



References

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Book Review

Mathematics and its History
 (Undergraduate Texts in Mathematics)

J. Stilwell
 Springer-Verlag, 1989,
 ISBN 3 540 96981 0.

Reviewed by James Ward

John Stilwell, in addition to his original contributions in mathematics, is the translator of Serre's *Trees* (Springer-Verlag), and the author of *Classical Topology and Combinatorial Group Theory*. His experience as a writer on mathematics shows to good advantage in the volume under review.

Proceeding from the observation (probably all too true in many universities) that students are taught Algebra, Calculus, Group Theory, Topology, Measure Theory etc, and are taught little of the connexions between these areas, the author's aim is to combine the ingredients of Mathematics, using History as a leavening agent; the result is very appetizing indeed!

This perspective differs from that of well known books on the subject, such as the works of Boyer and Struik — to name but two — who are more concerned with tracing the evolution of mathematical ideas; also they aspire to produce a complete account of the history of the subject (Struik being telegraphic in style but, given its length, remarkably complete; Boyer is very comprehensive).

In Stilwell's book, the presentation of material in each chapter is followed by a section of Biographical Notes, which in most cases includes illustrations of the mathematicians mentioned in the chapter. This is very useful for a lecturer seeking last-minute

information on say Pascal or Fermat or Descartes! (One may not infer that this is an empirical observation of mine.)

The topics covered in the book are: 1. The Theorem of Pythagoras; 2. Greek Geometry; 3. Greek Number Theory; 4. Infinity in Greek Mathematics (a wise 2nd year student once wrote "Euclid proved the number of primes is infinite, and nobody knows how many there are"); 5. Polynomial Equations; 6. Analytic Geometry; 7. Projective Geometry; 8. Calculus; 9. Infinite Series; 10. The Revival of Number Theory; 11. Elliptic Functions; 12. Mechanics; 13. Complex Numbers in Algebra; 14. Complex Numbers and Curves; 15. Complex Numbers and Functions; 16. Differential Geometry; 17. Non-Euclidean Geometry; 18. Group Theory; 19. Topology; 20. Sets, Logic and Computation.

In his Preface, the author pleads an excuse for not including Lie Groups or Functional Analysis, and also for not mentioning Probability Theory. The choice of topics is nonetheless very wide, and is an ideal for the breadth of knowledge of a mathematics graduate. Some of the material is quite sophisticated, but the author's exposition is very clear and concise (in particular in Chapter 11, whose topic does not commonly feature in undergraduate curricula, and which would serve as an ideal background to a post-graduate course on that area).

The last chapter is particularly welcome (not all universities offer a course on Set Theory or Mathematical Logic) especially since rapid developments in Computer Science are impinging on mathematics curricula. I think it is worthwhile listing the sections in this chapter: An Explanation, Sets, Measure, The Diagonal Argument, Logic and Gödel's Theorem, Provability and Truth, Biographical Notes: Gödel. I might add that there is a curious aperçu of Gödel's character on pp. 28–29 of *Conversations* by Primo Levi and Tullio Regge (the late celebrated Italian author and chemist, and renowned physicist respectively).

As one has come to expect from Springer-Verlag, the book is extremely well produced. I failed to spot any misprints of consequence, although there is an egregious blunder in the copyright statement caused by the omission of the word "not" — this is corrected in an erratum. This adds a certain piquancy to the book.

I recommend very highly *Mathematics and its History*. It was a pleasure to read it, and be reminded of the beauty and purity of mathematics as a human endeavour.

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