

CONTENTS

PREFACE	v
ACKNOWLEDGEMENTS	viii
INTRODUCTION	1
1. THE BIOSPHERE	7
The beginnings of life	10
Photosynthesis, food chains and multicellular organisms	12
Food, energy and ecosystems	15
Energy flows	15
Soil	17
Nutrient cycles	19
Ecological balance	23
Kinds of ecosystems	24
Healthy and unhealthy ecosystems	25
2. BIOLOGICAL EVOLUTION	29
Life in water	29
Life on land	33
Land plants	33
Land animals	36
The evolutionary process	39
Comment	43
3. PATTERNS IN NATURE	45
Diversity and uniformity	45
Uniformities	45
Diversity	50

The concept of the ecological niche	50
The procurement and digestion of food	51
Reproduction	56
Comment	60
A note on animal behaviour	61
Comments on environmental change	63
Symbiosis, parasitism and infectious disease	65
 4. HUMANS	69
Evolutionary background	69
The emergence of human culture	74
Geographical distribution and genetic variation	76
<i>Homo sapiens</i> in the evolutionary habitat	77
Ecology	79
Social organisation	80
Life conditions	83
Health and disease	86
Psychosocial experience	87
Arts and crafts	88
Behaviour in humans	88
Human health needs	90
Adaptation in humans	90
Comment	94
 5. THE BIOSPHERE AND HUMAN SOCIETY	95
Interrelationships between the biosphere and society	97
Interrelationships between humans and society	99
Arrangement of remaining chapters	100
The four ecological phases of human existence	100
Human population – demographic aspects	104
People on the move	109
 6. FARMING	115
The beginnings	116
The spread of farming	120
Kinds of farming and changing technology	121
Some ecological considerations	123
Farming in the high-energy societies	127
Overview of global food production in recent years	130
Sustainability of production and some predictions	131
Plant cultivation and animal breeding for non-utilitarian purposes	133

7. TECHNOLOGICAL DEVELOPMENTS AND THE METABOLISM OF SOCIETY	137
Metallurgy	138
Pitch, cement and concrete	143
Synthetic plastics	144
Mechanical devices and machines	146
Introduction	146
Sources of physical power	146
Some key mechanical devices and their uses	152
The technometabolism of society	153
Extrasomatic energy	155
Material inputs	157
Metabolic outputs	161
Technoaddiction	173
8. WARFARE AND WEAPONRY	175
Ubiquity of warfare	176
The steppe lands	180
The scale of war	181
Numbers of participants and casualties	181
Weaponry	182
Modern weaponry	183
9. CHANGES IN HUMAN SOCIETY	187
Some biosocial consequences of urbanisation	189
Ownership and wealth	192
Corporate organisations	194
Influence in society	196
People within corporate organisations	198
Comment	200
10. BIOLOGICAL IMPACTS ON HUMAN POPULATIONS	203
Population density and infectious disease	203
Population density and psychology	211
Diet	212
Quantitative aspects of diet	212
Qualitative changes	215
Air quality	223
Noise	225
Comment	226
11. HUMAN BEHAVIOUR AND THE LESS TANGIBLE ASPECTS OF HUMAN EXPERIENCE	229
Subsistence behaviour	229
Leisure experience	231

Family and community experience	232
Learning experience	234
Consumer behaviour	236
Religion	237
Comment	241
12. THE PRESENT AND THE FUTURE IN BIOHISTORICAL PERSPECTIVE	243
The human situation today	243
A new vision	246
Extrasomatic energy use	248
Population	250
An urgent educational challenge	251
APPENDIX 1	253
APPENDIX 2	255
INDEX	259