Index

A

accelerators, 204
acclimating new fish, 95–98
acidity, 210–211, 311
acriflavin, 273
acrylic aquariums, 108
actinic lighting, 147, 162, 311
actinic wattage, 147
activated carbon, 268, 276, 311
activated charcoal, 114
adipose fin, 311
aeration, 130–132, 191, 194, 214, 311
aerator, venturi, 119
aerobic bacteria, 311
aggression, 45, 46, 60, 97–98
aggressive behavior, 262, 280
agonistic behavior, 45, 280
air diffuser, 131
air pump, 131–132
airstones, 131–132, 311
algae
blue-green, 224–225
brown, 223
in clams, 80
in coral, 74
description, 217, 311
diatoms, 223
dinoflagellates, 224
eating by fish and invertebrates, 220
excessive, 219–221
in gorgonians, 76
green, 221–222
hair, 222
light and nutrient needs of, 218–219, 220
macro, 164, 218
micro, 218
in mushroom anemones, 73
red, 222
removing, 220–221
in sea anemones, 71
seaweeds, 164, 217, 218, 221, 223
snails feeding on, 79
sterility syndrome, 219
algae scrubber, 176
alkalinity, 212–213, 311
American Marinelife Dealers Association, 155, 309
ammonia, 25, 199–205, 311
ampullae of Lorenzini, 27
anaerobic bacteria, 312
anal fin, 22, 311
anatomy
body shape, 20
diagram of, 21
feeding, 24
fins, 20–22
respiration, 24–25
scales, 23
senses, 25–27
swim bladder, 23–24
anemonefish, Clark’s, 56
anemonefishes. See clownfishes
anemones. See sea anemones
angelfishes
Arabian, 63
bicolor, 63
blue-faced, 64
description of family, 29, 55
difficult species, 63–64
French, 64
good choices, 55
king, 64
Koran, 64
purple moon, 63
queen, 64
regal (royal), 64
rock beauty, 64
three-spot, 63
Annelida (invertebrate phylum), 81–82
anoxic zones, 181
antibiotics, 270
appetite, loss of, 264
Aqua Link (Web site), 309
Aquaria Central (Web site), 309
Aquariology: Fish Diseases and Water Chemistry (Gratzek), 306
aquarist, 13, 312
aquarium
  fish capacity, 105–106
  hospital tank, 268–269
  placement, 102–104, 187–188
  rinsing, 188
  size, 104–106
  tank types, 106–108
  weight, 103
Aquarium Advice (Web site), 309
Aquarium Filtration (Stratton), 307
Aquarium Fish (Mills), 306
Aquarium Fish.com (Web site), 309
Aquarium Global Resource (Web site), 309
Aquarium.net (Web site), 309
Aquariums For Dummies (Hargrove, M.), 306
aquascape
  coral, 162–164
  definition, 312
  gravel, 157–158
  natural look, 154–155
  ornaments, 165
  plants, 164
  rock, 158–162
  rules for, 154
  water chemistry, effect on, 154
Aquatic Book Shop (Web site), 310
aragonite, 157
archerfishes, 184
area conversions, 296–297
argulids, 275
Aristotle's lantern, 90
Arthropoda (invertebrate phylum), 83–87
arthropods
  crabs, 83–84
  description, 83
  lobsters, 85, 292
  shrimps, 86–87, 292
Atlas of Marine Aquarium Fishes (Burgess, Axelrod and Hunziker), 306
• B •
background
  description, 155–156
  diorama, 156
  paint, 156
  stick-on, 156
  tank, 188
bacteria
  aerobic and anaerobic, 311
  in maturation process, 202–204
  in nitrogen cycle, 200–201
  seeding aquarium with, 203
bacterial infections, 270–271
bags, air space in, 95
Bailey, M. (The Ultimate Aquarium), 305
bannerfish, 52
barbel, 26, 312
The Basic Marine Aquarium (Bower), 305
basslets, fairy
  black-cap gramma, 62
  description of family, 34
benthic, 224
bicarbonates, 212
bimetallic strip, 139
bioballs, 124, 231
bioload, 202, 205, 312
biological filtration
  description, 113–114, 312
  by live rock, 124
  nitrogen cycle, 200–201
  with undergravel filter, 114, 118–120
biowheels, 120–121
bivalves, 80, 292
black spot, 274
blackworms, 250
blanching vegetables, 246
bleach, 275
blennies
bicolor, 51
description of family, 30–31
difficult species, 61
false cleanerfish, 61
good choices, 51
Midas, 51
Persian, 51
redlip, 61
blue devil, 64
blue-green algae, 224–225
books
Aquariology: Fish Diseases and Water Chemistry (Gratzek), 306
Aquarium Filtration (Stratton), 307
Aquarium Fish (Mills), 306
Aquariums For Dummies (Hargrove, M.), 306
Atlas of Marine Aquarium Fishes (Burgess, Axelrod and Hunziker), 306
The Basic Marine Aquarium (Bower), 305
Captive Seawater Fishes: Science and Technology (Spotte), 307
Catalogue of the Genera of Recent Fishes (Eschmeyer), 306
Clownfishes in the Aquarium (Skomal), 307
The Complete Aquarium (Scott), 306
The Conscientious Marine Aquarist (Fenner), 306
The Coral Reef Aquarium: An Owner’s Guide to a Happy Healthy Pet (Shimek), 306
The Diversity of Fishes (Helfman, Collette, and Facey), 306
The Everything Tropical Fish Book (DeVito and Skomal), 306
Fish Medicine (Stoskopf), 307
Fishes: An Introduction to Ichthyology (Moyle and Cech, Jr.), 306
An Illustrated Encyclopedia of Aquarium Fish (Sandford), 306
Keeping Marine Fish: An Aquarium Guide (Lundegaard), 306
The Macmillan Book of the Marine Aquarium (Dakin), 306
The Marine Aquarium Manual (Melzak), 306
Marine Aquariums: A Complete Introduction (Burgess), 305
A PocketExpert Guide to Marine Invertebrates: 500+ Essential-to-Know Aquarium Species (Shimek), 307
The Reef Aquarium: A Comprehensive Guide to the Identification and Care of Tropical Marine Invertebrates, 306
Reef Fishes, Volume 1: A Guide to Their Identification (Michael), 306
Seawater Aquariums (Spotte), 307
Setting Up a Saltwater Aquarium, An Owner’s Guide to a Happy Healthy Pet (Skomal), 307
The Tropical Marine Fish Survival Manual (Kay), 306
The Ultimate Aquarium (Bailey and Sandford), 305
Your First Marine Aquarium (Tullock), 307
Bower, C.E. (The Basic Marine Aquarium), 305
boxfishes
avoiding species, 288
description of family, 31
spiny, 62
spotted, 63
brackish water, 179, 312
brackish water aquarium
description, 15, 179–180
equipment for, 180–182
fishes for, 182–185
plants for, 185–186
brine shrimp, 247, 248–249, 312
bristleworm, 291
brown algae, 223
brush, tube, 177
buffering capacity, 211, 212, 214, 312
buoyancy, maintaining, 23–24
Burgess, W.E.
Atlas of Marine Aquarium Fishes, 306
Marine Aquariums: A Complete Introduction, 305
burrefish, striped, 62
butterflyfishes
  banded, 61
  Chevron, 61
copperband, 61
description of family, 31
difficult species, 61
four-eyed, 61
good choices, 52
hooded, 61
red tailed, 61
red-headed, 61
saddleback, 61
threadfin, 52
wimplefish, 52
yellow long-nosed, 61

• C •
calcareous
definition, 312
gravel, 157
ornamentation, 154
rock, 159
calcium carbonate
  in coral, 73–74, 163
definition, 312
  in sea urchins, 89
calcium hydroxide, 168, 211, 213
calcium, level in water, 215
camera, 282–283
canister filters, 122, 189, 193, 230
capacity, aquarium, 105–106
captive bred fish, 12
Captive Seawater Fishes: Science and Technology (Spotte), 307
capture stress, 259–260
carapace, 83
carbohydrates, 245
carbon, activated, 268, 276, 311
carbon dioxide, 199–200, 214–215, 312
carbonate hardness, 212–213
cardinalfishes
  description of family, 32
  flamefish, 50
  pajama, 50
carnivores, 47, 244, 254, 312

Catalogue of the Genera of Recent Fishes (Eschmeyer), 306
catfishes, description of family, 32
caudal fin, 22, 312
Caulerpa spp., 222
cauliflower disease, 272
Cech, Jr., J.J. (Fishes: An Introduction to Ichthyology), 306
cephalopods, 81, 291
charcoal, activated, 114
chloramine, 167, 234, 312
chlorine, 167, 234
choosing fish
  attitude, 46
  diet, 46–47
  finding good choices, 48
  health assessment, 94
  size, 46
Christmas tree worms, 82
chromatophores, 23
chromis, blue green, 57
circulation, 130–133
clams, 80
cleaner fish, 35
cleanerfish, false, 61
cleaning
  filters, 229–231
  importance of, 227
  schedule, 235–237
  testing, 231–232
  tools, 174–177
  vacuuming, 228–229
  water changes, 232–235
clownfishes
  common, 56
  description of family, 32–33
  orange, 56
  sea anemones, 71
Clownfishes in the Aquarium (Skomal), 307
clubs, 307
Cnidaria (invertebrate phylum), 70–77
Collette, B.B. (The Diversity of Fishes), 306
color, faded, 265
community tank, 312
The Complete Aquarium (Scott), 306
conches, queen, 79, 292
The Conscientious Marine Aquarist (Fenner), 306
conservation, 155
conversions, metric
  area, 296–297
  length, 295–296
  temperature, 295
  volume, 297
  weight, 296
copepods, 275
copper, 216, 270, 274
coral
  aquascaping with, 162–164
  artificial, 163–164
  dead, 163
  fire, 293
  horny, 76–77
  live, 164
The Coral Reef Aquarium: An Owner’s Guide
to a Happy Healthy Pet (Shimek), 306
coral, soft
  finger or colt corals, 76
  illustration of, 77
  leather or mushroom corals, 76
  pulse or waving hand corals, 76
  spicules, 76
coral, stony
  algae associated with, 74
  brain corals, 75
  bubble corals, 75
  calcium carbonate skeleton, 73–74
  feeding, 74
  plate corals, 75
  polyps, 74
  staghorn and elkhorn corals, 74
  sun corals, 75
  vase and frog spawn corals, 74
coral trout, 65
corallfish, pennant, 52
coris
  clown, 62
  queen, 54
counter-current protein skimmer, 126–127
cowries, 79
crab
  anemone, 84
  arrow, 84
hermit, 84
horseshoe, 83, 84
crowding, 261
crown of thorns starfish, 291
crustaceans
  infestations, 275
  species for the aquarium, 83–87
cryptocaryoniasis, 274
cysts, 249
D
Dakin, N. (The Macmillan Book of the
  Marine Aquarium), 306
damselfishes
  anemonefish, Clark’s, 56
  blue devil, 64
  chromis, blue green, 57
  clownfish, common, 56
  description of family, 33
  difficult species, 64
  good choices, 56–57
  sergeant major, 56–57
  use in maturation process, 203
dealer, choosing, 12–13
dechlorinator, 167
decoration
  background, 155–156
  invertebrates, 164
  setup, 190
deionization, 168
Delbeek, C.J. (The Reef Aquarium:
  A Comprehensive Guide to the
  Identification and Care of Tropical
  Marine Invertebrates), 306
denitrators, 128
denticles, 23
detritus, 225, 228–229
DeVito, C. (The Everything Tropical Fish
  Book), 306
diatom filters, 128
diatoms, 204, 223, 312
digestive system, anatomy of, 24
dinoflagellate, 74, 224, 273
diorama, 156
dip method, 269
discoloration, 265
diseases
  bacterial, 270–271
  black spot, 274
  cauliflower disease, 272
  crustacean infestations, 275
  cryptocaryoniasis, 274
  erosion, head and lateral line, 275
  exophiala disease, 273
  fin rot, 271
  fungal, 272–273
  ichthyophonus disease, 272
  in invertebrates, 273–275, 276
  lymphocystis, 272
  marine ich, 274
  marine velvet disease, 273
  marine white spot, 274
  medications, 270
  parasitic, 273–275
  poisoning, 276
  stress, 266
  tang turbellarian disease, 274
  treatment methods, 267–269
  trematodes, 275
  tuberculosis, 271
  ulcer disease, 271
  uronema disease, 274
  vibriosis, 271
  viral, 272
  wasting disease, 271
  whirling disease, 272
  distilled water, 235, 312
  diurnal fishes, 44, 146, 312

The Diversity of Fishes (Helfman, Collette, and Facey), 306
dolomite, 157
doors, locating aquarium near, 103
dorsal fin, 22, 313
dottybacks
  description of family, 34
  difficult species, 64
  good choices, 58
  royal, 64
  strawberry gramma, 58
dragonets, description of family, 34

- E -
earthworms, 250
echinoderms
  pentamerous radial symmetry, 87
  sea cucumbers, 90–91, 293
  sea stars, 88–89, 291
  sea urchins, 89–90
  sensitivity to salinity, 87
eels, moray
  avoiding species, 288
  description of family, 37
  reticulated, 63
  snowflake, 63
electrical fields, detection of, 27
  electricity, dangers of, 103–104
  emergencies
    leaks, 238
    overheating, 238–239
    planning for, 237
    pollution, 239
    power failures, 238
  epidermis, 23
equipment. See also specific items
  algae scrubber, 176
  cleaning tools, 174–177
  hydrometer, 168–170
  list of needed, 14
  logging addition or replacement, 281
  nets, 172–174
  vacuum, 228–229
  water testing, 168–172
  erosion, head and lateral line, 275
  Eschmeyer, W.M. (Catalogue of the Genera of Recent Fishes), 306
  estuary, 180
euthanasia, 276
evaporation
  effect on salt level, 109, 209
  water loss from, 235
  The Everything Tropical Fish Book (DeVito and Skomal), 306
  exophiala disease, 273
  exoskeleton, 74, 83
  eyes
    anatomy, 25
    clouded, 265
Facey, D.E. (The Diversity of Fishes), 306
fairy basslets
  black-cap gramma, 62
description of family, 34
family, involving in fish keeping,
  30, 278, 313
fanworms, 82
featherduster worms, 82
feeder, automatic, 254
feeder fish, 250
feeding
  anatomy, 24
  appetite, loss of, 264
  brine shrimp, 248–249
carbohydrates, 245
carnivores, 47, 244, 254, 312
choosing fish based on diet, 46–47
dried foods, 247
filter feeders, 254–255, 313
flake foods, 247–248
frozen foods, 247, 252
guidelines, 250–254
herbivores, 244, 254, 313
invertebrates, 254–255
lipids (fats), 245
live foods, 248–250
logging, 280–281
meaty foods, 246–247
natural foods, 246–247
omnivores, 244, 314
overfeeding, 251
poor nutrition as stressor, 261
prepared foods, 247–248
proteins, 245
traveling, 253–254
variety of foods, 253
vegetables, 246
vitamins and minerals, 245
watching fish during, 252–253
Fenner, R.M. (The Conscientious Marine Aquarist), 306
filefishes
  description of family, 34
  long-nose, 63
filter
  for brackish water aquarium, 181
canister, 122, 189, 193, 230
choosing, 115–116, 129–130
cleaning, 229–231
definition, 313
denitrators, 128
diatom, 128
fluidized bed, 125, 190, 193
in-line, 126
inside box, 116–117, 229
live rock, 124–125, 190, 194, 231
medium, 112–113
power filters, 120–121, 189, 193, 230
protein skimmers, 126–127, 190, 194, 231
reversing flow through, 118–119
setup, 188–190, 192–194
sponge, 117, 229
trickle, 123–124, 189, 193, 231
undergravel, 114, 118–120, 189, 193, 230
wet-dry, 123–124
filter feeders, 254–255, 313
filtration
  biological, 113–114, 312
  chemical, 114
  complete water-management systems, 128
description, 112–113
  foam fractionation, 126
importance of, 111
mechanical, 113, 313
water disinfection, 129
fin
  adipose, 311
  anal, 22, 311
caudal, 22, 312
dorsal, 22, 313
frayed, 265
pectoral, 22, 314
pelvic, 22, 314
shapes, 21
spines, 21, 22
uses, 20
fin rot, 271
fingerfishes, 183
fire coral, 293
Fish Base (Web site), 310
fish, families of brackish water
  archerfishes, 184
  mollies, 184–185
  monos, 183
  puffers, 185
  scats, 183–184
Fish, families of saltwater activity levels, 44
angelfishes, 29, 55, 63–64
blennies, 30–31, 51, 61
boxfishes, 31, 63
boxfishes and trunkfishes, 288
butterflyfishes, 31, 52, 61
cardinalfishes, 32, 50
catfishes, 32
crownsfishes, 32–33
damselshishes, 33, 56–57, 64
dottybacks, 34, 58, 64
dragonets, 34
fairy basslets, 34, 62
filefishes, 34, 63
gobies, 35, 52–53
grouper and sea basses, 35, 288
grunts, 36
hawkfishes, 36
lionfishes, 64
lionfishes and scorpionfishes, 37, 288
moray eels, 37, 63, 288
parrotfishes, 37, 289
porcupinefishes, 37, 62
pufferfishes, 59, 65
puffers, 38
rabbitfishes, 38, 58–59
sea basses, 58, 65
seahorses, 289
seahorses and pipefishes, 39, 65
sharks, 39, 287
skates and rays, 287
snappers, 39, 63, 289
squirrelfishes, 39–40, 62
stonefish, 287
surgeonfishes and tangs, 40, 48–49, 60
twentylips, 57
triggerfishes, 40–41, 50–51, 60–61
trunkfishes, 31
wormfishes, 41
wrasses, 41, 54–55, 62
Fish Index (Web site), 310
Fish Medicine (Stoskopf), 307
Fishes: An Introduction to Ichthyology (Moyle and Cech, Jr.), 306
fishnet, 172–174
flagella, 224
flagyl, 275
flamefish, 32, 50
flatworms, 77–78, 244
floss, filter, 112–114
fluidized bed filter, 125, 190, 193
foam fractionation, 126, 313
food. See feeding formalin, 274
foxface, 58–59
freeze-drying, 247
Freshwater and Marine Aquarium (magazine), 308
freshwater dip, 269, 273
frustules, 223
fungus disease, 272–273

G

Gases
- carbon dioxide, 199–200, 214–215, 312
- oxygen, 25, 104, 213–214
gasping, 264
genus, 30, 313
gills, 24–25, 313
gillslit, 25
girth, fish, 106
glass shrimp, 250
glass tank, 107
goby
description of family, 35, 52
lemon, 53
neon, 53
Randall’s shrimp, 53
gorgonians, 76–77
gamma
black-cap, 62
flash-back, 58
strawberry, 58
Gratzek, J.B. (Aquariology: Fish Diseases and Water Chemistry), 306
gravel
- calcareous, 157
- cleaning, 175–176
depth, 158
- as filter medium, 114, 118
- rinsing, 157
- for seeding bacteria, 203
- size, 158
gravel tidy, 118, 158
green algae, 221–222

groupers
  avoiding species, 288
  description of family, 35
  golden-stripe, 65
  grunts, 36

• H •

habitat, 47, 313
hair algae, 222
Halimeda spp., 222
handling stress, 259–260
hard coral. See coral, stony
hardness, 212–213, 313
Hargrove, M. (Aquariums For Dummies), 306
hawkfishes, 36
healthy fish, choosing, 94–95
hearing, 26
heater, aquarium
  for brackish water aquarium, 181
  cost, 137
  damaged, 137
  depth and length, 143
  description, 135–136, 136–137
  hanging, 137
  malfunctions, 238–239, 262
  multiple, 142–143
  need for, 135–136
  placement, 139
  safety, 143
  setup, 191, 192
  size, 141–142, 144
  submersible, 138
  temperature control, 140
  thermal protection, 141
  thermostat, 139–140
  wattage, 141, 143
Helfman, G.S. (The Diversity of Fishes), 306
herbivores, 244, 254, 313
hogfish, Spanish, 54
homeostasis, 257–258
hood, aquarium, 108–109, 192
hospital tank, 268–269
hydras, 70
hydrogen ions, 210
hydroids, 70
hydrometer
  calibration, 209
  description, 168–169, 182, 313
  floating, 169
  swing-needle, 170
  using, 209
Hygrophila spp., 186

• I •

ich, marine, 274
ichthyologists, 11
ichthyology, 11, 313
ichthyophonus disease, 272
An Illustrated Encyclopedia of Aquarium Fish (Sandford), 306
injury, as stressor, 260–261
Internet resources, 308–310
invertebrates
  to avoid, 291–293
  bivalves, 80, 292
  cephalopods, 81, 291
  classification, 68
  corals, soft, 76
  corals, stony, 73–75
  crabs, 83–84
  as decorations, 164
  definition, 313
  diseases of, 276
  diversity in, 67–68
  flatworms, 77–78
  lobsters, 85, 292
  phylum Annelida, 81–82
  phylum Arthropoda, 83–87
  phylum Cnidaria, 70–77
  phylum Echinodermata, 87–91
  phylum Mollusca, 78–81
  phylum Phylum Platyhelminthes, 77–78
  phylum Porifera, 69
  polyps, 73
  sea anemones, 70–73
  sea fans, 76–77
  sea whips, 76–77
  shrimp, 86–87, 292
  snails, 78–79, 292
  sponges, 69
  worms, segmented, 81–82
  iodine, 168
ion-exchange resins, 114
ions, 210
iridophores, 23
isopods, 275

Java fern, 186
jellyfish, 70, 292
journal. See log, aquarium

kalkwasser, 168, 211, 213, 313
Kay, G. (The Tropical Marine Fish Survival Manual), 306
Keeping Marine Fish: An Aquarium Guide (Lundegaard), 306
kelp, 223
kidneys, 28

lagena, 26
lateral line, 26–27, 313
lava rock, 159
laziness, as sign of stress, 264
leaks, 238
length, 295–296, 313
light attenuation, 146
light spectrum, visible, 146
lighting
actinic, 162, 311
algae, 218, 220
for brackish water aquarium, 181
combination system, 151
for coral reef habitat, 145–146
diurnal and nocturnal activity level, 44, 146
fixture types, 147
fluorescent, 148–149
intensity, 146–147
mercury vapor, 150
metal halide, 150
natural light, 148
for photography, 282
poor as stressor, 261
power compact fluorescent, 149
setup, 194
spectrum, 146, 148
timer, 151
tungsten, 148
lionfishes
avoiding species, 288
description of family, 37
shortfin turkeyfish, 64
lipids (fats), 245
live rock
 cleaning, 231
cultured, 160, 162
cured, 161, 203
cycling/seeding, 162
definition, 313
as filtration method, 124–125, 195
in maturation process, 202–203
organisms in, 160–161
recommendations on, 161–162
setup, 190, 194
uncured, 161
live sand, 157, 195, 202–203, 313
lobster
 avoiding in aquarium, 292
flame, 85
purple spiny, 85
location, aquarium, 102–104
log, aquarium
on comings and goings, 280
equipment addition or replacement, 281
feedings, 280–281
fish interactions and behavior, 280
general notes, 282
importance of, 279
problems, 281
long bath, 268
Lundegaard, G. (Keeping Marine Fish: An Aquarium Guide), 306
lymphocystis, 272

The Macmillan Book of the Marine Aquarium (Dakin), 306
magazines, 307–308
maintenance schedule
biweekly, 236
daily, 235–236
monthly, 236
quarterly, 237
weekly, 236
yearly, 237
malachite green, 268, 273
malathion, 275
Malayan angel, 183
mandarinfish, 34
Marine Aquarium Advice (Web site), 310
Marine Aquarium Council, 12, 155, 310
*The Marine Aquarium Manual* (Melzak), 306
*Marine Aquariums: A Complete Introduction* (Burgess), 305
marine biology, 279
marine, definition, 313
marine ich, 274
marine velvet disease, 273
marine white spot, 274
maturation, 202–204
mebendazole, 275
mechanical filtration, 113, 313
medication
  antibiotics, 270, 271
copper, 270, 274
internal, 269
overdosage, 268
melanophores, 23
Melzak, M. (*The Marine Aquarium Manual*), 306
metric conversions
  area, 296–297
  length, 295–296
  temperature, 295
  volume, 297
  weight, 296
Michael, S.W. (*Reef Fishes, Volume 1: A Guide to Their Identification*), 306
Mills, D. (*Aquarium Fish*), 306
minerals, 245, 314
mollies, 184–185
Mollusca (invertebrate phylum), 78–81
mollusks
  bivalves, 80, 292
cephalopods, 81, 291
description, 78
snails, 78–79, 292
monos, 183
mooneyfishes, 183
moray eels
  avoiding species, 288
  description of family, 37
  reticulated, 63
  snowflake, 63
mouth, anatomy of, 24
Moyle, P.B. (*Fishes: An Introduction to Ichthyology*), 306
mucous, 23, 260, 261
mulm, 314
mushroom anemones, 73
mussels, 80

• N •
naming fish, 277
nares, 26
nauplii, 248, 249, 314
nematocysts, 70
nets, 172–174
new fish
  acclimating, 95–98
  choosing healthy, 94–95
  stress and quarantine, 93–94
  transporting, 95
nictitating membranes, 25
nitrate
  algae, 218–219, 220
definition, 314
denitrators for reduction of, 128
in nitrogen cycle, 200, 201, 204
nitrification, 201, 314
nitrite
  definition, 314
  in nitrogen cycle, 200, 201, 204
*Nitrobacter*, 201
nitrofurazone, 273
nitrogen cycle
  biological filtration, 200–201
description, 200, 314
maturation, 201–204
problems, 205
role of bacteria, 201
testing, 201
Nitrosomonas, 201
nocturnal fishes, 44, 146, 314
nudibranchs, 79
nutrients, 243
nutrition, poor as stressor, 261

• O •

observing fish
appetite loss, 264
discoloration, 265
eyes, clouded, 265
fins, frayed, 265
gasping, 264
laziness, 264
for relaxation, 278
rubbing/twitching behavior, 264
showing off, 278–279
stomach appearance, 265
writing down in log, 280
octopuses, 81, 291
olfactory system, 26
omnivores, 244, 314
operculum, 25, 314
ornamentation. See also aquascape
adding to tank, 165
calcareous, 154
setup, 190
osmoregulation, 28, 314
osmosis, 27, 314
osmotic stress, 263
otoliths, 26
overcrowding, 105, 261
overfeeding, 251
overheating, 238–239
oxygen
content of water, 25
dissolved, 213–214
measuring, 213–214
temperature effect on water
content of, 104
oysters, 80
ozone, 129, 314
ozonizers, 115, 129

• P •
paint, background, 156
parasitic infestations
black spot, 274
crustacean infestations, 275
cryptocaryoniasis, 274
definition, 314
marine ich, 274
marine velvet disease, 273
marine white spot, 274
tang turbellarian disease, 274
trematodes, 275
uronema disease, 274
parrotfishes
avoiding species, 289
description of family, 37
pectoral fin, 22, 314
pelagic, definition, 314
pelvic fin, 22, 314
pets, aquarium fish as, 11
pH
carbonate hardness, 212–213
definition, 314
fluctuations, 211
scale, 210–211
solution, 211
pharyngeal jaws, 41
phosphate, 215–216
photography, 282–283
photosynthesis, 314
phycoerythrin, 222
phytoplankton, 223
pipefishes
banded, 65
description of family, 39
plankton, 218, 223, 314
plants
aquascaping with, 164
artificial, 164
for brackish water aquarium, 185–186
tending, 186
Platyhelminthes (invertebrate phylum),
77–78, 274
A PocketExpert Guide to Marine Invertebrates: 500+ Essential-to-Know Aquarium Species (Shimek), 307

- **Q**
  - quarantine period, 93
  - quarantine tank
    - acclimating fish to, 96–97
    - description, 93–94, 172
    - hospital tank as, 268
    - water quality of, 94

- **R**
  - rabbitfishes, 38, 58–59
  - radial symmetry, 70, 87
  - radula, 78
  - rays (fin), 315
  - rays (species), 287
  - red algae, 222
  - red slime, 225
  - red-rim flatworm, 78
  - red-tide, 224

*The Reef Aquarium: A Comprehensive Guide to the Identification and Care of Tropical Marine Invertebrates*, 306

*Reef Fishes, Volume 1: A Guide to Their Identification* (Michael), 306

- reef supplements, 168
- reef tank, 315
- relaxation, 278
- resources
  - books, 305–307
  - clubs, 307
  - Internet, 308–310
  - magazines, 307–308
- respiration, 24–25, 112, 213
- responsibilities, as aquarist, 13–14
- reverse osmosis, 168
- rock
  - choices, 158–162
  - dead, 159
  - lava, 159
  - tufa, 159
- rotifers, 250
- rubbing behavior, 264
sacculus, 26
sailfin mollie, 184–185
salinity
brackish water, 182
defined, 27, 315
echinoderm sensitivity to, 87
evaporation, effect of, 209
increase from evaporation, 109
osmoregulation, 28
parts-per-thousand (ppt), 208
specific gravity, 209
stress of changes in, 262
testing, 208–209
salt. See also salinity
adding to water, 166–167, 192
definition, 315
stress from changing levels of, 262–263
salt creep, 104, 315
salt water
seawater, artificial, 166–168
seawater, natural, 165–166
sand, live, 157, 195, 202–203, 313
Sandford, G.
An Illustrated Encyclopedia of Aquarium Fish, 306
The Ultimate Aquarium, 305
scales, 23, 315
scallops, 80
scats, 183–184
school, 45, 315
scorpionfishes
avoiding species, 288
description of family, 37
Scott, P.W. (The Complete Aquarium), 306
sea anemones
algae housed in, 70
clownfish host anemone, 72
description, 70–71
feeding, 70
Gelam and Malu anemones, 73
long-tentacled anemone, 73
pink-tipped anemone, 72
wild versus captive bred, 72
sea basses
avoiding species, 288
description of family, 35
difficult species, 65
good choices, 58
wreckfish (sea goldie), 58
sea cucumbers
anatomy, 90
avoiding species, 293
knobby black, 91
sea apple, 91
sea fans, 76–77
sea goldie, 58
sea stars
anatomy, 88
blue, 89
brittle stars, 89
limb regeneration, 89
orange or elegant, 88
sea urchins
anatomy, 89–90
common or short-spined, 90
long-spined, 90
pencil, 90
sea whips, 76–77
seafood, 246–247
seahorses
avoiding species, 289
description of family, 39
lined, 65
yellow or spotted, 65
seawater
artificial, 166–168
composition, 165, 208
natural, 165
storing, 167
Seawater Aquariums (Spotte), 307
seaweed, 164, 217–218, 221, 223
senses
hearing, 26
sight, 25–26
smell, 26
taste, 26
touch, 26–27
sergeant major, 33, 56–57
Setting Up a Saltwater Aquarium, An Owner’s Guide to a Happy Healthy Pet (Skomal), 307
setup. See aquarium setup
shape, body, 20
sharks
avoiding species, 287
description of family, 39
Shimek, R.


shoal, 33, 45, 315

shrimp

- anemone or commensal, 86
- banded coral, 86
- blood (fire), 86
- brine, 247, 248–249, 312
- candy (camelback), 86
- cleaner, 86
- glass, 250
- mantis, 292
- sight, 25–26
- silica, 223
- siphoning water, 233–234
- size, fish, 46
- skates, 287
- skimmer. See protein skimmer

Skomal, G.B.

*Clownfishes in the Aquarium*, 307

*The Everything Tropical Fish Book*, 306

*Setting Up a Saltwater Aquarium, An Owner’s Guide to a Happy Healthy Pet*, 307

smell, 26

snails, 78–79

snappers

- avoiding species, 289
- description of family, 39
- emperor, 63
- soapfish, six-stripe, 65

sound, sensing of, 26

spawning, 315

specialty tank, 315

species, 30, 315

species tank, 315

specific gravity

- defined, 27, 182, 209, 315
- measurement of, 169–170, 209

spicules, 76

spinal cord, severing, 276

spiral valve, 24

sponge filter, 117, 229

sponges, 69

Spotte, S.

*Captive Seawater Fishes: Science and Technology*, 307

*Seawater Aquariums*, 307

spotted sharpnose pufferfish, 38

Sprung, J. (*The Reef Aquarium: A Comprehensive Guide to the Identification and Care of Tropical Marine Invertebrates*), 307

squids, 81

squirrelfishes

- common, 62
- description of family, 39–40
- stand, aquarium, 109–110, 187
- starfish, 88–89, 291
- sterility syndrome, 219
- stomach, appearance of, 265
- stonefish, 287

Stoskopf, M.K. (*Fish Medicine*), 307

Stratton, R.F. (*Aquarium Filtration*), 307

stress

- acute, 260, 263
- aggressive behavior, 262
- capture, 259–260
- chronic, 258, 259
- definition, 257
- diagnosis, 265–266
- disease, 266
- disturbances as, 263
- handling, 259–260
- injury, 260–261
- lighting, poor, 261
- in new fish, 93
- noise, 263
- nutrition, poor, 261
- osmotic, 263
- overcrowding, 261
- recognizing, 263–265
- salinity changes, 262–263
- table of causes, 258
- temperature changes, 262
- transport, 260
- water quality, poor, 259
- stressor, 257
strobe light, 282
substrate
  aquarium setup, 190
  for brackish water aquarium, 181
definition, 315
  as filter medium, 114
  gravel, 157–158
  live sand, 157
surface area, 104–105
surgeonfishes
  description of family, 40
difficult species, 60
good choices, 48–49
  powder brown, 60
sweetlips
  description of family, 36
  yellow, 57
swim bladder, 23–24, 315
symbiosis, 224, 315

- T -
tang tubellarian disease, 274
tangs
  Achilles, 60
description of family, 40
difficult species, 60
good choices, 48–49
  lipstick, 49
  powder blue, 60
  regal or hippo, 49
  yellow, 49
tank
  acrylic, 108
  background, 188
  for brackish water aquarium, 180
glass, 107
  rinsing, 188
  size, 104–106, 180
  styles, 106–108
  surface area, 104–105
tape grass, 186
taste, 26
taste buds, 26
taxonomy, 30, 315
temperate, definition, 315
temperate fishes, 135
temperature. See also heater, aquarium
  aquarium location, 103
  metric conversions, 295
  oxygen content of water, effect on, 104
  preferences of fishes, 135, 136
  stress of changes in, 262
  when transporting fish, 95
temperature controller, 145
test, 89
test kits
  alkalinity, 213
calcium, 215
  phosphate, 216
  water chemistry, 170–171
thermometer
  choosing, 143–145
definition, 316
digital, 145
  floating, 144
  hanging, 144
  liquid crystal, 145
  setup, 192
  sinking, 144
  sticking, 144
  thermometer-hydrometer, 145
thermostat
  bimetallic strip, 139
definition, 316
electronic, 140
threadfin butterflyfish, 31
timer, lighting, 151
touch, 26–27
treating fish, 95, 260
treatment methods
  description, 267–268
dip method, 269
  direct aquarium treatment, 268
  hospital tank, 268–269
  internal medication, 269
  long bath, 268
  trematode infestations, 275
trichlorfon, 274, 275
trickle filters, 123–124, 189, 193, 231
triggerfishes
  boomerang, 61
clown, 61
description of family, 40–41
difficult species, 60–61
good choices, 50–51
Niger, 50–51
queen, 61
undulate, 61
white-lined, 61
tropical, definition, 316
Tropical Fish Hobbyist (magazine), 308
The Tropical Marine Fish Survival Manual (Kay), 306
trunkfishes
avoiding species, 288
description of family, 31
tube brush, 177
tuberculosis, fish, 271
tubifex worms, 250
tubing, air-line, 132
tufa, 159
Tullock, J.H. (Your First Marine Aquarium), 307
Turbellaria, 77–78
turkeyfish, shortfin, 64
tuskfish, harlequin, 62
twitching behavior, 264

• U •
ulcer disease, 271
The Ultimate Aquarium (Bailey and Sandford), 305
ultraviolet (UV) light, 146, 316
ultraviolet (UV) sterilizers, 115, 129
undergravel filters, 114, 118–120, 189, 193, 230
unicornfish, orange-spine, 49
uronema disease, 274

• V •
vacuum
aquarium, 228–229
gravel, 175–176
Valonia spp., 222
vegetables, 246
velvet disease, marine, 273
venturi skimmer, 127
vibriosis, 271
viral diseases, 272
vitamins, 245
volume conversions, 297

• W •
wasting disease, 271
water
access to, 104
balance in fish, 28
conditioning tap water, 167–168
density of, 20
distilled, 235, 312
filling aquarium, 191
setup, 191
water changes
adding water, 234
amount and frequency, 232
siphoning water, 233–234
topping off, 235
water chemistry
aquascaping, effect of, 154
test kits, 170–171
water conditioner, 167, 192, 234
water disinfection, 129
water quality
calculator, 215
carbon dioxide level, 214–215
copper, 216
gases, 213–215
hardness, 212–213
gases, 213–215
importance of, 207–208
oxygen level, 213–214
pH, 210–211
phosphate, 215–216
pollution, 259, 261
quarantine tank, 94
salinity, 208–209
specific gravity, 209
stress of, 259
water sprite, 186
water testing
actions required, 232
description, 231
hydrometer, 168–170
test kits, 170–171
test probes, 172
wattage
actinic, 147
heater, 141, 143
lighting, 147
wavemaker, 133
Web site
American Marinelife Dealers Association, 155, 309
Aqua Link, 309
Aquaria Central, 309
Aquarium Advice, 309
Aquarium Fish.com, 309
Aquarium Global Resource, 309
Aquarium.net, 309
Aquatic Book Shop, 310
Fish Base, 310
Fish Index, 310
Freshwater and Marine Aquarium (magazine), 308
Marine Aquarium Advice, 310
Marine Aquarium Council, 12, 155, 310
Practical Fishkeeping (magazine), 308
Tropical Fish Hobbyist (magazine), 308
weight conversions, 296
weight, of aquarium, 103
wet-dry filters, 123–124
whirling disease, 272
white spot, marine, 274
wimplefish, 52
windows, locating aquarium near, 102–103
wormfishes, 41
worms, segmented, 81–82, 291
wrasses
African clown, 54
birdmouth, 62
bluestreak cleaner, 54–55
canary, 55
clown coris, 62
description of family, 41
difficult species, 62
dwarf parrot, 62
good choices, 54–55
harlequin tuskfish, 62
moon, 62
Spanish hogfish, 54
twin-spot, 62
wreckfish, 58

● X ●
xanthophores, 23
xanthophyll pigment, 223

● Y ●
yellow sweetlips, 36
Your First Marine Aquarium (Tullock), 307

● Z ●
zeolite, 114
zooplankton, 223
zoanthellae, 71, 74, 146, 224