CONTENTS

Acknowledgments xi
Introduction xiii

1 Classical probabilities, 1660–1840 1
1.1 Introduction 1
1.2 The beginnings 2
1.3 The classical interpretation 6
1.4 Determinism 11
1.5 Reasonableness 14
1.6 Risk in gambling and insurance 19
1.7 Evidence and causes 26
1.8 The moral sciences 32
1.9 Conclusion 34

2 Statistical probabilities, 1820–1900 37
2.1 Introduction 37
2.2 Statistical regularity and l’homme moyen 38
2.3 Opposition to statistics 45
2.4 Statistics and variation 48
2.5 The error law and correlation 53
2.6 The statistical critique of determinism 59
2.7 Conclusion 68

3 The inference experts 70
3.1 In want of a "system of mean results" 70
3.2 Analysis of variance 73
### Contents

3.3 Fisher's antecedents: early significance tests and comparative experimentation 79
3.4 The controversy: Fisher vs. Neyman and Pearson 90
3.5 Hybridization: the silent solution 106
3.6 The statistical profession: intellectual autonomy 109
3.7 The statistical profession: institutions and influence 115
3.8 Conclusion 120

4 Chance and life: controversies in modern biology 123
4.1 Introduction 123
4.2 Spontaneity and control: chance in physiology 124
4.3 Coincidence and design: chance in natural history 132
4.4 Correlations and causes: chance in genetics 141
4.5 Sampling and selection: chance in evolutionary biology 152

5 The probabilistic revolution in physics 163
5.1 The background: classical physics 163
5.2 Probability in classical physics: the epistemic interpretation 166
5.3 Three limitations of classical physics: sources of probabilism 170
5.4 Comments on the three limitations 175
5.5 Mass phenomena and propensities 179
5.6 Explanations from probabilistic assumptions 182
5.7 The puzzle of irreversibility in time 187
5.8 The discontinuity underlying all change 190

6 Statistics of the mind 203
6.1 Introduction 203
6.2 The pre-statistical period 204
6.3 The new tools 205
6.4 From tools to theories of mind 211
6.5 A case study: from thinking to judgments under uncertainty 214
6.6 The return of the reasonable man 226
6.7 Conclusion 233
Contents

7 Numbers rule the world 235
  7.1 Introduction 235
  7.2 New objects 237
  7.3 New values 251
  7.4 New rules 263
  7.5 Conclusion 270

8 The implications of chance 271
  8.1 Probabilistic imperialism 271
  8.2 What does probability mean? 274
  8.3 Determinism 276
  8.4 Mechanized inference 286
  8.5 Statistical Lebensgefühl 289

References 293
Name index 327
Subject index 334