

**W**hy are eggs egg-shaped and fish fish-shaped? Why do the planets and stars look like balls rather than squares or pyramids? What accounts for the similarities and the variety of shapes and forms found in the natural world?

Mathematicians have long explored questions such as these, hoping to find a series of fundamental laws governing nature's design schemes. In *The Parsimonious Universe*, mathematicians Stefan Hildebrandt and Anthony Tromba look at this centuries-old search. An intriguing, beautifully illustrated blend of science, history, and many surprising examples of the influence of shape and form in nature, this book provides a fascinating introduction to the ways geometry is being used to explore and explain our world.



AN IMPRINT OF SPRINGER-VERLAG  
NEW YORK, INC.  
175 FIFTH AVENUE  
NEW YORK, NY 10010-7868

ISBN 0-387-97991-3

ISBN 0-387-97991-3



EAN

9 780387 979915 >



# T A B L E O F

Preface x

---

Prologue: On Form and Shape 1

---



**1** A Grand Scheme of the World 19

---



**2** The Heritage of Ancient Science 41

---



**3** Shortest and Quickest Connections 85

---



**4** A Miracle and Not a Miracle 127

---



5

Soap Films: The Amusement of  
Children and Mathematicians 145

---



6

Optimal Design 213

---



Epilogue: Dynamics and Motion 269

---

References, Comments, and  
Further Readings 305

---

Sources of Quotations 318

---

Sources of Illustrations 319

---

Index 321

---