reflected in his founding of the journal Acta Mathematica (in the early volumes of which Poincaré published on Fuchsian groups and Cantor on set theory), in his promotion of the 1885 King Oscar II Prize Competition (one of the winners of which was Poincaré on the three body problem), in his securing of the appointment of Sonya Kovalevski to a post at Stockholm, and in his bequest of what later became the Mittag-Leffler Institute. (There is even a linkage to more recent times: André Weil, who died in August 1998, testified to Mittag-Leffler's nose for young mathematical talent when he recalled how the latter, just before his death in 1927, promised to publish his thesis (unseen and then unfinished!) in Acta.) Since then, as Gårding puts it, Sweden has not been lacking in good mathematicians: I'll list a few of those described together with brief reminders of their work.

Bendixon (Cantor-Bendixon theorem)

Beurling (inner/outer functions, spectral analysis)

Carleman (Carleman kernels, quasianalytic functions)

Cramer (modern probability theory) Fredholm (integral equations)

Frostman (potential theory) von Koch (snowflake curve)

Nagell (number theory) Nörlund (difference equations)

M. Riesz (conjugate functions, Riesz-Thorin theorem).

But, as Gårding rather elegiacally reflects in a postscript, the attraction of a book such as this is not so much in the rehearsing of those names which Posternity sanctifies but in the dusting-off of those which Time has forgotten: who now has heard of Björling, Dillner, Falk, Malmsten, Wiman, or Gullstand (who won the 1911 Nobel Prize for Medicine)? Indeed, to share a personal reminiscence, the name Edvard Phragmén rang a rusty bell with me from the Phragmén-Lindelöf principle (an extension of the maximum modulus theorem to sectors). He now emerges from the shadows first as the eagle-eyed proof-reader who detected Poincaré's serious mistake in his initial submission for the King Oscar II Prize (the rectification of which led Poincaré to his intimation of the possibility of chaotic behaviour of solutions to the three body problem, [1]). He then succeeded Kovalevski as professor at Stockholm in 1892 but (as Erdős would have put it) he ‘died’ in 1903 to become a highly successful chief inspector of insurance!

I found this book full of such surprises and fresh insights: I can warmly recommend both it, and the preceding twelve volumes (such as [1]) of the joint AMS/LMS History of Mathematics series in which it takes it place.

Reference


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The first edition of this book caused considerable interest, and even controversy, from its appearance in 1987, for the author really did offer a new interpretation of Greek mathematics, especially Euclid's Elements. The principal theses, which concern both the mathematics itself and the available sources, may be summarised as follows:

1) Reliable historical evidence for all ancient Greeks is scanty, and not only for
the deep past such as the Pythagoreans; for example, the provenance of the statement over Plato’s Academy ‘let no one unskilled in geometry enter’ dates only from the +6th century, and even the reading of the word ‘geometry’ needs pondering (ch. 6).

2) The emphasis on geometry was indeed strong; the objects treated were, for example, lines, rather than lengths upon which a manner of measuring and thereby arithmetic has been imposed. In particular, ratios of lines have to be distinguished from rational numbers (chs. 1-4).

3) The Euclidean algorithm led to a sophisticated theory of (say) geometrical magnitudes and their parts (ch. 2), with especial attention in Euclid’s Book 10 to properties (including ratios) of the forms \((\sqrt{a} + \sqrt{b})\) and \((\sqrt{\sqrt{a} + \sqrt{b}})\) for given magnitudes \(a\) and \(b\); relationships between squares and their sides was an important motivation (ch. 5). This theory resembles that of continued fractions in arithmetic, though not to be identified with it; but features of the latter, a curiously fugitive topic in mathematics, can be examined (ch. 9) to improve understanding.

4) Much doubt is to be cast upon the well-known claim that the discovery of irrational numbers caused a crisis in Greek mathematics. Apart from the distinction between such numbers and incommensurable ratios anyway, there are good reasons to think that the properties of the algorithms, including periodicity of the residues in many cases, led to exciting developments (ch. 8).

5) Many of the oldest texts are written on materials such as papyrus or wood, so that their layout and state needs to be considered in detail (ch. 6 and several plates). So do the systems of numerals deployed, especially concerning fractions (ch. 7).

The chapter numbers given above are still valid, for the new edition does not exhibit major remodelling. Some further plates are provided, and ch. 5 has been rewritten; but the main addition is a new ch. 10, which focuses mainly upon theses 3) and 4) above. The reader is now advised to start with the opening section of this new chapter before proceeding to its predecessors; but this is not very satisfactory if (as is likely) he is unfamiliar with the kinds of argument deployed.

Two features of the first edition have been retained where change would have been appreciated. First, the textual references to items in the substantial bibliography are given as, say, ‘Hogendijk HTATGIG’, which is an unwelcome use of acronyms. Second and more important as an example of the dominance of geometry, these Greek mathematicians spoke of, for example, ‘the square on the side’ and not ‘the square of the side’, which is redolent of the multiplication of lengths. The author’s stress on this point is sabotaged by his denoting a square on line \(b\) by the notation \(b^2\), which has been read in the other sense for centuries under the influence of common algebra. Preferable alternative notations include ‘\(T(b)\)’, the tetragon (or square) on \(b\), which was adopted by E. J. Dijksterhuis in his Dutch edition of the Elements in 1929-1930, along with similar symbols for cubes, circles, and so on.

The summary above shows that this book is a research monograph par excellence, and so not directly usable for mathematics teaching before a late stage in a first-degree course. But the issues raised are of major importance in order not to misunderstand ancient Greek mathematics, and the book deserves to play an important role on the rewriting of general and introductory histories of mathematics.

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