

## Preface

The practice of the history of mathematics is in flux. This statement may seem ironic or even paradoxical, for a discipline that relies seemingly on logic and precision. However, trends in the scholarly practice of history are gradually causing substantial changes in the questions raised by practitioners of the discipline, and the methods used to try to arrive at answers. Fifty years ago the discipline was populated mostly by mathematicians, emphasizing logical reconstructions and explanations; today, the concerns of the historian are being heard. Surprisingly, nowhere are these changes more true than in the study of ancient Greek mathematics, which has seen precious little genuinely new source material come to light in the past decades. Debates concerning, for instance, how to consider the Greek notion of geometric algebra led to an increasing realization that even mathematical structures can be shaped by cultural perspective; therefore, modern reconstructions of ancient concepts contain the hidden danger of saying as much about the historian as about the history.

With respect to medieval Islamic mathematics, the manuscript situation is entirely different: hundreds or even thousands of texts remain in libraries, unedited and not yet easily available to the scholar. Nevertheless similar trends have been felt. Categorizing subdisciplines according to our modern mathematical perspective is rightly viewed with suspicion. The border between mathematics and science was entirely different, and subjects like astrology need to be placed in a context appropriate for its time, not ours. The assumption of a single Islamic mathematical culture has been criticized, and nuanced evaluations of different mathematical communities are starting to arise. Even the traditional focus on the best theoretical mathematics of the time period has been questioned, raising the need to clarify the purpose of studying the history of mathematics in the first place. Is our primary task to provide a plausible logical path that led to the present mathematics, or should we rather be concerned with how mathematics clarifies the human condition within and between different cultures?

The literature accompanying these shifts in perspective has been vast, and negotiating the terrain can be difficult even for a scholar in these areas, let alone a new graduate student or an interested outsider. We are thus truly fortunate that a small tradition of surveys of the current state of the art, both in Greek and in Islamic mathematics, was initiated in the 1980s by J. Lennart Berggren. His 1984 survey of Greek mathematics (the first article in this volume), followed by a 1998 survey by Ken Saito (the second article), vividly tell the story of changing foci and perspectives. On the Islamic side, Len's 1985 and 1997 surveys (the fourth and fifth articles) tell the story of a vast literature coming to light, and the interaction of different points of view in coming to grips with it.

These four articles, so helpful to us as developing scholars, have not received updates since then (other than a couple of surveys in particular subdisciplines). As a fitting tribute to a man so important to us, and as a vital service to new scholars, graduate students, and interested readers, we have brought these four papers together in this volume, and written two new survey papers (one Greek, and one Islamic) to take the narrative to the present day. Through this we hope to provide a handbook or guide to developments in the field over the past forty years. In addition, we hope that the combined bibliographies of these articles, some 900 entries altogether, can form a kind of paper database to provide a guide to the recent practice of the discipline. They also bear witness to the shifts in perspective that

Len has witnessed, reported, and influenced since he began his historical career almost forty years ago.

The survey papers were just one aspect of the many contributions that Len has made to the history of both Greek and Islamic mathematics over this period. Dozens of journal articles in both areas reveal Len's role as a leader in shaping new and more nuanced approaches to the history of mathematics, while preserving the great achievements of our predecessors. The diversity of topics within these papers, including geometry, arithmetic, astronomy, and geography, is an impressive record of following the historical actors where they went, rather than using the material to one's own purposes — the art of the true historian. We are particularly grateful for Len's commitment to the primary literature as the key to grounding one's perspective. This is witnessed in many of his papers as well as his two translations of ancient texts (Euclid's *Phaenomena* with Robert Thomas, and Ptolemy's *Geography* with Alexander Jones).

But Len is much more than just a scholar. We find among his publications a devotion to taking the results of our labors to the broader community. Len worked tirelessly producing and editing encyclopedia articles, and wrote a variety of articles for pedagogical and popular publications. Most important among these is his *Episodes in the Mathematics of Medieval Islam* (1986), a popular book that continues to have a deep impact in increasing public awareness of Islamic contributions to mathematics. Recently it has been translated into German, and will soon appear in a second edition. Some of Len's most valued works combine his dedication to the original sources with public outreach: he edited the Islamic section of Victor Katz's *The Mathematics of Egypt, Mesopotamia, China, India and Islam* and is preparing a section for a supplementary volume; and he edited (with Jonathan and Peter Borwein) three editions of *Pi: A Sourcebook*. It is out of this latter project that we are fortunate to have from one of Len's non-historical colleagues, Jonathan Borwein, a survey of the story of  $\pi$  in this volume, as a tribute to Len's commitment to connecting the academic discipline of the history of mathematics with the broader community. Finally, Len is an active devotee of sundials and their many varieties; he has contributed articles to *The Compendium*, the official publication of the North American Sundial Society. One of the editors' fondest memories is of helping Len and his sundial colleague Brian Albinson to paint a split analemmatic sundial on the parking lot of Simon Fraser University, Len's home institution. A picture of Len serving as the gnomon for this dial is available on the Internet.

It is a truly a mark of the great respect that Len's colleagues hold for him that so many of them wished to join in this project in his honor. The second part of this book is a collection of seventeen studies by his friends that contribute to Len's interests in various ways. Each of these studies exemplifies Len's approach, respecting the original texts and following the historical trail where it leads. We offer this volume to Len as a tribute to his powerful scholarship and gentle leadership, and with our best wishes for a healthy and productive future.

San Diego, January 2013

Glen Van Brummelen and Nathan Sidoli

From Alexandria, Through Baghdad

Surveys and Studies in the Ancient Greek and Medieval  
Islamic Mathematical Sciences in Honor of J.L. Berggren  
Sidoli, N.; Van Brummelen, G. (Eds.)

2014, XV, 583 p. 158 illus., 21 illus. in color., Hardcover

ISBN: 978-3-642-36735-9