

THE PATH TO THE DOUBLE HELIX

The Discovery of DNA

ROBERT OLBY

*Professor of the History and Philosophy of Science
The University of Pittsburgh*

FOREWORD BY

FRANCIS CRICK

DOVER PUBLICATIONS, INC.

NEW YORK

Contents

Frontispiece	
Foreword by Francis Crick	v
Preface	ix
Note on References to Source Material	xiii
List of Plates	xvii
Introduction	xix
Note to the Introduction (1994)	xxv
Section I <i>From Colloidal Particles to Long-Chain Molecules</i> : Bergmann, Staudinger, Svedberg, Polanyi, Mark, Astbury	1
Chapter 1 The Macromolecule	3
Chapter 2 The Ultracentrifuge	11
Chapter 3 The Fibre Diagram and the Long-Chain Molecule	23
Chapter 4 The Leeds School under Astbury	41
Chapter 5 Astbury under Attack	59
Section II <i>Nucleic Acids and the Nature of the Hereditary Material</i> : Levene, Caspersson, Garrod, Muller, Darlington, Stanley	71
Chapter 6 Kossel, Levene and the Tetranucleotide Hypothesis	73
Chapter 7 The Nucleoprotein Theory of the Gene	97
Chapter 8 The Physiology of the Gene	123
Chapter 9 The Enzyme Theory of Life	143
Chapter 10 The Chemistry of Virus-Genes	153
Section III <i>Bacterial Transformation, its Nature and Implications</i> : Griffith, Avery, Boivin, Vendrely, Chargaff, Wyatt	167
Chapter 11 Bacterial Transformation	169
Chapter 12 The Identity of the Transforming Substance	181
Chapter 13 Support for Avery	195
Chapter 14 Base Ratios	207
Section IV <i>Intellectual Migrations</i> : Delbrück, Schrödinger, Bernal, Perutz, Pauling, Watson and Crick	223
Chapter 15 Physicists in Biology: The Informational School	225
Chapter 16 Physicists and Chemists in Biology: The Structural School	249

CONTENTS

Chapter 17 Pauling, Caltech and the α -Helix	267
Chapter 18 Watson and Crick	297
Section V <i>Hunting for the Helix</i> : Wilkins, Gosling, Furberg, Franklin, Pauling, Watson and Crick	321
Chapter 19 DNA as a Single- or Multiple-Strand Helix	323
Chapter 20 DNA as a Triple Helix	353
Chapter 21 DNA as a Double Helix	385
Chapter 22 Conclusion	425
Postscript (1994)	445
Bibliography	457
Index	507