

# Index

- Achistrum triassicum* distribution 218–19  
*Acteonella* trans-Pacific distribution 250  
Aegean, southern, late Cretaceous  
  metamorphism, HT-LP 41–3, 46–8  
  stratigraphy and premier flysch 43–6, 47  
African Plate, stress condition, 30  
algae, Tethys-wide distribution 214–15  
Alpide orogenic system 119  
  formation 120  
  sutures 144–8  
Alpine orogenic system  
  evolution 23  
  suture zone, Africa/Alps collision 146  
ammonites  
  and Tibet, origin of 235–9  
  of western Tethys 225–34  
    Bajocian–Bathonian isolation/endemism 227  
    Balkano-Moesian isolation 230  
    Callovian/Oxfordian 227–9, 231  
    Caucaso-Dobrodegean furrow 230, 232  
    north-west margin 229–30  
    Pliensbachian endemism 226–7  
    qualitative/interpretative approaches 225  
amphibians  
  interchanges, South America/African 265  
  Jurassic 260  
  Triassic 255–7  
Angara  
  boundaries, and palaeobotany 207–9  
  flora 201  
angiosperm ranges 307–11  
  evolution 307  
  fossil record 307  
    Australian 309  
  fossils, need for 310  
  and the Malay Archipelago 308–9  
  origin/diversification 308  
  and palaeoclimates 307–8  
  and palaeogeography 309–10  
  taxonomic study, need for 310  
Antarctic/Africa, Euler poles 67  
Apennines 146  
*Asaphopsis* shelf fauna 188–9  
Asia, *see* terranes, continental, south-east Asia  
asthenosphere/lithosphere thermal boundary 6  
aulacogens and fauna distribution 192–3  
Australia  
  angiosperm fossil record 309  
  trilobite faunas 189  
  *see also* Tethys, southern margin evolution  
  
Balkano-Moesian ammonite isolation 230  
Banda Arc, *see* Tethys, southern margin evolution  
Basin and Range  
  extension prediction 34  
  stress conditions 31  
benthos, shallow, trans-Pacific 247–53  
  distribution/dispersal, disjunct 248–51  
  volcanothermal activity 247–8  
biogeography 275–80  
  anecdotal analysis 278  
  cladistic biogeography 280  
  and endemism 278  
  historical 276  
    fossils in 276–8  
  provinces, biotic 268–9  
  range analysis 279  
  *see also* parsimony analysis of endemism;  
    phylogeography  
'Bohemian' fauna 193  
boine snakes, *see* *Madtsoia*  
Borneo, south-west, terrane 106, 109  
botany, *see* angiosperms; palaeobotany, late  
  Palaeozoic  
brachiopods  
  distribution and geographical cline 190  
  Jurassic 260  
  Ordovician, early, shallow-shelf 186  
  Silurian/late Llandovery 194–5  
  in Triassic Pangaea 255–6  
  of Turkey 241–5  
  
*Calclamnoidea canalifera* distribution 217–18  
Callovian ammonites  
  Tethys, western 227–9, 231  
  Tibet 236–7, 238  
Calymenidae, early Ordovician, 186  
Capitosauridae in Triassic Pangaea 256  
Caribbean Plate stress condition 30  
Carpathians 147  
Cathaysia  
  boundaries and palaeobotany 206–9  
  flora 201  
Caucaso-Dobrodegean furrow ammonites 230, 232  
Caucasus suturing 139–40  
Central Iranian Microcontinent 164  
  rotation 132  
China  
  Cimmeride tectonics 133–9  
  palaeobotany and plate reconstruction 207  
  Triassic dicynodonts in 258–9  
Cimmerian continent, rifting/drifted 112–13  
Cimmeride orogenic system 119  
  in China 133–9  
  collisions in Tethys evolution 161  
  formation 120  
  sutures 123–44  
    vs. Alpide 147–8  
    mesozoic 128–44  
    palaeozoic 123–7  
cladistic biogeography 280  
cline, geographical, and faunal distribution 189–90  
cluster analysis, multivariate, for fossil  
  distribution 279–80

- conifer studies, need for 310  
 coprolites, anomuran, distribution 221–2  
 crinoids, Tethys-wide distribution 215–17  
 crocodiles  
   in Cretaceous Gondwana 261  
   dispersal 265–6  
   South American/African 264–5  
*Cyclotosaurus* in Triassic south-eastern Asia 259  
 Cynodonts in Triassic Gondwana 257  
*Cypeina besici* Tethys-wide distribution 214–15  
*Cytherella acuta* distribution 220
- Dalmanella multiplicata*, Caradoc 193  
 Dalmanitid–calymenacean shelf fauna, early  
   Ordovician 186–8  
 Dead Sea Transform 33  
 dendrograms of floristic provinces 205–6  
 Dice Similarity Index in dendrogram  
   construction 205  
 dicynodonts, Triassic  
   in China 258–9  
   in Pangaea 256  
 dinosaurs  
   Cretaceous 261–2  
   interchanges, trans-Tethyan 262  
   Jurassic 260  
   in Triassic Pangaea 256  
 dyke injection and continental extension 36
- echinoids, *see* parsimony analysis of endemism  
 endemism in fossil distribution analysis 278  
   *see also* parsimony analysis of endemism  
 Euler poles and rotation angles 65, 67  
 Euramerican flora 201
- facies and faunas, lower Palaeozoic 183–200  
   biofacies 184–6  
   map 183–4  
   Ordovician, early 186–93  
     *Asaphopsis* 188–9  
     and aulacogens 192–3  
     distribution 189–90  
     ocean/deeper shelf 190–3  
     shallow shelf  
   Ordovician, middle/end 193–7  
     Caradoc interchanges 193  
     and climatic cooling 193–4  
     orthid 'Bohemian' fauna 193  
   Silurian 194–7  
     brachiopods 194–5  
     graptolites 196  
     limestone 197  
     Malvinokaffric 195  
     and ocean widening 197  
     rhynchonellidae 195  
 fauna categories 185  
   *see also* facies and faunas, lower Palaeozoic;  
   palaeobotany, late Palaeozoic; Triassic  
   Tethys microfaunas
- fish, freshwater  
   in Cretaceous Gondwana 261
- in Triassic Pangaea 257  
*Fissobractites subsymmetrica* distribution 218  
 floras, *see* angiosperms; palaeobotany, late  
   Palaeozoic  
   *see also* fauna categories  
 folding, *see under* Zagros  
 foraminifera, Tethyside 150–5  
   Jurassic, early 152  
   Jurassic/Neocomian 152–5  
   Permian, late 150–2  
 frogs, pelobactid, Cretaceous/Palaeocene  
   dispersal 266
- Gigantopteris* flora 201  
   on East Asian continent 115  
*Glossopteris* flora 201  
   distribution and plate reconstruction 206–7  
   leaf identification 203–5  
 graben formation and rifting 19  
 graptolite faunas 185  
   deep-water 190–1  
   Silurian 196  
 gravity glide and plate tectonics 5–21  
   calculation 11  
   continent splitting 11–14  
   dynamics of plate motion 17–19  
   forces 5–7  
   implications/applications 19–20  
   mechanism 8–11  
   stresses, lateral 7–8  
   distribution, glide-induced 14–15  
   subduction zone initiation 15–16
- Himalayan neo-Tethys 145–6  
*Hirnantia*  
   and climatic cooling 193–4  
   migration 186  
 holothurians distribution 217–19  
*Holocrinus quinqueradiatus* distribution 215–17  
 Hungarellinae 221  
*Hungioides* pan-Gondwanan distribution 190  
 hydrocarbon deposits and rifting 33–4
- Iceland and gravity glide 8–9  
 India  
   Eurasia collision 145  
   frog dispersal, Cretaceous/Palaeocene 266  
   rotation/Euler angle 67  
 Indian Ocean evolution 61–77  
   continental units 61–3  
   palaeomagnetism 64–73  
     continental 70–3  
     marine anomalies and fracture zones 64–70  
   spreading anomalies 66–9  
 indobrachyopidae in Triassic Pangaea 256  
 Indo-China terrane 106, 108  
 intrusions, alkaline, and continental extension 36  
 Iran  
   Central Iranian Microcontinent 164  
   rotation 132  
   Cimmeride sutures 131–2

- Iran—*cont.*  
 evolution 171  
 pan-African terranes 156–7  
 in Tethyside collage evolution 157–65  
*see also* Zagros
- Judahella tuberculifera* distribution 221
- Kuznetsk flora 201
- latitude change and plate stress 25
- Laurasia  
 collisions in Tethyside evolution 161  
 dinosaurs, Cretaceous 261–2  
 faunal provinces, Triassic 257  
 margin, southern 140
- Lhasa block 149
- limestones  
 and *Cypeina besici* distribution 214–15  
 Silurian, late 197
- lithospheric stress 7–8, 30–2
- lizards, Eocene, Madagascar/South America 266–7
- lungfish, freshwater  
 of Cretaceous Gondwana 261  
 Triassic 257, 259
- Lydekkerinidae in Triassic Pangaea 255–6
- Lyria* trans-Pacific distribution 250
- Lystrosaurus* in Triassic China 258–9
- Madagascar, fauna origin 266–7
- Madtsoria* 267  
 distribution 261  
 interchange, Cretaceous–Eocene, South  
 American/African 265  
 in Senonian Madagascar 266
- Malay Archipelago angiosperms 308–9
- Malaya, East, terrane 103, 105–6, 107
- Malvinokaffric faunas Silurian precursors 195
- mammal interchanges  
 Eurasian/Africa 262–4  
 European/South America 264  
*see also* vertebrates, terrestrial
- mantle convection  
 vs. gravity glide 5  
 and stress generation 25
- marsupials, Eocene 261  
 African 265  
 Madagascar, Senonian 266
- Mediterranean region in Tethyside evolution 161
- metamorphism, HT-LP, Aegean 41–3, 46–8
- metoposaurs in Triassic Gondwana 257–8
- microcontinents  
 and Jurassic rifting 97  
 in Tethys southern margin evolution 79, 81  
*see also* Central Iranian Microcontinent
- olivine strength 7–8
- ophiolite obduction  
 in Alpidic suturing 145  
 and graben tectonic inversion 19  
 in Tethyside evolution 164
- Ordovician faunas  
 early 186–93  
*Asaphopsis* 188–9  
 and aulacogens 192–3  
 distribution 189–90  
 shallow shelf 186–8  
 middle/end 193–7  
 and climatic cooling 193–4  
 interchanges, Caradoc 193  
 orthid ‘Bohemian’ 193
- orthid ‘Bohemian’ fauna 193
- ostracods distribution 219–21
- Ovulites* trans-Pacific distribution 250
- Pacific  
 benthos dispersal 248–51  
 volcanothermal activity 247–8
- palaeobotany, late Palaeozoic 201–10  
 and plate reconstruction 206–9  
 provinces, floristic 201–2, 205–6  
 taxonomic problems 202–5
- palaeomagnetism, Indian Ocean 64–73  
 continental 70–3  
 reliability of data 71–3  
 marine anomalies and fracture zones 64–70  
 Cretaceous 68–9  
 Jurassic 69–70  
 mid-Eocene 66–8
- Pan-African orogenic system as Tethyside  
 marker 155–7
- Parafavreina thoronetensis* distribution 222
- parsimony analysis of endemicity 281–99  
 and biotic history 282–5  
 data for, echinoid/reef-coral 290, 302–3  
 and Earth history 285–6  
 and horizon, stratigraphic 287  
 and locality 286–7  
 problems 287–90  
 results 290–5
- Permian Tethys 211–12
- Persian Gulf and Zagros folding 51–2
- petroleum exploration and continental rifting 33–4
- phenetics for fossil distribution analysis 279–80
- Phyllothea* leaf taxonomic problems 202–3
- phytochoria, Carboniferous/Permian 201–2
- phytosaur, Triassic 257–8, 259
- plateaux, mantle-compensated, stress conditions 31
- premier flysch, southern Aegean 43–6
- prosauropods in Triassic Pangaea 256
- Pyrenees 147
- Qantang block of Tethyside collage 149–50
- range analysis for fossil distribution 279
- Raub Red Beds in East Malaysia Terrane 105–6
- Nesuretus* 186, 187–8
- New Zealand 61

- reef-corals, *see* parsimony analysis of endemcity  
reptiles  
  interchanges 264, 265  
  Triassic 256–7  
rhynchonellidae, Silurian 195  
Rhytidosteidae in Triassic Pangaea 256  
rift valleys 32
- salt sequences 36  
sea-urchins, *see* parsimony analysis of endemcity  
Seismic profiles for extension values 34  
*Selenopeltis* 188  
Sibumasu block of Tethyside collage 150  
  stratigraphy/palaeontology  
Silurian faunas 194–7  
  brachiopods 194–5  
  graptolites 196  
  limestone 197  
  Malvinokaffric 195  
  and ocean widening 197  
  rhynchonellidae 195, 197  
similarity coefficients in fossil distribution  
  analysis 279–80  
snakes, *see* *Madstoia*  
splitting of continents 11–14, 32–3  
stress and deformation and tectonic cycles 23–40  
  extension  
    buffering 34–5  
    calculation of 34  
    localization 32–4  
    geology evolution, intra-plate 35–6  
    present-day regime 30–2  
    strains 23–4  
  stress  
    limits/distribution 26–30  
    origins/magnitudes 24–6  
subduction  
  forces 6  
  initiation 15–16  
  and stress generation 26  
  Tethyan ocean floor 146  
Sulawesi in Tethys evolution 92–3  
  stratigraphic correlation 94–5
- Tasman Sea evolution 61  
terranes, continental, south-east Asia 101–18  
  assembly 112–13  
  drifting 113–15  
  rifting 113  
  origin 111–12  
  stratigraphy/palaeontology 103–11  
  East Malaya 103, 105–6, 107  
  Indo-China 106, 108  
  palaeomagnetic data 109–11  
  Sibumasu 103, 104, 105  
  South-west Borneo 106, 109
- Tethys  
  southern margin evolution 79–100  
  correlation sections 82–6, 93, 94–5  
  maps 87–91  
  microcontinents 81  
  North Australia/New Guinea margin 91–4  
  rifting  
    North Australia margin 95–6  
    New Guinea, Jurassic 97  
  Permian/Cretaceous palaeogeography 97–8  
  *see also* Permian Tethys; Triassic Tethys  
  *see also under* ammonites  
  Tethyside orogenic collage 119–81  
    blocks 148–57, 167–8  
    basement geology 155–7, 170  
    Carboniferous/Permian 148–52  
    Jurassic/Neocomian 152–5  
    palaeomagnetic data 155  
  Cimmeride/Alpide systems 119–20, 121  
  collisions  
    and sea level 170  
    and subduction zones 167  
  evolution 157–65, 170  
    Cimmeride collisions 161  
    Cretaceous, late 164  
    Laurasia collisions 161  
    Mediterranean region 161  
  magmatism and collisions 165–6, 166–7  
  map, terrane 170  
  suture distribution 122  
  suture zones, 122, 165  
    Alpide 143–8, 165  
    Cimmeride 123–47, 148, 165  
    strike/slip motion 168–70  
  Tethyan domain 120  
*Thyrastylon* trans-Pacific distribution 249  
Tibet  
  Cimmeride suturing 142  
  Lhasa block 143  
  origin and ammonite biogeography 235–9  
  plateau, stress conditions in 31  
Timor metamorphism, HT-LP 47–8  
*Torreites* trans-Pacific dispersal 248  
Trematosauridae in Triassic Pangaea 256  
Triassic Tethys 213–23  
  algae 214–15  
  coprolites, anomuran 221–2  
  crinoids 215–17  
  ostracods 219–21  
  similarity, Tethys-wide 213–14  
trilobites  
  distribution and geographical cline 189–90  
  migration 185–6  
  oceanic/deeper shelf 191–2  
  shallow shelf 186–7  
Turkey  
  brachiopods, mesozoic, 241–5  
  Cimmeride tectonics 139  
  suturing  
    Alpide 144–5  
    palaeo-Tethyan 140–1  
turtles in Cretaceous Gondwana 261
- Valdosaurus* polyphyletism 262  
*Vernedia* trans-Pacific distribution 250  
vertebrates, terrestrial 255–73  
  Cretaceous–Eocene 260–7  
  exchanges, trans-Tethyan 262–6  
  Gondwana 261–2  
  India 266

vertebrates—*cont.*

- Madagascar 266–7
- Jurassic 259–60
- post-Eocene 267
- Triassic and faunal provinces 255–9
- Asia, south-eastern 259
  - China 258–9
  - Gondwana 257
  - Pangaea 255–7

## Wilson Cycles 35

## Zagros

- folding, serial, Holocene 51–9
- deformation rates 52–3
- forces 53–8
- and the Persian Gulf 51–2
- rifting 132