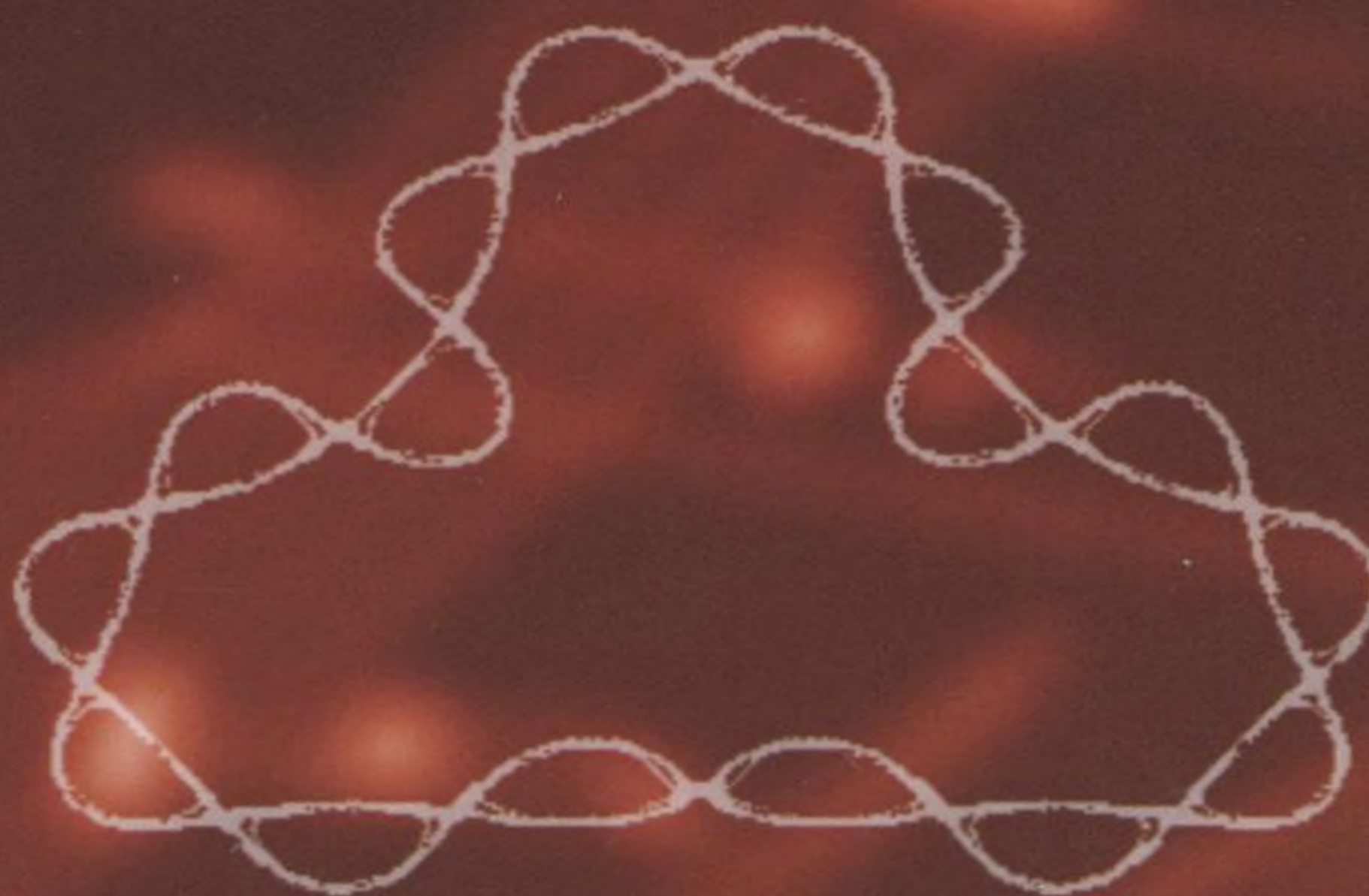


From Ancient Greek times, music has been seen as a mathematical art, and the relationship between mathematics and music has fascinated generations. This new-in-paperback edition of a collection of wide-ranging, comprehensive and fully illustrated papers, authored by leading scholars, presents the link between these two fields in a lucid manner that is suitable for students of both subjects, as well as the general reader with an interest in music. Physical, theoretical, physiological, acoustic, compositional, and analytical relationships between music and mathematics are unfolded and explored with focus on tuning and temperament, the mathematics of sound, and modern compositional techniques.



'This is a lucid and stimulating introduction to a many-sided topic, leavened with amusing anecdotes and occasional donnish humour. The writing throughout is wonderfully elegant and clear, so when the mathematical symbolism defeated me I could still follow the gist of the argument.'

BBC Music Magazine

OXFORD
UNIVERSITY PRESS

www.oup.com

ISBN 978-0-19-929893-8



9 780199 298938

Music and mathematics: an overview 1

Susan Wollenberg

Part I: Music and mathematics through history 11

1. Tuning and temperament: closing the spiral 13

Neil Bibby

2. Musical cosmology: Kepler and his readers 29

J. V. Field

Part II: The mathematics of musical sound 45

3. The science of musical sound 47

Charles Taylor

4. Faggot's fretful fiasco 61

Ian Stewart

5. Helmholtz: combinational tones and consonance 77

David Fowler

Part III: Mathematical structure in music 89

6. The geometry of music 91

Wilfrid Hodges

7. Ringing the changes: bells and mathematics 113

Dermot Roaf and Arthur White

8. Composing with numbers: sets, rows
and magic squares 131

Jonathan Cross

Part IV: The composer speaks 147

9. Microtones and projective planes 149

Carlton Gamer and Robin Wilson

10. Composing with fractals 163

Robert Sherlaw Johnson

Notes on contributors 173

Notes, references, and further reading 177

Acknowledgements 183

Index 187