

CONTENTS

<i>Preface</i>	<i>xiii</i>
<i>Acknowledgments</i>	<i>xv</i>
CHAPTER 1: Introduction: Finding, Dating, and Classifying Fossils	1
How Do You Find Fossils?	1
Dating Fossils	3
Naming Fossils	6
How Do We Classify Animals?	10
Further Reading	13
CHAPTER 2: The Origin of Vertebrates	15
What Is a Vertebrate?	15
Our Kinfolk in the Sea	17
Getting a Head: The Vertebrates	22
Conodonts	24
Further Reading	27
CHAPTER 3: Jawless Fish	29
Fish in Armor	29
Heterostracans	29
Thelodonts	32
Anaspids	34
Osteostracans	34
Galeaspida	38
Where Did They Come From?	
Where Did They Go?	40
Further Reading	41
CHAPTER 4: Primitive Gnathostomes	43
Jaws	43
Placoderms	44
Arthrodires	46
Antiarchs	47
Chondrichthyans: Sharks, Rays, Skates, and Chimaeras	51
Acanthodians	58
Further Reading	59

CHAPTER 5:	Osteichthyes: The Bony Fish	61
	Fish Bones	61
	The Age of Teleosts	65
	Further Reading	70
CHAPTER 6:	The Transition to Land: The Tetrapods	71
	Lobe-Finned Fish	71
	Invasion of the Land: The Tetrapods	77
	Further Reading	83
CHAPTER 7:	Tetrapod Diversify	85
	Amphibians and Their Relatives	85
	Temnospondyls	85
	Lepospondyls	91
	Lissamphibians	92
	Further Reading	96
CHAPTER 8:	Primitive Reptiles	97
	Land Eggs and the First Amniotes	97
	Parareptiles	105
	Eureptilia	109
	Turtles	112
	Further Reading	118
CHAPTER 9:	Back to the Sea: Marine Reptiles	121
	Ichthyosaurs and Plesiosaurs	121
	Ichthyosaurs	122
	Plesiosaurs	125
	Placodonts	129
	Further Reading	133
CHAPTER 10:	The Scaly Ones: Lepidosauria—	
	Lizards and Snakes	135
	Lepidosauria	135
	Rhynchocephalia	139
	Squamates	140
	Snakes	143
	Mosasaur	149
	Further Reading	152
CHAPTER 11:	Ruling Reptiles: Archosaurs	153
	Archosauria	153
	Archosauromorphs	155

Rhynchosauria	157
Allokotosauria	158
Proterosuchidae	159
Mystery Reptiles: Choristoderes	160
The Crocodile Branch: Pseudosuchia	163
Phytosaurs	163
Aetosaurs	166
Ornithosuchidae	167
Poposaurs	168
Rauisuchians	170
Further Reading	172
CHAPTER 12: Crocodylomorphs	173
Crocodylomorphs: The Crocodiles and Their Kin	173
"Bunny Crocs"	174
Notosuchia: The "Southern Crocodiles"	177
Thalattosuchia and Dyrosauridae: Back to the Ocean	180
Neosuchia	185
Further Reading	186
CHAPTER 13: Pterosaurs	187
Ornithodira/Avemetatarsalia	187
Flying Reptiles: The Pterosauria	189
Pterosaur Anatomy	189
Pterosaur Evolution	192
Further Reading	198
CHAPTER 14: The Origin of Dinosaurs	201
What Is a Dinosaur?	201
Further Reading	209
CHAPTER 15: Ornithischians I: Origins and the Thyreophora	211
The Ornithischians	211
Early Ornithischians	212
Thyreophorans: Stegosaur and Ankylosaur	215
Roofed Lizards: The Stegosaur	216
Turtle-Shell Dinosaurs: The Ankylosaur	221
Further Reading	226

CHAPTER 16:	Ornithischians II: Hadrosaurs and Marginocephalians	227
	Neornithischia	227
	Ornithopoda: The "Bird-Footed"	
	Dinosaurs	228
	The Hadrosaurs	231
	Pachycephalosaurs:	
	The "Boneheads"	235
	Ceratopsia: The Horned Dinosaurs	239
	Further Reading	246
CHAPTER 17:	Sauropods: Long-Necked Giants	247
	The Largest Land Animals	247
	The Origin of Sauropods	248
	Jurassic Park of the Sauropods	251
	Diplodocoids	254
	Macronarians	257
	Titanosaurs	259
	Size Matters	261
	Sauropod Physiology	262
	Further Reading	264
CHAPTER 18:	Theropods: Carnivorous Dinosaurs	265
	Theropoda	265
	Early Theropods	267
	Tetanurae: Carnosauria	271
	Carnosauria: Spinosauridae	274
	Carnosauria: Megalosauridae	275
	Carnosauria:	
	Metriacanthosauridae	275
	Carnosauria: Allosauridae and Carcharodontosauridae	275
	Tetanurae: Coelurosauria	277
	Coelurosauria: Tyrannosaurs	277
	Coelurosauria:	
	Compsognathidae	282
	Coelurosauria: Ornithomimids	283
	Coelurosauria: Maniraptora:	
	Therizinosaurus	285
	Coelurosauria: Maniraptora:	
	Oviraptorosauria	285
	Coelurosauria: Eumaniraptora:	
	Dromaeosaurs	285
	Further Reading	288

CHAPTER 19: Birds: The Flying Dinosaurs	289
Birds Are Dinosaurs	289
Mesozoic Bird Evolution	292
The Cenozoic Radiation of Aves	296
Neognath Birds	299
Neoaves	303
Terror from the Skies	304
Terror Birds	306
Further Reading	309
CHAPTER 20: Synapsids: The Origin of Mammals	311
The Origin of Mammals	311
To Be a Mammal	312
Early Synapsids: "Pelycosaur"	317
Later Synapsids: "Therapsids"	320
The Third Wave: "Cynodonts"	324
Further Reading	328
CHAPTER 21: Primitive Mammals: Mesozoic Mammals, Monotremes, and Marsupials	331
Mesozoic Mammals	331
Morganucodonts	333
Docodonts	335
Monotremes and Their Relatives	336
Multituberculates	337
Eutriconodonts	338
Therian Ancestors	339
The Marsupials or Metatheria	341
Further Reading	347
CHAPTER 22: The Placental Explosion: The Mammals Diversify	349
Placentals	349
Xenarthra: Sloths, Armadillos, and Anteaters	354
Afrotheria	358
Further Reading	365
CHAPTER 23: Laurasiatheria I: Carnivores, Bats, Insectivores, and Their Kin	367
The Laurasiatheres	367
Insectivores	367
Chiroptera (Bats)	369

	Pholidota (Pangolins)	370
	Carnivorous Mammals	372
	Creodonts	376
	Carnivorans	377
	Further Reading	383
CHAPTER 24:	Laurasiatheria II:	
	The Ungulates	385
	Horns, Hooves, and Flippers	385
	Artiodactyls	387
	Perissodactyls	395
	Miscellaneous Mammals with	
	Hooves	404
	Pantodonts	406
	Further Reading	408
CHAPTER 25:	Euarchontoglires: Rodents,	
	Rabbits, Primates—And	
	Humans	411
	The Euarchontoglires	411
	Glires	411
	Rodents	414
	Lagomorpha	417
	Euarchonta	418
	Tree Shrews	418
	Colugos	418
	Primates	419
	Strepsirhini	419
	Haplorhini	422
	Hominoidea (Apes and Humans)	423
	Human Evolution	424
	Further Reading	435
	<i>Index</i>	437