

INDEX

Numbers in italics refer to Tables and Figures; those in bold type refer to general discussions.

- Acantharia* spp., and symbiotic algae, 388
Acanthophora muscoides, 375
spicifera, 142, 143, 227, 360, 370
Acetabularia clavata, 149
moebii, 149
Acetabularia spp., 73, 110, 130, 145, 493
 acetylene reduction technique, 150
 Achnanthes, 572
Achnanthes affinis, 134, 359
brevipipes, 240
coarctata, 49, 195, 214
didyma, 364
exigua, 203, 214
flexella, 364
hauckii, 221
hungarica, 42, 359
kriegeri, 161
lanceolata, 53, 127, 128, 195, 160, 359
lapponica, 364
linearis, 323
longipes, 240
marginulata, 52, 161
minutissima, 128, 130, 195, 214, 218, 359, 364
pinnata, 221
Achnanthes spp., 28, 30, 52; as epipelon in springs, 161; growth of, at higher temperatures, 204; horizontal distribution of, 510; as pedunculate epiphyte, 216, 217, 218, 233; nutrients, effects of, 538; on sandy surfaces, 122; of soils, 194
Achochaetium pectinatum, 70
Achochaetium spp., 29, 30, 36, 75–6, 101, 235, 238, 564
 acid pollution, 549–50
 acid rock surfaces, epilithic spp. on, 49
 acidic habitats, 161, 167
Acmaea spp., 417
Acmaea virginea, 416
Acrocarpia spp., 384
Acrochaete repens, 221
Acrochaetictalia, 35
Acropora spp., 391–2
Aerosiphonia arcta, 83, 98
Aerosiphoniales, 537
Acrosorium maculatum, 376
uncinatum, 104
Acrothrix novaeangliae, 451
Actinastrum hantzschii, 268
Actinastrum spp., 262, 263, 268, 425
Actinella punctata, 167
Actinella spp., 216
Actinia equina, 82
Actinocyclus divisisus, 505
ehrenbergii, 185, 240
ellipticus, 506
ingens, 506
ochotensis, 505
oculatus, 505
roperi, 186
Actinocyclus spp., 192
Actinocyclus valentinae, 505
Actinopytchus spp., 385
Actinopytchus splendens, 185
undulatus, 185, 186
Acystis spp., 384
Adenocystis utricularis, 106
 adhesion properties, 128
 addressed epiphytes, 215, 216
 aerial species, of epiphyton, 213–16
 aerial transport, of algae, 358–60
 Africa, South, zonation of epilithic spp. in subtidal regions, 103
 Africa West, distribution of coastal algae, 375, 376
Agardhiella coulteri, 65
Agardhiella spp., 73, 131, 132
Agardhiella tenera, 69, 71, 72, 451
Agarum cribosum, 103, 416, 417, 453
fimbriatum, 368, 369, 417
Agarum spp., 100, 102, 109, 117, 132, 134
Aglaozonia melanoidea, 36
parvula, 36
Aglaozonia spp., 97
Agmenellum quadruplicatum, 174
Agmenellum spp., 562
Ahnfeltia plicata, 98, 99, 106, 121, 186
Ahnfeltia spp., 65, 91, 118, 119, 120, 362
Aiptasia spp., 390
Alaria crassifolia, 90–1
crispa, 89
esculenta, 100, 118, 222, 372
fistulosa, 368
grandifolia, 103, 106
marginata, 65, 369
praelonga, 368
Alaria spp., 97, 115, 130
 Alaska: epipelon, subtidal of, 175; epipellic spp. of ponds and lakes, 167; growth patterns of marine phytoplankton, 440, 441–2, 445
 algal cup reefs, 153
 algal plain, of coral reefs, 146–8
 algal ridge, of coral reefs, 137–40
 algicides, 126
 alkaline habitats, 167
 Alps, sub-aerial epilithic spp. of, 48
Amansia glomerata, 142, 149
Amansia spp., 147
Amblyochara spp., 524–5
 Amchitka Island, zonation of
 . epilithic spp. of intertidal region, 89, 90–1
Ammonia spp., 413
Amoebophilidium spp., 402
Amphibolis spp., 219
Amphicampa hemicyclus, 167
Amphidinium amphidinioides, 284
carterii, 545
klebsii, 387, 388
Amphidinium spp., 29, 30, 174, 175, 223; and bacterial symbiosis, 397; primary productivity of, 321; as symbionts, 394
Amphipleura pellucida, 53, 282
Amphiprora alata, 268, 280
hyperborea, 210
kjellmanii, 210
kryophila, 210
oestrupis, 210
ornata, 278, 282
paludosa, 268
Amphiroa beauvoisii, 35
crassa, 149
foliacea, 138
rigida, 34
Amphiroa spp., 29, 30, 93, 138, 150, 173, 238, 564
Amphiscolops langerhansi, 387, 388
Amphisorus duplex, 393
hemprichii, 393
Amphistegina lessonii, 388, 393
Amphistegina spp., 388
Amphora coffeaeformis, 17, 172, 177, 221
cymbifera, 126
exigua, 240
inflexa, 240
montana, 195
ovalis, 53, 122, 124, 128, 129, 218
ovalis v. *pediculus*, 122, 124, 359
Amphora spp., 28, 29, 30, 122,

- Amphora* spp. (*cont.*)
 150, 174, 175, 246, 385;
 adpressed epiphytes, 216,
 222; on sandy surfaces,
 122; seasonal variations in
 subtidal regions, 176
- Amscotia* spp., 380
- Anabaena circinalis*, 304, 307,
 429, 435
- cylandrica*, 259
- flos-aquae*, 271, 273; doubling
 time, 429; grazing of, 407,
 413, 415; as measure of
 available phosphate, 535;
 nitrogen fixation, 310;
 periodicity of, 447
- planktonica*, 322
- solitaria*, 311, 532
- Anabaena* spp., 28, 30, 125, 183,
 186, 261, 263, 298, 563;
 and bacterial parasites,
 403; as endophyton, 235;
 flotation of, 305; grazing
 of, 407; in lakes, 277, 278;
 nitrogen fixation, 309, 310,
 311; in rivers, 268; of soils,
 193, 202; and temperature
 profile, 349
- Anabaena torulosa*, 174, 198
- variabilis*, 174, 359
- Anabaenopsis arnoldii*, 280
- Anabaenopsis* spp., 278, 304, 563
- Anacystis dimidiata*, 174
- montana*, 174
- Anacystis* spp., 51, 214
- Ancylonema nordenskoldii*, 208–9,
 210
- Ancylus fluviatilis*, 411
- angiosperms: and endophytic
 algae, 235; macrophytic
 spp. on, 218–19, 222;
 terrestrial algal spp. of,
 213–14
- animals, 360, 377–9, 403–13,
 420
- Ankistrodesmus acicularis*, 273
- falcatus*, 532, 542
- Ankistrodesmus* spp., 28, 30, 262,
 263, 277, 425; in
 atmosphere, 358; in rivers,
 268, 269; sampled on glass
 slides, 128
- Annelidia, 230
- annual cycles, 426–59; of
Asterionella formosa, 426–32,
 434, 445, 448–9; dormant
 periods, 449, 450–2; light
 penetration, effects on,
 455–7; of macroscopic
 algae, 449; of marine
 plankton, 440, 441–5;
 perennation, 435–7; of
Skeletonema costatum, 432–3;
 in subtidal habitats,
 452–3; temperature
 ‘shock’, 439, 440; water
 flow rate, effects on,
 452–6
- annual succession and growth,
 421–60; annual trends,
 422–6; annual cycles *see*
 annual cycles; doubling
 times, 421; succession of
 different spp., 425–6
- Anodonta* spp., 394–5, 410
- Anomooneis exilis*, 167, 364
- serians*, 167, 364, 509
- Anomooneis sphaerophora*, 280
- Anomooneis* spp., 17, 168, 169,
 233, 510
- Antarctic: aerial dispersal of
 algae, 358; carbon fixation
 values, 469; chlorophyll *a*
 content, 466; distribution
 of Fucales, 384;
 phytoplankton of, 272–6,
 284; sea ice species, 210;
 soil algae of, 198; and
 silica deposition by algae,
 485, 488
- Antarctic bottom water, 9
- Antedon bifida*, 416
- Anthoceros* spp., 235
- Anthopleura* spp., 391
- Antihamnion boreale*, 362
- plumula*, 76
- Antihamnion* spp., 106, 222, 452
- Apatococcus lobatus*, 214
- Aphanizomenon flos-aquae*, 39, 43,
 273, 429, 447, 448–9, 532
- Aphanizomenon* spp., 261, 263,
 277, 278, 381, 413; and
 bacterial parasites, 403;
 flotation of, 304; nitrogen
 fixation, 309, 310, 311
- Aphanocapsa anodontae*, 59
- grevillei*, 48, 50, 359
- musciola*, 50, 59
- pulchra*, 52, 59
- Aphanocapsa* spp., 49, 61–2, 168,
 169, 562, in atmosphere,
 358; on bare rock surfaces
 in caves, 49, 50; on desert
 rocks, 51; on mosses, 214;
 of soils, 193, 198; of
 subsurface sands, 126;
 symbiosis of, 387; in
 tropical lakes, 278
- Aphanochaete* spp., 216, 218
- Aphanothece castagnei*, 59, 204
- clathrata*, 59
- microsporum*, 59
- nidulans*, 59
- saxicola*, 59, 205
- Aphanothece* spp., 51, 60, 214,
 562
- Aphanothece stagnina*, 166
- Aphelidium* spp., 402
- Aplysia californica*, and symbiosis,
 395
- Aplysia* spp., 414
- Apoglossum ruscifolium*, 35
- aquatic habitats, 28–9, 30–1
- Archaeolithothamnium episporum*,
 153
- Arctic: lakes, phytoplankton of,
 272–6; species in sea ice,
 210; surface
 phytoplankton of, 314,
 315; zonation of epilithic
 spp. in coastal subtidal
 regions, 103, 106
- Argentine basin, diatom
 preservation in sediments,
 504, 505
- Arnaudovia* spp., 296
- Artemia* spp., 389
- Arthrocladia villosa*, 101
- Arthrodesmus* spp., 298
- Arthrospira jenneri*, 183, 552
- Arthrospira* spp., 563
- Arthrothamus bifidus*, 368
- artificial substrata, 126–30,
 146, 222, 360–1
- Ascidia, and symbiont algae, 388
- Ascocyclus* spp., 222, 226
- Ascomycetes, 396, 400
- Ascophyllum nodosum*, 79, 186,
 397, 403; algal association
 with, 219, 224, 238;
 biomass, 117; colonisation
 of cleared areas, 121;
 current drift dispersal,
 361; distribution of,
 373–4; and endophytic
 algae, 236; germination of,
 72, 73; of intertidal region,
 78; in northern intertidal
 regions, 89; respiration,
 effects on, 112, 113;
 submersion, effects on, 92;
 temperature, effects on,
 112; zonation of, 86, 87,
 88, 92
- Ascophyllum* spp., 73, 131, 186,
 372, 402, 403; distribution
 of, 384; morphology,
 effects of depth on, 110;
 pigmentation, effects of
 depth of, 110; on salt
 marshes, 91; sporelings,
 growth rate of, 76;
 zonation of, in intertidal
 regions, 86, 87, 88
- Ascoseira mirabilis*, 106
- Asparagopsis armata*, 362
- Asparagopsis* spp., 226, 385
- Asparagopsis taxiformis*, 475
- Asplanchna* spp., 407
- associations, of communities,
 38–42; epiphyton, 41,
 213–32
- Asterolampra grevillei*, 506
- Asterionella formosa*, 39, 43, 245,
 282, 358, 381, 482; annual
 cycle of, 426–32, 445;
 eutrophication, effects of,
 535, 536, 542, 543; growth
 on glass slides, 128;
 growth at various depths,
 314, 318; heavy metals,
 effects of, 545; horizontal
 distribution of, 290; in
 lakes, 267, 269, 277;
 nutrient levels, effects on
 growth, 336, 337;
 periodicity of, 430, 432,
 433, 434, 448–9; in rivers,
 269; spatial niche of, 44
- japonica*, 318, 397, 440, 441–2
- socialis*, 295, 410
- Asterionella* spp., 249, 261, 263,
 279, 338, 345, 380, 381,
 421, 425; chlorophyll
 content, 349; growth
 patterns of, 437–8, 454–5;
 inhibition of, by other
 algae, 317; in lakes, 266,
 267; and parasitic fungi,
 400, 402; sinking rates,
 300, 302, 303
- Asterocaelum* spp., 409
- Asteromphalus hilltonianus*, 508
- moronensis*, 506
- robusta*, 505
- Astra* spp., 414
- Astrolamprales, 572
- Astrolampra marylandica*, 287
- Atlantic Ocean: calcium
 deposition, 491, 492;
 carbon fixation values,
 470; core analysis, 502;

- distribution of benthic macrophytic algae, 367, 373–4; distribution of Fucales, 384; phytogeographic regions of, 366, 385; silica deposition, 486–7; surface and deep water circulation in, 10; vertical distribution of phytoplankton, 348
- Atopochara* spp., 524–5
- ATP estimation, for phytoplankton biomass, 251, 252, 253
- Atractophora* spp., 564
- Audouinella bonnemaisoniae*, 236
- endophyticum*, 235–6, 241
- infestans*, 241
- membranacea*, 98, 99, 100
- Audouinella* spp., 75–6, 221
- Audouinella purpureum*, 174, 362
- Aulacodiscus argus*, 185
- kittoni*, 186, 295
- Auliscus sculptus*, 185
- Aulosira* spp., 214, 563
- Australia: distribution of freshwater algae, 381, 383, 385; stromatolites, 188; zonation of, 91, 103, 106
- auto-inhibition, 318, 319
- autoradiographic estimates, of phytoplankton primary productivity, 320, 321, 322
- autrophic index, 554
- Avicennia nitida*, 228
- Avicennia* spp., 227
- Avrainvillea* spp., 228, 370
- Axillariella* spp., 384
- Azolla* spp., 235
- Bacillaria paradoxa*, 185, 186, 240, 246, 282
- Bacillariophyceae, 48, 323, 359
- Bacillariophyta, 18, 193, 297, 317, 358, 425, 571–2; *see also* Diatoms
- Bacillus subtilis*, and algal symbiosis, 397
- bacteria: and algal symbiosis, 396–7; epiphytic, 228; and relationship with phytoplankton, 354–5
- Bacteriastrum hyalinum*, 301–2
- Bacteriastrum* spp., 245, 279, 286
- Baffin Island: epilithic river flora, 52; epipelon of streams, 160
- Bahia Phosforente, Puerto Rico, bioluminescent phytoplankton of, 334
- Balanus balanoides*, 82, 85, 86
- Balanus* spp., 241
- Ballia callitricha*, 107
- Baltic Sea, eutrophication of, 531–2
- Bangia atropurpurea*, 61, 363
- fuscopurpurea*, 78, 79, 239, 240; growth patterns of, 451; life history, and environmental factors, 94, 95; phenology of reproductive structures, 69; in supratidal regions, 84; zonation of, in coastal regions, 82; zonation of, in intertidal regions, 87, 89, 90–1
- Bangia* spp., 60, 61, 92, 94, 95, 564
- Bangiophyceae, 563, 564
- Basycladia ramulosa*, 239
- Basycladia* spp., 239–40
- Basispora africana*, 93
- Batophora* spp., 158
- Batrachospermum boryanum*, 52
- moniliforme*, 56, 57, 61, 553
- Batrachospermum* spp., 57, 59, 61–2, 564
- Batrachospermum vagum*, 57, 553
- Beggiatoa* spp., 553
- benthos, 39–42; *see also* phytobenthos
- Berkleya rutilans*, 64, 175, 221
- Berkeleya* spp., 238
- Berthelinia chloris*, 395
- Biddulphia aurita*, 441–2, 444
- granulata*, 185
- rhombus*, 185, 186
- sinensis*, 383
- Biddulphia* spp., 279, 290, 385
- Biddulphia vesiculosa*, 185
- weisflogii*, 210
- Biddulphiales, 572
- Bifurcaria brassicaeformis*, 91
- bifurcata*, 79
- Bifurcaria* spp., 96, 384
- Bifurcariopsis* spp., 384
- Bikini atoll, 140, 141
- biochemical measurements, of biomass of phytoplankton, 251, 252–5
- biocoenosis, 31 & n
- bioluminescence, of phytoplankton, 332–4
- biomass, of algae, 151, 152, 249–55, 255–8
- biome, 41
- Black Sea, 17, 19, 385, 518, 520–1
- Blasia* spp., 235
- Blidingia marginata*, 79, 84
- Blidingia minima*, 78, 79, 84, 92, 239, 240
- blooms *see* water blooms
- blue-green algae, 171–4; *see also* individual species
- Boergeseniella fruticulosa*, 34
- bog pools, 233, 234, 277
- Bonnemaisonia asparagoides*, 101, 236
- hamifera*, 98, 101, 362
- Bonnemaisonia* spp., 226, 385
- Boodlea composita*, 149
- Boodlea* spp., 144
- Borgia* spp., 563
- Bornetella sphaerica*, 142
- Bornetella* spp., 368
- Borzia* spp., 51
- Bossea gardneri*, 104
- orbigniana*, 104
- Bossiella* spp., 415, 416
- Bostrychia montagnei*, 228
- rivularis*, 452
- scorpioides*, 79
- Bostrychia* spp., 84, 91, 93, 132, 133, 227
- Bostrychia tenella*, 138, 227
- Botrydiopsis arhiza*, 214
- Botrydiopsis* spp., 214, 296
- Botryocladia skottsbergii*, 142
- Botryocladia* spp., 93
- Botryococcus braunii*, 267, 273, 323, 247
- Botryococcus* spp., 277, 297, 303, 498
- Braarudosphaera bigelowi*, 502
- Brachiomonas submarina*, 291
- brackish waters, epilithic species of, 78, 84
- Bracteococcus* spp., 51, 193, 194, 199, 358
- Brongniartella byssoides*, 98, 99
- Brongniartella* spp., 101
- Bruniopsis mirabilis*, 506
- Bryopsidales, 567
- Bryopsidophyceae, 185; and calcium deposition to sediments, 493; on coral reefs, 145, 146, 150; effects of light intensity on, 110; phytogeography of, 370
- Bryopsis balbisana*, 376
- corymbosa*, 376
- hypnoides*, 69, 116
- indica*, 149
- plumosa*, 69, 98, 99, 116
- Bryopsis* spp., 88, 91, 93, 185
- Bryothamnion seaforthii*, 185, 376
- Bryozoa, epiphytic species, 229
- Bulbochaete* spp., 59, 60, 63, 216, 218, 233, 234, 235
- Bulbocoleon piliferum*, 221
- buoyancy *see* sinking and floating
- Cachonina niei*, 330, 331, 340
- Caecum nitidum*, 418
- Calanus finmarchius*, 404, 406
- helgolandicus*, 406
- Calanus* spp., 418, 420
- calcareous algae, 137, 140, 141
- calcareous rock faces, epilithic spp. on, 49
- calcium deposition to sediments, 490–5; calcareous bodies, 492; coccolith content of sediments, 493; from beach rock, 495; in lakes, 495; solubility of calcite, 493, 494
- calcium exchange, in algae of coral reefs, 151, 392, 393
- California coasts: biomass/density of plants/animals, 104–5; subtidal epilithic spp. of, 101, 102, 103, 104–5
- Calliarthron cheilosporioides*, 104
- Calliarthron* spp., 65
- Calliarthron yessoense*, 90–1
- Callithamnion arbuscula*, 79, 83
- byssoides*, 69, 452
- granulatum*, 35
- scopulorum*, 79
- tetragonum*, 35
- tetricum*, 79
- Callophyllis flabellulata*, 71
- marginifruca*, 104
- Callophyllis* spp., 97, 219
- Caloglossa lepieurii*, 227
- Caloglossa* spp., 227
- Caloneis amphibaena*, 268, 440
- fasciata*, 200, 359
- formosa*, 172
- silicula*, 166
- Caloneis* spp., 28, 30, 175, 193, 233
- Calothrix aeruginea*, 174
- crustacea*, 148, 149, 239, 416

- Calothrix aeruginosa* (cont.)
fusca, 59, 61
parietina, 48, 50, 56, 58, 59, 61
scopulorum, 79, 84, 87
Calothrix spp., 28, 30, 396, 553,
 563; colonisation of
 cleared areas, 121;
 epiphytic species, 227;
 effects of light intensity on,
 110; subsurface sands, 126,
 186; temperature
 tolerance of, 203
Calothrix thermalis, 204
Calyptrochilum spp., 232
Campanularia spp., 416
Campylodiscus hibernicus, 160
Campylodiscus spp., 150, 168,
 169, 177
Campylodiscus thuretii, 240
Camptylonema spp., 193, 563
 Caprellids, epiphytic spp., 229
Caposiphon fulvescens, 79
 carbon; and effects on
 eutrophication, 533;
 production by
 phytoplankton, 339
 carbon cycle, 476–9
 carbon dioxide: dissolved in
 water, 21–2; uptake of, by
 phytoplankton, 258–9
 carbon fixation rates: and
 depth-photosynthetic
 profiles of phytoplankton,
 342–5, 352, 356; diurnal
 effects on, 327, 328; and
 energy flow, 462–4, 468,
 469–73, 474–6; of
 phytoplankton, 274, 275,
 280, 282–3, 320–5; and
 role of nanoplankton,
 250, 255; of reef algae,
 150–1; and symbiotic
 production, 390, 395–6
Carpoglossum spp., 384
Carpophyllum spp., 103, 132, 384
Carteria spp., 209–10, 262, 263
 Caspian Sea, distribution of
 algal species, 385
Castagnea cylindrica, 222
irregularis, 222
Catenella opuntia, 227
repens, 79
Catenella spp., 227
Caulacanthus rayssiae, 35
ustulatus, 79, 91
Caulerpa cupressoides, 149
filiiformis, 363
mexicana, 475
prolifera, 475
racemosa, 149, 185, 418
septularioides, 158
Caulerpa spp., 41, 144, 368,
 370; on algal ridge of
 coral reefs, 138, 140, 145;
 carbon fixation values,
 471; epiphyte on
 mangroves, 227; and
 nutrient transference, 224;
 on stable sediments, 158;
 zonation of, in coastal
 regions, 93
Caulerpa verticillata, 158, 227,
 418
 Caulerpales, 567
Caulocystis spp., 384
 caves, bare rock surfaces of:
 epilithic spp. on, 49, 50,
 110
Cavicularia spp., 235
Centroceras clavulatum, 227
Centroceras spp., 91, 93, 132,
 133, 158
Cephaleuros spp., 213, 398
 Ceramiales, 565
Ceramium ciliatum, 35, 239
diaphanum, 36, 69
deslonchampsii, 79
fastigiatum, 69
gracillimum, 36, 149
rubrum: association table, 34;
 as epiphyte, 220, 221; and
 epiphytic fauna, 231; and
 endophytic algae, 236;
 growth patterns, 452;
 phenology of reproductive
 structures, 69; effects of
 temperature on
 respiration, 113; zonation
 of, in coastal regions, 83;
 zonation of, in subtidal
 regions, 98
shuttleworthianum, 79, 361
Ceramium spp., 131, 132, 140,
 149, 370; in coastal rock
 pools, 96; and effects of
 temperature on
 respiration, 112, 113
Ceramium strictum, 69
tenerrimum, 89, 239
tenuicorne, 78
tenuissimum, 36
echinotum, 35
Cerataulus smithii, 185
turgidus, 185, 186
Ceratium arcticum, 382
arietinum, 383
brachyceros, 247
carriense, 287, 382
cephalotum, 377–9
furca, 321, 381, 445, 551
fuscus, 284, 321, 334, 445
hirundinella, 256, 258, 267,
 302, 520
horridum, 445
lineatum, 443, 445
longipes, 321, 381, 445
lunula, 377–9
macroceros, 289, 381, 445
massiliense, 287
pentagonum, 284
Ceratium spp., 28, 29, 30, 245,
 246, 261, 263, 279, 287,
 291, 300, 339, 517; and
 bacterial symbiosis, 397;
 and fungal parasites, 399;
 growth patterns of, 437,
 438, 444; movement of,
 331, 332
Ceratium trichoceros, 287
tripos, 289, 377–9, 381, 445
Ceratocorys horrida, 287
Ceratoneis arcus, 53, 163, 164–5,
 218, 268
Ceratophyllum spp., 216
Cestodiscus spp., 506
Chaemaesiphon geitleri, 218
minus, 218
Chaetangium ornatum, 91
saccatum, 91
Chaetangium spp., 564
 Chaetocerales, 572
Chaetoceros affinis, 314
armatum, 295, 410
borealis, 289
bulbosus, 284
compressus, 440
costatus, 440
curvisetus, 443
danicus, 443
debilis, 283, 420, 441–2, 444
decipiens, 289, 443
densus, 289
dichaeta, 284
laciniosus, 443
lauder, 318
pseudocritinitus, 282
simplex, 280, 443
socialis, 283, 420
Chaetoceros spp., 29, 30, 245,
 279, 284, 286, 352, 385; in
 food web, 420; growth
 patterns of, 437, 438;
 primary productivity, 321;
 sinking rates of, 302, 303;
 and effect of water motion
 on, 10; vertical
 distribution in sediments,
 505
Chaetoceros teres, 443
Chaetomorpha aerea, 22, 450
antennina, 93
capillaris, 35, 239
linum, 450
melagonium, 98, 99, 100,
 106
Chaetomorpha spp., 83, 91, 93,
 101, 547
Chaetophora cornudamae, 61
elegans, 56
incrassata, 52, 63, 238
 Chaetophorales, 566
Chaetophora spp., 28, 30, 52,
 159, 495, 531
Chaetopteris plumosa, 101, 106
Chaetosphaeridium spp., 233
 chalcidony, epilithic spp. found
 on, 49, 51
 Chamaesiphonales, 563
Chamaesiphon confervicolus, 56
cylindricus, 59
incrassatus, 56, 218
polonicus, 48, 56, 553
polymorphus, 61
prescottii, 205
Chamaesiphon spp., 28, 30, 51–2,
 53, 54, 61–2, 218, 563
Champia lumbricalis, 91
parvula, 69, 149, 451
Champia spp., 93
Chara aculeolata, 156
aspera, 78, 156, 157
baltica, 156
braunii, 155, 156, 548
canescens, 156
contraria, 156
corallina, 157
cuspidata, 363
denudata, 158
filiiformis, 158
globularis, 156
hispida, 156
rudis, 156
Chara spp., 151, 155, 156, 168,
 169, 524–5
Chara strigosa, 156
tomentosa, 156
vulgaris, 156
zeylandica, 156
Characium limneticum, 273
Characium spp., 28, 30, 218,
 233, 549
Charotia actinocyclus, 284

- Charophyta, 155–8, 521, 495, 523, 524–5, 568
 chasmolithic algae, 51, 125
Cheilosporum spp., 138
Chelodina spp., 239
 chemical characteristics of the environment: dissolved gases, 19–22; dissolved salts, 13–18; mineral components of, 19; organic components of, 18–19; salinity of, 15–17
 chemocline, 26
Chilonema ocellatum, 220
Chilodon spp., 411
Chiloscyphus spp., 128
Chionaster bicornis, 208–9
nivalis, 208–9
Chironomus plumosus, 527n
Chlainomonas spp., 207
Chlamydomonas acidophila, 550
applanata, 549, 550
asymmetrica, 359
augustae, 359
bolyaiana, 208–9
foraminata, 359
globosa, 291, 549
gloeoepara, 359
intermedia, 359
moewussii, 290
nivalis, 207, 209
ovalis, 291
pseudintermedia, 359
reinhardi, 201
sanguinea, 208–9
Chlamydomonas spp., 28, 30, 243, 262, 263, 407, 549; aerial dispersal of, 359; energy flow, 465; epiphytes on planktonic algae, 228; effects of eutrophication, 532; herbicides, effects on, 200
 growth patterns, 440; in lakes, 59, 277; in mixed cultures, 318; in rivers, 268, 269; in snow and ice, 209, 210; of soils, 193, 194, 198, 199; as symbionts, 393; on tree bark, 213; and vitamin excretion, 341
Chlamydomonas subcaudata, 291
yellowstonensis, 208–9
Chlorella ellipsoidea, 214
minutissima, 359
pyrenoidosa, 309, 413
rugosa, 214
sorokiniana, 309
Chlorella spp., 48n, 359, 425, 532; in atmosphere, 358; in arctic lakes, 272; grazing of, 407; inhibition of other algae, 317; in lakes, 277; light adaptation of, 308; productivity of, 322; in rock pools, 295; in soils, 198, 199; as symbionts in animals, 388, 389, 390, 393–4; temperature adaptation of, 308, 309; on tree bark, 213, 214
Chlorella vulgaris, 198, 290, 359, 545
 Chlorellales, 566
Chlorormidium spp., 194, 198, 213
Chlorohydra viridissima, 388, 389, 394
Chlorobotrys polychloris, 234
Chlorochytrium spp., 42, 238
Chlorococcalean spp., 359
 Chlorococcales, 277, 396, 562–3, 566
Chlorococcum humicolum, 48, 198
macrostigmatum, 548
Chlorococcum spp., 200, 214, 318, 322, 358
Chlorococcus spp., 49
Chlorodesmus comosa, 138
fastigiata, 149
major, 149
Chlorogloea microcystoides, 48, 50, 61
Chlorogloea spp., 563
Chlorogonium elongatum, 549
Chloromonas spp., 194, 198
 Chlorophyceae, 79; aerial dispersal of, 359; carbon fixation rate, 323; as epizoon, 239; frequency of, on sub-aerial rocks, 48; in salt marshes, 174; in streams as epipelon, 161; in wet forests, 214; zonation of, in tropical intertidal regions, 89
 chlorophyll: chlorophyll *a* content of various waters, 465, 466–7, 468; annual trends of concentration, 422, 423, 458; and depth-photosynthesis profiles of phytoplankton, 345, 346–7, 348, 349, 350, 351, 352; diurnal variations, 327; and horizontal distribution of phytoplankton, 289, 290–1; and vertical distribution of phytoplankton, 250, 252, 253, 254–5, 258, 342–54; sedimentary, 496–7
 Chlorophyta, 18, 42, 255, 260, 358, 425, 493; classification of, 565–8; on coral reefs, 141, 145; in coastal rock pools, 96; colonisation of cleared areas, 121; on desert rocks, 51; dormant growth periods, 450; as epipellic flora in lakes, 165; epiphytic spp., 213, 226; environmental factors affecting sporulation of, 69; eutrophic waters, increase of, 529, 532; extracellular secretion, 317; and formation of ‘algal mat’, 191; and fungal parasites, 402; and fungal symbiosis, 396; in lakes, 278; in rivers, 267, 268; on sandy surfaces, 122; in soils, 193, 200; symbionts, 388, 389, 393; temperature tolerance of, 203; and palaeoecology, 498
 chloroplasts, symbiosis of, 395–6
Chlorosarcina spp., 193
 Chlorosarcinales, 566
Chlorosarcinopsis negerensis, 51
Chlorosarcinopsis spp., 51, 214
Chlorosphaera antarctica, 207, 209
Chlorotylum cataractum, 553
Chlyocladia verticillata, 221
Chnoospora implexa, 149
Chnoospora spp., 144
Chodatella brevispina, 209
Chodatia tetrallantoidea, 208–9
Chondria baileyana, 452
boryana, 35
capensis, 376
corphilia, 296
decipiens, 65
sedifolia, 452
tenuissima, 186, 452
Chondrus crispus, 397, 535; bacterial parasites of, 403; and endophytic bacteria, 238; growth patterns of, 451; effects of light on growth of, 113, 114; photosynthesis, effects of temperature on, 113; respiration, effects of temperature on, 112, 113; sporulation, effects of salinity and temperature on, 70, 71; standing crop measurements, 116; zonation of, in coastal regions, 83; zonation of, in intertidal regions, 86, 87; zonation of, in subtidal regions, 98, 99
ocellatus, 90–1
Chondrus spp., 110, 113, 114, 131, 417
Chondrus yendoii, 90–1
Chorda filum, 75, 221, 368, 449, 451
Chorda spp., 97, 130, 220–1, 400
 Chordaria spp., 89, 121
 Chordariales, 573
Chovanella spp., 524
 chromatic adaptation, 110–11
 chromatography, and estimation of photosynthetic pigments, 254–5
Chromophyton (Chromulina) rasanoffii, 296
 Chromulinales, 571
Chromulina ovalis, 549
rosanoffii, 47
Chromulina spp., 272, 273, 296
 Chroococaceae, 48
 Chroococcales spp., 61
Chroococcidiopsis spp., 51, 563
Chroococcus helveticus, 48
limneticus, 323, 532
minor, 205
ninutus, 48, 204, 280
Chroococcus spp., 61, 62, 168, 169, 425, 562; aerial species, 214; on bare rock surfaces in caves, 49, 50; on desert rocks, 51; as endopelon, 186; of subsurface sands, 126
Chroococcus tenax, 48
turgidus, 48, 50, 59, 205, 234
turicensis, 48
westii, 50
Chroomonas spp., 174, 175
Chrysocapsa spp., 402
Chrysochromulina parva, 273
pringsheimii, 502, 523

- Chrysochromulina* spp., 260, 280, 411
Chrysococcus diaphanus, 332
Chrysococcus spp., 273, 331
Chrysoikos skujajae, 273
 Chrysophyceae, 245, 323
 Chrysophyta, 18, 255, 260, 277, 308; classification of, 570–1; extracellular secretion of, 317; grazing of, 407
Chrysostephanosphaera spp., 396
Chthamalus stellatus, 82
 Chytrids, and parasitism of algae, 401, 402
 Chytridiomycetae, as algal parasites, 400
 Ciliata: grazing on microscopic algae, 408; and symbiotic algae, 393
 circadian variations *see* diurnal effects
 circulation, of waters, 8–12
 Clachan Sound, Argyll, Scotland, study of intertidal epilithic spp., 86–7
Cladophora albida, 239
 coelothrix, 35
 crystallins, 149
 dalmatica, 35
 flexuosa, 69
 fracta, 553
 glomerata, 52, 53, 78, 128, 218, 553, 558
 gracilis, 69, 450
 laetevirens, 35, 89
 refracta, 450
 rudolphiana, 450
 rupestris, 81, 82, 96, 98
 sericea, 101
Cladophora spp., 61–2, 135, 149, 185, 186, 481, 531; association table, 36; epiphytic algae on, 217, 218, 226; and epiphytic fauna, 229; as epizoon, 238; on flints in rivers, 54; growth of epiphytic diatoms on, 128; effect of insecticides on, 548; in lakes, 63; mat formation, 159; effect of wave action on, 88; as weeds, 557, 558
Cladophora trichotoma, 65
 Cladophorales, 568
Cladophoropsis membranacea, 89
Cladophoropsis spp., 142, 159
Cladosiphon occidentalis, 226
Cladostephus spongiosus, 83
 clams, razor, and grazing of microscopic algae, 410
 classification, of algal communities, 32–7, 43; *see also* Appendix
Clastidium setigerum, 48, 59
Clastidium spp., 563
Clathromorphum circumscriptum, 109, 110, 368
Clathromorphum spp., 371, 372
Clavator spp., 524–5
Clavularia hamra, 391
 Clear Lake, and nitrogen fixation of phytoplankton, 310–12
Climacosphenia spp., 380
Climacostomum spp., 393
 climax communities, 43–4
Closterium acutum, 234
 ehrenbergii, 531
 pronum, 234
Closterium spp., 28, 30, 168, 169, 233, 262, 263, 440
 coastal regions, epilithic species of, 63–110, 135; belts of algae *see* intertidal, subtidal and supratidal regions; silting, effects of, 63; spore production and colonisation of, 68–76; sporeling and crustose stage, 76–7; zonation of, 64–8, 101–3, 104–5, 106
 coastal regions: epilithon of *see* coastal regions, epilithic spp. of; epipelon of, 171–4, 178–9; standing crop of benthic algae, 116; pollution of, 550; in tropics, 144
 cobalt, and inhibition of photosynthesis, 338
Coccolithis spp., 51, 563
Coccolithis stagnina, 174
 coccoliths, 501–2
 Coccolithophorids, 18, 492, 493
Coccolithus huxleyi, 284, 287, 321, 340, 501
 pelagicus, 379, 502
Coccolithus spp., 279, 358
Coccomyxa dispar, 214
Coccomyxa spp., 49, 396
Coccomyxa thallosa, 48
Cocconeis ceticola, 241
 gautei, 241
 imperatrix, 241
 molesta, 240
 pediculus, 359, 516
 placentula, 42, 359, 439, 552, 557; in calcareous springs and streams, 56; as epiphyton, 218, 221; on glass slides, 128; on rocks in running water, 53, 55; stratigraphy of, 516
 scutellum, 221, 231–2, 240
Cocconeis spp., 28, 29, 30, 52, 122; epiphytic growth form, 215, 216, 217, 218, 226
Cocconeis wheeleri, 241
Cocophora spp., 384
 Coccospheres, 492
 Codialales, 567
Codiolum spp., 241
Codium adhaerens, 363
 arabicum, 142
 bursa, 236, 475
 edule, 142, 143
 fragile, 98, 122, 362–3, 395
 isthmocladium, 185
Codium spp., 110, 223, 224, 385, 396, 397
Codium taylori, 185
 vermilaria, 239
Coelospaerium spp., 563
Coelastrum spp., 425
Coelenterata, 230
 Coleochaetales, 566–7
Coeloseria pacifica, 90–1
Coelospaerium naegelianum, 267
Coelospaerium spp., 261, 263
Coenococcus planctonicus, 412
Colacium spp., 241
Coleochaete orbicularis, 128
 scutata, 216
Coleochaete spp., 215
Coleochlamys apoda, 296
Collema granosum, 396
 pulposum, 396
 colonisation, of epilithic species, 118–22
Colozoum spp., 394
Colpomenia peregrina, 221, 361
 sinuosa, 36, 104, 142
Colpomenia spp., 93
 communities, 31–45, 46; associations of, 33, 34–6, 38–42; of benthos, 39–42; climax communities, 43–4; gradient analysis, 37–8; maturity of, 44–5; niche, 44; physiognomic classification of, 32–3; phytosociological classification of, 33–7; of plankton, 39; seasonal changes in, 54, 55
Compsopogon spp., 52, 61–2, 548, 564
Conchocelis, spp., 241, 563n
Constantinea spp., 107
Constantinea subulifera, 107
 continuity, of algal species, 363–5
Convolvata convoluta, 388
 roscoffensis, 387, 388, 390
Convolvata spp., 387, 390
 Copepoda, 229, 238; grazing of microscopic algae, 408, 410
Corallina chilensis, 104
 gracilis, 104
 mediterranea, 36, 229
 officinalis, 239; in coastal rock pools, 96; growth patterns of, 451; standing crop measurements, 116; zonation of, in coastal regions, 82, 85; zonation of, in intertidal regions, 86; zonation of, in subtidal regions, 98, 99
 pilulifera, 90–1, 376
Corallina spp., 131, 153, 493, 564; in coastal rock pools, 96; algal associations with, 222, 226; sporeling development, 76, 77; tides, effects on, 65; zonation of, in coastal regions, 93; zonation of, in intertidal regions, 91; zonation of, subtidal regions, 97
 coralline red algae, 371, 372, 472
 coral reefs, free-living algal flora of, 136–54; algal plain, 146–8; algal ridge, 137–40; carbon dating of, 153; carbon fixation values, 472; core examination of, 150; cup reefs and ‘trottoir’, 153–4; distribution of species on, 139, 141, 142, frondose algae, 141–3; Great Barrier Reef system, 148–50; nitrogen fixation

- rates of communities, 145, 146; reef flat, 141–6; sub-divisions of, 138, 139; wave action, effects on, 138, 140
- corals; calcification of, 392; depth variation in photosynthesis, 392; grazing of macroscopic algae, 416; oxygen production, 390, 391; and symbiotic algae, 388, 389, 390
- Corethron criophilum*, 378
- Coriolis Force, 24, 25
- Corothon hystrix*, 289
- Corycaeus* spp., 238
- Corynebacterium* spp., and algal symbiosis, 397
- Corynomorpha* spp., 93
- Coscinodiscales, 572
- Coscinodiscus asteromphalus*, 244, 301, 421
- concinus*, 289, 302, 403
- curvatulus*, 505
- denarius*, 268
- excentricus*, 289, 344, 345
- gigas*, 506
- lewisianus*, 506
- lineatus*, 359
- marginatus*, 505, 506
- monicae*, 506
- nodulifer*, 506, 509, 512
- oculis-iridis*, 185, 506
- paleaceus*, 506
- platicus*, 506
- radiatus*, 289
- rudolfi*, 280
- Coscinodiscus* spp., 29, 30, 243, 279, 286, 317, 385, 488; in atmosphere, 358; and fungal parasitism, 401; grazing of, 406; primary productivity, 321
- Coscinodiscus stellaris*, 185
- subtilis*, 210
- vetustissimus*, 506
- Coscosira polychorda*, 344, 345
- Coscosira* spp., 279
- Cosmarium abbreviatum*, 433, 434
- bioculatum*, 323
- contractum*, 267, 401, 433, 434
- curcubita*, 234
- Cosmarium* spp., 168, 169, 277, 298, 300; and fungal parasites, 399, 402; effects of heavy metals on, 545; as metaphyton, 233
- Cosmarium sphagnicolum*, 234
- Costaria costata*, 90–1, 132, 369, 417
- counting methods, for biomass determination of phytoplankton, 249–51
- Craspedodiscus coscinodiscus*, 506
- critical depth, of phytoplankton growth, 314, 315, 316
- Cromwell Current (Pacific undercurrent), 9
- Crouania attenuata*, 34
- Crucigenia rectangularis*, 273
- Crucigenia* spp., 262, 263, 268, 269, 277
- Crustacea: epiphytic spp. on *Fucus*, 230; grazing on microscopic algae, 407
- crustose phase, of epilithic spp., 121
- Cryocystus brevispina*, 208–9
- cryophyton, 42
- cryoregulation *see* snow and ice
- Cryptomonas baltica*, 291
- erosa*, 256, 258, 425, 549
- ovata*, 166, 549
- salina*, 291
- schaudinii*, 393
- Cryptomonas* spp., 210, 258, 261, 263, 300, 346, 549, 550; in arctic lakes, 272, 274; grazing of, 411; intertidal sandy shores, 174; and parasitic viruses, 400
- Cryptonemia angustata*, 104
- Cryptonemiales, 564
- Cryptophyta, 255, 565
- Cryptopleura ramosa*, 100, 219, 220
- Cryptopleura* spp., 130, 131; algal associations of, 219; in Californian subtidal regions, 97, 100; spore attachment, 73; zonation by depth of subtidal regions, 97, 100
- Cryptopleura violacea*, 71, 72
- cultivation, of algae, 126
- Curdia gymnogongroides*, 97
- recivilzae*, 107
- current strength, in rivers, and effects on epilithic spp., 51–2
- Cutleriales, 573
- Cutleria multifida*, 101, 220
- Cutleria* spp., 224
- Cyanidium caldarium*, 203, 205
- Cyanidium* spp., 193, 197, 206
- Cyanochloronta, 562–3
- Cyanocyta korschikoffiana*, 387
- Cyanophora paradoxa*, 389
- Cyanophyceae, 79, 562; aerial dispersal, 359; association table, 36; in deserts, 196; carbon fixation rates, 323; as endopelon, 186; of the epipelon, 160; as epizoon, 239; on flints in rivers, 54; in lakes, 60, 266, 267; on sub-aerial rocks, 48
- Cyanophyta, 18, 21, 42, 51, 125, 183, 260, 358, 421, 425, 529; and bacterial parasites, 403; calcium deposition to sediments, 495; in calcareous springs, 55, 56; of coral reefs, 145, 150; on desert rocks, 51; as epipellic flora, 165, 174; and epiphytic spp., 213, 214, 226, 227; eutrophication, effects of, 532, 540; flotation of, 297, 303, 304, 305; and formation of stromatolites, 186–91; and fungal symbiosis, 396; in hot springs, 202–6; in lakes, 57–63, 274, 276, 277, 278, 280; in mountain streams, 52–3; and palaeoecology, 498; and parasitic viruses, 400; periodicity of, 447; in rivers, 268; in rock pools, 96; on rocks in running water, 52; rhythmic mobility of, 182; of sandy surfaces, 122; in soils, 193, 196, 197, 198, 199, 200, 201; of sub-aerial rocks, 47–51; of subsurface sands, 126; in supratidal regions, 84; symbiosis, 320, 387, 389
- Cyathea pubescens*, 214
- Cycas* spp., 235
- Cyclococcolithus leptoporus*, 379, 523
- cyclomorphosis, 421
- Cyclotella antiqua*, 515, 516
- bohanica*, 282
- comensis*, 257, 258, 518
- comta*, 282, 364, 578
- cryptica*, 317, 339, 353, 421
- glomerata*, 282
- kutzingiana*, 364, 509, 510, 518
- meneghimiana*, 359, 518; as epipelon in streams, 161; and nutrient levels, effects on growth, 336, 337, 339; primary productivity, 322, 323; in tropical lakes, 280
- michigiana*, 282
- nana*, 309, 353
- ocellata*, 518
- psudostelligera*, 268, 409, 532
- Cyclotella* spp., 28, 30, 261, 263, 277, 354, 358, 434; counting methods, 251; periodicity of, 448–9; in rivers, 267
- Cyclotella stelliger*, 282
- striata*, 268, 359
- Cylindrocapsales, 566
- Cylindrocystis brebissonii*, 48
- Cylindrocystis* spp., 193, 194, 198, 200, 234
- Cylindrospermum* spp., 199, 204, 563
- Cylindrotheca closterium*, 172, 174, 185, 210, 353
- gracilis*, 172
- signata*, 181
- Cymatiosphaera globulosa*, 520, 521
- Cymatopleura elliptica*, 167, 440
- solea*, 128, 160, 167, 440
- Cymatopleura* spp., 28, 30, 168, 169, 277
- Cymatosira* spp., 122
- Cymbella affinis*, 129, 218
- angustata*, 364
- cistula*, 129
- gracilis*, 167
- mexicana*, 129
- pusilla*, 172, 238
- sinuata*, 53, 359, 364
- Cymbella* spp., 28, 30, 52, 55, 122; and endophytic algae, 238; grown on glass slides, 128; as metaphyton, 233; pedunculate epiphyte, 216, 217; in tropical lakes, 278
- Cymbella turgida*, 129
- ventricosa*, 53, 63, 218, 359
- Cymodocea manitorum*, 116
- Cymodocea* spp., 138, 219
- Cymopolia* spp., 493
- Cystoclonium purpureum*, 82, 98
- Cystophora intermedia*, 97
- Cystophora* spp., 103, 384
- Cystophyllum* spp., 384

- Cystoseira abies-marina*, 475
baccata, 397
barbata, 186
fimbriata, 35, 475
mediterranea, 34
myriophylloides, 79
osmundacea, 65, 104
Cystoseira spp., 375, 376; in coastal rock pools, 96; distribution of, 384; epiphytic fauna, 229; grazing of, 414; light intensity, effects of 110; zonation of, in subtidal regions, 100, 102, 103
Cystoseira tamarisifolia, 397
 Cystoicretalia, 34
Cystoseiretum crinitae, 35
strictae, 34
Cystosphaera spp., 384
- Dactylococcus infusiorum*, 199
Dactyliosolen antarcticus, 284
Daphnia longispina, grazing of microscopic algae, 413
Daphnia spp., 406, 407, 411, 419, 465
Dasycladus spp., 493
Dasya pedicellata, 69, 452
Dasya spp., 36, 236
 Dasycladales, 567–8
 day length, effects on epilithic spp., 110
 Dead Sea, salinity of, 16
 Death Valley, California, endolithic spp. of, 125
Deflandrea spp., 520, 522
Delesseria sanguinea, 98, 99, 100, 219, 220
Delesseria spp., 97, 100, 112, 121, 131, 395
Dendropoma spp., 494
Denticula hustedtii, 506, 509
kamtschatica, 509
lauta, 506, 509
nicobarica, 506
semina, 505, 512
Denticula spp., 205, 278
Denticula subtilis, 172
tenuis, 160
 depth of soil, and distribution of soil algae, 198–9
Deflandrius spp., 502
 depth of water: and growth of epipellic spp., 177–9, 182–4; and algal metabolism, 108; and morphological variation, 109–10; and photosynthetic profiles of phytoplankton, 342–54; pigmentation of epilithic spp., 110; and zonation on coral reefs, 147, 148; zonation of subtidal epilithic spp., 97, 98, 99, 107–8
Dermatolithon irregularis, 222
pustulatum, 36
Dermatolithon spp., 36
Dermatophyton spp., 240
Dermocarpa spp., 28, 30
Deschampsia antarctica, 194
 deserts: dew, as source of moisture, 51; endolithic spp. of, 125; epilithic spp. on rock surfaces, 51; soil algae of, 193, 196–8
Desmarestia aculaeata, 98, 106, 397
anceps, 106
herbacea, 65
 Desmarestiales, 573
Desmarestia ligulata, 101, 397
menziesii, 106
Desmarestia spp., 102, 132, 133, 396
Desmarestia viridis, 98, 99, 451
 Desmidiales, 567
Desmidium spp., 277, 549
 desmids: and annual trends of growth, 422; and fungal parasites, 401; in lakes, 266, 267
Desmococcus vulgaris, 48, 214
Desmonema spp., 563
Desmonema wrangelii, 48
 desiccation, and effects on intertidal epilithic spp., 92–3
 detergents, 550; as source of eutrophication, 529–30
Detonula cystifera, 443
Detonula spp., 309
 detritoplankton, 46
 dew, as moisture source in deserts, 51
Diatomus sicilis, 409
Diatoma elongatum, 218, 359
hiemale, 53
vulgare, 53, 54, 63, 218, 268
 Diatometers, 269
 Diatoms, 42, 261, 263; aerial spp., 214; aerial dispersal of, 358, 359; association table, 36; and contribution to silica deposition, 484–90; as endophyton, 236, 238; as epipelon, 160–5, 165–7, 171–3, 176–9; as epiphyton, 221, 226; as epizoon, 238; at lake sites, 59; and palaeoecology *see* Diatoms, palaeoecology of; photosynthetic pigments of, 255; as metaphyton, 232, 233, 235; in rhythmic migration cycles, 164, 179–83; in rivers, 267–8; on rocks in running water, 52; on sandy surfaces, 122, 123, 160; in sea ice, 210; in soils, 193, 195; on sub-aerial rocks, 47, 49
 Diatoms, palaeoecology of, 498, 502–17; classification of, 512, 514, 571–2; pH spectra, 515, 517; in Quaternary lake sediments, 498–9; relative frequencies of, in cores, 516, 518; stratigraphy of, 514, 516; tolerance of, 512, 513, 514; vertical distribution in sediments, 504, 505
 Dichotomosiphonales, 567
Dichothrix compacta, 58
gypsophyla, 48, 58, 59, 61
orsiniiana, 48
Dichothrix spp., 60, 227, 563
Dictyocha fibula, 287
Dictyochloris spp., 199
Dictyoneuropsis reticulata, 369
Dictyoneuropsis spp., 102, 132, 133
Dictyoneurum californicum, 369
Dictyopteris australis, 142, 147
delicatula, 93
membranacea, 101, 108, 224, 397
plagiogramma, 142, 147
Dictyopteris spp., 97, 110, 145, 146, 147
Dictyopteris zonarioides, 104
 Dictyosiphonales, 573
Dictyosiphon foeniculaceus, 451
Dictyosphaeria cavernosa, 142
Dictyosphaeria spp., 140, 144
Dictyosphaeria versluysii, 142
Dictyosphaerium elegans, 532
pulchellum, 410–12
Dictyosphaerium spp., 262, 263, 268, 277, 402, 532
Dictyota acutiloba, 142
bartayresii, 149, 418
binghami, 104
crenulata, 142
dichotoma: egg release, relative to tidal cycle, 73–4; as epiphytes, 221, 224, 229, 231; light intensity on, 110; production rates, 475; zonation of, in subtidal regions, 100, 108
divaricata, 185, 418
fibula, 284
 Dictyotales, 573
Dictyota spp., 397, 490; on coral reefs, 140, 144, 145, 146, 147; nitrogen fixation on 150; photosynthetic rhythm of, 74; zonation of, in coastal regions, 93; zonation of, in subtidal regions, 97, 101
Dictyuris spp., 93
Didymosphenia geminatum, 52, 218
Didymosphenia spp., 61–2
Digenia simplex, 296
Dilophus fasciola, 34, 376
Dilsea carnososa, 397
integra, 106
Dimerogramma fulvum, 240
Dimerogramma spp., 122, 385
 Dinamoebales, 569
Dinobryon divergens, 267, 447, 449
sertularia, 323
Dinobryon spp., 28, 30, 245, 261, 263, 345, 382, 480; algal associations with, 228; in arctic lakes, 272, 273; in bogs, 277; as metaphyton, 233; perennation of, 435
 Dinoflagellates, 245; ‘cysts’, palaeoecology of, 517–21, 522; distribution of, 380–1; as symbionts, 388, 394
 Dinophyceae, 359
 Dinophysiales, 569
Dinophysis acuminata, 441, 445
acuta, 289, 331, 445
Dinophysis lenticula, 321
norwegica, 380, 381, 445
rotundata, 445
Dinophysis spp., 279, 287
 Dinophyta, 18, 255, 307, 498; classification of, 569;

- extracellular secretion, 317; as symbionts, 388, 389, 393
- Dinotrichales, 569
- Diplanthera wrightii*, 116
- Diploneis didyma*, 172
- occulta*, 304
- ovalis*, 166
- smithii*, 175, 268
- Diploneis* spp., 29, 30, 54, 150, 174, 175, 233
- Diploneis subcincta*, 175
- suborbicularis*, 240
- Diplosoma* spp., 388
- Discoaster* spp., 502
- dispersal, of algae, 357–63, 385; aerial transport, 358–60; by animals, 360; artificial dispersal, 360–1; current drift, 361–2; by direct flow of water, 360
- Dissodinium lunula*, 333
- Dissodinium* spp., 393
- Distephanus* spp., 490
- Distichlis spicata*, 172
- distribution, horizontal, of oceanic phytoplankton, 289, 290–1
- distribution, vertical, of phytoplankton, 250, 252, 253, 254–5, 258; diurnal migrations, 330–2
- Ditylum brightwellii*, 297, 340, 441
- Ditylum* spp., 279, 303, 338
- diurnal effects: and colonisation of algal spp., 162, 163; movements of epipellic spp., 178–83; on metabolism, movement and luminescence of phytoplankton, 325–34; of photosynthetic rates, 344, 345
- diversity, of species, 45
- Dohrnialla antillarum*, 376
- doubling times, of algae, 421
- Draparnaldia glomerata*, 553
- plumosa*, 553
- Draparnaldia* spp., 59
- Drudesnaya verticillata*, 101
- Dumontia incrassata*, 79, 98, 99, 236
- Dunaliella parva*, 413
- Dunaliella* spp., 17, 223, 291
- Dunaliella tertiolecta*, 293, 340, 353, 545
- viridis*, 293
- dune system, epilithic spp. of, 84
- Durviella* spp., 133
- Echinochara* spp., 524–5
- Echinodermata, 230
- Echinus* spp., 98
- Ecklonia cava*, 90–1
- muratii*, 376
- radiata*, 97, 103, 132
- ecotone, and different populations of phytoplankton, 284
- Ectocarpaceae, 361
- Ectocarpales, 77, 573
- Ectocarpus breviarticulatus*, 89, 118, 119
- confervoides*, 75, 95–6, 110, 118, 226, 239, 450
- fasciculatus*, 83, 220
- granulosus*, 104
- indicus*, 149, 238
- irregularis*, 149
- mitchellae*, 149
- siliculosus*, 70, 82, 94, 95, 96, 114, 115, 450; as an epiphyte, 220, 221, 222
- Ectocarpus* spp., 29, 30, 76, 88, 130; algal associations of, 226; in coastal rock pools, 96; on coral reefs, 138; as epizoon, 238; and nutrient transference, 223, 224; and effects of salinity on, 93
- Ectochaete* spp., 221
- Ectrogella* spp., 401
- eddy diffusion coefficient, 25n
- Egregia laevigata*, 101, 103, 117, 369, 545–6
- menziesii*, 65
- Egregia*, 132, 133; in subtidal regions, 102, 105; grazing of, 414, 416, 417
- Eichornia* spp., 216
- Eisenia arborea*, 103, 368, 369
- bicyclis*, 90–1
- desmarestioides*, 369
- masonii*, 369
- Eisenia* spp., 102, 105, 132, 133, 414
- Elachista fucicola*, 79, 82
- scutulata*, 79
- Elakatothrix gelatinosa*, 273
- Elakatothrix* spp., 262, 263, 345
- Elodea canadensis*, 216
- Elodea* spp., 127, 128
- Elphidium* spp., 393
- Elysia atroviridis*, 395
- Embergerella* spp., 524–5
- Emergococcus* spp., 296
- emersion, and effects on epilithic spp., 66, 72, 87
- Emiliana huxleyi*, 379, 435
- Encephalartos* spp., 235
- endobenthos, 42
- Endocladia muricata*, 65, 117, 118
- Endodinium chattonii*, 388
- endolithon, 42, 125–6, 135
- endopelon, 42, 155, 186
- endophyton, 42, 235–81, 242; see also symbiosis
- endosymbiosis see symbiosis
- endopsammon, 42, 126
- endozoon, 241
- English Channel, phytoplankton growth patterns, 435, 436
- energy flow, and productivity, 461–76, 483; carbon fixation rates of algal communities, 469–73, 474–6; photosynthetic efficiency and phytoplankton production, 464–8; theoretical maximum net photosynthesis, 463, 464
- Engraulis mordax*, 404
- Enhydrias* spp., 218
- Eniwetok Atoll: algal biomass of, 151, 152; algal spp. of ridge, 140; algal species of reef flat, 141, 145; calcification rate, 151; nitrogen fixation rates, 145–6
- Enteromorpha clathrata*, 148, 149, 450
- compressa*, 82, 89, 93, 94, 224, 239, 450
- flexuosa*, 138, 227
- intestinalis*, 69, 73, 93, 94, 450
- linza*, 69, 113, 450
- minima*, 69
- plumosa*, 450
- prolifera*, 174
- Emteromorpha* spp., 76, 77, 78, 130, 240; algal associations of, 219, 221, 222, 226; artificially cleared areas, colonisation of, 121; on coral reefs, 138, 149; dispersal of, on artificial substrata, 361; emersion and submersion, effects of, 66; and epiphytic fauna, 229; eutrophic conditions, increase of, 532; light intensity, effects on, 110; matforming rhizobenthos, 159; lava flows, colonisation of, 118, 119; oil pollution, effects of, 77; on rocks in running water, 52; salinity, effects of, 93; seasonal changes in intertidal zonation, 92; of subtidal regions, 78; spore attachment, 73, 76; swarmer release, 73; zonation by depth, of subtidal regions, 97; zoospore settlement, 74, 75
- Enteromorpha torta*, 174, 450
- Entocladia perforans*, 241
- Entocladia* spp., 221
- Entophysalis conferata*, 148
- deusta*, 79, 174, 239, 240; on coral reefs, 148, 149; and stromatolite formation, 189; zonation of, in coastal regions, 82, 84, 85, 93
- Entophysalis* spp., 175, 190, 563
- environment, physical and chemical characteristics, 7–26; chemical properties of water, 12–22; circulation of water, 8–12; solar radiation and temperature, 22–6
- Eochara* spp., 524
- epilithon, 41, 133–4; carbon fixation values, 471–2; chlorophyll *a* contents of water, 467; continuity of, 363; energy flow, 461; in freshwater habitat, 28, 30; on glass slides, sampling methods, 127–30; grazing of, 411; in marine habitat, 29, 30; phytogeography of, 368, 369; rhythmic phenomena of, 161–5; in subtidal regions, 104, 105, 106; in sand surfaces see rock and sand surfaces; in waterwork filter beds, 126
- Epilithon membranaceum*, 153
- epineuston, 39, 46, 296
- epipelon, 42, 155, 159–86, 211; annual growth trends of, 425, 426, 428, 440; carbon fixation values, 472–3; chlorophyll *a* content of

- epipelon (*cont.*)
 waters, 466–7;
 communities of, associated
 with sediment, 184–6;
 depth distribution of,
 177–9, 182–4; energy flow,
 461; grown on glass slides,
 128; in freshwater habitat,
 28, 30, 54; grazing of,
 411; in marine habitat, 29,
 30, 171–9, 183–4;
 photosynthetic rate, 185;
 in ponds and lakes, 165–7;
 rhythmic phenomena of,
 161–5, 168, 170, 171,
 179–83; of salt marshes,
 171–4; sampling methods,
 167–71; of sandy shores,
 174, 175; of springs and
 flowing water, 160–5;
 subtidal, 175–9
- epiphyton, 41, 213–32; and
 bacterial associations, 228;
 calcium deposition to
 sediments, 494; carbon
 fixation values, 473;
 chlorophyll *a* content of
 waters, 467; colonisation
 and distribution of, 231–2;
 and energy flow, 461; and
 epiphytic fauna, 229–31;
 epiplankton, 229; in
 freshwater habitat, 28, 30,
 216–19; grazing of, 410;
 growth forms of, 215; of
 mangrove swamps, 227–9;
 in marine habitat, 29, 30,
 219–27; nutrient
 transference, 223–6;
 sampling of, on glass
 slides, 127–30; of streams,
 rivers and lakes, 216–19
- epiplankton, 228
- epipsammon, 41, 122–5;
 chlorophyll *a* content of
 waters, 467; energy flow,
 461; in freshwater habitat,
 28, 30, 122; in marine
 habitat, 29, 30, 122, 123
- Epiphyxis* spp., 218, 233, 382
- Epithemiales, 572
- Epithemia muelleri*, 56
sorex, 128, 359
- Epithemia* spp., 183; adpressed
 epiphyte, 216, 226; as
 endophyton, 238; in
 freshwater core samples,
 515
- Epithemia turgida*, 129
zebra, 200
- epizoon, 41, 238–41
- Equisetum* spp., 216, 232, 233,
 234, 235
- Eremosphaera* spp., 296
- Eretmochelys* spp., 239
- Erythrocladia* spp., 221, 564
- Erythrotrichia carnea*, 114, 115,
 239
- Erythrotrichia* spp., 29, 30
- Erythrotrichia welwitschii*, 79
- Escherichia coli*, and algal
 symbiosis, 397
- estuaries: carbon fixation
 values, 470, 472;
 endopsammon of, 126;
 epipelon of, 171–3, 175;
 and eutrophication, 540;
 phytoplankton of, 271–2;
 pollution of, 545, 557
- Ethmodiscus* spp., 245, 303, 489,
 503
- Euastrum binale*, 234
- Euastrum* spp., 52, 168, 169, 233
- Eucampia balaustium*, 210
cornuta, 440
- Eucampia* spp., 29, 30, 279
- Eucampia zoodicus*, 284
- Euclidean* spp., 146
- Euclidean* spp., 117, 357n, 370
- Eucocconeis flexella*, 166
- Eucypris rivens*, 413
- Eudorina zosterata*, 226
- Eudorina californica*, 319
cylindrica, 319
elegans, 267, 319, 410, 412
illinoisensis, 319
- Eudorina* spp., 318, 402
- Euglena gracilis*, 542
obtusa, 181
mutabilis, 181, 200, 234, 359,
 549, 550
robertilami, 291
rostifera, 330
- Euglena* spp., 29, 30, 174, 332,
 549, 550, 553; in
 atmosphere, 358; as
 endozoon, 241; in
 estuaries, 173, 175; in
 rivers, 268; vertical
 migration rhythm, 471,
 178, 180, 181, 182
- Euglena viridis*, 397, 552, 545
- Euglenamorpha* spp., 241
- Euglenophyceae, 359
- Euglenophyta, 18, 165, 193,
 268, 568–9
- Eugomontia sacculata*, 239, 241
- Eunotia bactriana*, 167
diodon, 516
exigua, 234, 359, 546, 549
flexuosa, 516
- Eunotiales, 572
- Eunotia lunaris*, 359
pectinalis, 359
polyglyphis, 167
praerupta, 47
septentrionalis, 167
- Eunotia* spp., 49, 52, 53, 364; as
 epiphyton, 216, 217, 218,
 233; as epipelon in
 streams, 161; horizontal
 distribution on surface
 sediments, 510
- Eunotia tenella*, 52, 161, 195
- euphotic zone, 22–3, 313–16
- euplankton, 39, 46, 245
- Euplotes* spp., 393
- Eustigmatophyta, 570
- Euterpe globosa*, algal
 communities of, 213
- Euthora cristata*, 106
- Eutreptiales, 569
- Eutreptiella* spp., 210
- eutrophication, 526–41, 558;
 carbon in water, effects
 on, 533; detection of,
 540–1; detergents, 529–30;
 epipsammic flora in rivers,
 122; experimental, 533–4,
 536–8; glass slide
 technique as indication of,
 52, 53; nutrient removal,
 541–3; phytoplankton
 and, 266, 267, 268, 277;
 sewage effluent, 528,
 530–1
- Exuviella apora*, 441
- Ezo* spp., 400
- Falkenbergia rufolanosa*, 36, 362
- fauna, epiphytic, 229–31
- Fragaria fragum*, 391
- Favia* spp., 388–9
- Feldmannia lebelii*, 34
paradoxa, 34
- fertilisers, excess, and
 eutrophication, 528,
 533–4
- Festuca rubra*, 201
- field measurements, of epilithic
 algae, 115–22
- filter beds, of waterworks,
 endopsammon of, 126
- filtration, Millipore, and
 sampling of
 phytoplankton, 249
- Fischerella* spp., 563
- fish, parrot, epizoic algae on,
 238
- Flabellochara* spp., 524–5
- flints, epilithic spp. on, 54,
 55
- floating, of phytoplankton *see*
 sinking and floating
- Florideophyceae, 564
- flow rate, of rivers: and effects
 on epilithic spp., 51–2, 57;
 and growth patterns of
 algae, 453–4; and
 relationship with diatoms,
 268, 269, 270
- Fontinalis* spp., 127, 128
- food chain, 420
- Foraminifera, 393, 413, 491
- form resistance, of
 phytoplankton, 300–1
- Fostiella farinosa*, 226
farinosa, 239
lejolisii, 226, 451
- Fostiella* spp., 221
- fouling, 41–2
- Fragilaria capucina*, 63, 218, 282,
 516, 531
constricta, 167
construens, 160, 221, 359, 515
crotonensis, 267, 277, 282;
 competition, 430, 432;
 effects of eutrophication,
 532, 538; glass slide
 growth, 128; growth of,
 318; periodicity of, 430,
 432; stratigraphy of, 516
hungarica, 167
hyalina, 222
leptostauron, 160
- Fragilariales, 572
- Fragilaria linearis*, 210
pinnata, 160, 359, 516
polygonata, 167
- Fragilaria* spp., 28, 29, 30, 210,
 261, 263, 270, 345, 380; as
 aquatic epiphyton, 217;
 competition, 430, 432; in
 freshwater sandy surfaces,
 122, 123; seasonal changes
 of, in rivers, 54; as
 symbionts, 388
- Fragilaria sublinearis*, 211
vaucheriae, 129
virescens, 53, 128
- Fragilarietum virescens*, 47
- Fragilariopsis oceanica*, 210

- Fragilariopsis* spp., 284
Fragilariopsis sublinearis, 284
Fremyella spp., 563
Fremyella grisea, 149
 freshwater: benthic
 environment in, 39;
 carbon fixation rates,
 470–1, 472, 473;
 chlorophyll *a* content of,
 467; core samples, 514–15;
 carbon dioxide, dissolved,
 21–2; epipsammon of,
 122–5; epiphyton of,
 216–19; grazing of algae,
 407, 408, 409;
 palaeoecology of, 498,
 514; and parasitic fungi,
 401; phytogeography, of
 algal spp., 380–3, 385;
 phytoplanktonic spp. of,
 260, 261–2, 263–6;
 pollution of, 545, 548;
 rhizobenthos of, 155–8;
 sedimented organic
 remains, 495–8; symbiotic
 algae, 389; *see also* lakes,
 rivers and streams
Friedmannia israeliensis, 51
Frittschiella tuberosa, 202
 frondose algae, of coral reefs,
 141–3, 146
Frontonia spp., 393
Frustulia rhomboides, 59, 166,
 167, 509, 549
 saxonica, 234
Frustulia spp., 52, 61–2, 168,
 169, 214, 233, 268
Frustulia vulgaris, 126
Frustulietum saxonicae, 47
 Fucaaceae, 372, 373–4, 386
 Fucales, 383, 384
Fucus ceranoides, 373–4, 557
 distichus, 89, 111, 115, 117,
 118; distribution of, 373,
 374, 375
 edentatus, 87, 111
 furcatus, 65
 pinnatus, 367
 serratus, 79, 81, 372, 418;
 distribution of, 373–4,
 376; epiphytic fauna of,
 230, 231; growth rates of,
 88; sexual cell production
 of, 70; spore germination
 of, 72; submersion on, 92,
 93; temperature, effects
 on, 112; zonation of, in
 coastal regions, 83, 85;
 zonation of, in intertidal
 regions, 86, 88; zonation
 of, in subtidal regions, 98,
 99
Fucus spp., 41, 76, 130; carbon
 fixation values, 474; algal
 associations with, 219, 222,
 230; colonisation on
 cleared areas, 121; effects
 of depth on pigmentation
 of, 110; distribution of,
 384; development of, on
 different substrata, 87;
 sporelings, growth rate of,
 76; effects of temperature
 on, 108, 111–12; wave
 force, effects of, 87;
 zonation of, in intertidal
 regions, 87
Fucus spiralis, 79, 81, 418;
 distribution of, 372,
 373–4; growth patterns
 and rate of, 88, 451;
 submersion, effects of, 92,
 93; temperature, effects of,
 111; zonation of, in
 coastal regions, 82, 85;
 zonation of, in intertidal
 regions, 86, 92
vesiculosus, 79, 81, 117, 418;
 biomass, 117; distribution
 of, 272, 373–4; energy
 flow, 462; heavy metals,
 effects on, 545, 546;
 growth patterns of, 451;
 and intertidal regions, 78;
 89; salinity, effects on, 93;
 sexual cell production of,
 70; submersion, effects on,
 92; in subtidal region, 78;
 effects of temperature on,
 111–12, 113, 114, 115;
 thallus length–dichotomy
 relationship, 88; zonation
 of, in coastal regions, 82,
 85; zonation of, in
 intertidal regions, 86, 87,
 88
 viruoides, 79, 115, 373–4, 375
 fungi: as algal parasites, 399,
 400–2; and effect on
 growth patterns, 433
Furcellaria fastigiata, 78, 98, 186,
 403
Furcellaria spp., 130, 131, 235
Galaxaura spp., 138, 150, 564
Galaxaura squalida, 475
Gambusia affinis, 407
 gametangia, of epilithic spp.,
 94–6
 Gammarids, 229
Gammarus locusta, 416
 gases, dissolved in water, 19–22
Gastroclonium clavatum, 35
 ovatum, 96
Gastroclonium spp., 235
 Gastropoda, grazing on
 microscopic algae, 411,
 418
 Gelidiales, 563n
Gelidiella acerosa, 89, 140
 bornetii, 148, 149
Gelidiella spp., 144, 149, 564
Gelidiopsis intricata, 146, 149,
 376
Gelidium cartilagineum, 361
 coulteri, 104
 crinale, 35, 69, 229, 451
 glandulaefolium, 97
 latifolium, 34, 83, 239
 pristoides, 91
 purpurascens, 104
 pusillum, 138
 robustum, 71
 sesquipedale, 376
 spathulatum, 34
Gelidium spp., 93, 120, 121, 132,
 149, 235
Gelidium spinulosum, 79
Gemmelicystis imperfectum, 412
Gemmelicystis spp., 412
Geminella spp., 402
 geographical zones *see*
 phytogeography
Gephyrocapsa oceanica, 501
 Ghana, coastal, zonation of
 intertidal epilithic spp.,
 91–2, 93
Gibbula cineraria, 86, 416
Giffordia duchassaingiana, 89
 hincksiae, 220
 mitchellae, 222, 450
Gigartina acicularis, 36, 229
 agardhii, 65
 canaliculata, 65
 corymbifera, 65
 cristata, 65
 leptorhynchos, 65
 Gigartinales, 564–5
Gigartina papillata, 65, 118
 radula, 91
Gigartina spp., 130, 131, 132;
 grazing of, 414, 415; effect
 of sand burial on, 91;
 zonation of, 91, 107
Gigartina spinosa, 65
 stellata, 79, 121, 362; effects
 of temperature, salinity
 and light on, 70, 71, 113,
 114; zonation of, 83, 87
 striata, 91
 volans, 65
Giraudya spp., 221
Giraudya sphaelaroides, 222
 glass slides *see* slides
Glaucocystis nostochinearum,
 389 & n
Glaucocystis spp., 387
Glenodinium danicum, 338
Glenodinium spp., 174, 175
Gleotilopsis spp., 532
Gloeobotrys spp., 198
Gloeocapsa atrata, 48
 biformis, 50, 58
 compacta, 49, 50, 58
 dermochroa, 48
 itzigsohnii, 48
 fuscoc-lutea, 48
 gelatinosa, 49
 granosa, 323
 kützingiana, 48, 49, 50, 58
 nigrescens, 48
 sanguinea, 48, 49, 50, 58, 61
 shuttleworthiana, 48
Gloeocapsa spp., 55, 62, 186,
 563; on desert rocks, 51,
 125; in lakes, 61, 62; on
 sub-aerial rocks, 47, 48;
 on trees, 214
Gloeochrysis turfosa, 549
Gloeocystis spp., 49, 277
Gloeocystis vesiculosa, 199, 234
 Gloeodinales, 569
Gloeotheca confluens, 58
 ruprestis, 50
Gloeothecae spp., 214
Gloeotila protogenita, 359
Gloeotrichia echinulata, 128, 304,
 435
Gloeotrichia spp., 245, 277, 309,
 563
Glotopeltis complanata, 90–1
 furcata, 65, 90–1
Glotopeltis tenax, 90–1
Glotosiphonia capillaris, 397
Golenkinia spp., 262, 263, 268
Gomontia polyrhiza, 241
Gomphonema acuminatum, 128,
 359
 angustatum, 53, 218, 359
 constrictum, 359
 eviense, 129
 exigum, 210

- Gomphonema* (cont.)
intricatum, 160, 218
longipes, 218
olivaceum, 54, 63, 128, 218
parvulum, 53, 195, 218, 359, 552, 557
Gomphonema spp., 28, 30, 205, 268, 411; epiphytic growth form, 215, 216, 217, 218
Gomphosphaeria lacustris, 449
Gomphosphaeria spp., 236, 237, 298, 563
Gonatozygon spp., 233
Gongrosira incrustans, 56
Gongrosira spp., 61–2, 194
Goniastrea spp., 138, 388–9, 392
Goniolithon soluble, 153
strictum, 158
 Goniotrichales, 564
Gonium pectorale, 319
Gonium spp., 262, 263, 268
Gonyaulax catenella, 281
digitale, 289, 334, 445, 450, 520
excavata, 334
polyedra, 330, 331, 334, 340, 341, 519
Gonyaulax spp., 279, 280, 404, 413, 517; production of saxitoxin, 307; ‘red tides’, 307
Gonyaulax spinifera, 334
tamarensis, 281, 381
Gonyostomum spp., 550
Gossleriella spp., 353
Gossleriella tropica, 287
Gracilaria eucheumioides, 138
folifera, 69, 186
Gracilaria spp., 93
Gracilaria verrucosa, 69, 116, 296, 451
Gracilaropsis spp., 73, 104
 gradient analysis, of communities, 37–8
Grammatophora gibberula, 240
Grammatophora spp., 29, 30, 385
 grave stones, epilithic spp. on, 49
 grazing, 398, 403–20; annual cycles of phyto- and zooplankton, 407, 408, 409; and effects on coral algae, 146; grazing webs, 418–19; on macroscopic algae, 415–19; on microscopic algae, 403–14; on toxic algae, 413–15
 Great Barrier Reef, 148–50; endosammon of, 126
 Great Lakes, eutrophication of, 526, 527, 534, 535
 Great Salt Lake, Utah, salinity of, 16
 green snow, 209–10
Griffithsia globulifera, 452
opuntioides, 376
Griffithsia spp., 158, 395
Griffithsia tenuis, 149
Grinnellia americana, 69, 452
Groenlandiella nivalis, 208–9
 Guinea, Gulf of, distribution of algae in, 375–6
 Gulf Stream, 8, 9, 10
Gunnera spp., 235
 Gymnodiniales, 569
Gymnodinium abbreviatum, 289
aeruginosum, 166
arcticum, 321
breve, 307
microadriaticum, 388
Gymnodinium spp., 261, 263, 279, 307, 359, 413; in arctic lakes, 272; and bacterial symbiosis, 397; as metaphyton, 233; primary productivity, 321; as symbionts, 388, 393
Gymnodinium splendens, 404
uberimum, 273
Gymnogongrus spp., 65, 91
 gymnosperms: algal spp. associated with, 213; and endophytic algae, 235
Gymnothamnion elegans, 35
Gyrodinium dorsum, 331
fulvum, 338
Gyrogona spp., 524–5
 gyrogonites, 521, 523; evolutionary trends of, 524–5
Gyrosigma acuminatum, 170
arcticum, 241
attenuation, 167, 515
balticum, 175
fasciola, 175
Gyrosigma spp., 29, 30, 128, 164
Gyrosigma spenceri, 175, 181
tenuissimum, 175
wansbeckii, 172
 habitats, 27–31, 45–6
Haematococcus pluvialis, 48, 295, 542
Halarachnion ligulatum, 98, 99, 100, 101
Halarachnion spp., 97, 101
Halichondria panicea, 83
Halidryis siliquosa, 86, 98, 231, 397
Halidryis spp., 72, 96, 97, 103, 130, 384
Halimeda cylindracea, 149
discoidea, 142, 149, 376
macroloba, 149
opuntia, 138, 149, 158, 186
Halimeda spp., 41; calcium deposition to sediments, 493, 494; calcium exchange, 151; on coral reefs, 138, 141, 145, 146, 147, 150, 153; phytogeography of, 370; rhizoidal systems of, 158
Halimeda tuna, 108, 149, 376
Haliotis corrugata, 414
fulgens, 414
rufescens, 414
Haliotis spp., 545–6
Halodule spp., 219, 222
Halopitys pinastroides, 186
Halopteris scoparia, 35, 229, 475
Halopteris spp., 97, 475
Halosaccicolax spp., 398
Halosaccion glandiforme, 65, 89
ramentaceum, 103
Halosaccion spp., 132
Halosphaera spp., 260, 279, 297, 302
Halymenia duchassaingii, 376
Halymenia spp., 93, 147
Hantzschia amphioxys, 192, 193, 195, 200, 202, 214, 215, 359
Hantzschia spp., 29, 30, 175, 181, 193, 194, 200, 214
Hantzschia virgata, 126, 173, 178–9, 180, 181
Hapalosiphon intricatus, 49, 50
Hapalosiphon spp., 61–2, 193, 214, 563
Haplochromis nigripinnis, 407
 Haptobenthos, 41–2
 Hardy continuous plankton recorder, 248–9, 265–6
 Harmattan winds, and aerial dispersal of algae, 358, 360
Harrisichara spp., 524–5
Harveyella spp., 398, 564
 Hawaii, 151; carbon fixation rates, 472; colonisation of epilithic spp., 118, 119, 120; dispersal of algae on artificial substrata, 300; reefs, 145, 146–7; seasonal changes in biomass of frondose algae, 143; storm waves, effects on algal growth, 453
Hecatonema spp., 226
Hedophyllum sessile, 65, 89, 369, 417
Helminthocladia hudsonii, 367
Helminthocladia spp., 564
Hemidiscus cuneiformis, 287, 506
karstenii, 508, 511
Hemiselmis virescens, 291, 293, 294
 herbicides, effect on soil algae, 200
Hermacina bifida, 395
smithi, 395
 Herpobenthos, 42
Herponema valiantei, 34
velutinum, 79
Herposiphonia pygmaea, 104
Herposiphonia spp., 93, 147
Herposiphonia tenella, 35, 145
Hesperophycus harveyanus, 373–4
Hesperophycus spp., 384
Heteraulacus polyedricum, 287
Heterocentrotus trigonarius, 239
Heterochordaria abientina, 90–1
 heterocysts, and nitrogen fixation, 310
Heteroderma spp., 368
Heterosiphonia plumosa, 235
Heterosiphonia spp., 97
Heterostegina depressa, 393
Heterostegina spp., 388
Heterothrix spp., 194
 heterotrophic algae, 27n
Hildenbrandia occidentalis, 65
prototypus, 78, 88
rivularis, 553
Hildenbrandia spp., 51–2, 53, 110, 131
Himanthalia elongata, 72, 79, 83, 85, 86, 96, 224, 373–4
Himanthalia spp., 75, 97, 130, 241, 384
 Himanthaliaceae, 372, 373–4
Himantothallus grandifolius, 357n
Histonius spp., 389
Hizikia fusiforme, 90–1
Hizikia spp., 384
Holocanthus bermudensis, 418
Holopedium geminata, 166
Holopedium spp., 29, 30, 168, 169, 176, 563

- Homoeothrix caespitosa*, 56
crustacea, 54, 56
juliana, 56
Homoeothrix spp., 61–2
Homoeothrix varians, 56
 horizontal distribution *see*
 distribution, horizontal
Hormidium rivulare, 549
Hormidium spp., 48, 51, 193,
 200, 214
Hormidium subtile, 57, 198, 209
Hormosira banksii, 38, 91
Hormosira spp., 91, 132, 133
Hormothonema spp., 563
Hormotila micigena, 48
 hot springs, algae of, 155,
 202–6, 212, 467, 473
 humic acid, and effect on
 phytoplankton, 280, 281
Hyalella spp., 411–13
Hyalococcus spp., 396
Hyalodiscus scoticus, 240
Hyalotheca mucosa, 267
Hyalotheca spp., 277, 322
Hydra spp., 389
Hydroclathrus clathratus, 89, 149
Hydroclathrus spp., 144
Hydrococcus caesatii, 56
Hydrococcus spp., 563
Hydrocoleum lyngbyaceum, 239
Hydrocoleus spp., 53, 186, 563
Hydrocoryne spp., 186, 563
Hydrocotyle spp., 216
Hydrodictyon spp., 557
Hydrosera spp., 380
Hydrodictyon reticulatum, 20
Hydrodictyon spp., 63, 186
Hydrolithon breviclavium, 140,
 147, 148
reinboldii, 140, 141, 147, 148
Hydrolithon spp., 140, 141
Hydrosera triquetra, 361
Hydrurus foetidus, 52, 53, 57
Hydrurus spp., 57, 61–2, 400
Hyella caespitosa, 126, 241
Hyella spp., 563
Hymenomonas spp., 29, 30, 282,
 400
Hypnea cervicornis, 142
musciiformis, 91–2, 227, 451
Hypnea spp., 91, 92, 93, 133,
 134, 149
Hypoglossum spp., 149
 hypolithic algae, 51
 hyponeuston, 39, 46, 296
 ice, 26, 155, 206 11, 212; as an
 aquatic habitat, 30;
 cryophyton communities,
 42; epilithic spp., 88–9;
 effect on phytoplankton,
 273 6, 282 6; *see also* snow
 and ice
 Indian Ocean: carbon fixation
 values, 469, 472;
 distribution of Fucales,
 384; phytoplankton of,
 287–8; primary
 production, 474
 inhibitors, production of, 318,
 319, 320
 insecticides, as pollutants, 548
 intertidal benthic communities,
 40 & n, 41; carbon
 fixation values, 472;
 epipelon of, 171–4, 175;
 epilithic spp., of, 67, 78,
 79, 84–96; fungal
 parasites, 402;
 eutrophication, effects of,
 532; effects of submersion
 on, 66, 79
Ircinia spp., 389
Iridaea capensis, 91, 376
flaccida, 117, 118
obovata, 107
Iridophycus coriaceum, 65
flaccidum, 65
splendens, 65
Iridophycus spp., 132
Ishige okamurai, 90–1
simicola, 90–1
 island mass effect, 281
Isoecystis pallida, 204
Isoecystis spp., 563
Isthmia enervis, 214

Jania adherens, 149
corniculata, 35
rubens, 34, 229
Jania spp., 91, 93, 144, 146,
 149, 150, 153, 475
 Japan, zonation of intertidal
 epilithic spp., 89, 90–1

Kallymenia schmitzii, 106
Kallymenia spp., 103, 130, 131
Kellicottia spp., 411
Kephyrion spp., 273
Keratella cochlearis, 411
Kirchneriella spp., 262, 263, 277
Kirchneriella subsolitaria, 540
Koliella alpina, 208 9
chodatii, 208 9
helvetica, 208 9
hernina, 208 9
nivalis, 208 9
Koliella spp., 210

Koliella tatrae, 208–9
viretii, 208–9
Krematochloris spp., 296
Krematochlamys conus, 296
Krematochrysis spp., 296
 Kuro Shio Current, 8
Kylinia spp., 564
Kyrtuthrix maculans, 148
Kyrtuthrix spp., 563

Lacuna vineta, 416
Lagerheimia spp., 262, 263,
 268
Lagenisma spp., 401
 lagoons, 116, 144, 145–6
Laguncularis spp., 227
Lagynion spp., 233
 Lake District, England: annual
 growthcycles in, 426–32,
 433–5, 453–4, 458–9;
 continuity of species, 364,
 365; distribution of
 epipellic spp. on sediments,
 166, 167; and fungal
 parasites, 401, 402, 413;
 grazing of
 microscopicalgae, 410,
 412; eutrophication,
 effects of, 535–6, 541;
 perennation, 435, 436;
 phytoplankton of, 276,
 277; vitamin B₁₂
 concentration in, 341
 Lake Ontario: eutrophication
 of, 512, 513; seasonal
 changes of biomass, 422;
 succession of different
 species, 425–6
 lakes: annual cycles of algae in,
 407, 408, 426–32, 433–5,
 438, 445 7, 453 6; and
 algal contribution to
 sediments *see* sediments;
 activity coefficients of
 phytoplankton, 256–7,
 258; carbon fixation rates,
 470–1; chemical
 composition of, 13, 14;
 chlorophyll *a* contents,
 466; depth-photosynthesis
 profiles of phytoplankton,
 343, 344, 346 7, 349, 353;
 diatom stratigraphy, 515,
 516; and dispersal of
 algae, 360; diurnal effects
 on phytoplankton
 production, 25, 325–6,
 327; endopsammon of,
 126; epilithic flora of,
 57–63, 130; epipelon of,
 165–7; epiphyton of,
 216–19; and eutrophic
 conditions, 529, 531, 532,
 533–4, 535–6, 537, 540;
 mixed depth, 316;
 nitrogen fixation in, 310;
 metaphytic spp., 233;
 nutrient removal, 543;
 palaeoecology of, 498, 500,
 509, 510, 511, 512, 513,
 514, 517, 518; and
 parasitic fungi, 401, 402;
 phosphorus and nitrogen
 in, 336; photorespiration of
 plankton, 259; primary
 production of
 phytoplankton, 322, 323;
 phytoplankton of, 263–4,
 266, 267, 268, 272–80,
 282; saline, 13, 15;
 stratification in, 26;
 seasonal changes of
 biomass, 422–7; water
 blooms in, 305–7; water
 circulation in, 8; *see also*
 eutrophication
Laminaria agardhii, 116
andersonii, 65
complanata, 367, 417
dentigera, 367
digitata, 72, 80, 81, 397; algal
 associations with, 219;
 annual succession, 452–3;
 distribution of, 372; heavy
 metals, effects on, 545;
 zonation of, in coastal
 regions, 83, 85; zonation
 of in intertidal regions,
 86; zonation of, in subtidal
 regions, 97, 98, 99, 101
ephemera, 367, 369
farlowii, 102, 367, 369
groenlandica, 367, 369, 417
hyperborea, 372; age of, 117;
 algal associations with,
 219; growth patterns of,
 452; effect of heavy metals
 on, 545; effect of
 insecticides on, 548;
 nature of host surface,
 222; effects of temperature
 and light on metabolism
 of, 109; survival of
 gametophytes, 75, 76;
 sporangia and spore
 production, 70, 75; as test
 organism for pollution,
 550; zonation of, in

- Laminaria agardhii* (cont.)
 subtidal regions, 97, 98, 99, 101
longicruris, 103, 385
longipes, 367, 368
nigripes, 106
ochroleuca, 100, 107, 109, 464–5
rodriguezii, 107
saccharina, 367, 369, 397;
 algal associations with, 219; grazing of, 417;
 effects of pollution on, 544, 545, 550, 551; spore
 production, 75; effects of
 submersion-emersion on,
 92; zonation of, in
 intertidal regions, 86;
 zonation of, in subtidal
 regions, 97, 98, 99, 101
schinzii, 376
setchelli, 367, 369
sinclairii, 65, 89, 367, 369
solidangula, 106
Laminaria spp., 130, 397; and
 algae associated with, 219,
 220; biomass, 117;
 distribution of, 367, 368, 369,
 385; carbon fixation
 values, 471; cultivation of,
 on concrete blocks, 126;
 energy flow, 462; grazing
 of, 414, 416; phenology of
 reproductive structures,
 68; spore settlement, 75;
 effects of temperature on,
 108, 109; translocation of
 photosynthate, 91;
 zonation of, in intertidal
 regions, 90–1; zonation of,
 in subtidal regions, 98,
 100, 102, 105
Laminaria yezoensis, 367
 Laminariales, 573
Laminariocolax tomentosoides, 83,
 220
Lamprothamnium papulosum, 156
Lamprothamnium spp., 524–5
Laurencia annulata, 440
Laurencia crispa, 65
flexilis, 149
intermedia, 376
intricata, 159
obtusata, 34, 149, 227
pacifica, 65, 395
papillosa, 89, 229
perforata, 149
pinnatifida, 34, 83, 86, 397
Laurencia spp., 132, 133, 146,
 149; in coastal rock pools,
 95; and endophytic algae,
 235; zonation of, in
 intertidal regions, 91, 93;
 in subtidal regions, 104
 lava flows, colonisation of
 epilithic algae on, 118, 119
 Lead, effects of, as a pollutant,
 545, 546
Leathesia difformis, 65, 451
Leathesia spp., 91
Lemanea annulata, 553
fluviatilis, 52, 53
Lemanea spp., 51, 52, 61–2,
 564
Lemma spp., 216, 217, 218, 238
 lentic environment, 30
Lepocinclis ovum, 549
Lepocinclis spp., 550
Leptocylindrus danicus, 441
Leptocylindricus spp., 302, 482
Leptogium lichenoides, 396
Leptophyton laeve, 368
Leptomitus spp., 531
Leptosomia simplex, 107
 Lessoniaceae, 368
Lessoniopsis littoralis, 65, 369
Lethocerus uhleri, 360
Leucothrix mucor, 396
Liagora spp., 150
 lichens, 396
Lichina confinis, 86
Licmophora abbreviata, 221
communis, 240
dalmatica, 240
ehrenbergii, 221, 240
flabellata, 240
gracilis, 118, 240
hyalina, 388
juergensii, 240
lyngba, 241
oedipus, 221
Licmophora spp., 29, 30, 36, 226,
 246, 385
Liebmannia leveillei, 35
 light adaptation, of
 phytoplankton, 307–8
 light intensity: 57; chromatic
 adaptation, 110–11; effects
 on epilithic species, 57,
 94–6, 110–11; and effects
 on growth patterns,
 455–7; and effects on
 metabolism, 109, 110; and
 effects on phytoplankton,
 344, 351, 352, 353, 354;
 and effects on rhythmic
 motility of epipelton,
 179–83; and effects on
 sporulation, 70, 94–6; see
 also day length
 limestone, destructive nature of
 endolithon, 125
Limnaea spp., grazing of
 microscopic algae, 411
Lineus longissimus, 416
Lingulodinium machaeophorum,
 519, 520, 521
Lithoderma adriaticum, 34
extensum, 106
faticens, 78
Lithoderma spp., 51–2, 121, 131
Lithodesmium rosenwringii, 77
subextensum, 77
undulatum, 338
Lithophyllum congestum, 140,
 153n
incrustans, 34, 239
kotschyarum, 139, 140
moluccense, 140
orbiculatum, 368
simulans, 149
Lithophyllum spp., 144, 153, 494
Lithophyllum tortuosum, 79
yessoense, 400
Lithoporella spp., 153, 371, 372
 ‘Lithothamnia’, 149, 150; as
 ‘maerl’ in subtidal
 regions, 101; in rock pools,
 96; zonation of, in coastal
 regions, 82, 85, 93
Lithothamnium calcareum, 101
coralloides, 101
glaciale, 107
sejunctum, 153
sonderi, 368
Lithothamnium spp., 106, 137,
 144
Lithothrix aspergillum, 104
Lithothrix spp., 153, 493
Litosiphon filiforme, 106
laminariae, 220, 222
pusillus, 449, 221
Littorella spp., 216
Littorina littoralis, 82, 86,
 241
obtusata, 86
saxatilis, 82, 86
Littorina spp., 417
 liverwort thalli, algal
 associations of, 214, 235
 living substrata, algae of,
 213–42; endophyton,
 235–8, 242; endozoon,
 241; epiphyton, 213–32,
 242; epizoon, 238–41;
 metaphyton, 232–5
Lobelia lakes, 155, 156
Lolium perenne, 201
Lomentaria articulata, 83
baileyana, 452
clavellosa, 36, 98, 99, 100
orcadensis, 98, 99, 100
 Long Island Sound, growth
 patterns of phytoplankton,
 440, 443
Lophosiphonia septabunda, 93
villum, 65
 lotic environment, 30–1
Loxodes magnus, 411
Lyngbya aeuergineo-coerulea, 56
aestuarii, 172, 189, 239, 240
agardhii, 236
confervoides, 79
gracilis, 236
lauterbornii, 532
limnetica, 271
lutea, 82, 85, 239, 240
majuscula, 79, 149
sempilena, 79, 82, 149
Lyngbya spp., 125, 147, 186,
 400, 418, 531, 563; on
 beach and estuarine
 sediments, 175; colonised
 by diatoms, 225, 226; on
 desert rocks, 61;
 herbicides, effect of, 200;
 in lakes, 277, 278; mat
 formation, 159, 191; on
 ricks in running water, 52;
 on trees, 214
Lytechinus spp., 414, 415
Macrocystis angustifolia, 102, 370
integrifolia, 368, 369, 370
pyrifera, 38, 220, 369;
 distribution of, 370; in
 subtidal regions, 101, 102,
 103, 104–5; effects of
 water depth on, 107
Macrocystis spp., 132, 133;
 bacterial parasites, 403;
 carbon fixation values,
 471, 474; current drift
 dispersal of, 361;
 distribution of, 370; and
 epiphytic fauna, 229;
 frond growth rates, 103;
 grazing on, 414, 415, 416;
 growth of, 453; spore
 production, 68; in subtidal
 regions, 101, 102, 103,
 104–5
 macrophytic marine algae,
 phytogeography of,
 365–76
 macro-plankton, 260

- macroscopic algae: energy flow, 461; grazing on, 415–19; growth patterns of, 449; production rates, 475
- Macrozamia* spp., 235
- Maedleriella* spp., 524–5
- Mallomonas acaroides*, 421
- caudata*, 532
- elongatum*, 532
- intermedia*, 532
- pseudocoronata*, 532
- pumila*, 273, 532
- Mallomonas* spp., 28, 30, 261, 263, 308, 382, 435; in arctic lakes, 272; in bogs, 277; carbon fixation, 323; as metaphyton, 233; movement of, 331; stratification of, 348
- manganese, depletion of, and auxospore formation, 338
- mangrove swamps, 280; epilithic spp. of, 91; epiphyton of, 227–9
- Manicina areolata*, 389
- marble, epilithic spp., on, 49
- Marginellopsis serrei*, 418
- Marginopora vertebralis*, 393
- Marginosporum crassissima*, 90–1
- marine habitat *see* seawater
- Mastigocladus laminosus*, 57, 202–3, 204
- paludosus*, 199
- Mastigocladus* spp., 563
- Mastigocoleus* spp., 175, 563
- Mastigocoleus testarum*, 126, 239, 241
- Mastogloia pusilla*, 222
- smithii*, 167, 385, 516
- Mastogloia* spp., 29, 30, 168, 169, 223, 233
- maturity of communities, assessment of, 44–5
- Mediterranean: annual biomass trends, 422; distribution of algae, 375; effects of depth of epipellic spp., 177–9; phytoplankton of, 287; 'trottoir', 153; zonation of subtidal epilithic spp., 100
- Melanthalia* spp., 97, 103
- Melobesia farinosa*, 36, 222
- lejoilii*, 222
- mediocris*, 104
- membranacea*, 226
- minutula*, 221
- Melobesiaceae, 36
- Melobesioideae, 148
- Melosira arenaria*, 53, 518
- distans*, 15, 268, 277, 364, 509, 510
- granulata*, 15, 267, 277, 282, 358, 516
- islandica*, 277, 282, 518
- italica*, 267, 277, 359, 364; frequency of, in sediment cores, 518, 519; glass slides, sampling on, 128; perennation of, 435, 436; and tolerance of low light conditions, 457
- moniliformis*, 185
- nummuloides*, 109
- roeseana*, 48, 49, 214, 215
- Melosira* spp., 28, 30, 49, 61–2, 245, 250, 261, 263, 345, 425; dispersal of, 358, 360; periodicity of, 445, 446, 448–9; sinking of, 297, 300; in soil, 192; in tropical lakes, 278
- Melosira sphaerica*, 284
- sulcata*, 186
- varians*, 53, 128
- Melosirales, 572
- Melosiretum roeseanae*, 47
- Membranipora membranacea*, 416
- Membranipora* spp., 229
- Membranoptera alata*, 83, 98, 99, 106, 219
- denticula*, 106
- Membranoptera* spp., 97, 101
- Mentha* spp., 216
- Meridion circulare*, 53, 56, 57, 553
- Meridion* spp., 61–2
- Merismopedia glauca*, 323
- Merismopedia* spp., 28, 30, 122, 168, 169, 186, 563
- Merismopedia trolleri*, 349
- meromictic waters, 26
- Meroplankton, 245, 444
- Mesocena elliptica*, 408
- Mesodinium* spp., 307
- Mesophyllum lichenoides*, 35, 96
- synthrophicum*, 153
- Mesospora macrocarpa*, 79
- mediterranea*, 35
- Mesotaeniales, 567
- Mesotaenium breggarii*, 208–9
- macrocoecum*, 48
- Mesotaenium* spp., 47, 61–2, 200
- metabolic pathways, effects of temperature and light on, 108–9, 110
- metals, heavy, as pollutants, 545–7
- metaphyton, 42, 232–5
- Miconia pachyphylla*, 214
- Micractinium* spp., 262, 263, 268
- Micrasterias* spp., 168, 169, 182
- Microchaete grisea*, 241
- Microchaete* spp., 563
- Microcladia borealis*, 65
- Microcoleus chthonoplastes*, 51, 172, 174, 188, 189, 197
- lyngyaceous*, 148, 149, 172, 174, 191, 238
- paludosus*, 48
- Microcoleus* spp., 186, 188, 194, 197, 563
- Microcoleus tenerimus*, 79, 172
- vaginatus*, 48, 58, 174, 197
- wuileri*, 236
- Microcystis aeruginosa*, 267, 437; carbon fixation rates, 323; cell contents of nutrients, 337–8; doubling time, 429; grazing of, 413; periodicity of, 447; sampling of, on glass slides, 128; vertical distribution of, 306, 307
- densa*, 205
- flos-aquae*, 437
- Microcystis* spp., 122, 261, 263, 298, 304, 563; algal associations, 228, 238; and bacterial parasites, 403; as endopelon, 186; grazing of, 407, 413; in lakes, 277, 278; nitrogen fixation, 311; in rivers, 268
- Microdictyon obscurum*, 149
- setchellianum*, 142
- Microdictyon* spp., 150
- Micromonas* spp., 400
- microphytic marine algae, distribution of, 377–80
- microscopic algae, grazing on, 403–13
- Microsporales, 506
- Microsporangium* spp., 222
- Microthamnium* spp., 194, 218
- Microthamnion strictissimum*, 549
- Millepora* spp., 392
- mineralisation, rate of, and algal production, 334
- mineral components, of water, 19
- Mischococcales, 570
- mixed layer, of phytoplankton growth, 314, 315, 316, 433, 457
- Mohole experimental drilling, distribution of diatoms in, 506, 507
- Moina hutchinsoni*, 409
- Mollusca: 229, 230, 241
- molybdenum, and stimulation of photosynthesis, 338
- Monochrysis lutheri*, 223, 293, 294
- Monodus* spp., 194, 198
- Monoraphidium dybowskii*, 162, 163, 164–5
- Monostroma fuscum*, 103, 106, 417
- grevillei*, 79, 241
- groenlandicum*, 79
- nitidum*, 90–1
- oxyspermum*, 79, 228, 450, 557
- quaternarium*, 57
- Monostroma* spp., 19, 76, 148
- Monostromatales, 567
- Montastrea annularis*, 391
- cavernosa*, 391
- Montastrea* spp., 392
- moss thalli, algal associations of, 214, 215
- motion, of water, 10–12
- Mougeotia* spp., 168, 169, 186, 218, 270, 549; as epipelon in streams, 160, 161; in lakes, 61; as metaphyton, 233; on rocks in running water, 52; as weeds, 557
- mucilage sheaths, of phytoplankton, 298–9, 300
- Mugil cephalus*, 407
- Muriella terrestris*, 359
- Murrayella pericladus*, 187
- Murrayella* spp., 227
- Mussa angulosa*, 391
- Mussa* spp., 390
- Mycocytium* spp., 399
- Mycosphaerella ascophylli*, 402
- pelvetiae*, 402
- Myelophycus simplex*, 90–1
- Myrmecia* spp., 194
- Myriogramme mangii*, 106–7
- minuta*, 35
- spectabilis*, 71
- Myrionema orbiculare*, 222
- Myrionema* spp., 221
- Myriotrichia subcorymbosum*, 222, 226
- Myrmecia* spp., 396
- Mytilis* spp., 404, 417
- Myxobacteria, as algal parasites, 403
- Myxophyta*, 562
- Myxosarcina* spp., 51, 563

- Naccaria* spp., 97, 564
Naccaria wiggii, 101
Najas spp., 218, 219
Nannochloris atomus, 309
oculata, 291, 294
Nannochloris spp., 293, 352, 358
 nannoplankton, 260, 272; in
 arctic lakes, 273; in
 oceans, 290–1; vertical
 distribution of, 250
 Narrangansett Bay, occurrence
 of marine plankton, 440,
 443
Nassula spp., 413
Nautocapsa neustophila, 296
Nautococcopsis spp., 296
Nautococcus emersus, 296
Navicula algida, 210
ammophila, 172
atomus, 195, 359
arenacea, 54, 359
avonensis, 181
bacillum, 359
binodulosa, 172
brekkaensis, 195
caduca, 195
cincta, 172, 195, 214
clementis, 359
cocconeiformis, 359
comoides, 64
contenta, 195, 214
crucigeroides, 210
cryptocephala, 170, 359;
 carbon fixation rates, 323;
 as epiphyton, 218; growth
 patterns, 439, 440;
 rhythmic motility of, 180;
 on rock in running water,
 53; sampling of, on glass
 slides, 128; in soils, 195
cuspidata, 202, 440
decussis, 359
dicephala, 167, 411
directa, 175, 210
diserta, 172
dismutica, 359
dumontiae, 236, 238
elkab, 280
endophytica, 42, 236
flexa, 170
fossalis, 195
gibbula, 195
gracilis, 53, 54, 210, 240
gregaria, 172, 359
grevillei, 222
hungarica, 160, 170, 359, 439,
 440
incerta, 64
insociabilis, 195
integra, 359
jarnefeltia, 364
kjellmanii, 210
lanceolata, 214, 323
menisculus, 170
minima, 195, 323, 359
mollis, 64, 118
mutica, 49, 195, 198, 214,
 215, 359
nitrophila, 202
nivalis, 549
oblonga, 122, 167, 439, 440,
 515
obtusa, 210
oppugnata, 359
ostrearia, 222
pelliculosa, 359, 545
pennata, 177
phyllepta, 172
placentula, 167
pseudoscutiformis, 364
pupula, 170, 359, 364; as
 epipellic flora in springs,
 160; as epiphyton, 218;
 growth patterns of, 439,
 440; sampling of, on glass
 slides, 128
pygmaea, 172
radiosa, 160, 323, 440
ramosissima, 64
reinhardtii, 167
rhynchocephala, 170, 180
salinarum, 170, 172, 181, 359
salinicola, 172
seminulum, 359, 364
spartinetensis, 172
Navicula spp., 28, 29, 30, 54,
 122, 168, 169, 173, 174,
 246, 385, 549, 553; in
 atmosphere, 358;
 distribution of, in surface
 sediments, 509, 510; and
 endophytic algae, 238;
 epipellic spp., daily
 periodicity of, 164; as
 epizoon, 241; growth at
 higher temperatures, 204;
 on leaves, 217; as
 metaphyton, 233;
 sampling of, on glass
 slides, 128; of soils, 193,
 194; on trees, 214, 215
Navicula subtilissima, 234
taraxa, 172
transistans, 175, 210
trigocephala, 210
tuscula, 183, 218
valida, 210
viridula, 172, 439
vitabunda, 359
 Naviculales, 572
Nectopsyche spp., 395
 Negev Desert, Israel,
 endolithon of, 125
Neidium affine, 364
bisulcatum, 364
dubium, 160, 364
hitchcockii, 166, 364
iris, 166
productum, 364
Neidium spp., 168, 169, 510
 Nemaiales, 493
 Nematoliales, 564 & n
Nemalion helminthoides, 79, 89,
 449
multifidum, 451
vermiculare, 90–1
Nematocystis decipiens, 360
Nematospaeropsis balcombiana,
 519–20
 Nematodes: as algal parasites,
 403; epiphytic spp., 229;
 epizoon algae of, 238
 Nemertini, 230
Nemoderma tingitanum, 79
Neochloris spp., 199, 213, 358
Neogoniolithon frutescens, 137
megacarpum, 140
myriocarpum, 140
notarisii, 35, 89
Neogoniolithon spp., 153
Neomeris spp., 147, 493
Nereis pelagica, 416
Nereocystis lutkeana, 132, 369,
 417
Nereocystis spp., 416; algal
 associations with, 22;
 growth patterns of, 453; in
 subtidal regions, 102;
 effects of wave force of, 12
Nerita spp., 120
 neritic plankton, 280, 282
Netrium oblongum, 234
Netrium spp., 168, 169
 neuston, 39, 46, 295, 296–7
 New Zealand, zonation of
 epilithic spp. in subtidal
 regions, 103
 niche, spatial, 44
Nienburgia andersoniana, 104
Nitella confervacea, 156
flexilis, 155, 156, 158
gracilis, 156
mucronata, 156
opaca, 155, 156
translucens, 156
Nitellopsis obtusa, 158
Nitellopsis spp., 524–5
Nitophyllum punctatum, 71
Nitophyllum spp., 130, 131, 223,
 224
 nitrates, and stimulation of
 phytoplankton growth,
 341
 nitrogen, dissolved in water,
 21, 150
 nitrogen cycle, 478–9
 nitrogen fixation: of desert soil
 algae, 197, 202; of
 phytoplankton, 309–13,
 327, 330; rates of, in algal
 communities of coral reefs,
 145, 146, 150; *see also*
 nutrients
Nitzschia acicularis, 268, 440
amphibia, 161, 195, 359, 516
angularis, 64
atlanticus, 440
biloba, 118
closterium, 175, 246
communis, 359
debilis, 195
delicatissima, 338, 440
denticula, 167
dissipata, 218, 440
elliptica, 549
filiformis, 161, 172
flexa, 183
fonticola, 359
fraudulenta, 380
frigida, 210
frustulum, 280, 359
hantzschiana, 359
heimii, 380
ignorata, 161
lavuensis, 210
leocinter, 284
lembiformis, 517
linearis, 53, 57, 60, 218
longissima, 175
marina, 505
martiana, 210
microcephala, 359
navicularis, 172
obtusa, 172
ovalis, 544
pacifica, 440
palea, 49, 170, 359, 397, 411,
 531, 549, 550, 557; as
 epipellic in streams, 161;
 growth patterns of, 440;
 and inhibition of other
 algae, 317, 318; rhythmic
 phenomena of, 161, 164,
 180; in soils, 198, 197
panduriformis, 172

- perminuta*, 359
pseudoseriata, 380
pingens, 380
recta, 359
reinholdii, 508
seriata, 210, 321, 380
sigma, 280
sigmoidea, 167, 170
sinuata, 200
Nitzschia spp., 28, 29, 30, 54, 122, 168, 169, 279, 302, 495, 549, 552; in atmosphere, 358; in cold oceans, 284; depth distribution, in soils, 199; distribution of, 380, 385; as endophyton, 238; as endozoon, 241; epipellic spp., daily periodicity of, 164; epiphyton spp., 217, 228; extracellular secretion, 317; in lakes, 59, 278; grazing of, 407; and effects of light intensity on, 57, 60; as metaphyton, 233; effects on nutrients on, 538; effects of salinity on, 17; saprophytic spp., 398; seasonal changes of, 54; as symbionts, 388
Nitzschia subcapitellata, 549
subfraudulenta, 380
subpacificae, 380
subtilis, 359
turgiduloides, 291
tryblionella, 128, 181
vermicularis, 128
vitrea, 517
 Nitzschiales, 572
Noctiluca miliaris, 395
Noctiluca spp., 303, 396
Nodularia harveyana, 174
Nodularia spp., 110, 186, 194, 563
Nodularia spumigena, 307
Norrissia spp., 414, 415
 North Atlantic deep water, 9
 North Sea: carbon fixation values, 470; seasonal variations in phytoplankton, 444–5
 Norway, waters of, Charophyta of, 155, 156
 Nostocales, 563
Nostoc coeruleum, 61
commune, 202
ellipsosporium, 197
fritschii, 197
macrosporium, 50
microscopicum, 48, 50, 58
minutum, 58
muscorum, 197, 198
parmeloides, 395
paludosum, 198
sphaericum, 48, 58, 61, 235
Nostoc spp., 126, 174, 191, 396, 563; on desert rocks, 51; as endophyton, 235; on marble, 49; of soils, 193, 194, 198, 199, 200; on stones in streams, 55
Nucella lapillus, 82
Nuphar spp., 216
 nutrient cycling, 477–83; carbon cycle, 476–9; nitrogen cycle, 478–9; phosphorus cycle, 479–81; silicon cycle, 481–2
 nutrient removal, 541–3; algal growth as a measure of eutrophication, 542–3
 nutrients: cycling of *see* nutrient cycling; depletion of, in oceans, 335; diurnal periodicity, 329–30; ions, concentration changes of, 526, 527, 529, *see also* eutrophication; and phytoplankton relationships, 334–42, 356; regeneration of, from phytoplankton, 342; transference of, between host and algae, 223–6
Nymphaea spp., 216
Obelia geniculata, 416
Obelia spp., endozoon algae of, 241
 oceans: carbon fixation rates, 469–70; calcium deposition, by algae, 490, 491; chlorophyll *a* content of, 468; circulation of water in, 8–12; dinoflagellate ‘cysts’ in sediments, 517–21, 522; and dispersal of algae by current drift, 361–2; marine cores, 514, 515; palaeoecology of, 498, 500, 506, 507, 514; productivity of, 469; silica deposition by algae, 484, 485–90
 oceans, phytoplankton of, 279, 280–96; in cold oceans, 282–6; depth–photosynthetic profiles, 342–54; horizontal distribution of, 289, 290–1; inshore and offshore, 280–2; and nutrient depletion, 335; rock pools, 291, 293–5; Sargasso Sea, 295–6; seasonal variations, 286; in temperate oceans, 289–90; in tropical oceans, 286–9
Ochlochaeta spp., 222
 Ochromonadales, 571
Ochromonas danica, 316
Ochromonas spp., 209, 549
Ocotea spathulata, 214
Odonthalia dentata, 98, 106
foccosa, 65
 Oedogoniales, 567
Oedogonium spp., 28, 30, 41, 186, 218; and bacterial symbiosis, 397; as epipelon in streams, 160, 161; epiphyton growth form, 215, 216, 218, 233; growth at higher temperatures, 205; in lakes, 63; as metaphyton, 234, 235; and parasitic viruses, 400; effects of radionuclides on, 547; and effects of river flow rate, 12; as weeks, 557
Oenanthe spp., 216
 oil spillage, as a pollutant, 548, 550
 oligosaprobic waters, indicator spp., of 552–3
 oligotrophic conditions, 527–8n, 538, 539
Olisthodiscus luteus, 318
Olisthodiscus spp., 319, 320
Oncobyrsa spp., 53, 61–2, 563
 oncolites, 54
Oocardium spp., 61–2, 495
Oocardium stratum, 55, 56
Oocystis lacustris, 323
naegelii, 323
solitaria, 234
Oocystis spp., 233, 262, 263, 277, 425
Oocystis submarina, 273, 532, 542
Opephora marina, 240
pacifica, 222, 240
Opephora spp., 28, 29, 30, 121, 122
Ophiocytium spp., 28, 30
Ophrydium spp., 241
Opuntia californica, 417
 organic components, of water, 18–19
 organic compounds, as pollutants, 547–9
Ornithocercus spp., 389
Oscillatoria agardhii, 267, 304; growth rates, 429; production of, 347, 349; stratification of, 347, 349; uptake of amino acids, 347, 349
amphibia, 359
amphigranulata, 532
benthonicum, 553
boryana, 204
brevis, 174, 204
chlorina, 553
geminata, 204, 205, 532
laetevirens, 174
limnetica, 183
margaritifera, 174
nigro-viridis, 174
redekei, 349, 421, 429
retzii, 60
rubescens, 304, 536
Oscillatoria spp., 28, 30, 49, 168, 169, 183, 186, 258, 261, 263, 425, 496, 563; in atmosphere, 358; form resistance of, 300; growth patterns, 440; mat formation, 159, 191; as metaphyton, 233; in lakes, 277; and parasitic fungi, 402; sampling of, on glass slides, 128; effects of light intensity on, 57, 60; of soils, 194, 198, 199; subsurface sands, 126; sinking of, 305; on tree bark, 213, 214
Oscillatoria submembranacea, 190
tenuis, 52, 174
 Oscillatoriaceae, 548
 Ostracods, 229
Ostreobium constrictum, 126
quekettii, 125, 241
reineckeii, 389
Ostreobium spp., 494
Ourococcus spp., 194
 oxygen, dissolved in water, 19–21; production by phytoplankton, 327
 oxygen production, of corals and symbiotic algae, 390, 391
Oxynoe panameinsis, 418
Oxyrrhis marina, 291
Oxytoxum variabile, 284

- Oxytrichia* spp., 411
- Pacific Ocean: carbon fixation rates, 469, 470, 473; calcium deposition by algae, 491; chlorophyll *a* content, 468; diatom preservation in sediments, 503, 504, 512; diatom stratigraphy, 514, 515; distribution of Fucales, 384; phytogeography of algal spp., 367, 368, 369, 370; silica deposition, by algae, 485, 486–7; and speciation, 385
- Padina australis*, 375
gymnospora, 89, 149, 418
japonica, 66, 142
mexicana, 375
pavonia, 108, 110, 475
sanctae-crucis, 71–2, 96, 101
- Padina* spp., 392, 493; algal associations of, 222; on coral reefs, 144, 146, 147; production rates, 475; zonation of, in intertidal regions, 91
- Padina thiryu*, 142
- Palaeochara* spp., 524
- palaeoecology, 137, 498–525; coccoliths, 501–2, 523; diatoms, 502–17, *see also* diatoms, palaeoecology of; dinoflagellate ‘cysts’, 517–21, 522; discoasters, geological record of, 502; gyrogonites, 521, 523, 524–5; sampling methods of, 500
- palaeomagnetic reversal data, and dating of oceanic cores, 500
- Palmariales, 565
- Palmaria palmata*, 219
- Palmella* spp., 200
- Palmogloea protruberans*, 198
- Palmophyllum crassum*, 107
- Palythoa* spp., 391
- Panama, Gulf of, growth patterns of phytoplankton, 440
- Pandorina charkowiensis*, 319
morum, 39, 277, 305, 319, 539
- Pandorina* spp., 28, 30, 237, 262, 263, 300, 318; in rivers, 268
- Pantoneura baerii*, 106
- Paracentrotus* spp., 416
- Parahistioneis* spp., 389
- Paralia sulcata*, 185, 443
- Paramecium bursaria*, 393–4
- Paramecium* spp., and symbiotic algae, 388, 390, 394
- parasitism, 388, 398, 403; bacteria, 403; fungi, as algal parasites, 399, 400–2; nematodes, 403; parasitic algae, 398, 400; protozoa, as algal parasites, 402–3; viruses, as algal parasites, 400
- Patella* spp., 82, 85, 238, 239, 240, 417
- Patella vulgata*, 86
- Patina pellucida*, 83, 415, 416
- Paulschulzia pseudovolvox*, 410
tenera, 410, 412
- Pavolva lutheri*, 546
- Pearson Island, Australia, zonation of epilithic spp., 103, 106
- Pedalia jennica*, 409
- Pediastrum clathratum*, 247
- Pediastrum duplex*, 317
- Pediastrum* spp., 262, 263, 268, 277, 278, 425, 498
- Pediastrum tetras*, 545
- Pedinomonadales, 568
- Pedinomonas* spp., 395 & n
- Pelagophycus giganteus*, 369
porra, 102, 369
- Pelagophycus* spp., 102, 105, 132
- Peltigera polydactyla*, 396
- Pelvetia canaliculata*, 38, 79, 92, 93, 373–4
fastigiata, 65; 373–4
- Pelvetia* spp., 72, 86, 97, 130, 372, 402
- Pelvetiopsis limitata*, 65, 373–4
- Penicillus capitatus*, 158
pyriformis, 158
sibogae, 149
- Penicillus* spp., 144, 146; and bacterial parasites, 405; calcium deposition to sediments, 493; epiphyte on mangroves, 228; phytogeography of, 370; rhizoidal systems of, 158
- Penium jenneri*, 549
- Percursaria percursa*, 174
- perennation, 435–7
- Peridinales, 569
- Peridinium brevipes*, 321
cerasus, 445
cinctum, 258, 437, 380, 520, 521, 523; perennation, 435; periodicity of, 447, 449; vertical migrations of, 330, 331
conicum, 289, 445
curtipes, 289, 445
depressum, 445
divergens, 445
gregarium, 295
monospinum, 321
oblongum, 380
oceanicum, 321
ovatum, 321, 445
pallidum, 289
pellicidum, 321, 445
ponticum, 520, 521
punctulatum, 289
pyriforme, 289
- Peridinium* spp., 29, 30, 210, 245, 261, 263, 279, 287, 529, 550; in arctic lakes, 272; grazing of, 411; movement of, 331; renewal times, 323, 324; and effect of water motion on, 12
- Peridinium steinii*, 289
- thorianum*, 289
- triquetrum*, 443
- trochoideum*, 404, 443, 445, 492
- willei*, 39, 277
- voltzii*, 267
- Perimneste* spp., 524–5
- periodicity, daily, of algal species, 161–5
- Persian Gulf, stromatolite formation in, 188–9
- Petalonia fascia*, 69, 239, 451
- Petalonia* spp., 96
- Petalonia zosterifolia*, 79, 118
- Petroderma maculiforme*, 77
- Petroglosso-plocamietum, association table, 35
- Petromyzon marinus*, 411
- Peysonnelia polymorpha*, 35
- Peysonnelia* spp., 110, 147, 149, 153, 227
- pH, of water, 21; and effects on Charaphyta, 155–6, 157
- Phacus* spp., 268
- Phaenocora typhlops*, 387
- Phaeocystis pouchettii*, 238, 246, 317, 432, 551
- Phaeocystis* spp., 238, 279, 290, 291, 321
- Phaeodactylum* spp., 393
- Phaeodactylum tricorutum*, 294, 335, 339, 340, 545, 546
- Phaeophila dendroides*, 126
- Phaeophyceae, 79, 239
- Phaeophyta: classification of, 572–3; colonisation of cleared areas, 121; on coral reefs, 141, 145; dispersal of, 361; growth patterns of, 450–1; phenology, of reproductive structures, 69; zonation of, in tropical intertidal regions, 89
- phaeophytin, and involvement with chlorophyll estimation, 54–5, 252, 350
- phaecopigments, 252, 270
- Phaeothamnium* spp., 549
- Phaeuris antarcticus*, 106
- phagotrophic algae, 27n
- Phalacroma pulchellum*, 284
- Phalacroma* spp., 279
- phenology, of epilithic reproductive structures, 68, 69, 70
- Philippines, algal biomass on coral reefs, 146
- Phormidium agile*, 236
ambiguum, 198
angustissimum, 204
autumnale, 56, 201, 359, 531
codicola, 236
corium, 174
favosum, 48
incrustatum, 54
inundatum, 553
laminosum, 204
lignicola, 204
lividum, 48
mucicola, 359
retzii, 198
- Phormidium* spp., 28, 30, 49, 186, 553, 563; in atmosphere, 358; as epiphyte on planktonic algae, 228; on rocks in running water, 53; soils, 193, 194, 198, 199; subsurface sands, 126; on trees, 214
- Phormidium subfuscum*, 61
tenue, 198, 204
uncinatum, 198
- phosphate uptake: and eutrophic conditions, 529, 530, 534, 535–6, 538; and nutrient removal, 541–3; and phytoplankton, 329, 334
- phosphorus cycle, 479–81

- photogrammetric technique, to determine algal cover on coral reefs, 147–8
- photokinesis, of epipellic species, 182
- photophilic species, 41
- photorespiration, of phytoplankton, 258–9
- photosynthesis, 23; of corals, 392; and depth–photosynthesis profiles of phytoplankton, 342–54; diurnal effects on, 324–9; and phytoplankton production, 467–8; in rivers, 270; and relationship with epilithic algal biomass, 54, 55, 150; seasonal variations of, 424, 425, 428; of subtidal epipelion, 176, 185; and effects of temperature on epilithic species, 112, 113, 114–15; translocation of photosynthate, 91; variations of, in air and seawater, 117, 118; *see also* production
- photosynthetic pigments: and estimation of biomass phytoplankton, 251, 252, 253, 254–5; diurnal variations in, 327; *see also* individual pigments
- Phragmites* spp., 216
- Phycodrys rubens*, 98, 100, 106, 219, 220
- Phycodrys* spp., 97, 101, 112, 113, 130, 131
- Phycomycetae, 400
- Phycopeltis* spp., 213
- Phycopeltis expansa*, 232
- Phyllogigas* spp., 107
- Phyllophora brodiaei*, 98
- crispa*, 98, 99, 100
- interrupta*, 106
- membranifolia*, 98, 99, 100
- palmettoides*, 362
- pseudoceranoides*, 100
- Phyllophora* spp., 91, 103, 130, 131, 185, 296
- Phyllophora truncata*, 100, 114
- Phyllosiphon* spp., 398
- Phyllospadix scouleri*, 104, 222
- Phyllospadix* spp., 102, 104–5
- Phymatodocis* spp., 380
- Phymatolithon laavigatum*, 368
- polymorphum*, 368
- rugulosum*, 109, 110
- physical characteristics, of the environment, 8–12, 22–6
- physiognomic classification, 32–3
- phytobenthos, of rock and sand surfaces, 47–135; of artificial surfaces, 126–35; endolithon, 125–7, 135; endopsammon, 126, 135; epilithon of, 47–122, 130, 132–3, 135; epipsammon, 122–5, 135; *see also* rock and sand surfaces
- phytobenthos, of stable sediments, 155–212; endopelon, 155, 186; epipelon, 155, 159–86, 211; hot springs, 155, 202–6, 212; rhizobenthos, 155–9, 211; soil algae, 155, 191–202, 212; stromatolites, 155, 186–91, 211
- Phytoconis botryoides*, 198
- phytoedaphon, 42
- phytogeography, of algae, 357, 365–86; of freshwater algae, 380–3; of macrophytic marine algae, 365–76; of microphytic marine algae, 377–80; regions of North Atlantic, 365, 366, 367; and speciation, 383–5
- phytoplankton, 183, 243–356; annual cycles of, 426–50, *see also* individual species; annual growth trends of, 422, 423; carbon fixation of, 320–5, 469–71; chlorophyll *a* content of waters, 466; depth–photosynthesis profiles, 342–53; diurnal effects, 325–34; energy flow, 461; of estuaries, 271–2; euphotic zone, mixed depth and critical depth, 313–16; extracellular secretion, 316–20; freshwater species, 260, 261–2, 263–6; in food web, 420; grazing of, 403–13; ice cover, effects of, 273–6; of lakes, 272–80; light adaptation, 307–8; nitrogen fixation, 309–13; nutrient relationships, 334–42; neuston *see* neuston; of oceans, 280–96; phytogeography of *see* phytogeography; plastic bag technique for *in situ* study, 337, 338, 339, 340; populations of, 260–97; and relationships with other organisms, 354–5; of reservoirs, 271, 272; in rivers, 267–73; sampling methods, 246–59; sinking and floating of, 297–305; terminology of, 243–6; thermocline, artificial breakdown of, 354; ‘water blooms’ and ‘red tides’, 305–7
- phytosociological classification, 33–7
- pigment diversity, as a measure of community maturity, 45
- Pikea* spp., 65
- Pilayella littoralis*, 71, 78, 79, 89, 106, 118
- Pilayella* spp., 89
- Pilimia ramosa*, 229
- Pinnularia acoricola*, 549
- borealis*, 49, 195, 198, 200, 215, 359
- braunii*, 364, 549
- gibba*, 128, 364
- globiceps*, 49
- hemiptera*, 364
- intermedia*, 359
- interrupta*, 359, 364, 509, 510, 546
- irrorata*, 195
- lata*, 364
- legumen*, 364
- mesolepta*, 198
- microstauron*, 195, 364, 549
- nobilis*, 364
- obscura*, 195
- quadratarea*, 120, 175
- semiinflata*, 210
- silvatica*, 200, 364
- Pinnularia* spp., 28, 30, 168, 169, 204; as epipelon in streams, 161; as metaphyton, 233; sampling of, on glass slides, 128; of soils, 193, 194
- Pinnularia subcapitata*, 195, 364
- termitina*, 549
- undulata*, 167
- viridis*, 128, 195
- Pinnularietum appendiculatae*, 47
- borealis*, 47
- Pistia* spp., 216
- Pithophora oedogonia*, 548
- Placidia dendritica*, 395
- Placobranchus ianthobapsus*, 395
- Plagiogramna* spp., 122
- Planetococcus* spp., 273
- plankton: and endophytic algae, 236, 237, 238; epiplankton, 228; in freshwater habitat, 28, 30; and marine habitat, 29, 30; sampling of, on glass slides, 128; *see also* phytoplankton
- Planktoniella muriformis*, 378
- Planktoniella* spp., 287
- Planktoniella sol*, 287
- Planktosphaerella* spp., 194, 353
- Planophila* spp., 194
- plastic, populations of algae growing on, 127
- Platydorina caudata*, 318, 319
- Platymonas conzolutae*, 388
- Platymonas* spp., 210, 317, 387, 390
- Platymonas tetrahele*, 291
- Plectonema adriaticum*, 236
- battersii*, 79, 239
- nostocrum*, 198
- notatum*, 203
- Plectonema* spp., 51, 175, 358, 359, 400, 563
- Plectonema terebrans*, 126, 188, 239, 241
- Pleodorina* spp., 318
- Pleurocapsa minor*, 61
- Pleurocapsa* spp., 29, 30, 563
- Pleurocapsales, 563
- Pleurochloris magna*, 359
- Pleurochloris* spp., 199
- ‘*Pleurococcus*’ spp., 27, 48 & n
- Pleurococcus viridis*, 50
- vulgaris*, 214
- Pleuroncodes planipes*, 406
- Pleurosigma aestuarii*, 172
- angulatum*, 172, 175, 181
- antarcticum*, 210
- delicatula*, 268
- elongatum*, 172
- longum*, 175
- Pleurosigma* spp., 174, 175, 205, 246, 385
- Pleurosigma stuxbergii*, 175, 210
- Pleurotaenium minutum*, 234
- Plocamium becheri*, 376
- cartilagineum*, 98, 99, 100

- Plocamium becheri* (cont.)
hammatum, 149
pacificum, 104
secundata, 106
Plocamium spp., 97, 100, 219, 227
Plocamium suhrii, 376
violacium, 65
Plumaria elegans, 71, 76, 79, 83
Plumaria spp., 219, 226
Plumariopsis eatoni, 107
Pocillopora spp., 392
Pocockiella variegata, 149, 475
Podocystis spp., 150
Podosira stelliga, 185
 pollution, 528, **543–57**; acids, 549–50; algae as weeds, 557–8; atmospheric, and composition of rainwater, 14; by heavy metals, 545–7; insecticides, 548; indicator species and communities, 552–7; oil spillage, and growth of epilithic species, 77, 548; by organic compounds, 547–9; by radio-nuclides, 546–7; testing of pollutants for algal effects, 550–2; thermal, 548–9
Polyarthra spp., 411
 Polychaetes, 229
Polyides rotundus, 98
Polyides spp., 235
Polymeura latissima, 104
Polysiphonia arctica, 106
collinsii, 65
denudata, 69, 452
elongata, 220, 236
ferrulacea, 227
harveyi, 69, 116, 452
havanensis, 159
lanosa, 79, 219, 224, 238, 403
nigrescens, 69, 97, 100
novae-angliae, 452
scopulorum, 238
Polysiphonia spp., 149, 158, 397; association table, 36; in coastal rock pools, 96; colonisation on cleared areas, 121; and nutrient transference, 223, 224, 226
Polysiphonia urceolata, 98, 99, 100, 219
violacea, 221
 Polyzoa, 230
Pomacentrus lividus, 418
 ponds, epipelonal species of, 165–7
 Porifera, 230
Porites astreoides, 391
compressa, 147
Porites spp., 388–9, 391
Porochara spp., 524–5
Porolithon craspedium, 137
gardineri, 139, 140, 151
onkodes, 150; on algal ridge system of coral reefs, 137, 138, 139, 140; effects of grazing on, 146; productivity of, effects of light on, 141, 142, 146
pachydermum, 140, 146, 153n
Porolithon spp., 140, 141, 149, 493
Porphyra capensis, 91
elongata, 79
lanceolata, 65
leucosticta, 35, 69, 79, 89, 451
linearis, 79, 82, 85, 87
naidum, 104
perforata, 65, 117, 118
purpurea, 79
Porphyra spp., 76, 239, 240, 563, 564; and adsorption of radionuclides on, 546; effects of depth on pigmentation, 110; effects of heavy metals on, 545, 546; life history of, 94 & n, 95; oil pollution effects of, 77; effects of salinity on sporeling stage, 76; zonation of, in intertidal regions, 90–1, 92
Porphyra tenera, 94
umbilicalis, 79, 118, 236, 376
 Porphyridales, 564
Porphyridium cruentum, 353
Porphyridium spp., 223, 400, 564
Porphirosiphon kurzii, 191
notarisii, 191
Porphyrosiphon spp., 193, 563
Porphyropsis coccinea, 98, 99
 Port Erin Bay, subtidal epilithic species, 100–1
Posidonia spp., 219, 222, 227
Postelsia palmaeformis, 65, 369
Postelsia spp., 121, 132
Potamogeton spp., 81, 128, 155, 156
 Prasiolales, 566
 Prasinocladales, 568
 Prasinocladus spp., 96
 Prasinophyta, 269, 388, 568
Prasiococcus calcarius, 48
Prasiola crispa, 49, 89, 202
meridionalis, 65
Prasiola spp., 84, 358
Prasiola stipitata, 79, 82, 85
Pringsheimiella scutata, 36
Pringsheimiella spp., 221
Prionitis australis, 104
filiformis, 104
lanceolata, 117, 118
Prochloron spp., 388, 563
 Prochlorophyta, 388, 563–5
 production and productivity of phytoplankton, 258, 320–5; autoradiographic estimates, 320, 321, 322; in cold oceans, 282, 283, 286; and depth–photosynthetic profiles, 342–54; diurnal effects on, 324–9; and energy flow *see* energy flow; and effects of eutrophication, 533, 534; in ice-covered lakes, 274, 275
 production–biomass ratio, 44–5, 255–8
 Prorocentrales, 569
Prorocentrum gracile, 441
micans, 297, 318, 404, 445, 544, 551
scutellum, 441
Prorocentrum spp., 397
Prorodon spp., 393
Proteus morgani, 397
Protococcus grevillei, 197
nivialis, 207
Protococcus spp., 358
Protococcus viridus, 48, 214
Protopteridinium claudicans, 334
conicum, 334
depressum, 381
granii, 334
leonis, 334
oceanicum, 334
Protopteridinium spp., 210, 517, 521
Protopteridinium subinermis, 334
trochoideum, 492
 Protosiphonales, 568
Protosiphon botryoides, 202
cinnamoneus, 197
 Protozoa: as algal parasites, 402–3; as epiphyte on *Fucus*, 230; grazing of microscopic algae, 409, 410, 412
Prymnesiales spp., 260, 498
Prymnesium parvum, 413
Prymnesium spp., 413, 415
 Prymnesiophyta, 18, 492, 571
Psammecinus miliaris, 416
Pseudanabaena articulata, 532
Pseudanabaena spp., 198, 359, 563
Pseudochantrasia chalybea, 56
pygmaea, 56
Pseudochantrasia spp., 55, 56, 564
Pseudoenotia doliolus, 287, 508
Pseudohimantidium spp., 238
Pseudokephyrion spp., 273
Pseudolithophyllum expansum, 107
Pseudolithophyllum spp., 372
Pseudomonas fluorescens, 396
putrida, 397
Pseudomonas spp., 403
Pseudonobyrza lacustris, 59
Pseudonobyrza spp., 563
 pseudoperiphyton *see* metaphyton
 pseudoplankton, 39, 246; *see also* metaphyton
Pseudosciania spp., 564
Pseudospora sensu lato, 410, 412
Pseudospora spp., 402, 410, 412
 psychrophilic algae *see* snow and ice
Pterocladia capillacea, 239, 366–7
clavatum, 229
Pterocladia spp., 96, 103, 133, 564
Pterygophora californica, 65, 103, 368, 369
Pterygophora spp., 102, 105, 132, 133, 416
Pterosiphonia complanata, 375
gloiophylla, 376
Pterosiphonia spp., 219
Pterosperma spp., 260
 Pterospermatales, 568
Ptilosarcus gurneyi, 395
Ptilota plumosa, 219
serrata, 101, 106, 107, 112, 114
Ptilota spp., 100
Ptilothamnium spp., 219
Pugettia spp., 414, 415
Punctaria latifolia, 451
plantaginea, 69, 451
Punctaria spp., 130
 Pycnogonida, 230
Pylaiella littoralis, 224
Pylaiella spp., 130, 131
 Pyramimonadales, 568
Pyramimonas spp., 358
 Pyrocystales, 569

- Pyrocystis acuta*, 333
fusciformis, 333
lumula, 443
noctiluca, 333
pseudonociluca, 287
Pyrocystis spp., 279, 287, 303, 393
Pyrodinium spp., 334
Pyrophacus horologicum, 289, 380, 445
Pyra pachydermatina, 97
- Quadrigula* spp., 128
 quartz, epilithic spp. found on, 49, 51
- radiation, solar *see* solar radiation
- Radiococcus* spp., 402
 Radiolaria, and symbiotic algae, 394
 radionuclides, as a pollutant, 546–7
Radiosphaera negevensis, 51
 rainwater, chemical composition of, 13, 14
Ralfsia expansa, 93, 149
fungiformis, 88
 Ralfsiales, 573
Ralfsia pangeonsis, 118, 119
Ralfsia spp., 120
Ralfsia verrucosa, 35, 79, 450
Ranunculus spp., 216
Raphidiopsis curvata, 271
Raphidiopsis spp., 563
Raphidium nivale, 207, 209
Raphidonema brevirostre, 208–9
nivale, 208–9
sabandum, 208–9
Raphidonema spp., 210
Raphoneis spp., 29, 30, 122, 507, 509
Raskyella spp., 524–5
 Red Sea, chemical composition of, 15
 ‘red snow’, 207, 209
 red tides, 307
 reefs, and effects of water movement, 12
 renewal rates and times of phytoplankton spp., 323–4
 reproductive structures, of epilithic spp., 68, 69, 70, 94–6
 reservoirs: eutrophic conditions, 528, 529; phytoplankton of, 271, 272
 respiration rates, of epilithic spp.: effects of light on, 109; effects of temperature on, 108, 112, 113
- Reynolds numbers (Re), and flow characteristic of water over objects, 51
Rhabdochara spp., 524–5
Rhabdonema adriaticum, 185
Rhabdosphaera claviger, 379
Rhexinema spp., 296
Rhincocalanus spp., 418
Rhipidodesmis caespitosa, 149
Rhipocephalus spp., 144, 146, 158
 rhizobenthos, 41, 155–9, 211; effects of pH on Charophyta, 155–6, 157; of marine waters, 158–9; stability of, 158
Rhizoclonium hookeri, 227, 228
riparium, 174, 450
Rhizoclonium spp., 93, 120
Rhizophidium nobile, 399
planktonicum, 400
Rhizophora mangle, 228
Rhizophora spp., 158, 227
Rhizosolenia alata, 210
bergonii, 382
calar-avis, 383
curvirostris, 505
delicatula, 284, 406, 443
eriensis, 277
faeroense, 443
fragilissima, 443
hebetata, 289, 382, 505
praebergonii, 508
rostrata, 210
setigera, 441
simplex, 284
Rhizosolenia spp., 29, 30, 245, 279, 286, 290, 309, 385
Rhizosolenia stolterfathii, 440
styliformis, 264, 265, 266, 289
 Rhizosoleniales, 572
 rhizosphere, and algal associations, 200
Rhodochorton floridulum, 83
purpureum, 65, 70, 88, 94–6
Rhodochorton spp., 110, 130, 131, 564
Rhodochytrium spp., 398
Rhodoglossum affine, 65
Rhodomela confervoides, 98, 100
larix, 65
 Rhodomelaceae, and bacterial symbiosis, 397
Rhodomonas minuta, 425, 538
Rhodomonas spp., 272
 Rhodophyceae, 79, 146, 239
Rhodophyllis dichotomum, 106
devaricata, 35
Rhodophysema elegans, 220
 Rhodophyta, 73, 400, 563–4; and algal mat formation, 191; and calcium deposition to sediments, 491; colonisation of cleared areas, 121; on coral reefs, 141, 145; dispersal of, 361, 362; distribution of, 368; growth patterns of, 451–2; as epiphytes, 226; effects of light intensity on, 110; and metabolism of halogens, 224, 226; parasitic species, 398, 400; of soils, 193; symbiosis, 388; reproductive structures, phenology of, 69
Rhodymenia ardissoni, 35
attenuata, 104
californica, 104
lobata, 104
pacifica, 104
palmata, 82, 103, 106, 220
Rhodymenia spp., 97
 Rhodymeniales, 565
 Rhodymenietalia, 35
Rhoicosphenia curvata, 53, 218, 240, 516
Rhoicosphenia spp., 218, 226
Rhopalocystis spp., 194
Rhopalodia gibberula, 280, 517
parallela, 200
Rhopalodia spp., 183, 216, 238
Rhopalodia ventricosa, 200
 rhythmic phenomena, of algal species, 161–5, 168, 170, 171
Rhytiphoea tinctoria, 186
Richelia spp., 309, 563
Rissella verruculosa, 79, 89
 rivers and streams: as an aquatic habitat, 30–1; chemical composition of, 13; chlorophyll *a* contents, 466–7; epilithon on rocks and stones in, 51–7; epiphyton of, 216–19; epipelon of, 160–5; and effects of flow rate on algae, 12, 51–2, 453–4; grazing of microscopic algae, 410; nutrient input, 527; periodicity of algal species, 448–9; phytoplankton of, 267–72; *see also* current strength, streams
Rivularia atra, 78, 82, 89
biasoletiana, 48, 56, 58, 59
bullata, 79
haematites, 54, 61
mesenterica, 79
Rivularia spp., 29, 30, 41, 55, 60, 91, 130, 131, 495, 563
 rock and sand surfaces, epilithon of, 47–122, 130, 132–3, 135; field measurements of biomass, 115–22; of lakes, 57–63; effects of light on, 110–11; of river and running water rocks, 51–7, 130; of sea coasts, 63–110, *see also* coastal regions; of sub-aerial rocks, 47–50, 134; effects of temperature on, 111–15
 rock surfaces, endolithon of, 125–6
 rock pools, 96, 291, 293–5
Roperia tessellata, 284, 287, 508
Rosalina spp., 413
Roseningiella constricta, 79
polyrhiza, 79
 Rotifera, and grazing of microscopic algae, 407, 408, 411
Rouxia peragalli, 506
 rubble crest, of coral reefs, algal species of, 149
Ruppia maritima, 116
- Saccorhiza dermatodea*, 103
polyschides, 98, 101, 121, 220
Saccorhiza spp., 81, 131; algal associations with, 219–20; and epiphytic fauna, 231; grazing of, 415–16; in subtidal regions, 103
 Sacoglossans, and symbiotic chloroplasts, 395–6
 salinity, of seawater, 15–17; and epipelagic species, 172; effects on sporulation, 70, 71, 75; effects combined with temperature, 112; effects on water loss, 93, 94
 salt marshes, 91, 171–3, 472
 salts, dissolved in water, 13–18
Sameioneis spp., *see* *Pseudohimantidium* spp.

- sampling methods: of epipelton, 167–71; using glass slides *see* slides, glass; of phytoplankton, 246–59; of soil algae, 195–6
- sand movement, and effect on epilithic species, 89, 91
- sand surfaces, epipsammon on, 122–5
- saprobial index, 554
- saprophytism, of algae, 398
- Sargasso Sea: chlorophyll *a* content, 468; light adaptation of phytoplankton, 308; phytoplankton of, 287, 295–6, 353
- Sargassum echinocarpum*, 142, 143
- filipendula*, 93, 376, 451
- fluitans*, 295
- horneri*, 90–1
- muticum*, 363
- natans*, 295
- nigrifolium*, 90–1
- obtusifolium*, 142
- polyphyllum*, 142
- Sargassum* spp., 185, 295–6; algal associations of, 227; antibiotic properties of, 222–3; bacterial parasites, 403; carbon fixation values, 471; current drift dispersal, 361; colonisation of coastal regions, 120; on coral reefs, 138, 141, 145, 149; and epiphytic fauna, 229, 231; phytogeography of, 368, 370, 385; effects of water depth on, 108; as weeds, 558; ‘wind-rows’ of, 291; zonation of, in subtidal regions, 103
- Sargassum thunbergii*, 90–1
- vulgare*, 93, 108
- saxitoxin, 307
- Scarus gnacamaia*, 238
- retula*, 238
- Sceletonema* spp., 29, 30
- Scenedesmus costulatus*, 199
- obliqua*, 199, 551
- obliquus*, 552
- quadricauda*, 332, 480, 542
- Scenedesmus* spp., 262, 263, 277, 278, 302, 360, 425; in atmosphere, 358; effects of eutrophication, 532; grazing of, 411; and inhibition of other algae, 317; as metaphyton, 233; productivity of, 322, 339; in rivers, 268; uptake of glucose, 317
- Schizogoniales, 566
- Schizothrix affinis*, 50, 58
- arenaria*, 58, 148, 172
- calicicola*, 79, 172, 174, 239; in deserts, 51, 197; and response to desiccation, 197; at lake sites, 59; and stromatolite formation, 190, 191
- crosswellii*, 89
- delicatissima*, 50, 58, 59
- fasciculata*, 56
- fuscescens*, 188
- heufferi*, 48
- lacustris*, 58, 59, 60, 61
- lardacea*, 50, 55, 58, 359
- meulleri*, 52
- mexicana*, 191
- penicillata*, 58
- Schizothrix* spp., 49, 55, 563; on bare rock surfaces in caves, 50; on beach and estuarine sediments, 175; on desert rocks, 51; mat formation, 159; of soils, 193, 194; stromatolite formation, 188, 191
- Schizothrix tenerrima*, 148, 191
- Schizymenia pacifica*, 65
- Schoenoplectus lacustris*, 134
- Schröderella delicatula*, 443
- Sciana* spp., 101, 564
- sciaphilic species, 41
- Scolymia lacera*, 391
- Scolymia* spp., 390
- Scoliella antarctica*, 209
- nivalis*, 208–9
- polyptera*, 208–9
- Scoliella* spp., 207, 209
- Scytonema hofmanii*, 197
- myochrous*, 48, 49, 50, 58, 59, 61
- ocellatum*, 51
- Scytonema* spp., 62, 396, 563; on beach and estuarine sediments, 175; on desert rocks, 51; of soils, 193, 202; stromatolite formation, 188, 190; on sub-aerial rocks, 47, 48
- Scytosiphon lomentaria*, 69, 96, 118, 239, 451
- Scytosiphon* spp., 89, 121, 130, 222
- Scytothalia dorycarpa*, 97
- sea grasses, algal associations with, 219, 222, 226–7
- seasonal effects, on reproductive structure of epilithic species, 68, 69
- sea urchins, grazing of macroscopic algae, 414, 415, 416, 417
- seawater: benthic communities in, classification of, 40–1; dissolved carbon dioxide, 21; epipelton of, 171–9; epiphyton of, 219–27; epipsammon of, 122–5; chemical composition of, 13; growth patterns of marine plankton, 440, 443–5; oxygen content, 19; phytogeography of macro- and micro-phytic algae, 365–80; rhizobenthos of, 158–9; salinity of, 15–17; symbiotic marine algae, 389, 390; *see also* coastal regions, oceans
- Sebdenia* spp., 222
- Secchi disc depth, 23
- secretion, extracellular, of phytoplankton, 316–20, 356
- sediments, algal contribution to, 484–97; calcium deposition, 490–5; organic remains, 495–8; silica deposition, 484–90; *see also* palaeoecology
- seiches, 24, 25
- Seirospora griffithsiana*, 100
- Selenastrum capricornutum*, 534–5, 536–9, 542
- Selenastrum* spp., 262, 263
- Selenastrum westii*, 128
- septic tanks, and eutrophication, 532
- Septifer* spp., 90–1
- Septorella* spp., 524–5
- sequential comparison index (SCI), 555, 556
- Sergia coracina*, 527n
- Serraticardia maxima*, 90–1
- seston, 39
- sewage and sewage effluent: and eutrophic conditions, 528, 530–1, 532, 535, 540; nutrient removal, 541 2; effects of pollution on algal growth, 544; testing for pollution, 554
- sewage ponds, 406, 464, 548
- Seychelles, frondose algae on algal ridge, 140
- Shark Bay, Australia, 187, 188
- shell-boring algae, 241
- shores *see* coastal regions
- Siderastrea radians*, 391
- silica, deposition of, 484–90
- siliceous nodules *see* flints
- silicon cycle, 481–2
- sinking and floating, of phytoplankton, 297–305, 356; of dead cells, 303; diurnal variations, 303; form resistance, 300–1, 302; gas vacuoles in algae, 303–5; and mucilage sheaths of algae, 298–9, 300
- Siphonocladales, 568
- Skeletonema costatum*, 39, 280, 283, 293, 294, 353; extracellular secretions, 317, 318; grazing of, 406; growth patterns of, 432–3, 440, 443; effects of pollution on, 544, 545, 547; productivity of, 335, 338; and relationship with bacteria, 355, 397; near river mouths, 282; sinking rate, 302; temperature adaptation of, 308; vitamin requirements and excretion, 340, 341
- Skeletonema* spp., 223, 279, 284, 317, 319, 320; and relationship with bacteria, 354, 355, 403
- Skeletonema tropicum*, 308
- Skujapeltis nuda*, 387
- slides, glass microscope: algal range, 128, 134; and collection of epipellic species, 167–8; and collection of phytoplankton, 269; production rate on, 129, 134; sampling methods, 52, 53, 54, 127–30, 135; spore settlement of epilithic species, 75
- Smithora naidum*, 222
- Smithsonimonas abbotti*, 208–9
- snow and ice, algae of, 155, nutrient removal, 212; in sea ice, 210; in surface snows of different colours, 209; on temporary ice, 210

- soil algae, 155, 191–202, 208–9, 212; aerial transport of, 358, 359; depth distribution of, 198–9; of deserts, 196–9; nitrogen fixation, 202; phytoedaphon, 42; and soil types, 200–3; and stabilisation with condition of soil, 199–200; sampling methods, 195–6; temporary algal associations, 202; of tropical areas, 198
- solar radiation, and effects on water temperature, 22–6
- Solomon Islands, reefs of, 138, 140
- Spartina alterniflora*, 172
- Spathoglossum* spp., 93
- speciation, and phytoecology, 383–5
- spectral classes, of physico-chemical tolerances, 512, 514, 517
- Spermatozoopsis* spp., 550
- Spermothamion investiens*, 376
- Sphacelaria cirrosa*, 34, 450
- furcigera*, 149
- hystrix*, 34
- novae-hollandiae*, 149
- penata*, 221
- plumula*, 100, 236
- radicans*, 100
- Sphacelaria* spp., 91, 122, 144, 146
- Sphacelaria tribuloides*, 149
- Sphacelariales, 573
- Sphaerellopsis rubra*, 207
- Sphaerocystis schroeteri*, 273, 412
- Sphaerocystis* spp., 262, 263, 277, 402, 411
- Sphaeropleales, 568
- Sphaerotilus natans*, 553
- Sphaerotilus* spp., 531
- Sphaerzosma granulatum*, 532
- Sphaerzosma* spp., 277
- Sphaerozoum* spp., 394
- Sphagnum* spp., 550
- Sphondylothamion multifidum*, 397
- Sphondylothamion* spp., 101
- Spiniferites bulloides*, 520
- cruciformis*, 519, 520, 521
- Spirogyra crassa*, 128
- Spirogyra* spp., 168, 169, 186, 218, 270–1, 397, 531; as epipelon in streams, 161; grazing of, 407; growth at higher temperature, 205; at lake sites, 59, 60, 63; sampling of, on glass slides, 128; on stones in running water, 52; as weeds, 557
- Spirorbis* spp., 241
- Spirotaenia* spp., 168, 169
- Spirulina corakiana*, 204
- labrynthiformis*, 206
- laxissima*, 280
- platensis*, 280
- Spirulina* spp., 183, 186, 307, 563
- Spirulina subsalsa*, 174, 191
- Splachnidium rugosum*, 91
- Splachnidium* spp., 132
- Spondylosium planum*, 267, 401, 532
- Spondylosium* spp., 233
- sponges, and symbiotic algae, 389
- Spongilla lacustris*, 390, 391
- Spongiocloris* spp., 197, 199, 213, 358
- Spongiocloris typica*, 193
- Spongiococcus* spp., 199
- spores, of algae, 361, 363–5
- Spongomorpha arcta*, 89, 106
- Spongonema tomentosum*, 79, 82
- spore production, and colonisation of coastal regions by epilithic spp., 68–76; factors affecting, 68, 69, 70, 95–6; longevity of, 75–6; seasonal effects upon, 69; spore attachment, 73; swarmer release, 73
- sporelings, of epilithic spp., 76–7
- Sporochmus pedunculatus*, 101
- Sporochmus* spp., 101
- Sporolithon erythraeum*, 140, 141, 147, 148
- Sporolithon* spp., 140, 141
- springs, 31, 55–7, 160, 467; see also hot springs
- Spyridia filamentosa*, 142, 227, 452
- Spyridia* spp., 91, 132, 133, 158
- standing crop, measurement of epilithic spp., 115–17
- Stangeria* spp., 235
- Staphylococcus aureus*, and symbiotic algae, 397
- Staurastrum anatinum*, 267
- boreale*, 532
- brevispinum*, 323
- chaetoceros*, 532
- cingulum*, 401
- dejectum*, 532
- leptocladium*, 247
- limneticum*, 247
- longipes*, 267
- lunatum*, 433, 434, 445, 446, 447
- paradoxum*, 532
- pseudopelagicum*, 401
- punctulatum*, 53
- Staurastrum* spp., 28, 30, 262, 263, 277, 298, 302; as endophytic algae, 237; grazing of, 407; as metaphyton, 233; and parasitic fungi, 402
- Staurodesmus cuspidatus*, 267
- megacanthus*, 401
- Staurodesmus* spp., 233, 277
- Staurodesmus triangularis*, 267
- Stauroneis anceps*, 439, 440
- legumen*, 364
- montana*, 195
- salina*, 172
- palea*, 195
- smithii*, 160, 166
- Stauroneis* spp., 168, 169, 193
- Stellatochara* spp., 524
- Stenogramme californica*, 65
- Stenoneis inconspicua*, 210
- Stenopterobia intermedia*, 167, 364
- Stephanodiscus astrea*, 277, 301, 359, 482, 518, 519
- binderana*, 282
- carconensis*, 512
- hantzschii*, 479, 482, 487
- minutus*, 516
- niagarae*, 128, 277, 282
- rotula*, 409, 431, 432
- Stephanodiscus* spp., 261, 263, 300, 345, 354, 358, 363; 381, 425, 434; counting methods, 267, 269; as metaphyton, 233; in rivers, 267, 269; in soil, 192
- Stephanodiscus tenuis*, 282
- Stephanopyxis palmeriana*, 287
- Stephanopyxis* spp., 338, 443, 506
- Stephanopyxis turris*, 176, 340, 353
- Stephanosphaera* spp., 295
- Stichococcus bacillaris*, 48, 214, 359, 549
- minor*, 359
- Stichococcus* spp., 49, 51, 193, 194, 198, 213
- Stictosiphon subsimplex*, 226
- Stigeoclonium* spp., 59, 63, 215, 216, 531
- Stigeoclonium tenue*, 128, 553
- Stigonema mammosum*, 52, 58, 59
- minutum*, 48, 49
- Stigonema* spp., 41, 47, 48, 214, 563
- Stigonematales, 563 & n
- Stilophora rhizoides*, 116, 451
- Stomochara* spp., 524
- stratification, of phytoplanktonic populations, 345–53
- streams, 52–3, 55, 56, 529, 530, 534, 544, 548; see also rivers
- Streblonema* spp., 222, 235
- Streptococcus pyogenes*, and algal symbiosis, 397
- Striaria attenuata*, 451
- stromatolites, 155, 186–91, 211, 492, 493; algal mat formation, 159, 191; siliceous, 191
- Strongylocentrotus dröbachiensis*, 416, 417
- franciscanus*, 414, 415, 416
- purpuratus*, 414, 415
- Stylosphaeridium* spp., 228
- submersion, and effects on epilithic spp., 66, 72, 78, 79, 87, 92
- substrata, living see living substrata
- subtidal regions, communities of, 40, 41; annual succession, 452–3; carbon fixation values, 471; epilithic spp. of, 67, 78, 79, 93, 96–110; epipelon, 175–9
- succession, annual see annual succession
- Suhria* spp., 564
- sulphide-rich areas of water, and growth of epipellic spp., 183
- sulphur content, of water, and effect of pollution on, 14
- supratidal regions: benthic communities, 40, 41; epilithic species of, 67, 78, 81, 84; rock pool phytoplankton, 291, 293–5; zonation of epilithic species in, 81, 83–3, 85, 93

- surface 'inhibition', of
 phytoplankton, 344, 345
 surf plankton, 295
Surirella brightwellii, 268
gemma, 172
linearis, 364
ovata, 195, 359
Surirella spp., 28, 30, 128, 168,
 169, 177, 278, 282
Surirella spiralis, 160
striatula, 268
 Surirellales, 572
 Surtsey Island, Iceland, 118,
 358, 359
 swarms, of epilithic species,
 69, 73, 75
Syacidium spp., 524
 symbiosis, 241, 387–97;
 algal–animal, 388–95;
 algal–bacterial, 396–7;
 algal–fungal, 396;
 of chloroplasts, 395–6;
 extracellular secretion,
 317; *see also* endophyton,
 parasitism
Symploca atlantica, 79, 174
Symploca spp., 563
Synchytrium borrieriae, 398
Synechococcus arcuatus, 204
aeruginosus, 48
cedrorum, 204
elongatus, 204
eximus, 204
lividus, 204, 206
longatus, 204
major, 48
Synechococcus spp., 203, 563
Synechococcus vesicus, 204
viridissimus, 204
vulcanus, 204
Synechocystis aquatilis, 538
minuscula, 204
Synedra acus, 267; effects of
 phosphate concentration,
 542; production rate on
 glass slides, 129; in rivers,
 268
affinis, 118, 238
crystallina, 240
gouseana, 506
nana, 364, 538
putrida, 398
radians, 128, 323, 538
rumpens, 549
Synedra spp., 29, 30, 210–11,
 217, 221, 226, 270, 278
Synedra ulna, 359, 552; daily
 periodicity of, 161, 162; as
 epiphyton, 218; in lakes,
 63, 277; in rivers, 268;
 sampling of, on glass
 slides, 128, 129; on rocks
 in running water, 53;
 seasonal changes of, 54
vaucheriae, 218
Synura carolinianum, 273
Synura spp., 262, 263, 277, 382,
 410, 412, 435, 440, 481
Synura uvela, 166
Syringodium spp., 222
Tabebuia rigida, 214
Tabellaria binalis, 167
fenestrata, 277, 300, 322, 323,
 354, 364, 516
flocculosa, 134, 267, 364, 519,
 541; carbon fixation rates,
 323; different forms of,
 263–4; as epipelon in
 streams, 161; as
 epiphyton, 218; frequency
 of, on sub-aerial rocks, 48;
 horizontal distribution of,
 290; periodicity of, 430,
 432; on rocks in running
 water, 52; distribution of
 surface sediments, 509,
 510, 511
Tabellaria spp., 28, 30, 261,
 263, 364, 380, 402; as
 epiphyton, 216, 233;
 epipelon in springs, 161
 Tabellariales, 572
 tadpoles, and grazing of
 microscopic algae, 410
Taenioma spp., 93
Talipeus spp., 414
 tannins, production of, 222–3
Tanytarsus lugens, 527
Taonia spp., 97, 101, 222
Tayloriella virgata, 376
Tectarius spp., 138
Tectatodinium psilatium, 518, 520,
 521
Tellamia contorta, 79
intricata, 241
 temperature, air, and desert
 soil algae, 197
 temperature, water: and effects
 on epilithic species, 52, 63,
 70, 71, 75, 94, 108, 109,
 111–15; and effects of
 solar radiation on, 20,
 22–6; and adaptation by
 phytoplankton, 308–9,
 349
Tenarea spp., 153
Tenarea tessellatum, 140, 147,
 148
tortuosa, 89
Terpsinoe spp., 395
 terrestrial habitats, of algae, 27,
 473
Tetracyclus emarginatus, 167
lacustris, 510
Tetracystis spp., 213
Tetralithus spp., 492, 523
Tetraselmis spp., 393
Tetraedron spp., 262, 263, 277,
 358
Tetraedron valdezi, 208–9
 Tetrasporales, 566
 tetrasporangia, of epilithic
 species, 94–6
 tetrasporophyte generation,
 361–2
Thalassia spp., 138, 141, 158,
 219, 222, 226
Thalassia testudinum, 116, 222,
 494
Thalassionema nitzschioides, 118,
 240, 284, 506
Thalassionema spp., 29, 30, 385
Thalassiosira antarctica, 378
convexa, 508
decipiens, 443
fluviatilis, 164, 353, 421
gravidia, 302, 443, 511, 512
nana, 317, 335, 353
nordenskioldii, 282, 283, 321,
 338, 440, 441–2, 445, 546
oestrupii, 508
pseudonana, 309, 341, 545
rotula, 338
Thalassiosira spp., 279, 302,
 309, 385, 505
Thalassiosira subtilis, 289
 Thalassiosirales, 572
Thalassiothrix antarctica, 284
longissima, 511, 512
nitzschioides, 301
Thalassiothrix spp., 279, 506
 thermal pollution, 548–9
 thermocline, 23, 24, 25; and
 accumulation of
 phytoplankton, 345, 348,
 350; artificial breakdown
 of, 354
 thermophilic spp., 31, 202–6,
 212
Thiobacillus spp., 549
Thiothrix nivea, 553
 tidal patterns, 11, 12, 91–2, 93
 tides, 65, 66–8, 91–2
Tilapia nilotica, 407
Tilopteris spp., 97
 Tintinnida, 395
 tolerance, to environmental
 conditions, 512, 513, 514,
 557
Tolypella nidifica, 78, 81, 156
Tolypella spp., 524–5
Tolypocladia glomerata, 149
Tolypothrix byssoidea, 48, 51
distorta, 61
epilithica, 48
lanata, 61
penicillata, 58, 59
Tolypothrix spp., 60, 61–2, 214,
 563
Tolypothrix tenuis, 61, 353
Trachelomonas kolii, 207
Trachelomonas spp., 28, 30, 261,
 263, 550; in deoxygenated
 sites, 183; movement of,
 331; in rivers, 268
Trachyneis aspera, 240
Trailiella intricata, 98, 100
 transference of nutrients,
 between host and
 epiphytic algae, 223–6
 Traunsee, Lake, distribution of
 epilithic algae in, 60, 61–2
Trebouxia spp., 51, 214, 396
Trentepohlia aurea, 48, 50, 214
jolithus, 49
Trentepohlia spp., 61–2, 213, 396
Trentepohlia umbrina, 48
 Trentepohliales, 213–14, 566
Tribonema minus, 57, 60
 Tribonematales, 570
Tribonema spp., 53, 57, 60,
 530–1
Triceratium favus, 185
Triceratium spp., 150
Trichodesmium contortum, 305
erythraeum, 305
Trichodesmium spp., 260, 279,
 290, 563; flotation of, 305;
 nitrogen fixation, 309–10,
 313; and effect of water
 motion on, 10, 12
Triclypella spp., 524–5
Tridachia crispata, 395
Tridachiella diomedea, 395
Tridachna spp., 391
 Tridachnida, and symbiotic
 algae, 391
Trifolium repens, 201
Triplastrum spp., 380
 tripton, 39, 46
Trochiscia americana, 208–9
antarctica, 209
aspera, 199
clevei, 321
hirta, 214
reticulatum, 198
Trochiscia spp., 51, 198, 209,
 321
Trochiliscus spp., 524

- Tropidoneis* spp., 29, 30
 'trottoir', 153
 tufa, epilithic flora of, 55, 56
 Tunicata, 230
 Turbellaria, 229, 230, 387
 turbidimetric techniques, for
 estimating biomass of
 phytoplankton, 252
Turbinaria ornata, 143, 149
Turbinaria spp., 138, 149
 turtles, epizootic algae of,
 239–40
*Tydemannia expeditione*s, 370
Tydemannia spp., 145, 370
- Udotea javanensis*, 149
petiolata, 107, 108
Udotea spp., 144, 146, 227, 370;
 epiphyte on mangroves,
 228; effects of light
 intensity on, 110; rhizoidal
 systems of, 158
Ulothrix flacca, 114, 115
implexa, 450
pseudoflacca, 174, 239, 240
Ulothrix spp., 28, 30, 549;
 colonisation of lava flows,
 118; and fungal parasites,
 399; growth at higher
 temperatures, 205; effect
 of herbicides on, 200;
 mat formation, 159; as
 metaphyton, 233; on rocks
 in running water, 52; as
 snow, 210; in supratidal
 regions, 84
Ulothrix subflaccida, 174
subtilis, 549
tenerrima, 549
Ulothrix zonata, 363, 549, 553
 Ulotrichales, 567
Ulva expansa, 117, 118
fasciata, 142, 360, 532
lactuca, 397; and bacterial
 symbiosis, 397; as
 epiphyte, 226; growth
 patterns, 450; and effects
 of dissolved oxygen in
 water, 20; and effects of
 light on ion exchange,
 109; phenology of
 reproductive structures,
 69; effects of pollution on,
 545; in rock pools, 293;
 effects of temperature on
 respiration, 113; zonation
 of, in coastal regions,
 82
lobata, 65, 73, 74
reticulata, 73, 142, 360, 361,
 532
rigida, 36
Ulva spp., 130, 239, 240;
 colonisation of coastal
 regions, 120; in coastal
 rock pools, 96; effects of
 day length on, 110; effects
 of depth on pigmentation,
 110; increase of in
 eutrophic waters, 532;
 grazing of, 415; and
 nutrient transference, 223;
 effect of oil pollution on,
 77; sporclings, growth of,
 76; temperature effects on
 respiration, 112, 113;
 zonation by depth, of
 subtidal regions, 97, 98,
 99, 100
 Ulvales, 566
Ulvella frequens, 55
Ulvella spp., 221, 233
 Ulvetalia, 36
Umbellosphaera irregularis, 502
tenuis, 284
Undaria pinnatifida, 90–1
Unio spp., 394, 410
Uroglena spp., 261, 263
Urospora hartzei, 79
penicilliformis, 79, 118
Urospora spp., 92
Urospora speciosa, 82
Utricularia spp., 218, 219
- Valdivia* spp., 93
Valonia cegagropila, 142
macrophysa, 109
Valonia spp., 138, 227
Valonia utricularis, 186
ventricosa, 149
Vampyrella spp., 399, 402
Vaucheria arcassonensis, 173, 174,
 450
bursata, 173
canalicularis, 173, 174
compacta, 173, 174, 450
coronata, 173, 174, 450
cruciata, 173
dillwynii, 173
erythrospora, 173, 174
frigida, 173
intermedia, 173, 174, 450
littorea, 174
minuta, 173, 450
pilobaloides, 557
sescuplicaria, 174
sessilis, 553
subsimplex, 173, 174
synandra, 173, 174
Vaucheria spp., 78, 159, 168,
 169; on flints in rivers, 54;
 on rocks in running water,
 52; on salt marshes,
 172–4; of soils, 193
Vaucheria terrestris, 173
thuretii, 450
velutina, 173, 174
 Vaucheriales, 570
Velevella velevella, 388
Verongia spp., 389
Verrucaria maura, 82, 86
Verrucaria spp., 86, 138
 vertical distribution *see*
 distribution, vertical
Vibrio spp., 403
Vidalia spp., 103, 132
Vidalia volubilis, 108, 186
 viruses, as algal parasites, 400
 vitamin requirements, and
 excretion of, by
 phytoplankton, 340–1
 Volvocales, 268, 566
Volvox aureus, 267, 396
globator, 319
Volvox spp., 18, 243, 262, 263,
 318, 397, 403
Volvox tertius, 319
Volvulina pringsheimii, 319
Vriesia sintensii, 214
- Waermiella lucifuga*, 79
 Waikiki; distribution of algae
 on algal ridge of coral reef,
 139, 140, 142; distribution
 of algal plain, 147, 148;
 calcareous red algae, 141
Waldoia antillarum, 376
 walls, epilithic species on, 49
 water: chemical properties of,
 12–22; circulation of,
 8–12; depth of *see* depth of
 water; origins of, 7; solar
 radiation and
 temperature, 22–6; *see also*
 freshwater, lakes, rivers,
 seawater
 water blooms, 305–7, 343, 355;
 and flotation of algae, 304
 waterworks, filter beds of,
 endopsammon of, 126;
 wave force: and effects on algal
 species of coral reefs, 137,
 138, 140; and effects on
 epilithic species, 87, 101–2,
 108; and effects on giant
 kelps, 12
 weeds, algae as, 557–8
 whales, sperm: epizootic algae
 of, 240–1; and grazing of
 microscopic algae, 404, 405
 wind-rows, of phytoplankton,
 291, 293
 winds, and dispersal of algae,
 358, 360
Wrangelia bicuspadata, 227
Wrangelia spp., 91, 132, 133
- Xanthidium antilopaeum*, 234
Xanthidium spp., 262, 263, 298,
 402
 Xanthophyceae, 174, 359
 Xanthophyta, 18, 193, 200,
 255, 260, 450, 569–70
Xenia hicksoni, 391
*Xenococcus kerner*i, 50, 59
rivularis, 56
Xenococcus spp., 563
Xiphophora spp., 103
- Yamaedaella ceno*myce, 149
- Zanardinula* spp., 65
 zinc, effects of, as a pollutant,
 545, 546
Zoanthus flosmarinus, 388
sociatus, 391
Zoanthus spp., 390–1
Zonaria spp., 140
 zonation, of epilithic species,
 64–8, 81, 82–3, 86; in
 subtidal regions, 96, 97,
 98, 99, 100, 101–3, 104–5
 zooplankton: energy flow, 461;
 in food web, 420; annual
 cycles of, 407, 408, 409;
 and grazing on
 microscopic algae, 403,
 404
 zooxanthellae, and symbiotic
 algae, 388, 389
Zostera marina, 116, 224, 231–2,
 475
Zostera spp., 81, 96, 219, 227
 Zygnematales, 567
Zygorhizidium spp., 400
Zygnema cylindricum, 48
Zygnema spp., 168, 169; as
 epipelon in streams, 161;
 at lake sites, 59, 60; on
 rocks in running water,
 52; sampling of, on glass
 slides, 128; as weeds, 557
 Zygnemaphyceae, 48, 61, 218,
 233
Zygnemopsis spp., 214
Zygonium ericetorium, 234, 549