

CONTENTS

M.C. Escher at Work G.A. Escher	1
ESCHER AND SYMMETRY	
Coloured Symmetry H.S.M. Coxeter	15
The 37 Combinatorial Types of Regular “Heaven and Hell” Patterns in the Euclidean Plane A.W.M. Dress	35
On Monohedral Space Tilings in M.C. Escher’s Work P. Engel	47
Mathematical Challenges in Escher’s Geometry B. Grünbaum	53
Hidden Symmetry C.H. MacGillavry	69
M.C. Escher’s Classification System for his Colored Periodic Drawings D. Schattschneider	82
Escher Designs on Surfaces M. Senechal	97
What Escher Might Have Done G.C. Shephard	111
ESCHER, MATHEMATICS AND VISUAL PERCEPTION	
Escher’s Impossible Figure Prints in a New Context B. Ernst	125
Puzzles of Pictures as Untouchable Objects R.L. Gregory	135

Escher and the Visual Representation of Mathematical Ideas R. Penrose	143
Perceptual Theory and Ambiguity in the Work of M.C. Escher against the Background of 20th Century Art M.L. Teuber	159
ESCHER AND GEOMETRY	
Rolling a Tetrahedron on the Plane to Produce Periodic Patterns of Symmetry P2 and Drawing Dragon Curves as Backbones of Escher Figures K. Husimi	181
Metamorphosis and Cycle in Curved Space Structures H. Lalvani	187
Polyhedra in the Work of M.C. Escher A.L. Loeb	195
Braiding Escher Models J. Pedersen	203
Butterflies and Snakes J.F. Rigby	211
How the “Path of Jerusalem” in Chartres Separates Birds from Fishes P. Rosenstiehl	221
Polyhedra in the Style of Leonardo, Dali and Escher J.M. Wills	231
Temari Workshop K. Yamamoto	237
ESCHER, CINEMA AND COMPUTER GRAPHICS	
Creating Hyperbolic Escher Patterns D.J. Dunham	241
Movies on M.C. Escher and their Mathematical Appeal M. Emmer	249
Animating Escher with Computer Graphics N. Greene	263
The Interactive Computer Graphics (ICG) Production of the 17 Two-Dimensional Crystallographic Groups, and Other Related Topics L. Cervini, R. Farinato and L. Loreto	269

ESCHER AND THE PHYSICAL WORLD

- The World of Escher and Physics**
G. Caglioti 287
- Symmetry in Protein Structure and Function**
E.P. Whitehead 297
- Structural and Dynamic Transformations in Molecular Biology**
M. Wurtz 305

ESCHER AND ART

- From M.C. Escher to Multi-Dimensional Thinking**
S. Bérczi, D. Nagy and T.F. Farkas 315
- Univocals, Ambiguity, Nonsense in Escher's Art**
C. Maltese 321
- Escher and Hoogewerff — A Meeting in the Thirties**
J. Offerhaus 329
- Escher: Between Cartography and Representation**
R.L. Pierantoni 339

ESCHER AND THE HUMANITIES

- Escherian and Non-Escherian Developments of New Frieze Types
in Hanti and Old Hungarian Communal Art**
S. Bérczi 349
- The Usual, the Ambiguous and Two Types of Visual Incongruity in the
Work of Maurits Cornelius Escher**
P. Bonaiuto 359
- A Set of Possible Worlds**
S. Marconi 369
- M.C. Escher's "Likely Impossibilities": Using the Beauty of Mathematics
to Create the Truth of Art**
E.B. Versluis 375
- Appendix: Drawing by Pirato 383**
- COLOUR ILLUSTRATIONS 385**