

# Index

- Abitibi Belt, 17  
Abukuma Plateau, 69  
Acadian orogenic events, 70  
accretionary orogens, origin, 11, 12, 13–14, 19  
Achiltibuie ultramafic bodies, 40  
ACID processes, 226  
'acme' of an evolving species, 133, 135  
acritarchs in biostratigraphic calibration, 87, 88  
acuity, 145, 146  
adhesion structures, 176  
Adirondack Mountains, 74  
aeolian bedforms and bedding, 175–6, 178  
Africa  
  carbonatites, 249–62  
  greenstone belts, 17  
alkali metasomatism (finitization), 249–50, 253, 256  
alkaline magmatism, 251–3, 255, 256, 259, 260  
Alpine Fault, New Zealand, 57  
Alps, collision zones, 76, 77  
Alston Block, 241–3, 244  
Amassalik mobile belt, 30–1  
Ameralik dykes, 26, 27, 28  
Amitsoq gneisses, 26, 27, 28  
ammonites  
  in biostratigraphic calibration, 130, 131, 132–5, 137–43, 146, 147  
  ecosomatic modification, 138  
ammonoids, British Dinantian, 110–11  
analytical top-down subdivision, 131  
Andrée, K., 189  
anisotropy of magnetic susceptibility, 200  
anorogenic magmatism, Proterozoic, 15  
Antarctica, 31, 32, 73  
Antrim flood basalts, 195, 196, 197, 198, 200–1  
Appalachian orogenic belts, 70, 74, 75  
Applecross Formation, 45  
aqueous bedforms and bedding, 176–7, 178–80  
Arabian–Nubian Shield, 12, 16, 18  
aragonite, solution and precipitation, 186–7  
Archaean  
  plate tectonics, 18–19  
  terraces, 16–18, 25–33, 246  
Archaean–Proterozoic boundary, 29  
Archaean–Proterozoic mafic suites, 27, 32  
Archerbeck Borehole, 118  
Ardgour gneiss, 44  
Ardnamurchan intrusive centre, 196, 197  
Ardnish pegmatites, 43  
Arenig fauna, 166  
Arenig Series, 86, 95  
Arkell, W. J., 129, 133, 134  
Armorica, 166, 167, 168  
Armorican Massif, 224, 226  
Arnsbergian Stage, 111  
*Arnsbergites falcatus* Ammonoid Zone, 121  
Arran Goatfell Granite, 196  
Arundian Stage, British Isles, 108, 109, 110, 113, 114, 115, 116, 117, 119, 120, 121  
Arunta Complex, 73, 74  
Asbian Stage, British Isles, 108, 109, 114, 116, 118, 119, 120, 121  
Asbian–Brigantian boundary, 109  
Askrigg Block, 242, 244  
assimilation of crustal rocks, 207, 210, 212  
Australia, 17, 19, 20, 31, 32  
Australian Platform cratons, 87  
avalanching (grain flow), 177–8  
Avalonia, 12, 167, 168, 170  
Avon Gorge stratigraphy, 105, 107, 108  
Badcallian metamorphism, 26, 38–41, 42, 54  
Badnaban dyke, 42  
Bahama Banks, fissure fauna, 160  
Bailey, E. B., 196  
Ballantrae Ophiolite, 59  
Baltica, 166, 167, 170  
Banks, J., 5  
Barberton greenstone belt, 18  
barkhan dunes, 175–6  
Barrande, J., 86  
'barren beds', 101  
barren intervals, 94  
'Barren Mudstones', 99  
Barrovian metamorphism, 68, 78  
Barrow, G., 74, 78, 223  
'Barrow's zones of progressive regional metamorphism', 68  
base metal production, 237, 238, 239  
basinal brine theory, 243  
Bather, F. A., 135  
batholiths, 221, 228, 230, 232, 233  
Bauer, G. (Agricola, G.), 238–9  
Beannach dyke, 42  
Beartooth mountains, 32  
Beaumont, E. de, 239, 240  
Becker, G. F., 206, 211  
bedforms and bedding  
  aeolian, 175–6, 178  
  aqueous and subaqueous, 176–7, 178–80  
  related to wind waves, 178–9  
'Belcraig Shale', 108  
Belgian Stage, 108  
Belingwe region, Zimbabwe, 17, 28  
*Bellisporites nitidus*–*Reticulatisporites carnosus* Zone, 118  
Ben Nevis volcano, 196  
Ben Vuirich, 58  
  granite, 47, 48, 49, 50, 63  
Betrand, M., 58  
*Beyrichoceras* Ammonoid Zone, 110–11  
Bighorn mountains, 31, 32  
bimodal mafic magmatism, 29  
Binneringie intrusions, 29  
'biochron', 137  
biostratigraphy  
  Dinantian, 105–7, 110–21  
  Early Palaeozoic, 83–9  
  Moffat series, 93–101  
  time-resolution, Jurassic, *see under* Jurassic geochronology  
biozones, 136  
Birimian orogen, 13, 14  
Bisat, W. S., 107  
bivalves, British Dinantian, 111  
blind ore bodies, 244  
'blocking temperatures', 46  
Blue Holes caves, fissure fauna, 160  
Bohemian Massif, 168  
'boils' on river surface, 176  
*Bollandites*–*Bollandoceras* Ammonoid Zone, 110  
boninitic magmatism, Precambrian, 32, 33  
Bonney, T. G., 189  
Borrowdale arc, 60  
Bosost massif, 76  
Bou Azzer ophiolite, 12–13  
Bowen, N. L., 205, 206, 207, 213, 214, 216, 221, 222, 227, 228  
Bowen trend of silica enrichment, 209, 210  
Bowen's reaction series, 228  
Brabant Massif, 168, 170  
brachiopod faunas, Budleigh Salterton, 165–9, 171

- brachiopod/coral zonation, 113–14, 121  
 Brady, H. B., 118  
 Brewster, D., 239  
 brick-pattern ripples, 178  
 Bridgend quarries, fissure fauna, 158  
 Bridport–Yeovil–Midford Sands, 146  
 Brigantian Stage, British Isles, 108, 109, 111, 112, 114, 116, 117, 119, 120  
 Brinkmann, R., 142  
 Bristol Channel, Mesozoic fauna, 153, 156, 158  
 Bristow, W. H., 155  
 Britain, attachment to Gondwana, 166, 167, 170  
 British Isles, Dinantian stratigraphy, *see* Dinantian stratigraphy in the British Isles  
 British Tertiary Province, 195, 196, 199, 230  
   *see also* North Atlantic Province  
 Brittany, 69  
 Brögger, W. C., 249, 258, 261  
 Brongniart, A., 84  
 Buch, L. von, 128–9  
 Buckman, S. S., 131–4, 138, 142, 146  
 Budleigh Salterton Pebble Bed, fauna from, 165–71  
 Bulman, O. M. B., 95  
 Bushveld complex, 29, 31, 208  
 Bute, Island of, 61
- Cadomian Belt, France, 226, 227  
 Cadomian–Avalonian belt, 19  
 calcio-carbonatite, 253–5, 256, 257, 261  
 calcitization, 186, 187  
 Caledonides, 59, 60–2, 98, 167, 230  
   metamorphism, 43, 47, 49, 68, 75, 77, 229  
   Norway, 68, 77  
 Cambrian System, 86, 87, 144, 145  
 Cambrian–Ordovician boundary, 95–6, 100  
 Cambrian–Silurian boundary, 85  
 Cambridge Time-Scale, 143  
 Campbell Smith, W. C., 249–51, 255, 256, 257, 258, 261  
 Canadian shield, 17, 29, 73, 74  
   gravity anomalies, 15–16  
 Canigou massif, 76  
 Caradoc beds, 86  
 carbonate magmas, 249–62  
 carbonatites, 249–50, 263  
   alkaline, 256, 259  
   effusive, 250–1, 253–5, 256, 257–8, 261, 263  
   intrusive, 250–1, 256, 257–8  
   link with kimberlites, 258, 260, 261  
   mantle source and primary flux, 258–9, 261  
 Carboniferous Limestone  
   fissure fauna, 153, 154, 155–60  
   stratigraphy, *see* Dinantian stratigraphy in the British Isles  
 Carboniferous System, 85, 86, 110, 113, 144  
 Carn Chuinneag, 39, 43, 58  
 Carn Gorm pegmatites, 43  
 Carrock Fell intrusion, 205, 212  
 Cashel–Lough Wheelaun intrusion, 48, 50  
 Catanda carbonatites, 254, 258  
 cave pearls (pisolites), 187, 188  
 cementation of carbonates, 187  
 ‘Cenozoic’, 85  
 Cenozoic-style plate tectonic processes, 19  
*Centenary History of the Society*, H. B. Woodward, 8  
 Central Highland Division, 63  
 Central Metasedimentary Belt, Ontario, 13  
 central volcanoes, 197, 199, 200, 201  
 Chadian Stage, British Isles, 108–9, 110, 113, 114, 115, 116, 117, 118, 119, 120, 121  
 chalk, pelagic nature, 189  
 Challenger expedition, 185, 186, 189  
 Changbaishan volcano, 197  
 characteristic faunal horizons, 136  
 Charterhouse Carboniferous Limestone, 155  
 chemical modelling, 232  
 chemostratigraphy, 146  
 Chilas complex, 13, 17  
 Chile, 230  
 china clay deposits, 238, 245  
 chronostratigraphy, British Isles, 105, 108–9  
 Chugach Metamorphic Complex, 81  
 Churchill Province, 31  
*Circular*, the, 8  
 Cleveland dyke, 200  
 climbing ripple cross-lamination structures, 176  
*clingani* ‘bands’, 101  
 closed-system fractionation, 208–10, 222  
 Coastal Batholith, Peru, 226, 227, 228–9, 230–1  
 Coastal Range, British Columbia, 76  
 Code of Rules of Stratigraphical Nomenclature, 129, 130  
 collisional metamorphism, 75, 76  
 collisional orogens, origin, 11, 12–13, 14–15, 19  
 colonnade lava tiers, 199  
 Colonsay rocks, 63  
 columnar structures, formation, 180  
*complanatus* ‘bands’, 101  
 ‘completeness of the geological record’, 146  
 concurrent-range biozones, 136  
 Connemara schists, 46  
 conodonts, in biostratigraphic calibration, 87, 95–6, 97, 111–13  
 contact metamorphism, 68, 69, 222, 223, 233  
 continents, dispersal and growth, 59–60  
 convection in magma chambers, 209, 211–12, 231, 232  
 convective fractionation, 206, 211, 212  
 Conybeare, W. D., 85  
 cooling histories and mineral ages, 46–7, 48  
 Cooma Complex, 224, 225  
 Coral Brachiopod Zone, 118  
 coral/brachiopod zonation, British Isles, 113–14, 118, 119, 121  
 corals, composition changes with time, 186  
 Cordilleran granite magmatism, 222, 226, 228–30, 231  
 Cordilleran orogens, 11  
 Cornubian Batholith, 224  
 Cornubian orefields and orefluids, 237–8, 239, 243–5, 246  
 Coronation Supergroup, 14  
*Coronatum* Zone, 147  
 Cotteswold Sands, 132–3  
 Courceyan Stage, British Isles, 108, 110, 111, 112, 113, 114, 115, 118, 119, 120, 121  
 Craven Basin, 107, 109, 110, 111, 119  
 Cretaceous System, 144, 145, 146  
   fauna, 161  
 critical melt fraction, 224  
 Cromhall Limestone Quarry, fissure fauna, 158  
 crustal accretion, Precambrian, 25–6, 32  
 ‘crustal accretion–differentiation superevent’, 26, 38  
 crustal anatexis, 70  
 crustal assimilation, 207, 213, 216  
 crustal extension and metamorphism, 75–6  
 crustal fracturing, 230  
 crustal melting, 20, 69–70, 231  
 crustal temperature changes, causes, 73  
 crustal thickening and magmatism, 32, 69–70, 73  
 crystal fractionation, 206–7, 208–12, 214–16, 228, 229  
 crystal settling, 206, 207, 208–11, 213, 215–16, 228  
 crystallization ages, in dating, 47–51  
 crystallization in fluid inclusions, 239–40  
 Cuillin Hills, intrusions, 195, 196, 197, 200, 201  
 Cullis, C. G., 186  
 current ripples, 176  
 Cuvier, G., 84
- Dabje Mountains, 77  
 Dalradian block, 60–1, 63  
 Dalradian Supergroup, geochronology, 46–51  
 Dana, J. D., 58  
 Darwin, C. R., 86, 189, 205, 206  
 Davey, H., 239  
 Davidson, T., 165

- Davies, A. M., 135  
 De La Beche, H. T., 84, 154  
 Dead Sea Rift Fault, 57  
 Deccan traps, fissure fauna, 161  
 'deep biotite granite', 224, 225  
 Degerloch Rhaetic bone bed, 155  
 Dehm, R., 156, 160  
 dehydration melting, 19, 70  
 Delhi orogen, 16  
 Derbyshire Dome, 242, 243  
 desiccation fractures, 179  
 destructive plate margins, movements caused by, 59–60  
 Devonian palaeogeography from pebble fauna, 169, 171  
 Devonian System, 85, 86, 144  
 dewatering structures, 179–80  
 Dewey, J. F., 59  
 Diabaig Formation, 45  
 diamond-bearing rocks, 77  
 diamonds, melt inclusions in, 258, 259  
 differentiation indices, 214–15  
 diffusion  
   intercrystalline, 77  
   in magmas, 206  
 Dinant basin, 118  
 Dinantian stratigraphy in the British Isles, 105–6  
   biostratigraphy, 105–7, 110–21  
   chronostratigraphy, 108–9, 121  
   custasy, 107–8, 121  
   seismic sequence stratigraphy, 109–10, 121  
 dinosaur bones, discovery, 156  
 'dirty window', 28–9  
 'disequilibrium', 72–3  
 dish structures, 180  
 diurnal inequality of tides, and bedding patterns, 177  
 Dixon, E. E. L., 189  
 Dob's Linn, 93, 97, 98, 99, 100  
 dolomitic carbonatite, 257, 258  
 Donegal, 232  
 Donegal Main Granite, 221  
 Dorset Inferior Oolite, 138, 141, 142, 147  
 double (multiple)-diffusive convection, 212  
 Drumbeg ultramafic bodies, 40  
 Dundry Hill, 134, 153–4  
 dunes, 175–7, 178  
 Dunham, K. C., 237, 241, 243  
 Dunham's limestone classification scheme, 189  
 Durdham Downs, Bristol, fissure fauna, 156
- Early Palaeozoic stratigraphy, 83–9  
 East African Rift, 214  
 East Cornwall, biostratigraphy, 110  
 East Greenland lava flows, 196, 197, 208  
 Eastern Layered Series, Rhum, 207  
 ecosomatic modification of Jurassic ammonites, 138  
 Elles, G., 94–5  
 Elsevirian orogeny, 13  
 'emanative centres', 244  
 Emborough Quarry, fissure fauna, 157  
 Embry & Klován's limestone classification scheme, 189  
 emplacement mechanism for carbonatites, 256  
 Enderby Land granulite terrane, 76  
 entablature lava tiers, 199  
*Eoparastaffella* Zone, 118  
 'epeiric seas', 190  
 equilibrium, mineralogical, 72  
 Eras, stratigraphical, 85  
 Eskola, P., 72, 221, 222, 223  
 Etheridge, R., 156  
 Europe, Northwest, palaeogeography, 166–71  
 European Variscides granulite terrane, 76  
 event stratigraphy, 87  
*extraordinarius* Zone, 99
- Faeringhavn terrane, 28  
 Falkland Island fossils, 86  
*Fascipericycclus*–*Ammonellipsites* Ammonoid Zone, 110  
 'fast exposure paths', 76  
 fault controlled sequences, 57–64  
 fauna, from fissures, 153–61  
 faunal horizons, 133, 135–43, 145, 146, 147  
 Feltar mass, ophiolitic assemblage, 63  
 Fen carbonatites, 249, 258  
 fenitization (metasomatism), 249–50, 253, 256  
 Fenner trend of iron enrichment, 109, 210  
 ferro-carbonatite, 256  
 filtration differentiation, 228  
 Finland, granulites, 76  
 Fiskenaasset-type layered complexes, 27, 28  
 fissure faunas, Southern England, 153–61  
 flood basalts (plateau basalts), North Atlantic Province, 195, 196, 197–9, 200–1  
 floral biostratigraphy, British Dinantian, 114–18  
 fluid inclusions, 185, 190, 239–40, 246  
   techniques and methodology, 241–5  
 fluid-absent melting, 231  
 fluorite, inclusions in, 242, 244  
 Folk's limestone classification scheme, 189  
 foraminiferal biostratigraphy, British Dinantian, 118, 121  
 Forfarshire, Northeast, map of, 67  
 Fort Portal carbonatites, 254–6, 258  
 forward modelling approach, 215, 216  
 fossil extraction techniques, 157–8, 160  
 fossils, importance in stratigraphy, 83–4, 85  
 fractional crystallization, 206–7, 208–12, 214–16, 228, 229  
 fracture patterns in bedforms, 179  
 Franciscan Complex, California, 77  
 Füchsel, G. C., 83  
 fundamental fractures, 57, 58–9, 62
- Gabilly, J., 138  
 Gahard Formation, 166, 169  
 Gaima Plateau, 197  
 Galapagos, volcanoes, 197  
 Galway granite, 47  
 Garabal Hill Complex, 227–9, 230  
 Gargano fissure fauna, 160  
 garnet, petrological studies, 77  
 Garwood, E. J., 107, 113  
 Geikie, A., 185, 195, 199, 201  
 geochronology of Scottish metamorphic complexes, 37–51  
 'Geological Inquiries', booklet of, 6  
 Geological Society, the, 5, 6  
   origins of the Journal, 5–8  
*Geoscientist*, the, 8  
 Geraldton–Beardmore terrane, 29  
 'ghost stratigraphy', 221  
 Giant's Causeway lavas, 199  
 Giletti, B. J., 37, 38, 43, 46, 47  
 Gilluly, J., 58  
 Girvan, fault controlled sequence, 60  
 Girvan district, palaeogeography, 97, 98, 99  
 Glen Dessarry syenite, 43, 47, 48, 50  
 Glen Kyllachy granite, 48, 50, 51  
 Glencoe volcanoes, 196, 201  
 Glenelg inlier, 44  
 Glenfinnan area pegmatites, 43  
 gneiss terrane accretion models, Precambrian, 26–7  
 Goatfell granite, Arran, 196  
 gold–quartz veins, 246  
 'Golden Spikes', 130  
 Goldschmidt, V. M., 72, 223  
 Gondwana, 166, 167, 170  
 Gorgona Island komatiites, 18, 31  
 Gorran Haven, Cornwall, 168  
 Gower Peninsula Carboniferous Succession, 189  
 'gradational differentiation', 228

- grain settling, 177–8  
 Grampian Group, 63  
 Grampian Highlands, 46, 50, 51  
 granite  
   classification systems, 232  
   layering in, 228  
   magmatism, 70, 221–33  
 'Granite Series', the, 223–6, 227  
 granite–greenstone terranes, 17–18, 25, 26  
 granite rocks, composition change over Earth history, 19  
 granitization (partial melting), 223, 224, 225  
 granule ripples, 176  
 granulite metamorphism, 76, 77–8  
 granulite–gneiss terranes, Archaean, 18  
 graptolites, in biostratigraphic calibration, 86–7, 93–5, 96–7, 99  
 gravel dunes, 176, 177  
 gravel-bed rivers, 177  
 Graveyard dyke, 41, 42  
 gravitational crystal settling, 206, 207, 208–11, 213, 215–16, 228  
 gravity anomalies, 15–16  
 Great Bear batholith, 15  
 Great Dyke, Zimbabwe, 29  
 Great Glen, 51  
 Great Glen Fault, 57, 58, 59, 62–4  
 Greenland, 28, 29, 31, 45, 196, 197, 208  
 Greenough, G. B., 6  
 'greenstone' belts, ancient, 27  
 greenstone terranes, 28–9, 246  
 greenstone–granite terranes, Precambrian, 17–18, 25, 26  
 Grenville orogen, 13  
 Grenville Province, 76  
 Grenvillian Belt, Labrador, 45  
 Grenvillian metamorphism, 44  
 Grenvillian Ocean, 13, 15  
 Grès Armoricaïn, 165, 166  
 Grès de Goasquellou sandstone beds, 169, 171  
 Grès de petit May, 165–6  
 Gressly, A., 84  
 Grout, F. F., 212  
 Gruinard Bay, 40  
 Guettard, J. E., 83  
 guide-fossils, 128–9, 130, 131, 132, 134, 136–8  
  
 Hall, J., 93  
 Harker, A., 69, 195–6, 205, 206, 207, 208, 212, 213, 215  
 Harker diagrams (variation diagrams), 208, 214  
 Harker index, 214  
 Hartville uplift, 31  
 Hastarian Stage, 108  
 Hawaii, volcanoes and lava flows, 197  
 heat production in the earth, 19, 20, 27  
 Hebridean basaltic plateaus, 195, 196, 201  
 Hebridean Province, 197  
 'hemarae', 133, 134  
 Hercynian Belt, Western Europe, 224  
 Hercynian orogeny, 85  
 Hibbard, C. W., 160  
 high-magnesium calcite, 187, 188  
 high-pressure metamorphic rocks, 77  
 high-temperature metamorphism, 69, 70  
 high-temperature–low-pressure metamorphism, 75–6, 77, 233  
 Highland Boundary Fault, 46, 49, 57–8, 60–2, 67  
 Highland granites, 228  
 Hill, A. J., 189  
 Himalayas, 11, 73, 75, 86  
 Hind, W., 107  
 Holkerian Stage, British Isles, 108, 109, 115, 117, 119, 120, 121  
 Holm, G., 95  
 Holwell quarry, fissure fauna, 153, 154–5, 156, 157, 161  
 homogenization temperature, 240  
 Hooke, R., 83  
 Horner, L., 240  
 Hottah island arc, 14, 15  
 hummocky cross-stratification, 178, 179, 180  
  
 Hutton, J., 11  
 hydraulics of bedforms, 176–80  
 hydrocarbon inclusions, 242  
 hydrocarbon maturity, 114  
 hydrocarbon reservoirs, 189  
 hydrothermal oilfields and ore fluids, 237–8, 245–6  
   ore-genetic theory, 238–45  
  
 Iapetus Ocean, 46, 98, 99, 166, 167, 170  
 Iceland, lava flows, 196, 197, 199, 200, 201  
*Imitoceras prorsum* Ammoïoid Zone, 110  
 immiscibility of liquids, 213–14, 215, 255–6  
 Inchbae facies, 43  
 index-fossils, 130  
 Inferior Oolite, Southern England, 132, 133, 134, 138–42, 146, 147  
 intercrystalline diffusion, 77  
 interface method of fossil extraction, 160  
 intrusions  
   categories, 29  
   as cause of regional metamorphism, 69  
 Inverian metamorphism, 38, 40, 41  
 'inverted metamorphism', 75  
 ion-microprobe analysis, 50  
 Irish Caledonides, 230  
 Irish Dinantian stratigraphy, 110–21  
 Islay rocks, 63  
 isobaric cooling paths, 76  
 isoclinal folding, 99  
 isothermal decompression paths, 76  
 Ivorian Stage, British Isles, 108, 110  
  
 Jason Zones, 147  
 Jimberlana intrusions, 29  
 Johnny Hoe suture, 15  
 Jones, O. T., 58  
 Jormua ophiolite, 16  
*Journal*, the, origins, 5–8  
*Journal des Mines*, 6  
 Judd, J. W., 195, 201  
 Jukes-Brown, A. J., 189  
 Julianehaab batholith, 13  
 Jura, fissure fauna, 156  
 Jurassic geochronology, 129–31, 135, 147–8  
   biostratigraphic time-resolution, 127, 131–4, 135–7, 147  
   ammonites in, 130, 137–43, 146  
   estimates of, 143–6  
   polyhemeral chronology, 134–5  
 Jurassic Period, 86–7, 144  
 'juvenile' source theory, 243  
  
 K–Ar dating, 38, 40, 41, 43, 45, 47  
 Kaapvaal craton, 18, 19, 20  
 Kaapvaal shield, 18, 19  
 Kainozoic, 85  
 Kaiserstuhl lapilli, 254  
 Kangamiut dykes, 30  
 Kangmar dome, 75  
 kaolinization, 245  
 Kapuskasing terranes, 18  
 Karelian terrane, 14  
 Katwe–Kikorongo volcanic fields, 255  
 Kennedy, W. Q., 57, 58, 59  
 Kerimasi, Oldoinyo Lengai, carbonatites, 250, 251, 252, 253, 254, 255  
 Kermach, K., 157, 158  
 Ketilidian  
   belts, Greenland, 31, 45  
   crust, Scotland, 63  
   orogen, Greenland, 13–14, 15  
 Keuper/Lias boundary, 155  
 Keweenawan rift, 13  
 Khanneshin carbonatites, 255, 258  
 Kilavea volcano, 208  
 kimberlites, link with carbonatites, 258, 260, 261

- Knoxisporites triradiatus*-*K. stephanephorus* Zone, 115  
 Knoydart pegmatites, 43  
 'Knoydartian' metamorphism, 44  
 Kobberminebugt suture, 13  
 Kohistan arc, 13, 17  
 Kola suture zone, 14  
 Kola-Karelian orogen, 14  
 komatiitic magmatism, Precambrian, 28-9, 31, 32, 33  
 Koolau volcano, 200  
 Koslowski, R., 95  
*Kraeuselisporites hibernicus*-*Umbonatisporites distinctus* Zone, 115  
 Krynine, P. D., 58  
 Kühne, W., 156, 160  
 Kun Lun orogen, 11  
 Kurunegala, granulite formation, 77  
 Kylesku gneisses, 38, 41
- Lachlan Fold Belt, 224, 226  
 Lake District, 95, 97, 98-9, 107  
   Borrowdale arc, 60  
 Lambert, R. St. J., 37  
 lamination patterns in aqueous bedforms, 176, 177  
 Landévennec Formations, 166, 169  
 Land's End mineral veins, 240  
 Lapworth, C., 86, 87, 93-4, 95, 96-7, 98, 99-100, 101, 134  
 Laramie mountains, 31, 32  
 lateral displacement of faults, 57, 59  
 Laurentia, 12, 166  
 Laurentian platform limestones, 95  
 lava-flow structures, 199-200  
 Laxford Front zone, 54  
 Laxfordian metamorphic events, 27  
   radiometric dating, 38, 39, 40, 41, 54  
 layered mafic intrusions, 207, 208, 215, 228  
 Lehmann, J. G., 83  
 Leny Limestone, 50  
 leucosome chemistry, 225  
 Lewisian Complex, 54  
   geochronology, 38-43  
   North West Scotland, 25, 26, 27, 29, 31, 32, 41, 45  
 Liassic fissure fauna, 155  
 lime-mud, origin, 187  
 limestones  
   classification, 189-90  
   structure and origin, 185-91  
 Limpopo belt, 18, 20, 76  
 Lindgren, W., 241  
 liquid immiscibility, 213-14, 215, 255-6  
 lithosphere structure and eruption ages, 259-60  
 lithospheric extension and regional metamorphism, 77, 78  
 lithostratigraphic time-resolution, 146  
 Llandeilo age of Scottish shales, 97  
 Llandovery Series, 86, 87, 88  
 local range biozones, 136  
 Loch Torr an Lochain dyke, 42  
 Lochan a' Chairn facies, 43  
 London-Brabant massif, 170, 171  
 longitudinal (seif) dunes, 176  
 Louis, J., Count de Bournon, 5  
 low magnesian calcite, 187, 188  
 low-pressure-high-temperature metamorphic belts, 69  
 Luleå-Kuopio suture zone, 13  
*Lycospora pusilla* Zone, 115  
 Lyell, C., 11, 84-5  
 Lys-Caillaouas massif, 76, 77
- Mackenzie dyke swarms, 15, 200, 201  
 mafic magmatism, Precambrian, 25-33  
 MAGIC processes, 226  
 magma mingling, 228  
 magma mixing, 206, 207-8, 212, 215  
 magma-flow directions, 200  
 magmas and magmatism, 19  
   alkaline, 251-3, 255, 256, 259, 260  
   anorogenic, 15  
   carbonate, 249-62  
   granite, 221-33  
   mafic, Precambrian, 25-33  
   plutonic, 69  
   tholeiitic, 208-10  
   *see also* magmatic differentiation  
 magmatic advection of heat, 70, 75, 78  
 magmatic differentiation, 205, 208-11, 212-16  
   early ideas, 205-7  
   mechanism, 207-12  
   modelling, 215  
 magnesio-carbonatite, 256, 257, 261  
 magnesium calcite, 187, 188  
 magnetostratigraphy, 88, 145, 146  
 Main Central Thrust System, 75  
 Malene metavolcanic rocks, 28  
 mammals, origin, 153  
 mantle metasomatism, 259, 260  
 mantle source and primary flux, 258-9, 261  
 mantle-plume-related magmatism, 27  
 Marathon dyke swarms, 15  
 marine bivalves in stratigraphy, 111  
 marine storm bedding, 178-9, 180  
 MASH processes, 226, 232  
 Massif Central, 224  
 Mberengwa allochthon, 17  
 M'Coy, 86  
 medium-pressure regional metamorphism, 68, 69  
 melt fraction material, 224, 225  
 melt generation and tectonism, 260  
 Mendip Hills, fissure fauna, 155, 156  
 mesothemic boundary status, 107  
 'Mesozoic', 85  
 Mesozoic fissure fauna, Southern England, 153, 157  
 metal-bearing hydrothermal fluids, 245  
 metamorphism  
   'inverted', 75  
   related to extension, 75-6, 223  
   and tectonics, 71  
   *see also* geochronology of Scottish metamorphic complexes;  
   regional metamorphism  
 metasomatism  
   alkali (fentitization), 249-50, 253, 256  
   mantle, 259, 260, 261  
 micro-probe analysis, 232  
 microstructural studies, 71  
 Mid-Carboniferous boundary, 110  
 Midford Sands, 132-3, 146  
 Midland Valley, Scotland, 58, 60, 61, 111  
 migma-magma, 223  
 migmatites, 224, 225  
 mineral ages and cooling histories, 46-7  
 mineral isochron ages, 77  
 mineralization of Cornubian and Pennine orefields, 237-46  
 Minnesota River Valley terrane, 18  
 miopore zonation, British Dinantian, 114-18, 121  
 Mississippi Valley Type mineral deposits, 238, 243, 244, 246  
 Mistassini dyke swarms, 15  
 Miyashiro facies series, 72  
 'mobile belts', 26  
 Moffat area, palaeogeography, 93, 94, 97-9, 101  
 Moine thrust, 43, 46, 58, 63  
 Moinian Supergroup, geochronology, 43-4, 45-6, 47, 49  
 Molson dyke swarms, 15  
 monogenetic volcanoes, 197  
 Moor bath, S., 37, 38  
 Moore, C., 153-6, 160  
 Morar Group, 44  
 Moray Firth, Old Red Sandstone displacements, 62  
 Morecambe Bay carbonate platform, 107  
 Mourne Mountain granites, 196  
 Mozambique belt, 12, 19  
 Mull, Island of, intrusive complexes, 195, 196, 197, 198, 201

- multiple-diffusive convection, 212  
Murchison, R. I., 83, 85, 86, 129  
*Murospora margodentata*–*Rotaspora ergonulii* Subzone, 116
- Nagssugtoquidian mobile belt, 30, 31  
Nahanni terrane, 15  
Nain Province, 31  
Namur basin, 118  
Namurian boundary, 110  
natrocarbonate, 251–3, 261  
*Neoarchaediscus* Zone, 118  
Neptunian dykes, 157, 158, 160  
Neptunist theory, 83  
New England, metamorphism, 71, 73  
New England Appalachians, 69  
Newer Granites, 46  
*Newsletter*, 8  
Nicol, H., 185  
Nockolds, S. R., 221, 222, 227, 228, 229, 230, 231  
noritic magmatism, Precambrian, 29–31, 32, 33  
Normandy–Wessex Basin, 146, 148  
North America  
  cartons, 87  
  exotic terranes, 59  
  fissure fauna, 160  
North Atlantic cratons, 26, 31  
North Atlantic Province, 196, 197, 199  
  *see also* British Tertiary Province  
North Sea Chalks, 189  
North West Europe, palaeogeography, 166–71  
North West Scotland  
  geochronology of Highlands, 37–51  
  Lewisian Complex, 25, 26, 27, 29, 31, 32, 41, 45  
  Scourie dyke swarm, 19, 27, 29, 31, 41–3  
Northumberland Trough, 111, 113, 118  
Norwegian Caledonides, 68, 77  
Nûk gneisses, 26, 27
- oceanic crust on the continent, 59  
oceanic lithosphere, Archaean, 19  
Oldoinyo Lengai volcano, Kerimasi, 250, 251, 252, 253, 254–5  
Onaman–Tashota terrane, 29  
oolitic grain formation, 187–9  
open-system magma chambers, 207–8  
Oppel, A., 86, 94, 129–30, 133  
Oppelian Zones, 129–30, 133, 134  
Orbigny, A. d', 86, 129, 133  
Ordovician series, North American, 86  
Ordovician System, 86, 87, 145  
  Moffat Series, 93, 94, 95–6, 97, 98, 101  
Ordovician to Devonian palaeogeography of Europe, 165–71  
Ordovician–Silurian boundary, 100, 101  
ore-genetic theory, 238–46  
orogens, origin, 11–16, 19  
orogeny and regional metamorphism, 68–9  
  *P–T–t* paths, 69–78  
ostracodes, in biostratigraphic calibration, 87, 118, 167  
Ottawan orogeny, 13  
Outer Hebrides, 45  
'outer limit' lines, 67  
Oxford Clay, Peterborough, 131, 138, 142–3, 147  
oxide–oxide variation diagrams, 208, 209, 210, 214–15  
oxygen fugacity, 209  
oxygen isotope dating, 77
- P–T–t* paths, 69–78  
'paired' metamorphic belts, 69, 81  
palaeogeography of Northern Europe, 166–71  
Palaeozoic, Early, stratigraphy, 83–9, 94, 95, 101  
Pan-African belt, 12, 16, 19  
partial melting (granitization), 223, 224, 225  
Payne River dyke swarms, 15  
Payson ophiolite, 16  
Pb–Pb dating, 38, 39, 40, 54
- Pearce element ratio diagrams, 214  
Pechenga Series, 14  
Pecora, W. T., 249, 250, 256  
Pennine orefields and orebodies, 237–8, 239, 241–4, 245, 246  
Penokean orogen, 13, 15  
Periods, stratigraphical, 85, 86  
Permian Reef Complex, 189  
Permian System, 85, 144  
*Perotrites tessellatus*–*Schulzospora campyloptera* Zone, 115  
Peterborough Member, 142  
Phanerozoic, 143  
  tectonism, 11, 19  
Phillipines, tectonic activity, 59  
Phillips, J. A., 84, 85, 241  
*Philosophical Transactions*, 5, 6, 7, 8  
Pikwitonei granulites, 18, 73, 74  
Pilton Shale Formation, 110  
plane beds, 176  
plate tectonic uniformitarian model, 11–21  
plateau basalts (floor basalts), North Atlantic Province, 195, 196, 197–9, 200–1  
Pleistocene, time-resolution, 146  
Plieninger, W. H. T. von, 155  
plumbing systems, 226, 232  
plutonism, 69, 222–3, 232, 259, 260  
  'place' in, 222–3  
  'time' in, 223–4  
plutons, shape of, 221  
Polino carbonatites, 254, 255, 258  
Poll Eorna dyke, 42  
polygenetic volcanoes, 197, 199  
*Polygnathus communis carina* Conodont Zone, 110  
*Polygnathus inornatus* Conodont Zone, 115  
*Polygnathus mehli* Conodont Zone, 115  
polyhemeral chronology, 134–5  
Pongola Supergroup, 18  
Port aux Basques Complex, 71  
Portsoy beds, 48, 50  
Precambrian  
  crustal development, 25–37  
  plate tectonics, 19, 20  
Prekeltidian belts, Greenland, 45  
Principle of Biostratigraphic Synchronicity, 128, 136, 137  
*Principles of Geology*, 11  
*Proceedings*, the, 7, 8  
prograde metamorphism, 77  
progressive regional metamorphism, 69  
Proterozoic  
  crustal development, 25, 29–31  
  plate tectonics, 11–20  
protolith formation and Badcallian metamorphism, 38–41  
*Pseudopolygnathus multistriatus* Conodont Zone, 115  
punctuated orogeny, 58  
Purtuniqu ophiolite, 16  
Pyrenees, 76, 231
- Quarterly Journal*, the, 7–8  
quenched dykes, 30  
Quercy phosphorites, 156
- radiogenic isotope dating, development, 77  
radiometric dating of Scottish metamorphic complexes, 37–51  
*Raistrickia nigra*–*Triquitrites marginatus* Zone, 116  
ramps, 190  
Ramsbottom, W. H. C., 107, 108, 111  
Rb–Sr dating, 37–8, 40, 41, 44, 45, 47, 48, 49, 50, 77  
Reaction Principle, 207  
Read, H. H., 221, 222, 227, 228, 230, 231, 232, 233  
regional metamorphism, 67, 68, 69, 78, 222, 223  
  orogeny and, 68–9  
  *P–T–t* paths, 69–74  
  recent advances, 74–7  
retrograde metamorphism, 77  
Rhaetic fissure fauna, 155, 156, 159

- Rhegreanoch dyke, 41, 42  
 Rheic Ocean, 167, 171  
 Rhum, Island of, igneous complex, 196, 197, 206–7  
 Riley, H., 111, 156  
 rimmed shelves, 190  
 ripples, sedimentary, 176, 178  
 Robinson, P., 157–8  
 rock-time duality, 127–8, 135  
 role of fault, 62  
 'room (space) problem', the 221–2, 232  
 Rossendale Millstone Grit, 107  
 Royal Society, 5  
 Ruedemann, R., 94  
 Rufunso carbonatites, 254, 257, 258, 259  
 Rule of Priority, 129, 130  
 Russian Platform, 87, 98  
 Ryoike Metamorphic Belt, 81
- Sahara, collisional orogen, 13  
 St Austell mineral veins, 238, 240  
 Saint Barthélemy massif, 76  
 St Malo Migmatite Belt, 224, 226, 227  
 St Michael's Mount mineral veins, 240, 244  
 Salter, J. W., 96, 165  
 San Andreas Fault, 57, 59  
 San-yo granitoids, 81  
 Sanbagawa Metamorphic Belt, 81  
 sand ripples, 176  
 sand waves, 177, 180  
 Sandford Lane Fossil Bed, 134  
 Sawkins, F. J., 241–2, 243–4  
*Scaliognathus anchoralis* Conodont Zone, 110  
 Scandinavian succession, 98  
*Schopfites claviger–Auroraspora macra* Zone, 115  
 Scotland, 63  
   metamorphic complexes, geochronology, 37–51  
   Southeastern Highlands, regional metamorphism, 67, 68, 74, 78  
   Southern Uplands, 58–64, 93–4, 97, 98–9, 101  
   *see also* North West Scotland  
 Scourian (Badcallian) metamorphism, 27, 38–41  
   radiometric dating, 38–43, 54  
 Scourie dyke swarms, 27, 29, 31, 41–3  
 sea-level changes, stratigraphy related to, 87, 88–9  
 secular biochronological resolution, 137, 146  
 secular resolving power, 137, 145  
 Sedgwick, A., 83, 85, 86  
 sediment drifts, 176  
 sediment waves, 176  
 sedimentary structures, Sorby and the last decade, 175–80  
 sedimentation and faulting, 58  
 sequence stratigraphy, 101, 190  
 series, stratigraphical, 86, 87  
 Sgurr Breac pegmatites, 43  
 Sharyzhalgay complex, 72  
 sheet-like pillar structures, formation, 180  
 shells, in formation of limestone, 186–7  
 Shelveian event, 86  
 Sherborne Building Stone, 134  
 Sherborne Inferior Oolite, 133, 134  
 SHRIMP, 50, 51, 232  
 Silesian Subsystem, 109  
 Silurian series, establishment of, 86, 87, 93  
 Silurian System, 85, 86, 87, 145  
   Moffat Series, 93, 94, 97, 98  
*Siphonodella crenulata* Conodont Zone, 115  
*Siphonodella sandbergi* Conodont Zone, 110  
 Skaergaard intrusion, 196, 207, 208, 209–11, 214, 216  
 skeletal disintegration as source of carbonate, 187  
 Skye, Island of, lava flows, 195, 196, 197, 199, 200, 201  
 Slave Province, Canada, 14, 17, 18  
 Slickstones Quarry, 157  
 Sm–Nd dating, 39–40, 41, 42–3, 44, 47, 77  
 Smith, W., 83–4, 128–9, 153  
 soft sediment deformation, 179–80  
 solidification index, 214  
 Solomon, M., 242  
 Solway line, 58, 60  
 Sorby, H. C., 175, 178, 185–9, 191, 237, 239–41, 245  
 Soret coefficient, 212  
 Soret diffusion, 206, 212, 213  
 South America, dykes, 31, 32  
 South Australian noritic dyke swarms, 32  
 South East Greenland dyke swarms, 29, 30–1  
 South Harris complex, 39  
 South Kola belt, 14  
 South Tibetan detachment system, 75  
 South Wales Lower Limestone Shales, 110  
 South West Greenland, 26, 27–30, 31  
 Southern Brittany Migmatite Belt, 73, 74  
 Southern Uplands fault, Scotland, 58, 60  
 Sowerby, 85  
*Spelaotriletes balteatus–Rugospora polyptycha* Zone, 115  
*Spelaotriletes pretiosus–Raistrickia clavata* Zone, 115  
 Spitzkop carbonatites, 255, 259  
 spring-neap cycle bedding patterns, 177  
 Spurr, J. E., 241  
 Staffa lavas, 199  
 Stages, stratigraphical, 86, 87, 130, 131  
   d'Orbigny, 130  
   Rule of Priority in Naming, 129  
 standard chronostratigraphic units, 129, 130–1, 136, 145  
 'standard geological column', the, 128, 143  
 standard time-ordered succession, 127  
 star dunes, 176  
 Steno, M., 83  
 Steno's Principle of Superposition, 127  
 Stensio, E., 95  
 Stillwater intrusion, 29, 31, 208  
 Stiperstones Quartzite, Shropshire, 166  
 Stoer Formation, 45  
 Stonesfield Slate, Oxfordshire, 153  
 storm bedding, 178–9, 180  
 Strathan dyke, 42  
 Strathmore syncline, 61  
 stratigraphical horizons, 136  
 Stratigraphical Nomenclature, Code of, 129, 130  
 stratigraphy, Early Palaeozoic, 83–9  
 Strichen granite, 48, 51  
 strike-slip faulting, 57, 59  
 Stutchbury, S., 156, 162  
 subaqueous dunes, 178  
 subduction geotherms, decrease in, 19, 21  
 subduction zone metamorphism, 76–7  
 Subzones, stratigraphical, 116, 130, 131, 145  
 Sudbury dyke swarms, 15  
 supercontinent, Proterozoic, 15  
 Superior Province, Canada, 17, 18, 29  
 suspect terranes, 59  
 Sutton, J., 25, 38  
 Svecofennian orogen, 13, 15, 16  
 swaley bedding, 179, 180  
 'syn-rift megasequence', 110  
 Synchronicity, Principle of, 136, 137  
 Systems, stratigraphical, 85–6, 100–1
- Tarfside Culmination, 47  
 Tayvallich volcanic sequence, 50  
 Teall, 67  
 tectonic control on sedimentation, 58  
 tectonic processes  
   of magmatism, 230, 232  
   and metamorphism, 77–8  
 tectonic transfer of heat, 75  
 tectonism and melt generation, 260  
 temporal scope of an analysis, 145  
 Tertiary System, 85, 145  
 textural analysis, 71  
 textural modelling, 232

- Theory of Earth*, 11  
 thermal modelling of orogenic belts, 73  
 thermobarometric measurements, 77  
 thermogravitational diffusion, 212–13, 215  
 thermometamorphism, 67, 68  
 tholeiitic magmas, differentiation in, 208–10  
 tholeiitic magmatism, Precambrian, 30  
 Thompson, A. B., 72  
 throw of a fault, 59, 60, 62–3  
 Tibetan sedimentary sequence, 75  
 tidal bedding, 180  
 Tien Shan orogen, 20  
 Tilley, C. E., 67–8  
 time–correlations, 127, 128–9, 147  
 time–duration, 137, 143, 144–5  
 time–interval, 137, 145  
 time–markers, 128  
 time–planes, 128  
 time–resolution, biostratigraphic, *see under* Jurassic geochronology  
 time–rock duality, 127–8, 135  
 time–scale of sedimentological events, 176–7  
 time–temperature trajectories, 47  
 Tornio–Koillismaa intrusions, 29  
 Tornquist Sea, 98, 166, 167  
 Torridonian sandstones, 43, 44–6  
 total range biozone–assemblage, 136  
 Tournaisian/Viséan boundary, 113  
*Transactions*, the, 6, 7  
 ‘transient’, 135  
 transverse dunes, 175–6  
 Traonlions Formation, 169, 171  
 Tremadoc Series, 86  
 Triassic System, 85, 144  
   fissure fauna, 157, 158, 160  
   palaeogeography, 166–71  
 trilobites in biostratigraphic calibration, 118–19, 120, 121  
*Tripartites distinctus–Murospora parthenopia* Subzone, 116  
*Tripartites vetustus–Rotaspora fracta* Zone, 117–18  
 Trois Seigneurs massif, 76, 224, 225, 227, 230, 231  
 Trueman, A. E., 135  
 Turner, F. J., 223  
 Twenhofel, W. H., 189  
 Tytherington Quarry fissure fauna, 158, 159
- U–Pb dating, 37, 38–9, 40, 41, 42–3, 45, 48, 49–50, 51, 54, 77  
 Uchi–Sachigo terranes, 17  
 uniformitarianism, plate tectonic model, 11–21, 25  
 uhitary association biozone, 136  
 upper-stage plane beds, 176
- Vallatisporites verrucosus–Retusotriletes incohatus* Zone, 115  
 Vallis Vale, fissure fauna, 154, 156  
 vapour–liquid ratios, Sorby, 240  
 variation diagrams, 208, 209, 210, 214–5  
 Variscan belt, 74  
 Variscan massifs, 76
- Vaughan, A., 105–7, 108, 113, 118  
 Ventersdorp rift system, 19  
 Verneuil, M. E., 85, 86  
 vertebrate fissure faunas, Southern England, 153–61  
 Vicary, V., 165  
 Viséan Stage, 108, 113, 114, 115, 121  
 Viséan/Namurian boundary, 118  
 volatile fluxing, 259  
 volcanic-hosted massive sulphide deposits, 246  
 volcanology, British, classic period of, 195–6
- Waagen, W., 129–30  
 Wabigoon terrane, 17  
 Wales, 58, 143  
 wall rock assimilation models, 207  
 Walls Boundary Fault, 62  
 Ward, D. J., 160  
 Watson, J., 25, 38  
 wave-related bedforms, 178–9, 180  
 Wawa–Abitibi terrane, 17  
 Weardale granite, 243, 245  
 Welsh Basin, 87  
 Werner, A. G., 83  
 West African craton, 12–13  
 West Greenland  
   granulite–gneiss terranes, 18  
   lave flows, 196, 197  
 Westbury–sub-Mendip fissure fauna, 160  
 Western Alp blueschist belts, 77  
 whole-rock ages, 49, 77  
   determination of, 39–41  
 ‘Wilson cycle’, 13, 29  
 Wilsonian cycle of megacontinent growth, 59  
 wind waves, bedforms related to, 178  
 Windsor Hill, Shepton Mallet, fissure fauna, 156, 157  
 Witham, H., 185  
 Witwatersrand Supergroup, 18–19  
 Woodward, H. B., 8, 134–5  
 Wopmay orogenic belt, 14–15, 73  
 Wyoming craton, 31, 32
- Yangtze Platform cratons, 87  
 Yeovil Sands, 132–3, 146  
 Yorkshire Dales, 107
- Zambian volcanic carbonatites, 253–4, 255  
 zibar ripples, 176  
 Zimbabwean craton, 17, 18, 20  
 zircon grain analysis, 45, 49, 50, 51, 232  
 zonal mapping, 68  
 Zones, stratigraphical, 86–7, 94, 130, 131, 133, 145, 147  
   Opellian, 129–30  
 Zonules, 130  
 zoogeographical provincialism, British Isles, 107