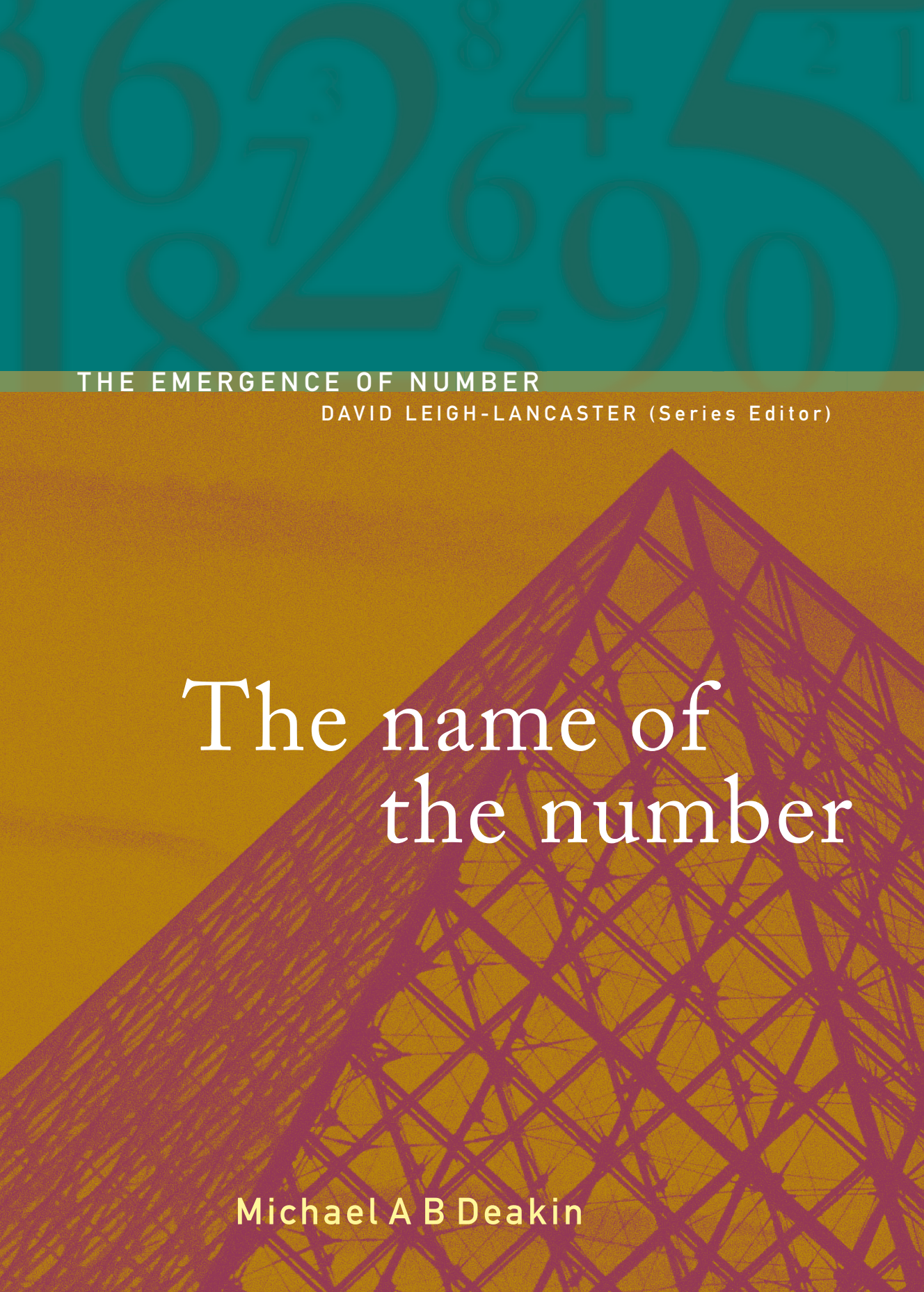

THE EMERGENCE OF NUMBER

DAVID LEIGH-LANCASTER (Series Editor)

The name of the number

Michael A B Deakin

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Series editor: David Leigh-Lancaster

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Series overview

The *Emergence of Number* is a series that comprises three complementary texts:

- *Growing Ideas of Number*
- *The Name of the Number*
- *Number and the Child*

While each of these texts can be read in its own right according to interest, their complementary combination is intended to provide a distinctive and comprehensive treatment of questions such as: *Where* do numbers come from? *What* are numbers? *Why* are numbers so important? *How* do we learn about number? The series is designed to be accessible *and* rigorous while appealing to several audiences:

- *Teachers and students* of mathematics and mathematics-related areas of study who wish to gain a richer understanding of number
- *Mathematics educators* and *education researchers*
- *Mathematicians* with a broader interest in the area of study
- *General readers* who would like to know more about 'number' in terms of its cultural and historical conceptual development and related practices

Growing Ideas of Number explores the notion of how number ideas and ideas of number have grown from ancient to modern times throughout history. It engages the reader in thinking about how different types of number, views of numbers, and their meaning and applications have varied across cultures over time, and combines historical considerations with the mathematics. It nicely illustrates some of the real problems and subtleties of number including counting, calculation and measuring, and using machines, which both ancient and modern peoples have grappled with—and continue to do today.

The Name of the Number covers the development of number ideas in language, not only as we know and use it today, but as a record of the development of a central aspect of human evolution: how number has emerged as a central part of human heritage, and what this tells us about

who we are in our own words and those of our ancestors—the story of number in language. The treatment is an anthropological and linguistic exploration that engages the imagination, combining phonetics, symbols, words and senses for and of number, counting and bases in a journey from ancient times to the present through the emergence and development of historical and contemporary languages.

Number and the Child discusses how students learn about number concepts, skills and processes in the context of theories, practical experience and related research on this topic. It includes practical approaches to teaching and learning number, and the place of number in the contemporary school mathematics curriculum. It stimulates the reader to consider the role of number in the mathematics curriculum and how we frame and implement related expectations of all, or only some, students in the compulsory years of schooling.

Each text in the series incorporates a comprehensive range of illustrative examples, diagrams, and tables, text and web-based references for further reading, as well as suggested activities, exercises and investigations.

About the author

Michael Deakin has interests in the History of Mathematics, in applied Mathematics (especially Biomathematics) and Mathematics Education. He taught at Monash University from 1967 until 1999, but has also taught Mathematics in the USA, in the UK, in Papua New Guinea and in Indonesia. He was for many years the editor of *Function*, a journal of School Mathematics (now incorporated into a sister journal *Parabola*, for which he continues to contribute a column on the History of Mathematics). He has authored over 100 technical papers and over 200 popular expositions of Mathematics.

Preface

This book collects material from a number of papers I have written over the past twenty-five years or so, dealing with aspects of number—in particular the influence of language on the evolution of the number concept. I am glad of the chance to revisit this material and to put it all together, and thank ACER and David Leigh-Lancaster for the opportunity to do so.

In a few instances, I have revised opinions I once held, so that there may in places be some inconsistency between what I wrote earlier and what I say here. There are only a few such cases, and in no case are they very important. For this reason, I have not drawn attention to them. However, the reader is advised that the views expressed here are to be preferred to those earlier expressions wherever any such conflict arises.

My aim is to be scholarly and authoritative. However, in an attempt also to be accessible, I have consciously avoided jargon, technical language and specialist notations. Where some technical detail seemed to me to be unavoidable, I have attempted to explain the concept in non-technical language. A book such as this necessarily depends heavily on the work of others, and all such debts are duly acknowledged in the notes supplied for each individual chapter. It is important in historical writing to say not only what we know about the past, but *how* we know it, and where opinions are expressed, not only to present those opinions, but to say *why* we hold them. This I have done throughout but, in order not to interrupt the flow of the story, these details are collated together in Chapter 8. The list at the end of the book of works cited provides a convenient summary.

In the preparation of this book, I have benefited greatly from the comments of John Crossley. There is much in common between this book and the one that he has written for publication in parallel with it. I do not draw specific attention to points of correspondence between our separate contributions, but the reader will see many such connections. The two different approaches should be seen as complementary.

It is also apposite to record that John was one of the sources of my own interest in the subject of Number and its history and in the history of Mathematics in general.