

# Contents

<i>Preface</i>		<i>ix</i>
<b>1 A philosophical introduction</b>		<b>1</b>
The nature of scientific theory		1
Example: Daily sleep and body size in herbivorous mammals		2
Scientific crisis in ecology		8
<b>2 A mathematical primer: Logarithms, power curves, and correlations</b>		<b>10</b>
Basic tools		10
Regression analysis		15
<b>3 Metabolism</b>		<b>24</b>
The balanced growth equation		24
Respiration		25
Interpretations and implications		39
<b>4 Physiological correlates of size</b>		<b>45</b>
Introduction		45
Mammalian models of respiratory and circulatory physiology		48
<b>5 Temperature and metabolic rate</b>		<b>54</b>
Temperature, size, and metabolism: A regression model		55
The estimation of body temperature		56
The effects of ambient temperature		57
Other factors and other processes		76
<b>6 Locomotion</b>		<b>79</b>
Description of the metabolic costs of locomotion		79
Speeds of locomotion		86
Transport costs		90
Moving metabolic rates		95

<b>7</b>	<b>Ingestion</b>	<b>100</b>
	Some basic properties	101
	Other factors	106
	Prey size	108
<b>8</b>	<b>Production: Growth and reproduction</b>	<b>118</b>
	The scaling of life history	118
	Population production	133
	An individual production term for the balanced growth equation	139
<b>9</b>	<b>Mass flow</b>	<b>147</b>
	The autecology of material flows	148
	Nutrients and nutrient turnover	158
<b>10</b>	<b>Animal abundance</b>	<b>164</b>
	The numerical density of individual species	165
	Home range area	170
	Community size structure	173
<b>11</b>	<b>Other allometric relations</b>	<b>184</b>
	Animal behavior	184
	Ecological economics	187
	Evolution	192
<b>12</b>	<b>Allometric simulation models</b>	<b>197</b>
	Introduction	197
	The basic model	198
<b>13</b>	<b>Explanations</b>	<b>213</b>
	Two basic components of allometric explanations	213
	Some allometric explanations	215
<b>14</b>	<b>Prospectus</b>	<b>227</b>
	<i>Appendixes</i>	231
	<i>References</i>	297
	<i>Index</i>	325