

Contents

Preface	vii
Acknowledgements	ix
Part I: The Three Parts of Everything	1
1. Gödel Visits Escher's Studio	3
2. Gödel's Theorem	10
3. Slippery Road	19
4. Fuller than Full	27
5. Cantor Would Have Been Pleased	34
Part II: Sources of Randomness	39
6. A Private Lesson a Long, Long Time Ago	41
7. The Five Faces of Order	47
8. Randomness of the First Kind	55
9. Randomness of the Second Kind	59
10. Randomness of the Third Kind	65
Part III: Randomness in the Universe	69
11. From Aristotle to Einstein	71
12. The World According to an Electron	76
13. Chaos	86

14. The Supreme Law	91
15. Randomness of the Fourth Kind?	98
16. Connections	102
17. Allowed Behaviors	107
Part IV: The Emergence of Real World	109
18. The Fractal Character of Nature	111
19. Physics Plus Randomness	129
20. Stochastic Processes	135
21. Self-Organization	138
22. The Blueprint of Life	140
23. Human Products and Social Phenomena	144
24. The Principle of Minimum Energy Consumption	159
Part V: The Role of Randomness	161
25. Efficiency, Paradoxes and Beauty	163
In Closing . . .	173
Notes and References	175
Index	189