

Contents

Preface	5
Chapter one. Disorder	9
1. Disordered Series of Digits	9
2. Disordered Arrangement of Particles	11
3. Gaseous State of Matter	13
4. Thermal Motion in Gases	15
Chapter two. Order	20
1. Symmetry of a Wallpaper Pattern	20
2. A Crystal	25
3. Invisible Lattices	27
4. Crystals Are Close-Packed Arrangements of Spheres	30
5. Crystals Are Not Always Close-Packed Spheres	38
6. The Same Atoms but Different Crystals	46
7. Long-Range Order	47
8. Order in Finely Crystalline Bodies	48
Chapter three. Elements of Order in Disorder	51
1. Short-Range Order. Liquids	51
2. Amorphous Bodies	55
3. Liquid Crystals	58
4. Thermal Motion in Liquids	60
5. Types of Order Put in Order	61
Chapter four. Elements of Disorder in Order	63
1. Thermal Motion in Crystals	63
2. Gaseous Crystalline State of Matter	64
3. Block Structure	67
4. Dislocations	68

5. Dislocations Travel
6. A Perfect Crystal
7. Intrablock Defects
8. Crystals with Errors
9. Order and Disorder in Binary Alloys
10. Magnetic Order

Chapter five. Order and Disorder in the World of Giant Molecules

1. Long-Chain and Branched Molecules
2. Bundles of Long-Chain Molecules
3. Behaviour of Molecules with Bundle-Type Structure
4. Monocrystals of Folding Polymer Molecules
5. Structure of Polymers
6. The Living Cell

Chapter six. Order \rightleftharpoons Disorder Transformations

1. Iron Vapour and Solid Air
2. Water Is the Exception to the Rule
3. How Crystals Grow
4. Spiral Growth
5. Crystal-Crystal Transformations
6. Delays in Transformation
7. Particles Change Places

Chapter seven. Order or Disorder

1. Probability and Disorder
2. Tendency Toward Disorder
3. Tendency Toward Order
4. Order Versus Disorder
5. In All Fields of Knowledge We Find Problems of Order and Disorder