Mathematics and its History. J. Stillwell. Springer-Verlag, Berlin, Germany. 2002. Second edition. 542 pp. EUR 59.95.

As the very title of this book makes it clear, the book is about mathematics and its history and not merely the history of mathematics. History plays a supporting role in this book. Thus the book fills a gap in the existing mathematics literature by providing an overview of mathematics peppered with its history and biographical accounts of famous mathematicians. Clearly the book is not meant for laymen. The reader is assumed to be familiar with topics like calculus, algebra and geometry.

Given its aim in presenting a unified view of mathematics, the book starts appropriately enough with a description of Pythagoras theorem. This theorem is a prime example of a result which connects different areas of mathematics – in this case, arithmetic and geometry. The author clearly brings out this connection; and such interconnections and their origin form a recurring theme in this book. Another useful feature is the presence of a large number of exercises throughout the book. This will be appreciated by those readers who wish to delve deeper into specific areas.

The second chapter deals with Greek geometry. Euclid and his *Elements* play a stellar role in this chapter. Towards the end of this chapter, the author laments the present low cultural status of mathematics and links it to the absence of a book comparable to the *Elements*. While the latter part is certainly true, the first part is no longer true as the vast potential of mathematics and its applications are widely appreciated today. Of course, mathematics and its practitioners were not always held in high esteem even in the past as the following quotation from St. Augustine (354–430) shows: *The good Christian should beware of mathematicians, and all those who make empty prophecies. The danger already exists that the mathematicians have made a covenant with the devil to darken the spirit and to confine man in the bonds of Hell.*

The next three chapters deal with number theory. In the Indian context, a commendable feature of this book is that it does not ignore the contributions of Indian mathematicians as do many books on the history of mathematics. There is a chapter on number theory in Asia which describes Indian contributions in some detail. Even though it is not as substantial as the material in the controversial book by G. Ifrah, it at least fills a lacuna present in the first edition of the book.

The author next describes polynomial equations, analytical and projective geometry. The last topic is not often dealt with at this level and is therefore a welcome addition. The next two chapters deal with calculus and infinite series. In particular, several results related to the infinite series expansions and infinite product formulas for p are listed. The author desists from exploring some of the hilarious sidelights connected with this. The reviewer cannot resist mentioning one: In 1897 a bill was introduced in the Indiana State (USA) House stating that one Mr Goodwin had solved the problem of squaring the circle and further copyrighted the solution. If the legislature endorses his solution, the state would be allowed to use it in its textbooks free of charge while charging royalty from other states. The bill implicitly would have legislated the value of p to be equal to 3.2. The bill was passed by the House 67-0. In the meantime, this came to the attention of a mathematician, Prof. C. A. Waldo, who ensured that the bill was shot down in the Indiana Senate. More accurately, the bill was indefinitely postponed and more than 105 years later, the bill still remains indefinitely postponed!

Modern books on mathematics often omit mechanics even though it played a crucial role in the development of mathematics and continues to do so in the area of dynamical systems. Fortunately, the present book does not belong to the above class. There is a chapter devoted to mechanics and hydrodynamics. However, this chapter could have made a connection to the modern theory of dynamical systems. Since this is another area where different streams of mathematics come together, an opportunity to further highlight the unity of mathematics is lost.

The author also briefly explores Fermat's last theorem and its connection with elliptic curves. The author next delves into complex numbers, curves and functions. This is followed by differential geometry and noneuclidean geometry. A simple and intuitive description of these difficult topics is given. The topics dealt with subsequently become progressively more difficult starting with group theory and hypercomplex numbers and ending with advanced topics like algebraic number theory. The author makes a largely successful effort in presenting this material in an understandable manner. The book ends with a brief description of set theory, measures and Godel's theorem.

In summary, the book covers an amazing range of mathematical topics in some depth, aided by a generous collection of exercises. However, important topics like probability and stochastic processes, dynamical systems, partial differential equations, numerical analysis, etc. are not covered adequately. But such omissions are to be expected in a book with such a vast scope and are therefore excusable. The exposition is clear throughout the book and provides a unified view of mathematics. The book should be required reading for all undergraduates majoring in mathematics.

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Ancient Indian Astronomy: Planetary Positions and Eclipses. S. Balachandra Rao. B. R. Publishing Corporation, Delhi. 2000. Rs 1200. pp. 288 + xv.

Our ancient texts in science suffer from being remote from the modern reader. Written in Sanskrit and using old notation, they are hardly suited for easy communication to a student of science. It is therefore laudable that Balachandra Rao has carried out the difficult job of explaining what our ancient astronomical texts were about, using the modern mathematical framework. The author has other books to his credit, dealing with our astronomical heritage as well as scientifically debunking astrology.

This one deals with how the ancients plotted stellar and planetary positions, could predict their future locations as well as positions on any past date, and more usefully tell the timings of solar and lunar eclipses.