

2742-7048

Developments in Palaeontology and Stratigraphy, 14

Global Biogeography

John C. Briggs

Arnoldsville, Georgia, USA



1995

ELSEVIER

Amsterdam – Lausanne – New York – Oxford – Shannon – Tokyo

Contents

Preface	vii
Acknowledgments	xi
Chapter 1 History of the science	1
In the beginning	1
19th century	4
20th century	8
The advent of continental drift.....	10
The rise of vicarianism	12
The present work	14
PART A – HISTORICAL BIOGEOGRAPHY	
Chapter 2. Precambrian and Early Paleozoic	19
Precambrian	22
Cambrian period	24
Ordovician period	30
End-Ordovician extinction.....	32
Summary.....	33
Chapter 3. Later Paleozoic	35
Silurian.....	35
Devonian.....	38
Frasnian extinction.....	43
Carboniferous-Permian.....	44
End-Permian extinction	53
Summary.....	57
Chapter 4. Early Mesozoic	61
Triassic.....	61
Late-Triassic extinction.....	65
Jurassic.....	66
Jurassic extinctions	74
Summary.....	75
Chapter 5. Late Mesozoic	77
Cretaceous.....	77
Marine patterns	78

Terrestrial patterns	85
Flora	85
Freshwater fauna	88
Higher vertebrates	92
Australia	94
India	95
Conclusions	96
Cretaceous extinctions	99
Cenomanian-Turonian	99
Cretaceous/Tertiary boundary	99
The time-span problem	99
The diversity problem	101
Extinction causes	103
Conclusions	104
Summary	105
Chapter 6. Paleogene	109
Paleocene	109
Marine patterns	110
Terrestrial patterns	110
Eocene	114
Marine patterns	116
Terrestrial patterns	118
Plants	118
Mammals	121
Birds	125
Lizards	126
Freshwater groups	126
Australia	128
New Zealand	130
Madagascar	130
India	131
Antillean relationships	131
Oligocene	133
Marine patterns	135
Terrestrial patterns	137
Summary	141
Chapter 7. Neogene	147
Miocene	147
Marine patterns	148
Terrestrial patterns	150
Plants	150
Mammals	151
Birds	154

Herpetofauna	156
Freshwater fauna	157
A Miocene extinction?	158
Pliocene.....	159
Marine patterns	160
Terrestrial patterns	165
Plants	165
Mammals.....	166
Birds	168
Herpetofauna	170
Freshwater fauna	170
Pleistocene	171
Marine patterns	172
Terrestrial patterns	176
Plants	176
Mammals.....	177
Freshwater fauna	182
Summary	185
Chapter 8. Historic extinctions	191
Historical development	191
Tempo of the extinctions	193
Scope of the extinctions	194
Effects on global species diversity	194
A common cause?	195
Biogeography and evolution	198
Conclusions	203

PART B – CONTEMPORARY BIOGEOGRAPHY

Chapter 9. Marine patterns, Part I.....	207
Latitudinal zones	208
Indo-West Pacific region	211
The East Indies: a center of origin?	213
The age gradient	216
Onshore-offshore gradients	218
Barrier effects	219
Disjunct patterns	220
Center of origin alternatives	221
Conclusions	222
Modes of speciation	223
Distribution patterns	224
Discussion	230
Conclusions	231
Indo-West Pacific subdivisions	231

Eastern Pacific region	236
Western Atlantic region	238
Eastern Atlantic region	241
Relationships of the tropical shelf regions	242
East Pacific Barrier	243
New World Land Barrier	244
Mid-Atlantic Barrier	245
Old World Land Barrier	246
Conclusions	247
Latitudinal barriers	248
Summary	249
 Chapter 10. Marine patterns, Part 2	 251
Warm-temperate regions	251
Southern hemisphere	251
Northern hemisphere	254
Cold-temperate regions	257
Southern hemisphere	258
Northern hemisphere	262
The cold (polar) regions	267
The Antarctic region	267
The Arctic region	267
The Pelagic realm	269
Epipelagic and mesopelagic zones	269
Arctic and Antarctic	274
Bathypelagic zone	275
Hadopelagic zone	276
Deep Benthic realm	276
Vertical distribution	276
Horizontal distributions	278
Diversity and origin	282
The marine system	283
Summary	284
 Chapter 11. Terrestrial patterns	 287
Introduction	287
Animals	288
Freshwater habitat	288
Terrestrial habitat	307
Invertebrates	307
Birds	312
Mammals	315
Amphibians and reptiles	319
Plants	322
Bryophytes and Pteridophytes	322

Gymnosperms	325
Angiosperms	326
Summary	334
Chapter 12. Significant patterns	341
Antitropical distributions	341
Marine environment.....	342
Isothermic submersion	351
Terrestrial environment.....	353
Flora	353
Fauna.....	355
Discussion.....	358
Hypothesis.....	361
Island life	362
Summary	367
Chapter 13. Species diversity: land and sea	371
Global diversity	371
Terrestrial.....	372
Marine	374
Conclusions.....	376
Latitudinal gradients	377
Vertical gradients	380
Longitudinal gradients	382
Diversity and conservation	385
Summary	387
Chapter 14. Epilogue	391
References.....	395
Appendix: Biogeographer's maps	427
Subject Index	443