

Contents

<i>Preface</i>	<i>page xi</i>
1 Introduction	0
2 Origins and Histories	18
The Emergence of the Genetic Paradigm	19
Mathematical, Material, and Computational Genetics	22
The Power and Pervasiveness of Statistics	25
R.A. Fisher: Statistics, Genetics, and Eugenics	27
A Thought Experiment	30
Genomic Journeys	33
Questioning European Origins	34
Evolution within Africa; Migrations Out of Africa	37
Our Ancestral Mother and Father	43
Our Family Tree	52
Out of Europe?	56
The Path Ahead	64
Genomics Glossary	67
3 The Mind, the Lab, and the Field: Three Kinds of Populations	72
Three Kinds of Populations	75
Fisher on Theoretical Populations	76
Park on Laboratory Populations	79
Lack on Natural Populations	82
Distinguishing Population Types	85
“Effective Population Size” as a Barrier: Distinguishing	
Theoretical from Natural Populations	86
The Danger of Conflation: Theoretical and Natural	
Populations in <i>Structure</i> Analyses	90
Assumption Archaeology and Population Pluralism	95

viii · Contents

4 Metrics and Measures	98
The Meanings of Metrics and Measures: Realism or Constructivism?	101
Three Metrics and Measures of Genetic Variation	103
Genetic Diversity	103
Genetic Heterozygosity	105
Genetic Differentiation	109
Contrasting (Genetic) Diversity, Heterozygosity, and Differentiation	110
Theoretical and Disciplinary Homes	112
Conservation Biology	114
Taxonomy	116
Lewontin (1972): Taxonomy Meets Conservation Biology	118
Phylogenetics	122
<i>Homo sapiens</i> : A Special Case	126
5 Models and Methodologies	130
A Tale of Two Methodologies	134
Variance Partitioning	138
Clustering Analysis	144
Mutual Methodological Consistency	148
When Maps Become the World	149
Population Reification	150
F_{ST} Reification	157
Cluster Reification	159
Statistic–Parameter Reification	160
Whither the Two Methodologies?	162
6 Six Patterns of Human Genomic Variation	164
Six Empirical Patterns	166
1. There Is Low Intraspecies Genomic Variation	167
2. There Are Small, But Often Critical, Interspecies Differences	168
3. Of All Continental Regions, Africa Has The Oldest – And Thus The Richest And Most Encompassing – Human Genomic Variation	171
4. Most Genetic Variation Is Among Individuals Within Populations, Not Across Populations Within Continental Regions, Nor Across Different Continental Regions (Lewontin’s Distribution)	176

5. Despite Lewontin's Distribution, Clustering Populations And Classifying Individuals Is Possible	185
6. Genomic Heterozygosity Of Populations Decreases With Increasing Distance From Africa, Along Human Migration Routes	187
Pattern Matters	189
7 Natural Selection	190
Natural Selection: Distinctions and Complementarity	192
The Genomic Signature of Natural Selection	199
Determining the Legible Signature of Selection	201
Case Study: Freediving Physiology	214
Trait Individuation	217
Gene Individuation	218
Mechanisms	219
Adaptive Scenario	221
Evidence of Selection	221
Evolutionary History	222
Taking a Step Back	223
8 Intelligence, Female Orgasm, and Future Discovery	226
Gene versus Environment in Disease	228
Intelligence, Female Orgasm, and Future Discovery	237
Intelligence	238
Female Orgasm	243
The Distinction Between Gene and Environment, and the Adaptationist Paradigm	259
9 Is Race Real?	262
Philosophers of Race Speak	264
The Reality and Reification of Race	267
Lewontin's Distribution and "Lewontin's Fallacy": When the Single Shannon Just Isn't Enough	270
The Song Remains the Same	275
Political Consequences and Possible Futures	279
Is Race Real?	283
10 The Conscious Universe: Genes in Complex Systems	284
Clockwork, Soup, and Consciousness	286

x · Contents

Chance, Law, and the Limits of Total Explanation	288
Statistics in a Conscious Universe	295
Philosophies of Causation	304
Explanatory Paradigms	305
An Invitation to the Reader	307
The Grand Scheme of Life	308
The Final Paradox	311
<i>References</i>	314
<i>Index</i>	358

Color plates can be found between pages 210 and 211.