was sophisticated. It’s quite another to see exactly what these people did, what questions they asked (sensible questions but mostly not the ones we’d ask) and how they answered them (with crude tools, but intelligently).It’s the only book at this level of detail on the subject that I have read, so I can’t speak to whether its focus or evaluations may be biased. If what you want is a detailed study, instead of a vague summary, this is a real one.

An `old fashioned’ text where the notes are as important as the body. The `Method’ is the `As it really was’ school. The author was a German mathematician who was drawn to Mesopotamian mathematics and astronomy early in the 20th century. Where used Greek or Latin is translated. The more modern European languages of French and especially German are extensively referred to in the notes but NOT in the body.The book is much more `Eurocentric’ than is `politically correct’ these days. By example the `zero symbol’ is attributed to Greece, thence to Egypt then to the Orient. Others disagree. This author presents data, lists and writings from the original sources ... he has received `lifetime awards’ form mathematical societies but the popular press has called other authors on zero, "ball buster’s"This book is a very deep investigation of the topic of the title. While not a `page turner’ for most if one relishes tidbits of fascinating information on numbers, antique maths, astronomical methods and spends the time to read the notes as well as the text when they finish this book they will have a good grip of the breadth of Mesopotamian knowledge of these subjects.

The Babylonians were good guys. They had a sophisticated, table-based system of arithmetic, they could solve quadratic equations, etc. For all this we respect them, but for Plimpton 322 we love them--surely only true connoisseurs of numbers would produce a table of Pythagorean triples. The

Egyptians on the other hand disappoint us. Their arithmetic "is probably best described as a retarding force" and their astronomy "remained through all its history on an exceedingly crude level" (p. 80). To be fair, their simple-mindedness did lead them to one great creation, namely "the only intelligent calendar which ever existed in human history", to be contrasted with e.g. "the chaotic Greek calendars, depending not only on the moon but also on local politics for its intercalations" (p. 81). Neugebauer's favourite topic is Babylonian astronomy. "The very backbone of Babylonian mathematical astronomy" (p. 102) is period relations, like 235 lunar months = 19 solar years. From here they build up a quite sophisticated, purely arithmetical system "excellently adapted to practical computation and to predicting new moons, eclipses, etc." (p. 114). "At no point of this theory are the traces of a specific geometrical model visible" (p. 110), so the Babylonian theory is completely different from the Ptolemaic theory. "Nevertheless, Babylonian influence is visible in two different ways in Greek astronomy: first, in contributing the basic empirical material ... second, in a direct continuation of arithmetical methods which were used simultaneously with and independently of the geometrical methods" (p. 156); apparently even the Greeks didn't want to pull out their trig tables for every little thing. Throughout the book there are also notes on various aspects of historical scholarship, including delightfully subjective remarks like "The much publicized 'progress' in the study of the history of science is difficult to reconcile with the shocking neglect of a great wealth of source material ... What we really need is not bibliographies and summaries, but competent publications of Islamic, Greek, and Latin treatises" (p. 55).

Readers purpose for examining the material was a search for more information into Egyptian use of Fibonacci sequences, specifically whether they used 1st. or 2nd. order, since it is known that the Italian was not the first. Readers questions in this regard were answered although not directly.Author of book makes case why astronomy did not evolve from astrology. Although author is not math intensive, author has incredible insight into the human subconsciousness role and direction into math as used by these early peoples. Reader was able to re-work, from the Astronomy section of MathCad, the base 60 calculator used by the Babylonians, (one was also constructed for the Eygptians in their base but is not nearly as interesting) and reflects how clearly the author had submitted the interpretations for the reader to follow. This book is gem.

Very pleased.

An excellent book about the history and the extent of advancement of mathematics, astronomy, and

physics in Antiquity.

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