



OCEAN

THE DEFINITIVE VISUAL GUIDE

NEW EDITION



INTRODUCTION BY
FABIEN COUSTEAU



OCEAN

THE DEFINITIVE VISUAL GUIDE

NEW EDITION





Penguin
Random
House

THIRD EDITION

Senior Editor Meezan van Zyl
Managing Editor Angeles Goveira Guerrero
Managing Art Editor Michael Duffy
Production Controller Meakerem Berhane
Production Editor Jacqueline Street
Jacket Designers Surabhi Wadhwa-Gandhi, Juhí Sheth
Jacket Design Development Manager Sophia MTT
Art Director Karen Sall
Associate Publishing Director Liz Wheeler
Publishing Director Jonathan Metcalf

Produced for DK by
Dynamo Limited

1 Cathedral Court, Southernhay East, Exeter, EX1 1AF

Publishing Manager Claire Lister
Senior Design Project Manager Judy Calley

FIRST EDITION

Senior Editors Peter Francis, Angeles Goveira Guerrero
Project Editor Rob Houston
Editors Rebecca Warren, Meezan van Zyl, Ruth O'Rourke, Amber Tokeley
Senior Art Editor Ina Stradins
Project Art Editors Peter Law, Kenny Grant, Maxine Lea, Mark Lloyd
Designers Francis Wong, Matt Schofield, Steve Knowlden
Cartographers Roger Bullen, Paul Eames, David Roberts, Ioworth Watkins

SCHERMULY DESIGN COMPANY

Senior Editor Cathy Meeus
Art Editor Hugh Schermuly
Editors Gill Pitts, Paul Docherty
Designers Dave Ball, Lee Riches, Steve Wismann-Savage
Cartographer Sally Gervis
Design Assistant Tom Callaghan

Picture Researcher

Illustrators Mick Posen (via Art Agency), John Woodcock, John Plumer,
Barry Craucher (via Art Agency), Planetary Visions
Managing Editors Sarah Larier, Liz Wheeler
Managing Art Editor Philip Ormerod
Publishing Director Jonathan Metcalf
Art Director Bryn Walls

This edition published in 2022

First published in Great Britain in 2006 by Dorling Kindersley Limited
DK, One Embassy Gardens, 8 Viaduct Gardens, London, SW11 7BH

The authorised representative in the EEA is Dorling Kindersley
Verlag GmbH, Arnulfstr. 12A, 80636 Munich, Germany

Copyright © 2006, 2014, 2022 Dorling Kindersley Limited
A Penguin Random House Company
10 9 8 7 6 5 4 3 2 1
001-326967-Apr/2022

All rights reserved

No part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the copyright owner.

A CIP catalogue record for this book is available from the British Library
ISBN: 978-0-2415-3782-4

Printed and bound in Dubai

For the curious
www.dk.com



This book was made with Forest Stewardship Council™ certified paper – one small step in DK's commitment to a sustainable future.
For more information go to www.dk.com/our-green-pledge

CONTENTS

ABOUT THIS BOOK	6
FOREWORD	9
BY FABIEN COUSTEAU	



INTRODUCTION

OCEAN WATER	28
THE PROPERTIES OF WATER	30
THE CHEMISTRY OF SEAWATER	32
TEMPERATURE AND SALINITY	34
LIGHT AND SOUND	38

OCEAN GEOLOGY	38
THE FORMATION OF THE EARTH	40
THE ORIGIN OF OCEANS AND CONTINENTS	42
THE EVOLUTION OF THE OCEANS	44
TECTONICS AND THE OCEAN FLOOR	46



CIRCULATION AND CLIMATE	52
OCEAN WINDS	54
SURFACE CURRENTS	56
UNDERWATER CIRCULATION	60
THE GLOBAL WATER CYCLE	64
OCEANS AND CLIMATE	66
EL NIÑO AND LA NIÑA	68
HURRICANES AND TYPHOONS	70

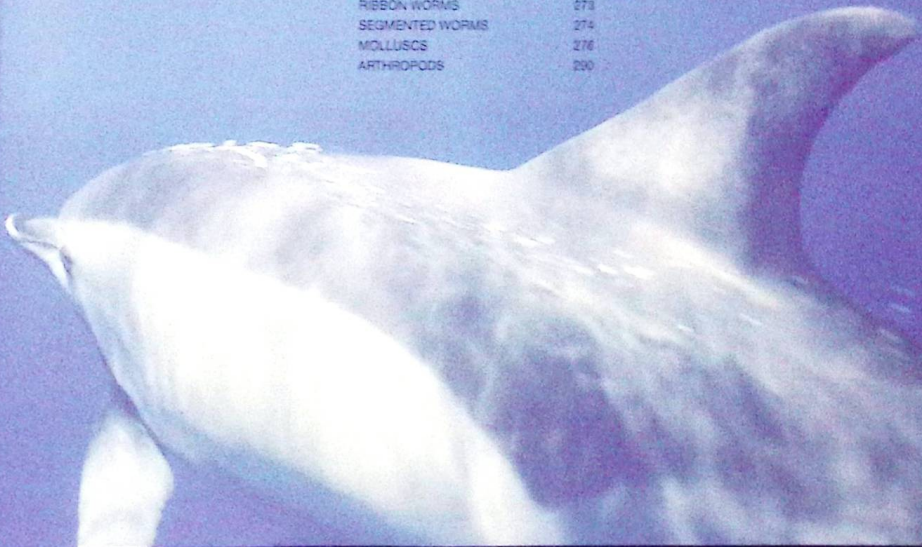
WAVES AND TIDES	74
OCEAN WAVES	76
TIDES	78



OCEAN ENVIRONMENTS

COASTS AND THE SEASHORE	86
COASTS AND SEA-LEVEL CHANGE	88
COASTAL LANDSCAPES	92
BEACHES AND DUNES	106

ESTUARIES AND LAGOONS	114		OCEAN LIFE			
SALT MARSHES AND TIDAL FLATS	124					
MANGROVE SWAMPS	130					
SHALLOW SEAS	138		INTRODUCTION TO OCEAN LIFE	204		
CONTINENTAL SHELVES	140		CLASSIFICATION	206	BRYOZOANS 305	
ROCKY SEA BEDS	142		CYCLES OF LIFE AND ENERGY	212	ECHINODERMS 308	
SANDY SEA BEDS	144		SWIMMING AND DRIFTING	214	SMALL, BOTTOM-LIVING PHyla 318	
SEA GRASS BEDS AND KELP FORESTS	146		BOTTOM LIVING	216	PLANKTONIC PHyla 317	
CORAL REEFS	152		ZONES OF OCEAN LIFE	218	TUNICATES AND LANCELETS 318	
THE PELAGIC ZONE	184		OCEAN MIGRATIONS	220	JAWLESS FISH 320	
			LIVING AT DEPTH	222	SHARKS, RAYS, AND CHIMAERAS 322	
			BIOLUMINESCENCE	224	BONY FISH 338	
			THE HISTORY OF OCEAN LIFE	228	REPTILES 362	
					BIRDS 378	
					MAMMALS 400	
THE OPEN OCEAN AND OCEAN FLOOR	166		KINGDOMS OF OCEAN LIFE	230		
ZONES OF THE OPEN OCEAN	168		BACTERIA AND ARCHAEA	232		ATLAS OF THE OCEANS
SEAMOUNTS AND GUYOTS	174		CHROMISTS	234		
THE CONTINENTAL SLOPE AND RISE	176		BROWN SEAWEEDS	238	OCEANS OF THE WORLD	422
OCEAN-FLOOR SEDIMENTS	180		PLANT LIFE	240	THE ARCTIC OCEAN	424
ABYSSAL PLAINS, TRENCHES, AND MID-OCEAN RIDGES	182		RED SEAWEEDS	244	THE ATLANTIC OCEAN	428
VENTS AND SEEPS	188		GREEN SEAWEEDS	246	THE INDIAN OCEAN	440
			GREEN ALGAE	248	THE PACIFIC OCEAN	456
			MOSESSES	249	THE SOUTHERN OCEAN	480
			FLOWERING PLANTS	250		
THE POLAR OCEANS	190		FUNGI	254	GLOSSARY	458
ICE SHELVES	192		ANIMAL LIFE	256	INDEX	484
ICEBERGS	194		SPONGES	258	ACKNOWLEDGMENTS	510
SEA-ICE	196		CNIDARIANS	260		
POLAR OCEAN CIRCULATION	200		FLATWORMS	271		
			RIBBON WORMS	273		
			SEGMENTED WORMS	274		
			MOLLUSCS	276		
			ARTHROPODS	290		



INDEX

Page numbers in bold indicate feature profiles or extended treatments of a topic. Page numbers in *italic* indicate pages on which the topic is illustrated.

A

- Abalone, Red 284
 Aberdeen Harbour, Hong Kong 99
 Abrolhos Bank 442
Abrolhos savanilla 358
 abyssal plain 168, 169, 176, 177, 180, 182
 abyssal zone 168, 171, 219
Abyssobrotia galathea 183
 Acadia National Park 94
Acanthaster planci 309
Acanthephyra pelagica 296
 acanthodians 227
 accretion, cold 40
Acetabularia acetabulum 247
 acidification, ocean 33, 67, 153
Acipenser sturio 340
 Acklins Island 441
 Acoel Flatworm 271
 Acorn Barnacle 294
 Acorn Worm 313
Aetopos lyranthus 268
Aetideus epima 206
Adamania palliata 267
 Adare Seamounts 485
 Adare, Cape 483, 485
 Adelaide Island 484
 Adelle Penguin 379
 Aden, Gulf of 422, 446, 448
 Admiralty Island 459
 Adriatic Basin 439
 Adriatic Sea 120, 438
 Aegean microplate 439
 Aegean Sea 438, 439
 Aegean Volcanic Arc 439
 Aegeir Ridge 430, 432
Aethia strigata 365
Aethia cristatella 399
Aethya pusilla 399
Aethya sarinaria 335
 African Plate 424, 437, 438, 439, 442, 455
 African Seamount 446
 Agadir Canyon 437
 Agalega Islands 454
 Agassiz Fracture Zone 423, 457
 Agassiz, Cape 484
 Agatti Island 458
 Agulhas Basin 422, 446
 Agulhas Current 446, 447, 455
 Agulhas Plateau 446
Agyrona foliolumina 375
Agyrona larvis 375
 air sacs, seabirds 378
 Aitutaki 476
 Ajo, Cabo de 437
 Akademii Nauk Rise 461
 Akademik Kurchatov Fracture Zone 436
 Aikapok Island 426
 Aland 433
 Alaska Current 457, 459
 Alaska Peninsula 459
 Alaska Plain 457, 459
 Alaska Seamount Province, Gulf of 459
 Alaska, Gulf of 423, 457, 459
 Alaskan Brown Bear 129
 Alaskan mudflats 129
 Albatross
 Black-browed 185, 201, 378, 387
 Black-footed 386
 Grey-headed 201
 Light-mantled Sooty 386
 Short-tailed 386
 Wandering 387
 albatrosses 380
 albedo 65
 Albina, Ponta 443
 Alboran Sea 438
 Albuja ridges 341
 Alcock Rise 450
Alcyonium diaphanum 305
Alcyonium digitatum 264
 Aldeia Atoll 158
 Aldera Group 454
 Aleutian Basin 422, 457, 458
 Aleutian Current 459
 Aleutian Islands 457, 458, 459
 Aleutian Rise 458
 Aleutian Trench 422, 457, 458, 459, 461
 Alex Herberg Island 425, 426
 Alexander Archipelago 459
 Alexander Island 483, 484
 algae
 blue-green 233
 green 238
 mudflats 125
 symbiotic partnership 248
 algal bloom, Chesapeake Bay 116
 Algarve 437
 Algarve, Western, marine erosion 97
 Algerian Basin 438
 alginate extraction 151
 Alex Seamount 455
 All-Terrain Vehicles, effect on sand dunes 113
 Alla Shad 344
Alona alona 344
 Alpha Cordillera 424, 425
 Alpha Seamount 469
 Alpine Fault, New Zealand 480
 Altair Seamount 436
 Alula-Fatak Trench 449
Aluterus scriptus 366
 Alvarado Mangroves Ecoregion 132
 Alvarado Ridge 479
 alveolates 236
Alvin submersible 168, 171, 173, 188, 189
Alvinella pompejana 171, 275
 Amalfi Coast, marine erosion 97
 Amami-Oshima 464, 466
 Amazon Estuary 118, 440
 Amazon Fan 429, 442
 Amazon, Mouths of the 442
Amblypneustes cristatus 376
Ambulacetus 228
 Anchika Island 458
 Anchika Pass 458
 America-Antarctica Ridge 423, 429, 482
 American Crocodile 132, 133, 369, 377
 American Horseshoe Crab 293
 American Lobster 294, 313
 Amirante Basin 454
 Amirante Islands 454
 Amirante Ridge 454
 Amirante Trench 454
Amplexites tobiana 361
 amonites 228, 229
Amorphophallus 251
 Ampere Seamount 437
Amphibolis antarctica 150
Amphiprion ocellaris 359
 amplitude, wave 76
 ampullae of Lorenzini 323
 Amsterdam Fracture Zone 447
 Amsterdam Island 447
 Amikta Pass 458
 Amund Ringnes Island 426
 Amundsen Gulf 424, 426
 Amundsen Plain 423, 457, 483, 485
 Amundsen Sea 423, 457, 483, 484
 Amundsen Trough 424, 426
 Amundsen, Roald (1872-1928) 426, 485
 Anaruk River 65
 Anadyr, Gulf of 457, 458
Anaschisma lupus 360
 Anatolian Plate 439
 Anaximander Ridge 439
 Anchoeta, Peruvian 344
Anchovy *brevipinna* 296
 Andaman Basin 447, 450
 Andaman Islands 447, 450
 Andaman Sea 422, 447, 450
 Andes Mountains 479
 andesite 43
 Andromed Islands 458
 Andrew Seamount 446
 Andrew Tablemount 449
 Andros Island 441
 Anegada Gap 441
 Anegada Passage 441
 Anemone
 Antarctic 267
 Beadlet 266
 Cloak 267
 Giant 266
 Jewel 143, 267
 Kelp 147
 Platane 267
 Tube 177, 270
 Anemone Shrimp 296
 Anemonefish 218
 Fabe Clown 359
 Maldives 218
 Angelish, Queen 154, 365
 Angelshark 323
 angiosperms 146, 250
 Angler 222, 351
 Deep-sea 223, 350
 Hairy 350
 Humpback *see* Common Blackdevil
 Regan's 351
 Angleyze 432
 Angola Basin 423, 429, 442, 443
 Angra Bank 449
Anguilla anguilla 342
 Anhunga 112
 anhydrite, hydrothermal vents 188
 animals 256-57
 bottom-living *see* benthos classification 207-209
 diversity 256
 reproduction 257
 Anjouan 454
 Anjuna Beach 111
 Ankabana, Tanjona 454
 Anna Trough 427
Anousia benetti 311
 Anring, Mary (1799-1847) 228
 Annobon 443
Anoplaxites comata 353
Anous stolidus 397
Anseropoda placenta 308
 Antalya Basin 439
 Antalya, Gulf of 439
 Antarctic Anemone 267
 Antarctic Circumpolar Current 195, 201, 428, 444, 456, 482
 Antarctic Coastal Current 201
 Antarctic Convergence 201
 Antarctic Fur Seal 403
 Antarctic Ice Sheet 46, 193, 482
 Antarctic ice shelves 192-93
 Antarctic Krill 199, 201, 205
 Antarctic Peninsula 423, 457, 483, 484
 Antarctic Plate 423, 444, 445, 482
 Antarctica 45
 Antarctic Canyon 484
 anthozoans 260-261
 Antairtal Seamount 436
 Anticosti, Ile d' 431
 anticyclones 55
 and downwelling 60
 Antilles 440
 Antipodes Islands 481
 Anton Bruun Ridge 454
Antonia maritima 304
 Anvers Island 484
Aphrodita aculeata 274
Aplysia punctata 286
Apygus anteus 359
 Appendicularian 218
Aptenodytes forsteri 383
Aptenodytes patagonicus 382
 Apulian Plateau 439
 Aqaba, Gulf of 448
 Arabian Basin 422, 447, 448, 449
 Arabian Gulf 99
 Arabian Peninsula 422, 446
 Arabian Plate 423, 448
 Arabian Sea 422, 447, 448, 449
 Arafura Sea 422, 451, 456, 472, 473
 Arafura Shelf 456, 472
 Archelon Lagoon, Cap Ferret 110
 archaea 102-103, 232, 233
 archaeocyathids 227
 Archeryfish, Banded 131
 Archipelago de Camaguey 441
 Archipelago de Sabana 441
 Arctic Basin, circulation 201
 Arctic Char 346
 Arctic Ocean 424-25
 circulation 200-201
 deep-water 201
 surface 200
 currents 425
 depth 169
 formation 45
 ocean floor 424
 salinity 65
 sea-ice 199, 424
 winds 425
 Arctic Skua 398
 Arctic Tern, migration 250
Arctophila antula 403
Arctophila gazella 403
Ardea onca 390
Ardenia gracilis 389
Ardenia tenuirostris 389
Ardenia interpres 395
 Arenas, Ponta de 444
Arenicola marina 274
 Argentine Basin 423, 429
 Argo Fracture Zone 447, 455
Argyropsolen aulianus 347
 Aristotle's lantern 307
 Arnhem Land 472
 Arrhen, Cape 472
Arthrocnemum stellatum 367
 arthropods 290-92
 anatomy 290
 classification 208, 292
 feeding 290
 growth 291
 lifestyle 292
 Aru, Kepulauan 472
 Aruba Gap 441
 ASCAT 54
 Ascension Fracture Zone 423, 429, 443
 Ascension Island 185, 442, 443
Ascophyllum nodosum 239
 Asia 425
 asthenosphere 42
 Asia racing yacht 57
 Astrid Ridge 429
Atromachium adhaerens 309
 Atacama Trench *see* Peru-Chile Trench
 Atafu Atoll 476
 Ata 476
 Atka Island 458
 Atlantic Cod 348
 Atlantic Conveyor 61, 430
 Atlantic Flyingfish 352
 Atlantic Gull 333
 Atlantic Herring 344
 Atlantic Mackerel 361
 Atlantic Ocean 428-31
 central 442-43
 circulation 428
 depth 169
 east 437
 icebergs 195, 428
 north 430
 northwestern 431
 ocean floor 428
 opening 45
 temperature 34
 water density layers 35
 winds 428
 Atlantic Plate 440
 Atlantic Puffin 399
 Atlantic Ridley Turtle 371
 Atlantic Scaup 364
 Atlantic Salmon 346
 Atlantic Scurry 352
 Atlantic Thorny Oyster 280
 Atlantic Torpedo 335
 Atlantic-Indian Basin 422, 429, 446
 Atlantic-Indian Ridge 423, 429, 446, 482
 Atlantis Fracture Zone 429, 436
 Atlasov Island 460
 atmosphere, Earth 41, 43, 226
 atmospheric cells 54
 atmospheric circulation 54
 Atoll des Rocas 432
 atoll formation 152
 atoll, raised 158
Atollornis robustus 319
 Atou Island 458
 ATVs *see* All-Terrain Vehicles
 Auckland Islands 481
 Auklet
 Crested 399
 Least 399
 auk 380
Audubonia maculata 356
Aurichia aurata 265
 Austral Fracture Zone 477
 Australia, Bay 476

- Broad Fish Tapeworm 272
 Brodeur Peninsula 424, 426
 Broken Ridge 422, 447
Brosme brosme 349
 Brown Bear, Alaskan 129
 Brown Booby 391
 Brown Noddy 397
 Brown Pelican 214, 379, 380, 391
 brown seaweeds 238-39
 Brown Sargassum 235
 Bruce Ridge 445, 484
 Brunt Ice Shelf 484
 Brush-turkey, Red-billed 135
 Bryan Coast 484
Bryopsis plumosa 246
 Bryozoa
 Gelatinous 305
 Pink Lace 305
 bryozoans 305
 Bubble Shell 286
 Buenos Aires 118
Bufoveratus wedli 350
 Buka Island 473
 Bull Kelp 150, 151
 Bulldog Bank 454
 Bullhead Shark 323
 Bullhead, Long-spined 357
Bullina lineata 286
 Bumphead Parrotfish 362-63
 Bunce Seamounts 449
 Buorhaya Guba 425
 buoyancy
 animals 256
 fish 357
 Burdwood Bank 444, 445
 Burke Island 484
 Burks, Cape 485
 Burma Plate 450
 Bura, Pulau 451, 465, 466, 472
 Butterflyfish
 Bluecheck 365
 Millettseed 161
 Button Mangrove 130
 By-the-Wind Sailor 214
 Bylot Island 425, 426
 Byramore Reef 449
 byssus threads 280
- C**
C. Quester submersible 173
 Cabo de Gata 438
 Cabo San Juan 443
 Cabot Strait 431
 Cactus Seaweed 247
 Cadiz, Gulf of 437
 Calabar Canyon 443
Calappa angusta 297
 Calarca Bank 441
 calcareous ooze 181
 calcium carbonate 67, 180, 181, 306
 compensation depth 181
 sclerites 260
 calcium, in seawater 32
Calidris alpina 395
 California Current 58, 59, 66, 457
 California, Gulf of 457, 469
 California, temperature 31
 Californian Sea Lion 19, 403
Callorhynchus milii 324
Callorhynchus urimus 403
Callorhynchus cristata 233
 calving, iceberg 192, 195
 Cambrian
 ocean life 227
 plate tectonics 44
 Carnées Seamount 449
 camouflage
 bony fish 338
 photophores 36, 224
 Campbell Island 480, 481, 457
 Campbell Plateau 422, 457, 480, 481, 483
 Campeche Bank 440
 Campeche Canyon 440
 Campeche Escarpment 440
 Campeche, Bay of 440
 Canada Basin 423, 424, 426
 Canada Plain 424
 Canaries Current 428, 440, 442
 Canary Basin 436
 Canary Islands 423, 437
 Canaveral, Cape 441
Cancer pagurus 300
 Cancun 132
 Candy Stripe Flatworm 271
 Canisteo Peninsula 484
 Canterbury Bight 481
 canyon
 submarine 176
 Monterey 469
 Cap Ferret 110
 Cape Basin 423, 429
 Cape Bathurst, Cape 426
 Cape Breton Island 431
 Cape Cod 431
 salt marshes 126
 Cape Creus 96
 Cape Hatteras 95
 lighthouse 95
 Cape Horn 444
 Cape Penguin see Jackass Penguin
 Cape Prince Alfred 424, 426
 Cape Verde Basin 423, 429
 Cape Verde Islands 423
 Cape Verde Plain 429
 Cape Verde Terrace 429
 Cape York Peninsula 472
 Capelin 345
 Capelinhos volcano 437
 capillary waves 76
Carcinus saxosus 359
Carcinus spp. 349
 carbon cycle 67
 carbon dioxide
 early Earth 43
 in oceans 67
 in seawater 32, 33
 carbon sink 33
 carbonates, continental shelf 141
 Carboniferous, plate tectonics 44
Carcharias taurus 328
Carcharodon carcharias 329
Carcinus maenas 300
 Carigan Bay 432
 Cardinalfish 131, 135
 Ring-tailed 359
 Cardno Tablemount 443
Caretta caretta 370
 Cargado Carajos Bank 454
 Caribbean Plate 440
 Caribbean Reef Shark 229
 Caribbean Sea 423, 428, 440, 441, 478
 depth 169
 Caribbean Spiny Lobster, migration 220
 Carlsberg Ridge 185, 422, 447, 448, 449
 Carnation Coral 265
 Carnegie Ridge 478
 carnivorous sponges 258
 Caroline Islands 456, 466
 Caroline Plate 423, 472
 Caroline Ridge 466
 Carpenteria, Gulf of 472
 Carpseshark 323
Carpinus maculatus 300
Carpophyllium flexuosum 150
 Carrageen Moss see Grape Pip Weed Moss
 carrageenan 245
 cartilaginous fish 322-23
 crinoids 312
Caryophyllia smithii 269
 Carysof Reef 156
 Cascadia Basin 457, 459
 Casey, Raas 446, 449
 Caspian Tern 397
Cassiopea andromeda see *Cassiopea xamachana*
Cassiopea xamachana 264
 casuarite, Andaman Sea 450
 Casuarina 243, 253
Casuarina equisetifolia 253
 catastrophe, iron 40
 catfish 339
 Gafftopsail Sea 345
 Striped 256, 345
 Catoche Tongue 440
 Catshark, Chain 329
 Caucasus Escarpment 439
 caudofoveates 279
Caulerpa racemosa 247
Caulerpa taxifolia 247
Caulophryne jordani 350
 caves 93
 as habitat 143
 caviar 340
 Cavoline, Three-tooth 286
Cavolinia tridentata 286
 Cay Sal Bank 441
 Cayman Ridge 441
 Caymen Trench 169, 441
 cays, Caribbean Sea 440
 Ceara Plain 429, 442
 Ceará Ridge 442
 Cebu 465, 466
 Cedros Trench 457, 469
 Cedros, Isla 469
 Celebes 422, 451, 456, 465, 466, 472
 Celebes Basin 465, 466
 Celebes Sea 422, 456, 465, 466
 cells
 atmospheric 54
 convection 41, 42, 44, 48
 Ferral 54
 Hadley 54
 Langmuir 61
 polar 54
 Celtic Sea 432, 437
 Celtic Shelf 429, 432, 437
 Central Atlantic Ocean 442-43
 Central Basin Trough 465, 466
 Central Bay, San Francisco 123
 Central Kara Plateau 425
 Central Pacific Basin 422, 457, 476
 Central Slope 440
 cephalopods 279
 anatomy 276
 chromatophores 277
 feeding 278
 movement 277
 reproduction 279
Cepola macrophthalmia 359
 Ceram Sea 465, 466, 472
Ceratostema edule 281
 cerata, Polybranchid 286
Ceratanthus membranaceus 270
Ceryle ridgii 399
Cetium veneti 317
 cetaceans 400-401
Cetorhinus maximus 328
 Ceylon Plain 422, 447, 450, 451
Chaenoccephalus acutus 360
Chaetoceros denticatus 237
Chaetodon semilarvatus 365
 Chaetognatha 317
 Chagos Archipelago 447, 455
 Chagos Bank 455
 Chagos Trench 447, 455
 Chagos-Laccadive Plateau 422, 446, 447, 448, 449, 455
 Chain Catshark 329
 Chain Fracture Zone 429, 442, 443
 Chain Moray Eel 342
 Chain Ridge 446, 449
 chalk, erosion, White Cliffs of Dover 96
 Chalkidiki 439
 Challenger Deep 171, 456, 467
 Challenger Fracture Zone 423, 457
 Challenger Plateau 480, 481, 483
 Challenger, HMS 171
 champignon (mushroom rock) 158
 Changjiang Estuary see Yangtze Estuary
 Channel Islands 432, 437, 469
Chanos chanos 344
 Chao Phraya River, discharge into South China Sea 465
 Chapman, Cape 424, 426
 Char, Arctic 346
 Charcot Island 484
 Charcot Seamounts 437
 charge imbalance 30
 Charlie-Gibbs Fracture Zone 423, 429, 436
Charonia tritonis 285, 309
 Chatham Islands 457, 481
 Chatham Rise 457, 480, 481, 483
Chaulioides sloani 346
Chaunax endauyuni 351
 Cheetham, Cape 485
Chelophycus heterurus 352
 Cheju Strait 464, 466
 Cheju-do 460, 464, 466
 chelicerates 292
Chelidonichthys cyathus 358
Chelonia mydas 340
 chemistry, seawater 32-33
 Cherbanian Reef 449
 Chesapeake Bay 114, 116, 431
 Cheshskaya Guba 427
 Chesil Bank 109
 Chesil Beach 109
 Chichagof Island 459
 Chidley, Cape 426
Chilana taylora 349
 Chile Basin 423, 457, 479
 Chile Rise 423, 457
 Chile Trench 444
 Chile, fiordlands 103
Chimaera monstrosa 324
 Chimaera
 Blunt-nosed see Spotted Ratfish
 Ploughnose 324
 chimeras 322-323
 chimneys, hydrothermal vents 188
 Chinese White Dolphin 122
 Chinook Trough 468
 Chinstrap Penguin 383
Chironis alba 394
 Chios 439
 Chirikof Basin 458
Chironex fleckeri 264
 Chirostylus Crab 179
 Chiton, Lined 289
 chitons 279
Chlamydolella anguineus 325
 chloride ions 32
 chlorophyll
 plants 242
 satellite measurement 187
 chloroplasts 237, 248
 Choiseul 473
Chondrocladia lyra 258
Chondrus crispus 245
 chop and swell waves 76
 chordates, classification 209
 Choyo Seamount 466
 Christmas Island 451
 Christmas Tree 457, 477, 275
 chromatophores 288
 cephalopods 277
 chromites 212, 234-235
 Chromodorid Sea Slug 286
Chromodoris luchi 286
 Chukchi Plain 424
 Chukchi Plateau 424
 Chukchi Sea 422, 424, 458
 Chukotskiy Peninsula 424
 Chukotskiy Polnostrov 458
 Chukotskiy, Mys 458
 Churchill Peninsula 484
 Chuuk Islands 466
 Cichlid, Mayan 133
 ciliates 236
 Cilia Trough 439
Ciona intestinalis 318
 circulation
 atmospheric 54
 effect of El Niño/La Niña 68-69
 oceanic
 Antarctic ice shelves 192, 193
 Arctic Ocean
 deep-water 201
 surface 200
 Atlantic Ocean 430
 Bay of Bengal 450
 and climate change 46, 65
 deep-water 61, 201
 Langmuir cells 61
 Southern Ocean 201
 surface 58-59, 200
 underwater 60-61
 and water density 35
 see also currents, oceanic
 Circumpolar Current 46
 creation 45
Cirripathes species 270
 cladistics 206
Cladococcus viminalis 237
 cladogram 206
 Cladophora, Giant 247
 Clam
 Giant 276, 281, 282-83
 Pacific Razor 129
 Clapper Rail 127
 Clarence, Isla 444
 Clarion Fracture Zone 423, 457, 469
 Clarion Island 469
 Clark Basin 441
 classification 206-209
 clay sediment 180, 181
 Cleaner Wrasse 360
Clidippus glomeratus 352
 cliff, undercut 93
 cliffs
 underwater 143
 uplifted 89
 climate change
 and Arctic Ocean salinity 65
 Atlantic Conveyor 61, 430
 Gondwana breakup 46
 Mesozoic 46
 ocean circulation 46
 and sea-level 47, 88
 Clipper Round the World Yacht Race 57
 Clipperton Fracture Zone 423, 457, 476
 Cloak Anemone 267
 cloud formation 64
 satellite monitoring 187
 Clownfish 217
Clupea harengus 344
 cnidarians 260-61
 anatomy 260
 classification 261
 reproduction 261
 zooanthellae 261
 endocytos 260
 CO₂
 carbon cycle 67
 early Earth 43
 in oceans 67
 in seawater 32, 33
 coastlines
 drowned 88
 emergent 89
 coasts 86-87, 92, 99
 artificial 92, 99
 breezes 55
 classification 92
 defences 105
 fringing reef 92

- coasts *cont.*
 marine-deposition 93
 pollution 63, 141
 primary 92
 and sea-level change 86-89, 92
 secondary 92
 volcanic 92
 wave-erosion 93
 Coats Island 426
 Cobb Hotspot 459
 coccolithophore 181, 237
 coccoliths 237
Cochleana officinalis 252
 Cockle, Common Edible 281
 cockling, Morecambe Bay 127
 Coco-de-Mer Seamounts 454
 Coconut Crabs 158
 Coconut Palm 243, 253
 Cocos Basin 422, 447, 450, 451
 Cocos Islands 451
Cocos nucifera 253
 Cocos Plate 423, 478
 Cocos Ridge 478
 Cod
 Atlantic 348
 overfishing 212
 Cod, Cape 431
Codium fragile 246
Codium tomentosum 247
 Coelacanth 339, 340, 455
 Indonesian 340
 Coelenterata *see* cnidarians
Coelopa frigida 304
Coeloplana astericola 317
 Coffinfish 351
 Coho Salmon 346
 migration 220
 cold accretion 40
 cold currents 66
 cold seeps 189
 cold-water coral 153, 179
 Collared Kingfisher 399
 Colombian Basin 441
 Colombian Trench 478
 Colón Ridge 457, 478
 Colonial Sea Squirt 319
 colonies, invertebrate 256
Colomesia australis 293
 colour change, cuttlefish 277
 colour, sea 36, 37
Colpomenia peregrina 238
Colpophyllia natans 269
 Columbia Bay 112
 Columbia, Cape 425
 Colville Ridge 481
 Colvocoresses Reef 449
 Comb Jelly
 Creeping 317
 Predatory 317
 comets, as source of water 43
 commensalism 217, 292
 Committee Bay 424, 426
 Commodore Reef 465
 Common Black-hawk 133
 Common Blackdevil 351
 Common Bluestripe Snapper 361
 Common Bottlenose Dolphin 123, 414
 Common Brittlestar 309
 Common Diving Petrel 389
 Common Dolphin 414
 Common Edible Cockle 281
 Common Eider 381
 eiderdowns 381
 Common Fangtooth 353
 Common Glasswort 250, 251
 Common Guillemot 378-79, 398
 Common Jellyfish, larva 214
 Common Limpet 284
 Common Minke Whale 409
 Common Mussel 280
 Common Periwinkle 285
 Common Piddock 281
 Common Prawn 296
 Common Sea Fan 265
 Common Sea Lavender 292
 Common Sea Squirt 318
 Common Seal 406
 Common Shelduck 381
 Common Shore Crab 300
 larva 214
 Common Skate 333
 Common Sole 127, 366
 Common Squid 289
 Common Stargazer 358
 Common Tern 128
 Comoro Basin 446, 454
 Comoros 446, 455
 compensation depth, calcium carbonate 181
 Conception Bank 437
 concretions, mineral, Moeraki Beach 112
Conalysata gigantea 266
Conger conger 342
Conger eel 342
 Congo Fan 429, 443
 Congo River 443
 Congo River estuary 114
 Constantine, Cape 459
 consumers 212
 continental crust 42
 continental drift 44-45
 continental rise 177
 continental shelf 140-41
 geology 141
 continental slope 176
 convection cells, mantle 41, 42, 44, 48
 convergent plate boundary 48
 conveyor
 global ocean 61, 430
see also Atlantic Conveyor
 Cook Inlet 459
 Cook Islands 477
 Cook Strait 481
 Cook Strait, currents 79
 Cook, Captain James (1728-79) 123, 445, 477
 Cookiicuter Shark 326
 Coorong Lagoon 121
 Copacabana Beach 108
 Copepod, Cyclopoid 294
 copepods 170
 Copper Shark 213
 Cora Diva Bank 449
 Coral
 Blue Ridge 160
 Bushy Black 270
 Carnation 265
 Daisy 268
 Dendrophyllid 269
 Devonshire Cup 269
 Giant Brain 269
 Hump 268
 Lophelia 178, 179, 269
 Mediterranean Red 266
 jewellery 260
 Mushroom 269
 Mushroom Leather 264
 Organ Pipe 264
 Pulse 265
 Table 268
 Whip 270
 coral reefs 138-39, 152-55
 biodiversity 154-55
 destruction 155, 160, 179
 zones 154-55
 Coral Sea 422, 456, 473, 480
 Coral Sea Basin 456, 472
 Coral Sea Islands 472, 480
 Coral Shrimp, Banded 217
 Coral Weed 245
 Coralline Sponge 259
Corallium rubrum 260, 266
 corals
 bleaching 153, 158, 159, 160, 161
 effect of El Niño 68
 cold-water 153, 179
 hurricane damage 71
 corals *cont.*
 reef-building 260-61
 anatomy 260
 stony 153, 158
 warm-water 153
 Cordgrass
 Saltmeadow 126
 Smooth 124, 126, 127
 Cordilleran Ice Sheet 46
 core, Earth 40-41
 Corfu 439
 Coriolis effect 54
 water 58
 wind 55, 70
 Cormorant
 Great 393
 Guamay 380, 392
 Cornish kelp forest 148
 Cornish Sucker 352
 Cornwallis Island 424, 426
 Coronation Gulf 424, 426
 Corryreckan Whirlpool 81
 Corsica 438
 Corvo 436
Corynactis viridis 267
Coryphaena hippurus 364
Coryphaenoides acrolepis 349
Coscinodiscus granii 235
 Cosmoledo Group 454
 Costa Blanca 438
 Costa Brava 438
 Costa del Sol 438
 Costa Verde 437
 Côte d'Azur 438
 Cotton's Seaweed 245
 Couch's Goby 148
 Coulman Island 485
 Courland Lagoon 433
 Cow Shark 323
 Cowrie, Tiger 285
 Cox's Bazar Beach 111
 Cozumel, Isla 440
 Crab
 Blue Swimming 301
 Chirostylus 179
 Common Shore 300
 larva 214
 Dungeness 123
 Edible 300
 Ghost 301
 Hermit 134, 267
 Reef 297
 Horseshoe 290, 293
 Hydrothermal Vent 189
 Japanese Spider 297
 Long-legged Spider 300
 Nodose Box 297
 Orange Fiddler 301
 Pea 217, 300
 Porcelain 291, 297, 298-299
 Red, migration 302, 303
 Robber 158, 297
 Sand Bubbler 290
 Spotted Reef 300
 Velvet 292
 Crabbeater Seal 407
 Cray Crab 485
Crangon furcatus 396
 Creeping Comb Jelly 317
 Crested Auklet 399
 Cretaceous
 ocean life 228
 plate tectonics 45
 Cretan Trough 439
 Crete 439
 Crete, Sea of 439
 Crimean Escarpment 439
 Crimean Peninsula 439
 crinoids, fossil 311
 Crocodile
 American 132, 133, 377
 Cuban 133
 Estuarine 135, 377
 Indo-Pacific 377
 Morelet's 132
 Crocodile *cont.*
 Nile 134
 Saltwater 136-37, 369, 377
 crocodiles 368-69
Crocodylus acutus 377
Crocodylus porosus 136-37, 377
 Crocus, Sand 242
 Crofter's Wig 239
 Crown of Thorns Starfish 158, 161, 307, 309
 Crozet Basin 422, 446
 Crozet Islands 446, 482
 Crozet Plateau 446
 Cruiser Tablemount 436
 crust
 Earth
 continental 41, 42, 44, 48
 oceanic 41, 42, 44, 48
 crustaceans 292
 Cruz, Cabo 441
Cryptocentrus cinctus 357
Cryptochorda euryzona 228
 ctenidia 277
 Ctenophora 317
 Cuban Crocodiles 133
 Cuban Gar 133
 Cuban Hutia 133
 Cuckoo Wrase 360
 reproduction 338
 Cucumber
 Deep-sea 312
 Edible Sea 312
 Sea 144, 181, 223, 312
Calappa novaezelandiae 308
 Cumberland Peninsula 426
 Cumberland Sound 426
 Curaçao 441
 Curaçuan Lagoon 119
 Curaçuan Spit 119
 currents
 ocean 45
 Agulhas Current 446, 447, 455
 Alaska Current 457, 459
 Aleutian Current 459
 Antarctic Circumpolar Current 195, 201, 428, 444, 456, 482
 Antarctic Coastal Current 201
 Arctic Ocean 425
 Atlantic Conveyor 61, 430
 Atlantic Ocean 428
 Benguela Current 59, 98, 148, 428, 442, 443
 boundary 59
 Brazil Current 59, 428, 442, 444
 California Current 58, 59, 66, 457
 Circumpolar Current 46
 creation 45
 cold 66
 East Greenland Current 59, 425, 427, 430
 Equatorial Countercurrent 442, 446, 447, 451, 473, 477
 Equatorial Undercurrent 442, 473
 Falklands Current 444
 Guanaa Current 428, 442
 Gulf Stream 31, 66, 428, 431, 440
 heat transfer 31, 58, 66
 Humboldt Current 376, 456, 457, 478, 479
 Indian Ocean 447, 451
 interaction 59
 Jan Mayen Current 427
 Kuroshio Current 58, 59, 66, 456, 457, 459, 460, 464, 467
 Labrador Current 59, 116, 195, 426, 431
 Laman Current 150
 currents *cont.*
 Mesozoic 46
 North Atlantic Drift 59, 66, 427, 428, 430, 431, 432
 North Equatorial Current 428, 440, 446, 447, 456
 Norwegian Atlantic Current 425, 432
 Oyashio Current 59, 457, 460
 Pacific Ocean 456, 457
 Peruvian Current 344, 457
 South Equatorial Current 442, 446, 447, 451, 455, 456, 473, 477, 479
 Southern Ocean 482
 surface 58-59, 66
 Transpolar Current 200, 201, 424, 425
 Tsushima Current 150, 464
 warm 66
 rip 110
 subsurface 60
 tidal 79
 turbidity 176
 Cushion Star 308
 Cusk-eel, Spotted 349
 Cusk-eel 183
 Cuttlefish
 Australian Giant 289
 eggs 279
 colour change 277
 Furrow Basin 447, 451
 Cuvier Plateau 447, 451
 Cuvier's Beaked Whale 413
 cyanobacteria 226, 232, 233, 254, 255
 Cyclades 439
 Cyclophorans 316
 cyclones 52-53, 55, 70-71
 East China Sea 464
 Haiyan 72-73
 Timor Sea 451
 and upwelling 60
see also hurricanes
 Cyclopoid Copepod 294
Cylopterus lumpus 358
Cyrtocodium angustum 297
Cyrene nigricans 286
Cyrtoloba compressa 148
Cyrtoloba gibbiventer 184
Cyrtoloba tigris 285
 Cyprus Basin 439
 D
 D'Entrecasteaux Islands 472
 Dacia Seamount 437
 Dahlak Archipelago 448
 Daisy Coral 268
 Datto Ridge 464, 466
 Dallas Reef 465
 Dalmatia 438
 Damar, Kepulauan 472
 Dampier Seamount 443
 Damsel Fish *see* Sergeant Major
 Dana Fracture Zone 479
 Danish Straits 432
 Danube Cone 439
 Danube delta 439
 Danzig, Gulf of 433
 Dao 465
 Dao Phu 465
 Dardanelles 437
Dardanus megistos 299
 Darwin Mangroves 135
 Darwin, Gulf of 441
 dark zone 168, 171, 219
 Darville, Cape 483
 Darwin Mounds 179
 Darwin, Charles (1809-82) 294, 444
Dasysia americana 334-335
 Davidson Bank 458
 Dawie Ridge 446, 454

- Davis Coast 444
 Davis Sea 483
 Davis Seamounts 429
 Davis Strait 423, 426, 429
 Dawlat Sawqirah 449
 De Soto Canyon 440
 Dead Man's Fingers 216, 264
 Dead Sea 439
 Dead Sea, salinity 35
 Dean Island 485
 Deccan Traps 455
 decompression, divers 35
 Deepflight submersibles 173
 Deep Rover submersible 223
 Deep Sea Red Prawn 296
 Deep-sea Angler 225, 350
 Deep-sea Cucumber 312
 deep-sea habitat 222-223
 food 223
 pressure 222
 see also abyssal plain; abyssal zone; dark zone
 Deep-sea Jellyfish 262
 deep-sea sediment 180, 182, 223
 Deepflight Super Falcon submersible 173
 Deepsea Challenger submersible 173, 467
 defences, coastal 105
 Del Cano Rise 446
 Delaware Bay 431
 Delgadán Fan 469
 Delgado, Cabo 446, 454
 Delphinapterus leucas 413
 Delphinus delphis 414
 Deltaworks, Netherlands, storm-surge barriers 105
 Demerara Plain 423, 429
 Dendronophthya species 265
 Dendrophyllia species 269
 Dendrophyllid Coral 269
 Denmark Strait 423, 425, 429, 430
 Denmark Strait 430
 density, seawater 35
 Denison Seamount 459
 deposition, coasts 93
 depression, see cyclones
 depth
 oceans 169
 satellite estimates 187
 Dermochelys coriacea 113, 371
 Derwent Hunter Guyot 481
 Deryugina Basin 461
 deserts, ocean 219
 Desmaneraia aculeata 238
 Desventurados, Islas de los 479
 Deutschland Canyon 484
 Devil's Hole 433
 Devil's-claw, Grand 253
 Devon Island 425, 426
 Devon Ria Coast 96
 Devon Shelf 425, 426
 Devon Slope 425, 426
 Devonian
 ocean life 227
 plate tectonics 44
 Devonshire Cup coral 269
 dhows 449
 Diadema saviignyi 310
 Diadema setosum 310
 Diamantina Fracture Zone 447
 Diamond-backed Terrapin 126
 diamonds, Namibia 443
 diatoms 169, 181, 234, 235
 siliceous 33
 Diobothriophthalma latu 272
 Dickens Seamount 459
 Dictyospha fibula 237
 Diego Garcia 455
 Diego Garcia Atoll 159
 differentiation, Earth structure 40, 41, 42-43
 Digital River 135
 bioluminescence 225
 sunlit zone 169
 Diodon hystrix 367
 Diomedea exulans 387
 Dipterus batis 333
 Dirk Hartog Island 451
 discharge, river 32, 65, 200
 Discovery Basin 448
 Discovery Tablemounts 429
 dissipative beach 106, 108, 110, 111, 112
 diurnal tides 78
 Diver, Great Northern 386
 divergent plate boundary 48
 divers (seabirds) 378-379, 380, 391
 Divided Flatworm 272
 diving (human)
 decompression 35
 effect on environment 475
 free 168
 scuba 173, 475
 tourism 475
 Dixon Entrance 459
 DNA 206, 226
 archaea 232
 Doberai 465
 Dodecanese 439
 Dog Whelk 284
 Dogfish Shark 323
 Dogfish, Piked 325
 Dogger Bank 432, 433
 drums 428, 457
 Doldrums Fracture Zone 429
 Dolicholaimus marioni 314
 Dollerman Island 484
 Dolphin
 Common Bottlenose 123, 414
 Common 414
 Indo-Pacific Humpback 122, 414
 Irrawaddy 135
 La Plata 118
 Long-nouted Spinner 414
 Risso's 414
 Dolphin and Union Strait 424, 426
 Dolphinfish 364
 dolphins, echolocation 37, 400
 Dominica Passage 441
 Donegal Bay 432
 Dongjin estuary 129
 Dorchester, Cape 426
 Doubtful Sound 123
 Dover
 Strait 433
 White Cliffs 96, 180
 Dover, Strait of 433
 downwelling 60
 epicontinental seas 45
 Greenland Sea 427
 Drachilla spectabilis 245
 Dragonfish 224
 Drake Passage 423, 429, 444, 457, 482
 Dreadnought Bank 450
 drift-aligned beach 106
 drift, continental 44-45
 Dronning Maud Land 484
 drowned valleys 88, 148
 DSV Limiting Factor submersible 173
 Ducie Island 477
 Duck Flightless Steamer 381
 ducks 380
 Dufek Coast 485
 Dugong 134, 150, 158, 401, 419
 importance of seagrass 146
 see also Paddle Weed
 Dugong dugon 419
 Dumbo Octopus 288
 Dumont D'Urville Sea 483
 Dumshaf Plain 425, 427
 Dundee Island 444, 484
 dune buggies, effect on sand dunes 113
 Dune Snail Bee 304
 dunes, see sand dunes
 Dungeness Crab 123
 Dungeness Spit (Washington State, USA) 113
 Dungeness, Punta 444
 Dunlin 395
 Durdle Door 92
 Durgin Seamount 459
 Dustin Island 484
 E
 Eagle
 Singapore Bald see Brahminy Kite
 White-bellied Sea 393
 Eagle Ray 158, 160, 204
 Earth
 atmosphere 41, 43
 convection 41
 differentiation 41, 42-43
 formation 40-41
 internal heat 40
 origin of life 226
 rotation 54
 structure 41, 42-43
 earthquakes 49
 Gulf of California 469
 Japan 460, 463
 Peru-Chile Trench 479
 East Atlantic Red Gurnard 358
 East Australian Current 66, 456, 457, 480
 East Azores Fracture Zone 429, 436, 437
 East Black Sea Escarpment 439
 East Cape 481
 East Caroline Basin 456, 466
 East China Sea 422, 456, 464, 466
 East Falkland 444
 East Greenland Current 59, 425, 427, 430
 East Indian Fracture 447, 451
 East Mariana Basin 456, 466
 East Mexico Shelf 440
 East Novaya Zemlya Trough 425, 427
 East Pacific Rise 175, 185, 423, 456, 457, 469, 478, 479, 480, 483
 East Scotia Basin 429, 445, 482
 East Scotia Ridge 445
 East Sea/Sea of Japan 150, 422, 460
 East Sheba Ridge 449
 East Siberian Sea 422, 424
 East Taiman Plateau 480
 East Thulean Rise 436
 East Wind Drift 195
 Easter Fracture Zone 423, 457, 479
 Easter Island 457, 479
 Eastern Box Turtle 126
 Eastern Mediterranean 438
 Eastern Scheldt Estuary 119
 storm surge-barrier 104
 Eastward Knoll 441
 Eauripik Rise 466
 Ebrié Lagoon 121
 Ebro Fan 438
 ecdysis 291
 Echinus nanus 364
 Echinus catenata 342
 Echinoides sigmoides 316
 Echiniscoides Water Bear 316
 Echinoderes aquilonius 315
 echinoderms 306-307
 anatomy 306
 classification 208, 306
 defence 307
 feeding 307
 reproduction 307
 Echinus exulans 310
 Echinocardium cordatum 311
 echolocation 37, 400
 Eklonia maxima 148
 Eklonia radiata 150
 eco-tourism 475
 eddies 79
 Edgeoya 425, 427
 Ediacaran fauna 226
 Edible Crab 300
 Edible Sea Cucumber 312
 Edible Sea Urchin 310
 Edward VII Peninsula 485
 Eel
 Banded Snake 343
 Chain Moray 342
 Conger 342
 European 342
 Gulper 343
 Ribbon 342
 Sand 364, 399
 Slender Snipe 342
 Spotted Garden 343
 Eelgrass 148, 150
 Eelpout 189
 eels 339
 migration 220
 see also Sargasso Sea
 Elfaté 473
 Egeria Fracture Zone 447, 455
 Egnont, Cape 481
 Egret
 Great 125
 Little 390
 Pacific Reef 390
 Reddish 132
 Egretta garzetta 390
 Egretta sacra 390
 Eider
 Common 381
 eiderdown 381
 Eight Coats 484
 Eirik Ridge 429
 Ekman spiral 58
 Ekman transport 58, 60
 Ekman, Walfrid (1874-1954) 58
 El Niño 68
 Peru-Chile Trench 479
 El Niño Southern Oscillation 34, 68, 456
 electrons 30
 Elephant Fish see Ploughnose Chimera
 Elephant Island 444, 484
 Elephant Seal 222
 collecting salinity and temperature data 61
 Northern 407
 pressure adaptations 35
 Eleuthera Island 441
 Ellef Ringnes Island 426
 Ellesmere Island 423, 425, 426
 Ellsworth Land 483, 484
 Elysian saunas 341
 Eltanin Fracture Zone 423, 483
 embayed beach 106, 111, 112, 113
 Emiliana huxleyi 237
 Emperor Penguin 190-91, 192-93, 379, 383, 384-385
 Emperor Seamounts 422, 457, 458, 461, 468
 Emperor Trough 468
 Emydoplax amulata 375
 ENBW Baltic 2 435
 endemic species 218
 Enderbury Island 476
 Enderby Bay 422, 446, 483
 Endurance Canyon 484
 Endurance Fracture Zone 444
 Endurance Ridge 445, 484
 energy cycles 212
 Enewetak Atoll 161, 467
 English Channel 432, 433, 437
 formation 96
 English Coast 484
 English Coast 484
 Erythrula ringosa 349
 Erythraea acoides 114
 Erythraea latu 402
 Erivis directus 281
 Eretmion aquarum 356
 Eretmion difflens 288
 Estrada, Punta 444
 Eocene, plate tectonics 45
 epicontinental seas 45
 Epinephelus tukula 358
 Eptatretus bageri 321
 Eptatretus stouti 321
 Equatorial Countercurrent 442, 446, 447, 451, 473, 477
 Equatorial Undercurrent 442, 473
 Eratosthenes Tablemount 439
 Erben Tablemount 469
 Eretmochelys imbricata 370
 Erimo Seamount 461
 erosion
 coastal defences 105
 wave 93, 96-97, 99
 erosion gully 176
 Erromango 473, 481
 Error Tablemount 449
 Erythraea robustus 408
 Espichel, Cabo 437
 Espirito Santo 473
 Estados, Isla de los 444
 estuaries 114-115
 environment 115
 formation 114
 inverse 122
 tectonic, San Francisco Bay 123
 types 114
 Ethmodon rex 237
 Etmopterus spinax 326
 Ettra 438
 Etolin Strait 458
 Eubalana glandula 408
 Euboea 439
 Eucherima ottomii 245
 Eucaeranthus dasygogon 327
 Eudypetes chrysiolopax 383
 Eudyptula minor 383
 Eugenia, Punta 469
 eukaryotes 206, 207, 226
 Eulalia viridi 274
 Euphausia superba 295
 Euphrates see Tigris-Euphrates Delta
 Euramerica 44
 Eurasian Oystercatcher 378, 394
 Eurasian Plate 437, 438, 439, 448, 451, 460
 Europa, Ile 454
 Europe 425
 European Eel 342
 European Otter 402
 European Flat Oyster 279
 European Sturgeon 340
 Euryphmes 223
 Eusale nordmanni 293
 Evans Strait 426
 evaporation 64-65
 inverse estuary 122
 evaporites, continental shelf 141
 Everard, Cape 480
 Everglades 132-33
 Exmouth Plateau 447, 451
 Explorer Plate 459
 Explorer Seamount 459
 Exquisite Lined Flatworm 272
 extinction, mass 228, 229
 Exuma Sound 441
 Exuma Valley 441
 Exxon Valdez oil spillage 459
 Eyclight Fish 352
 F
 FAD see Fish Attracting Device
 Faeroe Bank 430, 432
 Faeroe Gap 430, 432
 Faeroe Islands 425
 Faeroe Shelf 430, 432
 Faeroe-Iceland Ridge 430, 432
 Faeroe-Shetland Trough 425, 430, 432
 Faial 436

- Fair Isle 433
 Fairy Prion 388
 Fairy Tern *see* White Tern
 Fakaofu Atoll 476
 Falkland Escarpment 429
 Falkland Islands 423, 444, 482
 Falkland Plateau 429, 444, 445
 Falkland Trough 444
 Falklands Current 444
 Falkmouth Bay 148
 False Clown Anemonefish 359
 Falster 433
 fan, outwash 176
 Fangtooth 171, 223
 Common 353
 Faugataufa 477
 Faraday Fracture Zone 436
 Farallon Plate 459
 Farewell Island 484
 Farewell Spit 93
 Farewell, Cape 481
 faros 159
 Farquhar Group 454
 Fartak, Ra's 449
 fast ice 198
 Fastnet Race 57
 faults
 Red Sea Coast 98
 transform 442
 Faxaflói 430
 Feather Black Coral 270
 Feather Star
 Passion Flower 311
 Tropical 311
 feather stars 306
 Fernando do Noronha Plain 442
 Ferrat, Cap 438
 Ferraz Ridge 442
 Ferrel cells 54
 Ferris Seamount 479
 fetch 76
 Fiddler Crab, ritual display 301
 Fieberling Tablemount 469
 Fifty Fathoms Flat, The 449
 Fiji 422, 457
 Fiji Plate 473
 Fiji Plateau 473
 Filchner Ice Shelf 484
 Filchner-Ronne Ice Shelf 192, 484
 Filefish, Scrawled 366
 Fimbal Ice Shelf 484
 Finland, Gulf of 433
 fins, fish 336, 337
 Fiorland 481
 fiordlands, Chile 103
 fiords 88, 114, 115, 140
 Alaska 459
 Fire Urchin 307
 Firefly Squid 36, 224
 first-year ice 198
 fish
 anadromous 220
 bony 336-39
 anatomy 336
 buoyancy 337
 camouflage 338
 classification 209, 339
 hunting 338
 protection 338
 reproduction 338
 senses 337
 swimming 336
 cartilaginous 322-23
 anatomy 322
 classification 209, 323
 hunting senses 323
 reproduction 323
 catadromous 220
 classification 209
 jawless 209, 227, 320-21
 lobe-finned 227, 339
 migration 220
 vision 36
- Fish Attracting Device 215
 fish farming 336, 355
 Fish-eagle, Madagascar 134
 Fisher Bank 432
 Fisher Strait 426
 fisheries
 continental shelf 140, 165
 continental slope 176
 Gulf of California 469
 sand eel 165, 355, 361, 399
 fishing 355
 bycatch 355
 damage to deep-water reefs 179, 355
 deep-sea 354
 East China Sea 464
 hazard to wildlife 355, 379
 industrial 355
 traditional 355, 451, 465
 Fishing Cat 134
 Fike, Cape 484
 Futera, Cabo 437
 Flaccid Green Seaweed 246
 flagella 232, 234
 Flame Shell 144, 145
 Flamingo Tongue 285
 Flamingo, Greater 132, 133
 Flashlight Fish 224
 Flatback Turtle 371
 flatfish 339
 Flatworm
 Acoel 271
 Candy Stripe 271
 Divided 272
 Exquisite Lined 272
 Imitating 272
 Thysanozoon 272
 flatworms 271
 Fleet Lagoon, Chesil Bank 109
 Flemish Cap 436
 Flesh Sponge 259
 Flightless Rail 135
 Flightless Steamer Duck 381
 Flint Island 476
 floating objects, as habitat 215
 floats, gas-filled 146, 256
 flooding, coastal defences 105
 Flores 436, 451, 472
 Flores Basin 451, 472
 Flores Sea 451, 472
 Florida Escarpment 440
 Florida Keys 440
 Florida Plain 440
 Florida Reef Tract 156
 Florida-Hatteras Slope 441
 Florida, Straits of 411
 Flower Urchin 307, 310
Fuena foliacea 305
 Fly River 135
 Flyingfish, Atlantic 352
 fog
 over cold currents 66
 northern Chile 66
 San Francisco 67
 Skeleton coast 98, 443
 Fogo Island 431
 food chain 33, 212
 food web 212
 food-energy pyramid 212
 food, at depth 223
 Football Jersey Worm 273
 Foraminifera 108, 181, 237
 foreshore 106
 Formentor 438
 Fortune Bank 454
 Four North Fracture Zone 442
 Foveaux Strait 481
 Fox Islands 458
 Foxe Basin 426, 428
 Foxe Channel 426
 Foxe Peninsula 426
Fragum erugatum 111
 Fram Basin 425
 Franklin Island 485
 Franklin, Benjamin (1706-90) 59
 Franz Josef Land 422, 425, 427
- Fraser Island 480
Freatula antica 399
 frazil ice 198
 Fred Seamount 446, 454
 free diving 168
 freezing point, seawater 35, 198
Fregata minor 390
 French Frigate Shoals, near-atoll 161
 Freshfield, Cape 485
 freshwater
 global 64
 inflow 65
 Fria, Cape 443
 Friesian Islands 433
 Fritgebeld, Great 380, 390
 Frilled Shark 325
 fringes, coastal, biodiversity 140
 fringing reef 152
 Frohisher Bay 426
 Froya Bank 433
 Fuerteventura 437
 Fugloya Bank 425, 427
 fugu *see* pufferfish
 Fukushima nuclear power plant 463
 Fulmar, Northern 388
Fulmar glacialis 388
 Funafuti 473, 476
 Funafuti Atoll, sea-level rise 91
 Fundy, Bay of 431
 fungi 254
 Fungia species 269
 Fur Seal
 Antarctic 403
 New Zealand 123
 Northern 403
 South American 403
 Furbelows 148
 Furneaux Group 480
 Futuna, Ile 473, 476
 Fyn 433
- G**
 gabbro 42
 Gabès, Golfo de 438
Gadus morhua 348
 Gafftopsail Sea Catfish 345
Gadropsanus mediterraneus 349
 Gakkel Ridge 424-25
 Galapagos Fracture Zone 423, 457, 476
 Galapagos Islands 92, 423, 457, 478
 hot spot 478
 influence of Peruvian current 66
 lava flow 17
 Marine Iguaña 376, 478
 Galapagos Penguin 218, 478
 Galapagos Rise 457, 479
Galaxaura ocean 332
 Galicia Bank 437
 Gallego Rise 457
 Galway Bay 432
 Gambia Estuary 120
 Gambia Plain 429
 Gambier Islands 477
 Ganges delta 134, 177, 452-453
 Ganges Fan 422, 447, 450
 Ganges, Mouths of the 450
 Garnet, Northern 12, 378, 380, 391
 Gar, Cuban 133
 garbage patches 63
 Garden Eel, Spotted 343
 Gardner Pinnacles 468
 Garofalo Whirlpool 82
 gas deposits
 Bass Strait 112, 480
 East China Sea 464
 sedimentary basins 47
 South China Sea 465
 gas, in seawater 33
 Gascoyne Plain 447, 451
- Gascoyne Seamount 481
 Gaspé, Péninsule de 431
Gasterosteus aculeatus 357
 gastropods 279
 anatomy 276
 feeding 278
 movement 277
 Gastrotrich 316
Gavia immer 386
 Gazelle Basin 481
 Gazi Bay 149
Geacoides natalis, migration 302, 303
 geese 380
 Geiranger Fjord 115
 Gela Basin 438
Geleimus virens 301
 Gelatinous Blindfish 183
 Gelatinous Bryozoan 305
Gelidium foliaceum 244
 Genoa, Gulf of 438
 George Bligh Bank 430, 432
 George V Coast 485
 George VI Sound 484
 Georges Bank 431
 Georgia, Strait of 459
 geotextile tube 105
 Gerupuk Bay 149
 Gettysburg Seamount 437
 Geysir Reef 454
 Gharial 134
 Ghost Crab 301
 Giacomini Seamount 459
 Giant Anemone 266
 Giant Brain Coral 269
 Giant Cladophora 247
 Giant Clam 276, 281, 282-83
 Giant Kelp 146-47, 151, 238, 249-41
 destruction by Purple Sea Urchin 310
 Sea Otter 402
 Giant Leaf Worm 272
 Giant Mussel Shrimp 295
 Giant Octopus 288
 Giant Pyrosome 256, 319
 Giant Sea Spider 293
 Giant Triton 285, 309
 Giant's Causeway 94-95
 Gibbs Seamount 441
 Gibraltar, Strait of 429, 437, 438
 Gibson Seamount 459
Gigantocypris muelleri 295
 Gilbert Ridge 467, 473
 Gilbert Seamounts 457, 459
 gills, fish 336
 Gippeland Lakes 112
 Giraud Seamount 454
 Gironde Estuary 120
 Gzhignigkaya Gulch 461
 glacial ice 46
 glacial cycle 47, 88
 glaciation
 Alaskan mudflats 129
 Chilean fiordlands 103
 Puget Sound 102
 Glacier Bay 459
 glaciers 192, 194, 195
 global warming 91
 Glass Squid 289
 Glasnost
 Common 250, 251
 The Wash 128
Glauconia flavum 252
 Global Explorer ROV 172
 global ocean conveyor 61, 430
 global warming
 Antarctic ice-shelf breakup 487
 Arctic Ocean 65
 Atlantic Conveyor 61, 430
 and sea-level change 88, 91, 487
 global water cycle 64-65
 Globiophthalma melar 418
 Glottidia albida 315
 Goban Spur 432, 437
- Goblin Shark 329
 Goby
 Couch's 148
 Yellow Shrimp 364
 Gofar Fracture Zone 478
 Gold Coast 480
 Golden Gate channel 123
 tide rip 82
 Golden Jellyfish 10-11
Colpistia vulgaris 314
 Gomers 436
 Gonsiwe, Golfe de la 441
 Gondwana 44, 45
 breakup 482
 climate change 46
 Falkland Islands 445
Goniocoma domosa 179
Goniopsis diphoterensis 268
 Good Hope, Cape of 423, 482
 Goodhope Bay 458
 Goose, Brent 150, 381
 Goosefoot Starfish 308
 Goose-neck barnacle 294
 Gorla Plate 459
Gorgonia ventalina 265
 gorgonin 265
 Gotringe Ridge 437
 Gotland 433
 Gotland Basin 433
 Goto-retto 464, 466
 Gough Fracture Zone 423, 429, 482
 Gould Coast 485
 Graciosa 436
 Graham Land 484
Grampus griseus 414
 Grand Bahama Canyon 176
 Grand Banks 431
 Grand Banks of Newfoundland 429
 Grand Cayman, "stingray city" 335
 Grand Devil's-claw 253
 Grande Comore 454
 Grande, Bahia 444
 granite 42
 Seychelles 455
 Grant Island 485
 Grape Pip Weed Moss 245
 gravel
 beach 107
 sea bed 144
 gravitation, Earth 40
 Gray Whale 408
 migration 417
 grease ice 198
 Great Abaco 441
 Great Abaco Canyon 441
 Great Australian Bight 422, 447
 Great Bahama Bank 156, 441
 Great Bahama Canyon 441
 Great Bahama Island 441
 Great Barracuda 364
 Great Barrier Reef 161, 162-63, 422, 456, 472, 473, 480
 Great Black-backed Gull 396
 Great Blue Hole 157
 Great Cormorant 393
 Great Egret 125
 Great Fish Bank 433
 Great Frigatebird 390
 Great Ice Barrier 192
 Great Inagua 441
 Great Lakes 423
 Great Meteor Tablemount 429, 436
 Great Northern Diver 386
 Great Salt Marsh, Cape Cod 126
 Great Scallop 280
 Great Shearwater 389
 Great Skua 398
 Great White Shark *see* White Shark
 Great Yangtze Bank 464, 466
 Greater Antilles 423, 428, 440, 441

- Greater Flamingo 132, 133
Greater Pipefish 146
Greater Weaver 361
grebes 380
green algae 125, 246
Green Humphred Parrotfish 360
Green Paddle Worm 274
Green Sand Beach 479-471
Green Turtle 112, 158, 370
 importance of seagrass 146
greenhouse gas 67
Greenland 423, 425
Greenland Coast 24-25
Greenland Fracture Zone 425, 427
Greenland Ice Coast 94
Greenland Ice Sheet 46, 61, 436
 global warming prediction 91
Greenland Plain 425, 427
Greenland Sea 423, 424, 425, 427
Greenland Shark 326
Greenland-Iceland Rise 430
Grenada Basin 441
Grenadier, Pacific 349
Grey Heron 390
Grey Islands 431
Grey Lichen 255
Grey Nurse Shark *see* Sand Tiger Shark
Grey Phalotop 380, 395
Grey Plover 394
Grey Reef Shark 229
Grey Seal 406
 Humber Estuary 119
Grey-headed Albatross 201
Gravel Ridge 478
Gymnastichus pinnis 298
Grill Seamount 442
Gronote Eylandt 472
Ground Shark 323
grounding line 192
groundwater 64
Grouper 304
Grouper 358
gryones 105
Gulf of Mexico 316, 428, 431, 440
 map by Benjamin Franklin 59
Gulfweed 235
Gull
 Great Black-backed 396
 Herring 396
 Ivory 397
 Laughing 397
 Swallow-tailed 396
gulls 380
gully, erosion 176
Gulper Eel 343
Gunnard, East Atlantic Red 358
Guaymas Bank 427
Guyot, Arnold Henry (1807-84) 174
guyots 174, 182
Gydaniky Poluostrov 425
Gypho alba 397
Gynandrium pubellium 236
gyrurus 32
gyres
 ocean 58
 Arctic 424
 Atlantic 428, 442
 Comoros 455
 Guatemala Basin 478
 Gulf of Alaska 459
 Indian Ocean 446
 North Pacific 469
 Pacific Ocean 456
 South Pacific 477, 479
 Southern Ocean 482, 483
 upwelling and downwelling 69-61
- H**
H₂O molecule 30
Ha Long Bay, karst 102
hadal zone 168, 171, 219
Hadley cells 54
Haemaphysalis ostolop 394
haemocyanin 277
haemolymph 290
Hagfish 182, 318, 321
 Japanese 321
 Pacific 321
Hairy Angler 350
Hayzen, typhoon 72-73, 467
Heliobrya leucogaster 393
Heliobrya indus 393
Hailout, Pacific 123
Halichoerus grypus 406
Halichondria panacea 259
Halimusa fuscipes 259
Halimusa aurata 262
Halimusa spicata 247
Halimusa rubra 284
halite 32
Halobacterium salinarum 233
Halobates 214, 292
Halobates arizonae 394
halocline 35
Halodule wrightii 148
halophiles 233
Halophila ovalis 251
halophytes 249
Halopogon yorii 248
Hamelin Pond 150
Hammerhead Shark 322-23
Scalloped 332
Haplochromis marulius 298
Haplophysa mollis 351
Harbour Porpoise 418
Harbour Seal *see* Common Seal
Hardanger Fjord 119
Hardground Shrimp Pipefish 356
Hardground Shrimp, moulting 291
Harpagium Swartdraps 359
Harp Seal 406
Harp Sponge 258
- Harrier
Marsh 128
Northern 126
Hastings pelagia 237
Hatchfish 224
 Lovely 347
Hatteras Island 95
Havlock Island 430
Hawaii lava coast 103
Hawaiian Archipelago 49, 161, 468
 circulation 468
Hawkbill Turtle 158, 368, 370, 372-73, 474
 hazard from fishing 355
headlands, erosion 93
heat capacity 31
heat, internal, early Earth 40, 41
heating, solar 54, 66
Heinrich Events 195
Heliopsis coralina 160
Helleren Trough 169, 439
Hennediella homi 249
Heptanobius perl 325
Hercules ROV 173
hermaphrodites 279
Hermisenda caviensis 286
Hermisenda Sea Slug 286
Hernat Crab 134
Heron
 Grey 390
 Madagascar 134
herons 380
Herring Gull 396
Herring, Atlantic 344
herrings 339
Heterochone calyx 258
Heterosanger basi 343
Heterodontus portusjacksoni 327
Hexanchus sanguineus 287
Hexanchus griseus 325
Hickfin Lizardfish 177
Hikurangi Trench 480
Himantopus himantopus 394
Himantopus warnak 335
Hippocampus bargibanti 365
Hippocampus hippocampus 356
Hirondeletia gigas 183
Histro histrio 351
HMS Challenger 171
Hokkaido 460
Holocephalus albus 365
holoplankton 214
Holothuria edulis 312
Holothuria maculata 297
Homotrypa rubrum 198
Honeycomb Worm 275
Hong Kong Harbour 99
Honshu 460, 462-463
Hoorn Island 444
Hoplolithes atlantica 353
homotrypa 233
Hornsea Island 239
Horn Shark 323
Horned-puppy, Yellow 252
Horseshoe Crab 395
Horseshoe Crab 290
 American 293
Horseshoe Worm 313, 314
hotspots 89, 174, 184
 Azores Plateau 437
 Cobb 459
 Galapagos Islands 478
 Hawaii 161, 468
 Kerguelen 451
 Marquesas Islands 477
 Pacific Ocean 456, 468
 Panama 49, 455
 Hound Noodlefish 352
Huang He *see* Yellow River
Humbler Estuary 119
Humboldt Current 376, 456, 457, 478, 479
 see also Peruvian Current
Humboldt Squid 277
- Hummingbird, Bee 133
Hump Coral 268
Humpback Angler *see* Common Blackdevil
Humpback Whale 408, 410-11, 416
 feeding 209-201
 migration 417
 song 37, 409
Humphred Parrotfish 160
Green 360
Hunter Ridge 473
Huon Peninsula
 New Guinea 472
 tectonic uplift 102
hurricanes 70-71
 coastal effects 71
 development and structure 70
 Frances 2004 71
 Ili 2002 440
 Ili 2002 440
Hua Izu 340
Hutia, Cuban 133
hydrocarbons
 cold seeps 189
 as food source 189
 see also gas deposits; oil deposits
hydrogen atoms 30
hydrogen bonds 30-31
hydrogen sulphide, hydrothermal vents 188
Hydroid, Stinging 262
Hydrotus ciliatus 324
hydrologic cycle 64-65
Hydrophis platurus 374
Hydrophis schistosus 374
Hydrophage capsa 397
Hydrothermal Vent Crab 189
hydrothermal vents 32, 185, 188-89
 archaea 232
 East Pacific Rise 478
 fauna 189
 Pompeii Worm 275
hydrozoans 261
Hydrurga leptonyx 407
Hyperoodon ampullatus 413
hyphae 254
- Iapetus Ocean 44
Iberian Plain 423, 429, 437
Ibiza 438
ice
 density 31
 fast 198
 first-year 198
 frazil 198
 grane 198
 multi-year 198
 pack 198, 199
 pancake 198
 see also
 ice age
 ice lat 46-45
 and sea-level change 47, 88-89
 Big 50 103
 Crumbed Bay 96
 ice breakers 199, 424, 485
 Ice Coast, Greenland 94
 ice lead 199
 ice platelets 198
 ice rafting 195, 198
 see also sea-ice
 ice shelves
 Antarctic 192-93, 484, 485
 breakup 487
 satellite monitoring 187, 487
 ice-shelfs 64, 88
 Antarctic 46, 482
 iceberg 194-95, 424
 B-15 487
 calving 192, 195
 detention 195
icebergs *cont.*
 Labrador Current 431
 satellite monitoring 187
 Southern Ocean 482
 Icefish, Blackfin 360
 Iceland 423, 425
 Iceland Basin 423, 429, 430, 432
 Iceland Plateau 425, 427, 430
 ichthyosaur 228
 Iron Star 308
 Ionaster longimanus 308
 Isaon Ridge 473
 igneous rocks 42
 Iguazu, Marine 368, 376, 478
 Imruwak Channel 429
 Imitating Flatworm 272
 impact crater, Chesapeake Bay 116
 Inca Tern 397
 Indian Mackerel 22-23
 Indian Ocean 446-47, 451, 454-55
 circulation 446, 447, 451
 depth 169
 ocean floor 446
 winds 447
 Indian Plate 423, 446, 448, 450, 455
 Indo-Pacific Crocodile *see* Saltwater Crocodile
 Indo-Pacific Humpback Dolphin 414
 Indonesian Fracture Zone 446
 Indonesian Coelacanth 340
 Indus Fan 447, 449
 Indus River 448
 Infantfish, Snout 161
 ink, octopus defence mechanism 208
 Inland Sea 83, 464, 466
 Inner Hebrides 432
 Inner Islands 454
 insects 292
 Inshore Hagfish *see* Japanese Hagfish
 Institut Okeanologi Ruse 461
 interference, wave 76
 interglacial 46
 internal waves 76
 intertidal habitat 78
 Intertidal Rover Beetle 304
 invertebrates 122
 invertebrates 256
 Investigator Ridge 422, 447, 451
 Invisible Bank 450
 Isidurus plomunculus 305
 Island Basin 439
 Island Sea 438, 439
 isots, in seawater 32
 Isonota imperata 252
 Ireland 423
 Ireland Trough 432
 Irresistible Drachella 245
 Irish Moss 245
 Irish Sea 432
 iron
 banded-iron formation 43
 Earth's core 41
 in seawater 33
 iron catastrophe 40
 Irrawaddy Dolphin 135
 Irrawaddy, Mouths of the 450
 Irrigation, Murray River 121
 Iskua Seamount 466
 Iselin Bank 485
 Iselin Seamount 485
 Ishigaki Island 160
 Istiaea hawaiiensis 326
 island arc formation 48, 464, 467, 468
 island chains 49, 456, 477, 480
 Isla Orcadas Ridge 482
 Isla Orcadas Rise 429, 445
 Istiocheilus albicans 364
 Ivory Gull 397

- Izu-Jima Ridge 464, 466, 467
Izembek Lagoon 150
Izu Spur 464, 466
Izu Trench 464, 466
Izu-shoto 464, 466
- J**
Jabiru Stork 131, 132
Jackau Penguin 383
Jaguar Seamount 454
Jamaica Channel 441
Jamaica Estuary
James Island, Gambia Estuary 120
James Ross Island 484
Jan Mayen 425, 427
Jan Mayen Current 427
Jan Mayen Fracture Zone 425, 427
Jan Mayen Island 427
Jan Mayen Ridge 425
Japan Basin 456, 460, 461
Japan Trench 422, 456, 460, 461, 464
Japan, Sea of 422
Japan, Sea of/East Sea 456, 464, 466
Japanese Hagfish 321
Japanese Spider Crab 297
Japweed 239
Jarvis Island 476
Jason Peninsula 484
Java 422, 447, 451, 456
Java Ridge 447, 451
Java Sea 422, 451, 456
Java Trench 169, 183, 422, 446, 447, 451
Jaz'ar Farasan 448
Jazrah Doberai 460, 472
Jeffreys Bay 110
Jelly Weed, Small 244
Jellyfish
Box 261, 264
Common, larva 214
Deep-sea 262
Golden 10-11
Moon 262
Stalked 262
Upsidedown 264
jellyfish 260-61
Jewel Anemone 141, 267
jewellery, coral 260
Johns Basin 485
John Dory 353
Johnston Atoll 468
Jonville Island 444, 484
Jones Sound 426
Joseph Bonaparte Gulf 472
Juan de Fuca Plate 423, 459
Juan de Fuca, Strait of 459
Juan Fernández, Ids 479
Juby, Cap 437
Juncella fragilis 265
Jurassic
ocean life 228
plate tectonics 45
Jutland Bank 432, 433
Jutland, sand dunes 109
Juventud, Isla de la 441
Jylland 433
- K**
Kabonkia ezardii 272
Kachibh, Gulf of 449
Kai, Kepulauan 422
Kamohaka Basin 458, 461
Kamohaka Peninsula 422, 456, 458, 460, 461
Kamohaka Terrace 458
Kamohaksky Zaliv 458, 461
Kamui Seamount 457, 468
Kanton 476
Kap Horn *see* Cape Horn
Kara Sea 422, 425, 427
Kara Strait 425, 427
Karaginsky Zaliv 458, 461
Karaginsky, Ozean 458
Karkinnit, Gulf of 439
Karpophos 439
karrat
Ha Long Bay 102
Krabi Coast 99
Kashevarov Bank 461
katabatic wind 193
Kathetostoma laeve 358
Kathuvar Peninsula 449
Kattgat 432, 433
Kauai 468
Kavachi volcano 472
Kazan-retto 464, 466
Keel-billed Tropicbird 132
Kelp 143
Kellett, Cape 424, 426
kelp 234
Kelp
Asian 150
Bull 150, 151
Giant 146-47, 151, 238, 240-41
destruction by Purple Sea Urchin 310
Sea Otters 402
Split-fan 148
Sugar 148
Kelp Anemone 147
Kelp Fly 290, 304
kelp forests 146-47, 148
Kelp Limpet 148
Kemp Ridley Turtle *see* Atlantic Ridley Turtle
Kena Peninsula 459
Kerala backwaters 121
Kerch Strait 439
Keruelen 447, 483
Keruelen Hotspot 451
Keruelen Plateau 422, 447, 482, 483
Kermadec Islands 476, 481
Kermadec Ridge 481
Kermadec Trench 422, 457, 476, 481
Kermadec-Tonga Trench 480
keys *see* cays
Rhombitah, Gulf of 449
Khayyam Seamount 469, 478
Kiel Bay 433
Kiel Canal 432
Kikori River 135
Kilauea, volcano 38-39, 103, 468
Killer Whale 415
Kinabatangan Mangroves 135
King Island 480
King Penguin 382
King of Fuca Plate 423, 459
King Peninsula 484
King Rapworm 275
King Seal *see* Great Scallop
Kingfisher
Collared 399
Pied 399
Red-breasted Paradise 135
kingfishers 380
Kingman Reef 476
Kings Trough 436, 437
kingranch 313
Kirinmat 476
Kiska Island 458
Kite, Brahminy 393
Kiwake, Black-legged 397
Kitty Hawk Seamount 465
Klapeda Strait 119
Knipovich Ridge 425, 427
Knipovich Seamount 442
Knotted Wrack 239
Knovola, Cape 484
Koon, Cape 459
Koo Samu 465
Kudak Island 457, 459
Kudak Seamounts 459
Kullbinnsey Ridge 425, 430
Kullbilim estuaries 134
Kuroshirokiyo Ozean 458, 461
Kuroshiro River 121
Korea Bay 464
Korea Strait 461, 464, 466
Korean Plateau 460, 464
Korff Ice Rise 484
Koto Sea 473, 476, 481
Kourou 467
Kozubue Sound 424
Kozulon Peninsula 99
Kra, Isthmus of 465
Krahi Coast 99
Krait, Sea, Yellow-lipped 368, 374
Krill
Antarctic 199, 291, 295
and water temperature 291
Kronotskiy Zaliv 458, 461
Kronpritsess Martha Kyst 484
Kure Atoll 468
Kuril Gap 461
Kurile Basin 456, 461
Kurile Harbour Seal 460
Kurile Islands 422, 456, 460, 461
Kurile Trench 422, 456, 458, 460, 461
Kuroshio Current 58, 59, 66, 456, 457, 459, 460, 464, 467
Kuroshio Extension 456, 459
Kuokswim Bay 458
Kwitya 425, 427
Kwajalein Atoll 161, 467
Kyushu 456, 460, 464, 466
Kyushu-Palau Ridge 456, 464, 465, 466, 467
- L**
L'Haridon Light 111
La Nao, Cabo de 438
La Niña 69
La Palma 436
La Palma, Canary Islands 437
La Pérouse Seamount 454
La Pérouse Strait 461
La Plata Dolphin 118
Labrador Basin 423, 429
Labrador Current 59, 116, 195, 426, 431
Labrador Sea 423, 429
Labyrinthula 369
Laluna mista 360
Labyrinthula 254
Labyrinthuloides species 254
Laccadive Islands 447, 448, 449, 455
Ladyfish 341
Lago 433
Lactingone zistacea 312
Lagosa don Paton 117
Lagna Mirim 117
lagoons
coastal 115
coral reef 152, 154
Laguna de Terminus 148
Laguna Madre 117
Laguna San Ignacio 123
Laguna Wan 464
Lake Alexandrina 121
Lake Okeechobee 132
Laminaria hypoleuca 148
Laminaria ochroleuca 148
Laminaria pallida 148
Laminariales 146, 238
Lang Shell 315
Langiers 321
Langpeta flavistilla 321
Langpeta 320
Humber Estuary 119
River *see* Langiers
Sea 321
Langpeta guttata 348
Lana'i 468
Lancaster Sound 426
Lancaster Trough 426
Lancelot 319
Lancet 318
land uplift, and sea-level change 86-89
Land's End 432, 437
Landlark's Wig 238
Langebaan Lagoon 148
Langman circulation cell 61
Lanterfish 339
Spotted 347
Lanternshark, Velvet Belly 326
Lanzarote 437
Laptev Sea 422, 425
Larostema inza 397
Larsen Ice Shelf 192, 193, 486, 487
Larsen Ice Shelf 484
Larsen Sound 424, 426
Lars argentatus 396
Lars marinus 396
Larva rubra, in Black Tufted Lichen 255
Larver Coast 484
Lately Island 484
lateral-line 323, 337
Laticauda subtrina 374
Lattieria thalassina 340
Lattieria menadensis 340
Lau Basin 473, 476, 481
Lau Group 473, 476, 481
Lau Ridge 473, 476, 481
Lau Ridge 480
Laughing Gull 397
Lauria 45
Laurentia 44
Laurentian Fan 431
Laurentian Trough 431
Laureline Ice Sheet 46, 431
lava
basaltic 38-39, 42
and 112
pillow 185, 436
lava flow
Galapagos Islands 17
Hawaii 18-39, 103
Laver 245
Laverbread 245
Lavoisier Island 484
Laysan Island 468
Lazarev Sea 429, 482
Leaf's Storm Petrel 389
Leaf-scaled Sea Snake 375
Leafy Seadrug 356
Leat Auklet 399
Leat Tern 126
Leatherback Turtle 113, 371
migration 220
Leeward Islands 441
Lemon Shark 323
Lemon Spurge 259
Lena River, discharge into Arctic Ocean 200, 424
Lena Seamount 446
Lena Trough 425, 427
Leopard Seal 407
Lepidogaster purpurata 352
Lepidochelys kempi 371
Lepidochelys weddellii 405
Les Pitons, St Lucia 95
Lesbos 439
Lessez Anilles 440, 441
Lessez Sunda Islands 451, 472
Lessoria variegata 150
Lessoria species 259
Lessorpharus atrilinea 397
Lessorpharus 439
Lessez Basin 454
Lexusington Seamount 465
Leyte 465, 466
Lionding 464
Lichen 234
Black Tie 255
Black Tufted 255
Grey 255
Yellow Splash 255
Lichia pygmaea 255
life
ocean, history 226-229
origin 226
Ligeti Ridge 445, 484
Ligula-mouled Sea Albatross 386
light, wavelength 36-37
Lighthouse Reef 156-57
Ligula oozema 295
Ligurian Sea 438
Lima Current 150
limnestic
Anatoli Coast 97
chemical erosion *see* karst
Limy Petricolite 238
Limonium vulgare 252
Limpet
Blue-eyed 147, 148
Common 264
Kelp 148
Slipper, sex change 279
Limos 439
limpets, feeding 278
Limpopo River 158
Limulus polyphemus 293
Linné's Sea 425
Lindensia 433
Line Islands 457, 476
Lined Chiton 289
Linnæus longimanus 273
Lingga, Kepulauan 451, 465
Linguid Brachiopod 315
Linnæan hierarchy 206
Linnæus, Carolus (1707-78) 206
Lionfish 357
Red Sea 158, 219
Loburru, Cape 424
Lomaxki Island 468
lithosphere 42
Litke Trough 425, 427
Little America Basin 485
Little Bahama Bank 156
Little Bahama Bank 441
Little Egret 390
Little Penguin 383
Littorina littorea 285
Lizard, Water Monitor 134
Lizardfish
Highfin 177
Keef 347
lizards 368-69
lobe-finned fish 227, 339
see also Coelacanth
Lobodon compositus 407
Lobster
Caribbean Spiny, migration 220
Norway 143
Spiny 297
Squat 141, 175, 178, 179
Violet-Spotted Reef 236-37
Loch Carbon, biodiversity 211
Loch Lomond Macleod 80
Loggerhead Turtle 370
Loligo vulgaris 289
Lolland 433
Lombok Basin 451
Lombok, seamount 149
Lomonosov Ridge 425
Lomonosov Ridge 424
London Reefs 465
Londrederry, Cape 451, 472
Long Bay 441
Long Island 431, 441
Long-tailed Pilot Whale 418
Long-legged Spider Crab 360
Long-mounted Spinner Dolphin 414
Long-spined Bullhead 357
Long-spined Sea Urchin 310
Longfin Bannerfish 160, 161
Longnose Sawshark 326
longnose drift 93, 106
Lonsdale 402
Looe, Cape 431
loons 380

Lopez, Cap 443
 Lophelia Coral 178, 179, 269
Lophelia pertusa 153, 178, 179, 269
Lophelia pinnata 351
 Lord Howe Island 480, 481
 Lord Howe Rise 422, 456, 481
 Lord Howe Seamounts 481
 Los Roques Basin 441
 Los Roques, Idas 441
 Lost Dutchmen Ridge 451
 Loubet Coast 484
 Loughheed Island 424, 426
 Louisiade Archipelago 472, 473
 Louisiade Plateau 473
 Louisville Ridge 422, 457, 476, 480, 481
 Lovely Hanchetfish 347
 Low Country, South Carolina 127
 Loyalty Islands 473, 481
 luciferin 224
 Lugworm 125, 274, 313
Luidia villosa 308
 Lutjboldt 484
 Lumpskutter 147, 358
 lures, bioluminescent 225
Lutjanus kasmira 361
Lutjanus lutjanus 402
 Luzon 465, 466
 Luzon Ridge 465, 466
Lycoteuthis mirabilis 247
 Lyddian Island 484
 Lyra Basin 466
 Lyra Reef 466, 473

M

Mabahiss Fracture Zone 455
 Macaque, Rhesus 134
 Macaroni Penguin 383
 Macclisfield Bank 465
 Mackenzie Bay 422, 483
 Mackenzie King Island 424, 426
 Mackerel Shark 323
 Mackerel, Atlantic 361
 Mackerel, Indian 22-23
 Macquarie Island 481
 Macquarie Ridge 456, 480, 481
Macrotis kampteni 297
Macrotis pygmaea 238, 310
Macrotis gigantea 388
Macrotis microtis 345
Macropodia robusta 300
 Madagascari 422, 446, 455
 mangroves 134
 Madagascari Basin 422, 446, 454
 Madagascari Fish-eagle 134
 Madagascari Heron 134
 Madagascari Plateau 422, 446, 454
 Madagascari Teal 134
 Madras 436
 Madras Plan 423, 429, 436
 Madras Ridge 436
 Madras, lies de la 431
 Madingley Rise 454
 Madisakak, Ri's 449
Madrovo scalis 179
 maelstrom 80
 maerl 144, 148, 245
 Maero 473
 Maia 454
 Magellan Rise 476
 Magellan Seamounts 456, 466
 Magellan, Ferdinand (c.1480-1521) 444, 456, 477
 Magellan, Strait of 444
 Magellanic Penguin 383
 magma 42, 185
 magnetism, in seawater 32
 magnetism, in cetacean brains 477
 Magnificent Feather Duster 275
 Magnoliophytes 256
 Mahabiss Fracture Zone 447

Mahana Beach see Green Sand Beach, Papakolea Beach
 Maine, Gulf of 431
 Majorca 438
 Majuro Atoll 161, 467
 Makarov Basin 424, 425
 Makarov Seamount 456, 466
 Makassar Strait 451, 456, 465, 472
 Makran Coast 449
 Malacca, Strait of 447, 450, 465
Malastoeus niger 347
 Malaita 473
 Malay Peninsula 447, 465
 Malden Island 476
 Maldives 159, 447, 448, 455
 Maldives Anemonefish 218
 Malekula 473
 Malin Head 432
 Mallorca Channel 438
Mallostus villosus 345
 Malta Channel 438
 Malta Plateau 438
 Malta Trough 438
 mammals 400-401
 anatomy and physiology 400
 breeding 401
 classification 209, 401
 conservation 401
 exploitation 401
 feeding 400
 Man, ill of 432
 managed retreat 105
 Manatee
 importance of seagrass 146
 West African 418
 West Indian 132, 419
 Mandarin Fish 337, 357
 Mangau 476
 manganese nodule 182
 Mangrove
 Black 130, 132, 135
 Button 130
 Red 130, 132
 White 130, 132
 Mangrove Britlestar 131
 Mangrove Jack 135
 Mangrove Kingfisher see Collared Kingfisher
 Mangrove Monitor 377
 mangrove swamps 130-131
 biodiversity 131
 formation 130
 plants 130
 mangroves
 aerial roots 135
 Gan Bay 149
 Madagascari 134
 New Guinea 136-37
 as tsunami protection 134
 Marshikili Plateau 457, 476, 477
 Manila Trench 465
 Manjari 133
 Mannaz, Gulf of 450
 Mansel Island 426
 Manson Bank 485
 Manua Bay 158, 160, 334
 mantle
 Earth 41
 convection cells 41, 42, 44
 sampling 41
 Manus Island 466, 472
 Manus Trench 466, 472
 Mapiuker Seamounts 422, 456, 467
 Maracá, Ilha de 442
 Maracato, Lake 441
 Marajó Island 318
 Marajó, Ilha de 442
 Marañon Seamount 442
 Marner, Alexander (1370-1822) 32
 Marcus Island 466
 Marghera, Isla de 441
 Marguerite Bay 484
 Mariana Islands 467
 Mariana Ridge 466

Mariana Trench 169, 171, 173, 183, 422, 456, 466, 467
 Marie Byrd Land 485
 Marie Celeste Fracture Zone 447, 455
 Marine Otter 402
 marine plastics 63
 Marine Skater 292, 304
 marine terraces 89, 103
 marine-deposition coasts 93
 Marmara, Sea of 439
 Marquesas Fracture Zone 423, 457, 477
 Marquesas Islands 423, 457, 477
 Marzam Grass 107, 109, 113, 243, 251
 Marsh Elder 127
 Marsh Harrier 128
 Marsh Periwinkle 127
 Marsh Sapphire see Common Glasswort
 Marsh Wren 127
 Marshall Islands 161, 467
 Marshall Seamounts 457, 467
 marshes, as tidal barrier 105
 Marsili Seamount 438
 Martaban, Gulf of 450
 Martha's Vineyard 431
 Martin Peninsula 484
 Martin Vaz, Ilhas 442
 Martinique Passage 441
 Mascarene Basin 422, 446, 454, 455
 Mascarene Islands 454
 Mascarene Plain 446, 454, 455
 Mascarene Plateau 422, 446, 454, 455
 Mascaret tidal bore 120
 Masrah, Jazirat 449
 Masrah, Khalij 449
 Masoala, Tanjona 454
 mass extinction 228, 229
Mastigias 19-11
Mastigias stellatus 245
 Matagorda Bay 115
 Mathematically Seamounts 457, 469
 Maud Rise 429
 Maui 468
 Mauna Loa volcano 112, 468
 Maupihia, Society Islands 161
 Maupiti, Society Islands 161
 Mauritius 446, 455
 Mauritius Trench 454
 Mauve Stinger 225, 263
 Mawsonites 226
 Maxwell Fracture Zone 436
 Mayan Cichlid 133
 Mayotte 454
 McClintock Channel 424, 426
 McClure Strait 424, 426
 Mecklenburg Bay 435
 Medina Bank 438
 Mediterranean Basin, history 46
 Mediterranean Bath Sponge 259
 Mediterranean Monk Seal 406
 Mediterranean Red Coral 266
 jewellery 260
 Mediterranean Ridge 439
 Mediterranean Sea 422, 423, 429, 437, 438-39
 depth 169
 evolution 46
 Midway Seamount 458, 461
 Midway, Ostrov 458
 medusae 260-61
Megachasma pelagius 328
Megalops atlanticus 341
 Megamouth Shark 328
Megastoma novaeangliae 408
 Meghina delta 134
 megalofauna 313
 Melanesia 422, 456, 472-73
 Melanesian Basin 422, 456, 467
Melanocheilus johnsonii 351
 Melita Bank 438
 Melilli Rise 473, 480

Melish Seamount 468
 melting point, water 31
 melting, impact, early Earth 40
 Melville Island 424, 426, 472
 Melville Peninsula 424, 426
 Melville Trough 424, 426
 Menard Fracture Zone 423, 457, 483
 Mendaña Fracture Zone 423, 457, 479
 Mendeleyev Plan 424
 Mendeleyev Ridge 422, 424
 Mendocino Fracture Zone 423, 457, 468, 469
 Mendoza Rise 479
 Mentawai Basin 451
 Mentawai Ridge 451
 Mentawai Trough 451
 Mentawai, Kepulauan 451
 Merganser, Red-breasted 381
 Mergui Terrace 450
Mergus serrator 381
 meristem 233
 Mermaid's Wineglass 247
 megarplankton 170, 214
 Mesozoic
 climate 46
 giant marine reptiles 228
 Messina, Strait of 438
 Meta Incognita Peninsula 426
 metamorphic rock 42
 meteorite impact crater, Chesapeake Bay 116
 methane
 cold seeps 189
 as food source 179
 methane-fixing bacteria 189
 METOP-C 54
Methidium unile 267
 Mexico Basin 440
 Mexico, Gulf of 423, 428, 440
 Michelson Ridge 466
 microalgae 248
 Micronesia 422, 456, 466, 467
 microparticles 63, 180
 Mid-Atlantic Ridge 184, 185, 423, 424, 428, 429, 430, 436, 437, 442, 443, 482
 Mid-Indian Basin 422, 447, 451, 455
 Mid-Indian Ridge 422, 446, 447, 455
 Mid-Ocean Canyon 429, 436
 Mid-Ocean Channel 423
 mid-ocean ridges 42, 174, 182, 185
 creation of oceanic crust 48
 and sea-level change 88
 Mid-Pacific Mountains 422, 456
 Mid-Pacific Seamounts 467, 468
 Middle America Trench 423, 457, 469, 478
 Midway Atoll 161, 457, 468
 migration 220-21
 birds 380
 Red Crab 302, 303
 tracking 220
 vertical 221
 whales 417
 Milkfish 339, 344
 Millennium Island 476
 Miller Seamount 459
 Milne-Edwards Butterflyfish 161
 Milne Seamounts 436
 Minami Daito Basin 464
 Minnao Bank 126
 Minich, The 432
 Mindanao 465, 466
 Mindoro 465, 466
 minerals
 hydrothermal vents 188
 in seawater 32, 177
 Minicoy Island 449
 Minke Whale, Common 409
 Minorea 438
Mionectes angusticeps 407

Mirton Pelagos 439
 Mississippi Estuary 116
 Mississippi Fan 440
 Mississippi Slope 440
 Mississippi-Alabama Shelf 440
Mitsukurina owstoni 329
 mixed estuary 114
Mnomopsis laevis 317
 moat, Easter Island 479
Molala bistrius 334
 Moeraki Beach 112
 Mohéli 454
 Mohs Ridge 425
 Mohorovicic discontinuity (Moho) 42
Mola mola 367
 molecules, water 30-31
 Molloy Deep 183
 molluscs 276-79
 anatomy 276
 classification 208, 279
 feeding 278
 lifecycles 279
 movement 277
 reproduction 279
 respiration 277
 sense organs 277
 Moloka'i 468
 Molokai Fracture Zone 423, 457, 468, 469
 Molokini Island 49
 Molucca Sea 451, 465, 466, 472
 Moluccas 451, 456, 465, 466, 472
 Mona Canyon 441
 Mona Passage 441
Monachus monachus 406
 Montego, Cabo 437
 Monitor Lizard
 Mangrove 377
 Water 134, 377
 Monkey
 Proboscis 135
 Rhesus Macaque 134
 Spider 132
 Monkfish see Angler
 Mono Rise 441
Monodon monoceros 413
 monoplacophorans 279
 monsoon, Indian 54, 446, 450, 473
 Monterey Bay 469
 kelp forest 151
 Monterey Canyon 469
 Monterey Fan 469
 Montevideo 118
 Moon
 formation 40
 influence on tides 78-79
 Moon Jellyfish 262
 Moon Snail 217
 Moonfish see Opah
 Moonless Mountains 457, 469
 Moorea 476
 Moorea, Society Islands 161
 Moray Eel, Chain 342
 Moray Firth 432
 Morecambe Bay 127
 Morelet's Crocodile 132
 Morning-glory, Beach 252
 Mornington Abyssal Plain 423, 457, 483
 Moro Gulf 465, 466
 Moro Reef 468
 Morotai, Pulau 465, 466
 Morris Jesup, Kap 425
Morus basianus 12, 391
 Mosaic Sea Star 308
 mosasaur 228
 Moskenstraumen see Lofoten Straits
 Mosquito Bank 441
 Mosquito Coast 441
 Moya
 Golden Dune 249
 Salt marsh 249
 Seaside 249
 Southern Beach 249

- mosses 249
 Mouthchoir Passage 441
 moulting, arthropods 291
 Mount Desert Island 94
 Mount St. Helens, volcanic eruption 459
 Mozambique Channel 422, 446, 454, 455
 Mozambique Escarpment 446, 482
 Mozambique Plateau 422, 446, 454
 mud
 bioturbation 113
 sea bed 144
 Mud Dragon 315
 Mud-shrimp, Bay of Fundy 126
 mudflats 124
 Alaskan 129
 Gulf of 128
 Mines Basin 126
 Morecambe Bay 127
 Saemangeum Wetlands 129
 The Wash 128
 Wadden Sea 127
 see also Common Glosswort
 Mudkipper 135
 Muertos Trough 441
 multi-year ice 198
 Munk, Walter (born 1917) 37
Murex pecten 284
 Murmansk Rise 427
 Murray Fracture Zone 423, 457, 468, 469
 Murray Ridge 447, 449
 Murray River 121
 Murray Seamount 459
 Murraroa 477
 Musashi Banks 461
 Mushroom Coral 269
 Mushroom Leather Coral 264
 Musicians Seamounts 457, 468
 Musau Trench 466
 Mussel
 Common 280
 Ribbed 127
 mutualism 217, 292
Myastophis punctatus 347
Myrtillepis colubrina 343
Myrtillepis vitata 352
 Mys Alevisa 461
 Mys Anvra 461
 Mys Enkan 461
 Mys Olyutorskiy 461
 Mys Shipunskiy 461
 Mys Sivuchiy 461
 Mys Taygoniy 461
 Mys Terpeniya 461
 Mys Tolstoy 461
 Mys Yelzavitsy 461
 Mys Yuzhnyy 461
Mytilus edulis 280
Myxine glutinosa 321
- N**
 Namibia Plain 429
 Nankai Trough 464, 466
 Nansen Basin 422, 425
 Nansen, Fridtjof (1861-1930) 201
 Nantucket Island 431
 Nares Plain 423, 429, 441
 Nares Strait 425, 426
 Naruto Whirlpools 83
 Narwhal 413
 Nashville Seamount 441
Naso vlamingii 365
 Nassau 476
 Natal Basin 422, 446, 454, 455
Nastator depressa 371
 National Oceanic and Atmospheric Administration, hurricane monitoring 71
 Natterjack Toad 125
 Natuna Sea 451, 465
- Natuna, Kepulauan 465
 Naturalist Fracture Zone 447
 Naturalist Plateau 447
Nautates ductor 14-15, 364
 Nautilus (cephalopod) 33, 288
Nautilus pompilius 288
Nautilus, (US submarine) 199
 Navarin, Mys 458
 Navarino, Isla 444
 navigation
 animal 221
 whales 417
 Nazareth Bank 454
 Nazca Plate 478, 479
 Nazca Ridge 423, 457, 479
 neap tides 79
 Near Islands 458
 nearshore 106
Nelusetta fernigera 327
 Necker Island 468
 Necker Ridge 468
 Needle Rush 127
 Needlefish, Hound 352
 Needles Overfalls 82
 Nekros 465, 466
 negro 165, 214
 sunlit zone 170
 Neman River, discharge 119
 nematodes 313
 Nemaya Zemlya 422
 nemertean worms 273
Nemidithys subopacata 342
Nemovarium tripos 236
Nemurus devona 311
 Neogene, ocean life 229
 Neom 158
 Neptune Grass 251
 Neptune's Necklace 239
Neocyttus hutchinsoni 150
 neuston 168
 Nevel'skoye Seamount 461
 New Britain 472
 Trench 472
 New Britain Trench 472
 New Caledonia 456
 New Caledonia Basin 480, 481
 New Caledonia Trough 473, 481
 New England Seamounts 429
 New Georgia Islands 473
 New Georgia Sound 473
 New Guinea 422, 456, 465, 466, 472
 New Guinea Flightless Rail 135
 New Guinea Mangroves 135
 New Guinea Trench 466, 472
 New Hebrides Ridge 481
 New Hebrides Trench 457, 473, 481
 New Ireland 466, 472
 New Zealand 422, 457, 480, 483
 New Zealand Fur Seal 123
 Neuenham, Cape 458
 Newfoundland 423, 431
 Newfoundland Basin 423, 429, 436
 Newfoundland Seamounts 436
 Newman Island 485
 Niua, Pulau 451
 Niagaragan Rise 441
 nickel, Earth's core 41
 Nicobar Islands 159, 447
 nictitating membrane, sharks 323
 Niger delta 443
 Niger Fan 429, 443
 Nihoa 468
 Nile Crocodile 134
 Nile Delta, deposition 97
 Ninety Mile Beach 111, 112
 Ninetyeast Ridge 422, 446, 447, 450, 451
 Ningaloo Reef, Whale Sharks 328
Nipponomeris pulcher 273
 nitrates, in seawater 33
- nitrogen
 early Earth 43
 in seawater 33
 nitrogen-fixing bacteria 233
Nitrosomonas 212
Nothula vittulosa 236
 green algae 248
 Noddy, Brown 397
 Nodose Box Crab 297
 nodule, manganese 182
 Nordaustlandet 425, 427
 Norfolk Island 481
 Norfolk Ridge 456, 481
 nori 245
 North American Plate 423, 437, 458
 North Atlantic Drift 59, 66, 427, 428, 430, 431, 432
 North Australian Basin 447, 451
 North Cape 425, 427
 North Channel 427
 North Equatorial Current 428, 440, 446, 447, 456
 North Fiji Basin 422, 457, 473, 481
 North Island 457, 481, 483
 North Jutland Dunes 109
 North Kann Basin 427
 North Kenya Basin 454
 North Makasar Basin 451, 465
 North New Hebrides Trench 473
 North Oki Bank 461, 464
 North Pole 424, 425
 North Sea 119, 423, 429, 432, 433
 depth 169
 Northwest Cape 451
 Northwest Passage 426
 North, Cape 431
 Northern Bluefin Tuna 361
 Northern Bottlenose Whale 413
 Northern Cook Islands 457, 476
 Northern Fulmar 388
 Northern Fur Seal 403
 Northern Gannet 378, 380, 391
 Northern Harrier 126
 Northern Mariana Islands 467
 North Atlantic Right Whale 408
 Northern Spencer Gulf Estuary 122
 Northland Plateau 481
 Northwest Georgia Rise 445
 Northwest Hawaiian Ridge 468
 Northwest Pacific Basin 422, 456, 458, 460, 461, 466
 Northwest Slope 440
 Northwind Plain 424
 Northwind Ridge 424
 Norton Plain 458
 Norton Sound 458
 Norway, Cape 482, 484
 Norwegian Atlantic Current 425, 432
 Norwegian Basin 423, 425, 427, 429, 433
 Norwegian Sea 423, 425, 427, 429, 430, 432, 433
 tidal races 80-81
 Norwegian Trench 425, 432, 433
 Noye Be 454
 Noye Glorieuses 454
 Noye Sainte Marie 454
 notch, wave-cut 93
 Noto-hutto 461
 Notre Dame Bay 431
 Nottingham Island 426
 nourishment, beach 105
 Nova Scotia 431
 Nova Trough 457, 476
 Novaya Zemlya 425, 427
 Novosibirskiy Ostrova 422, 425
Nucella lapillus 284
 nudibranchs, in sea slugs
 Nuku Hiva 477
- Nukunoni Atoll 476
Nomenius phaeopus 395
 Nunivak Island 458
 nurseries, kelp forests and seagrass beds 147
 Nusa Tenggara 160
 Nutlars Trough 441
 nutrients
 cycle 112
 in seawater 33
 Nyasa, Lake 454
- O**
 O'ahu 468
 O'Gorman Fracture Zone 478
 O₂ in seawater 32, 33
 Oarfish 348
 Oates Bank 485
 Ob' Trench 447
Obelia, bioluminescence 224
 Obuchev Rise 458, 461
 Obuchev Seamount 461
 Obyska Guba 425
 ocean circulation, polar 200-201
 ocean deserts 219
 ocean floor
 plate tectonics 48-49
 structure 42
 ocean garbage patch 63
 ocean gyres 58
 Ocean Sunfish 215, 367
 ocean temperature
 satellite monitoring 187
 and sea-level 88
 ocean trenches 183
 ocean warming 192
 ocean winds 54-55
 ocean yacht racing 56-57
 ocean-air interface 168, 214
 oceanic crust 42
 recycling 48
Oceanius oceanicus 389
Oceandroma lewiniana 389
 Oceanographer Fracture Zone 423, 429, 436
 oceanography, satellite 186-87
 oceans
 acidification 67
 depth, average 169
 depth, satellite estimates 187
 evolution 44-45
 life, history 226-29
 origin 42-43
 width 422-23
 zones
 depth 168-71, 219
 geographical 218
 life 218-19
 ocelli 277
 Octocoral 175
 Octopus
 Dumbo 288
 North Pacific Giant 288
 Southern Blue-ringed 288
Oryzopsis saratan 301
 Odden ice tongue 427
Odontaspis noronhai 403
Odontaspis stylifera 295
 Oeno Island 477
 offshore breezes 55
 Ogasawara Trough 464, 466
 Ogasawara-Ishino 464, 466
Ogocypselus radiatus 350
Oikopleura labridens 319
 oil deposits, on
 Sikhlin Island 460
 Sea of Okhotsk 460
 sedimentary basins 47
 South China Sea 465
 Timor Sea 451
Oithona nitida 294
 Okhotsk Plate 423, 460
 Okhotsk, Sea of 422, 456, 458
 Oki Bank 461
 Oki Ridge 461, 464
 Oki-shoto 461, 464
 Okidato Ridge 464, 465, 466
 Okinawa 464, 466
 Okinawa Trough 464, 466
 Oland 433
 Old Harry Rocks 93
 Old Sow Whirlpool 80
 Oleron, Ile d' 437
 Olive Sea Snake 375
 Olympus Knell 436
 Olyutorskiy Zaliv 458, 461
 Olyutorskiy, Mys 458
 Oman Basin 449
 Oman, Gulf of 446, 449
 Ona Basin 444
Onchidaria kinoshii 346
 onshore breezes 55
 Onslow Bay 441
 Ontong Java Rise 456, 466, 472, 473
 ooze
 biogenic 180, 181
 calcareous 181
 deep sea 223
 siliceous 181
 Opah 348
 Oparin, Aleksandr I. (1894-1980) 226
Ophiocystis fragilis 309
Ophioprocoides 345
Opsanus tau 349
 Orange Fairy Bantlet 162-63
 Orange Fiddler Crab 301
 Orange River 443
 Orange Roughly 175, 353
 Orange Sea Pen 266
 Orange, Cape 442
Orthis gossamerifera 295
Orthis onca 415
 Oregon National Dunes 113
 Oregon Ridge 432
 Orson Pipe Coral 264
 Orskney Deep 445, 484
 Orskney Islands 432
 Orsona 476
 Orozco Fracture Zone 469, 478
 Ortelgud, Cape 437
Orthostigma crassifolium 249
 Orville Crater 484
 Osborn Plateau 447, 451
Oscillatoria spp. 233
 osculum 258, 259
Oithona sporadica 305
Omma zaratana 314
 Oprey 393
Ostracion melanogaster 366
 Ostrov Belyy 425
 Ostrov Berraga 461
 Ostrov Bol'shevik 425
 Ostrov Bol'shiy Lyakhovskiy 425
 Ostrov Inerap 461
 Ostrov Karagomskiy 461
 Ostrov Kolgerviy 427
 Ostrov Korsomolenskiy 425
 Ostrov Kotel'my 425
 Ostrov Kamshir 461
 Ostrov Mednyy 461
 Ostrov Novaya Sibir' 424
 Ostrov Olyutorskiy Revnivunn 425
 Ostrov Parazhinskiy 461
 Ostrov Sikhlin 422, 456, 461
 Ostrov Simushir 461

- Ostrov Urup 461
 Ostrov Vrangelya 424
 Ostrovoy Seamount 461
 Otranto, Strait of 439
 Otter
 European 402
 Marine 402
 Sea 151, 401, 402
 Otway, Cape 480
 Outer Bailey 430, 432
 Outer Hebrides 430, 432
 outwash fan 176
 overfalls 79, 82
 overfishing 348
 Cod 212
 Sand Eel 399
 Owen Fracture Zone 446, 448, 449
 oxygen
 origin 43
 in seawater 32, 33
 oxygen atoms 30
 Oyashio Current 59, 457, 460
 Oyster
 Atlantic Thorny 280
 Black-lip Pearl 280
 European, over-exploitation 279
 Oyster Plant 243
 Oyster Thief 238
 Oyster Toadfish 349
 Oystercatcher, Eurasian 378, 394
 oysters
 Chesapeake Bay 116
 pearl formation 277
 Ozbourn Seamount 476, 481
- P**
 P'enghu Lighthouse 464
Pachyptila nortoni 388
 Pacific Angel Shark 326
 Pacific Blackdragon 347
 Pacific Gray Whale 123, 460
 Pacific Grenadier 349
 Pacific Haggish 321
 Pacific Halibut 123
 Pacific Ocean 456-57, 467, 468, 469, 477, 478, 479
 circulation 456, 457
 depth 169
 El Niño/La Niña 68-69
 Northwestern 460-61
 ocean basin 456
 Ring of Fire 174, 184, 456, 458
 temperature 34
 winds 457
 Pacific Plate 184, 423, 456, 458, 460, 469, 472, 473, 480
 Pacific Razor Clam 129
 Pacific Reef Egret 390
 Pacific Salmon 459
 Pacific Stilt-mangrove 252
 Pacific-Antarctic Rise 480
 Pacific-Antarctic Ridge 422, 457, 483
 pack ice 199
 Paddle Weed 251
 Paddle Worm, Green 274
Palaemon gymnotus 238
 Padre Island 117, 440
Palaudites grisea 223
Palaudina nitida 388
Palaudina chinensis 397
Palaudina groenlandica 406
Palaudina pinnatus 267
 Painted Ray 333
Palaudina 228
 Paleo-Tethys Sea 44, 45
 Palaeogeographic, ocean life 229
Palaemon serratus 296
 Palau 456
 Palau Samba 472
- Palau Trench 465, 466
 Palawan 465
 Palawan Trough 465
 Palk Strait 450
 Palm, Coconut 243, 253
 Palmas, Cape 443
 Palmerinhas, Ponta das 443
 Palmerston 476
 Palmyra Atoll 476
 Palos, Cabo de 438
 Palomas Basin 478
 Panama Canal 440, 441, 444
 Panama Fracture Zone 478
 Panama, Gulf of 478
 Panay 465, 466
 pancake ice 198, 427
Pandion haliaetus 393
 Pandora Bank 473
 Pangea 44, 45
 Panikkar Seamount 449
 Pantar Island 160
 Parahulais Ocean 44
Paraulinus agius 297
 Papakolea Beach see Green Sand Beach, Mahana Beach
 Papua Plateau 472
 Papua, Gulf of 472
 Papua Swiflet 135
Parablenius gattorgine 365
 Parcel Islands 465
 paratomb 217, 292
Parazanthus anguiformis 270
 Paria, Gulf of 441
 Parker Seamount 459
 Parnaba Ridge 442
 Parrotfish
 Green Humphead 360
 Humphead 160
 Passamaquoddy Bay 80
 Passion Flower Feather Star 311
 Patagonian Ice Sheet 46
 Patagonian Ice-fields 103
 Patagonian Shelf 444, 445
 patch reefs 152
 Patel Island 454
Patella vulgata 284
 Patton and Gilbert Seamounts 459
 Patton Escarpment 469
 Patton Seamount 459
 Pea Crab 217, 300
 Peacock Mantis Shrimp 295
 Peanut Worm 313, 314
 Pearl and Hermes Reef 468
 Pearl River Estuary 122
 Pearlfish 349
 pearls, formation 277
Peanutella graeffe 312
 pebbles, beach 107, 109
Pecten maximus 280
 pedicellariae, sea urchin 307
 pedicle 315
 Pedro Bank 441
 Pedro Escarpment 441
 Peel Sound 424, 426
Pegia confederata 319
Pelagia noctiluca 263
 pelagic seabirds 378
 pelagic zone 164-65
Pelicanoides urvaticus 389
Pelicanus occidentalis 391
 Pelican
 Australian, Coorong Lagoon 121
 Brown 214, 379, 380, 391
 pelicans 380
 Peloponnese 439
 Permba 446, 454
 Penguin
 Adelle 379
 Chinstrap 383
 Emperor 190-91, 192-93, 379, 383, 384-385
 Galapagos 218
 Jackass 383
 King 382
 Little 383
- Penguin cont.
 Macaroni 383
 Magellanic 383
 Rockhopper 444
 penguins 380
 Peninsula Brunswick 444
 Pennell Bank 485
 Penrhyn 476
 Penrhyn Basin 457, 476
 Pentecost 473, 481
 Penzhinskaia Guba 461
Pentaceros scor 308
 peridotite 42
 period, wave 76
Periphylla periphylla 262
 Periwinkle
 Common 285
 Marsh 127
 Pernambuco Basin 429, 442
 Pernambuco Plateau 442
 Pernambuco Seamounts 442
 Persian Gulf 446, 448, 449
 Peru Basin 422, 423, 447, 457, 479
 Peru-Chile Trench 423, 457, 478, 479
 Peruvian Anchoveta 344
 Peruvian Current 344, 457
 see also Humboldt Current
 Pervernes Canyon 458
 Peter I Island 484
 Peters Ridge 459
 Petrel
 Bonin 388
 Common Diving 389
 Leach's Storm 389
 Snow 388
 Southern Giant 388
 Wilson's Storm 389
 petrels 380
Petrolia cristata see *Mastocarpus stellatus*
Petrolites lamarkii 297
Petromyzon marinus 321
Phaeothion aetherei 390
Phalaronax bougainvillii 392
Phalaronax carbo 393
 Phalarope, Grey 380, 395
Phalaropus fulicarius 395
 Philippine Basin 422, 456, 465, 466, 467
 Philippine Plate 464, 467
 Philippine Sea 422, 456, 464, 465, 466, 467
 Philippine Trench 456, 465, 466
 Philippines 422, 456
Phoca vitulina 406
Phocoena phocoena 418
Phocobatra albatrus 386
Phocobatra nigripes 386
Phocobatra palpebrata 386
 Phoenix Islands 457, 476
Pholis dactylos 281
Phonon hypoleuca 314
 phosphates, in seawater 33
 phosphorescence 225
Photolithon polybatrum 352
 photosocytes 224
 photophores 36, 224, 225, 233, 289, 295, 326, 339, 346, 347
 photosynthesis 248
 early Earth 226
 oxygen production 33
 sunlit zone 168, 169
Phycodurus equus 356
Phyllidella pustulosa 272
Phyllispa 151
Phymatolithon calcareum 245
Phyceter macrocephala 412
 phytoplankton 164, 214, 235
 at seamounts 174-75
 Barents Sea 427
 food chain 33, 199, 212, 213
 Antarctic Convergence 201
 photosynthesis 36
 sunlit zone 169-70
- phytoplankton cont.
 surface layer 168
 see also diatoms; dinoflagellates; microalgae
 Pichavaram Mangrove Wetland 134
 Pico 436
 Pico del Teide volcano 437
 Pico Fracture Zone 436
 Piddock, Common 281
 Pied Avocet 394
 Pied Kingfisher 399
 Pierre Braza Seamounts 443
 Piked Dogfish 325
 Pilchard, South American 344
 pillow lava 185, 456
 Pilot Whale, Long-finned 418
 Plottfish 14-15, 364
 Pinch Bug 175
Pinctada margaritifera 280
 Pineapplefish 35duet2
 Pink Lace Bryozoa 305
 Pink Sands Beach 108
 pumped 400-401
 early 228
Pinnotheres pison 300
 Pioneer Fracture Zone 469
 Pipefish
 Greater 146
 Harlequin Ghost 356
 Snake 356
 piracy, Strait of Malacca 450
Pisces II submarine 173
Pisomys grandis 253
 Pitcairn Island 457, 477
 Piton de la Fournaise 455
 Placencia Bay 431
 placoderms 227
 placodonts 228, 229
 Plance 366
 plain
 abyssal 176, 177, 182
 sediment 140, 182
 planetesimal 40
 plankton 170, 214, 317
 bioluminescent 225
 classification 207
 see also phytoplankton; zooplankton
 plankton cycle 164
 plains
 aquatic 243
 beach 242
 classification 207
 coastal 250
 dune 242, 243, 250
 flowering 146, 250
 intertidal 243
 marine 242-43
 diversity 242
 plastic, marine 63
 plate tectonics
 Cambrian 44
 Carboniferous 44
 Cretaceous 45
 Devonian 44
 Eocene 45
 Jurassic 45
 ocean floor 48-49
 platelets, ice 198
 plates
 tectonic 44-45, 174, 183, 423
 boundaries 48-49
 Ring of Fire 184
 platforms, wave-cut 89
Platystrophia 308
Platystrophia chaptaliae 359
 Plenty, Bay of 481
 plesiosaurs 228
Platanoceras platosa 366
 Phoenix Trench 339
 Phoenix Islands 345
Platystrophia lineata 345
 Ploughnose Chimaera 324
 Plover, Grey 394
 Plumose Anemone 267
- plunge divers (sea birds) 378-79, 391
 plunging breakers 77
 see also barrel waves
Pluvialis squatarola 394
 pneumatophore 130
 pocket beach 106, 109, 112
 Rockington Trough 472, 473
 Pohmpet 467
 Poinsett, Cape 483
 Polar Bear 21, 199, 402
 threat of global warming 91
 polar cells 54
 polar easterlies 54, 425
 Pole Plain 425
 Polka-dot Batfish 350
Polliopsis polyzona 294
 pollution
 Chesapeake Bay 116
 coastal 141
 coral reefs 153, 155, 156
 Curonian Lagoon 119
 Ebric Lagoon 121
 effect on Yellow Splash Lichen 255
 Exxon Valdez oil spillage 459
 Klappet Strait 119
 New Guinea mangroves 135
 Nusa Tenggara 160
 Pearl River Estuary 122
 Venetian Lagoon 120
 Poluostrov Kanin 427
 Poluostrov Taymyr 425
 Poluostrov Yamal 425
 Polybranchid 286
 polychaetes 274
 polychaete flatworms see flatworms
 Polynesia 457, 476, 477
 polynias 199
Polyptron americanus 365
 polyps, reef-building coral 153, 260
 Pomeranian Bay 433
 Pompeii Worm 275
 Poor Knights Islands 150
 Poppy, Yellow Horned 252
 Porcellan Crab 291, 297, 298-299
 Porcupine Bank 432, 437
 Porcupine Plain 429, 436
 Porcupine Seabight 437
 Porcupinefish 367
Porosia lobata 268
 porotoca tidal bore 118
Porphyra diwa 245
Porphyra porphyra 262
 Porpoise, Harbour 418
 Port Jackson Shark 327
 Portcharmo Beach 109
 Portland Bank 459
 Portuguese Man-of-War 214, 256
Portunus pelagicus 301
Portunus australis 150
Portunus oceanica 251
 post-glacial rebound 88, 96
Posidonia palmifera 238
Posidonia, in seawater 32
 Potato Grouper 358
 Poutrelles Escarpment 441
 Powell Basin 444, 484
 Pratt Seamount 459
 Prawn
 Common 296
 Deep Sea Red 296
 prawn farming 296
 Precambrian, ocean life 226
 precipitation 64-65
 predators, top 212
 Predatory Comb Jelly 317
 pressure
 underwater 35, 171
 deep-sea animals 171, 222
 pressure-system winds 55
 effect of El Niño/La Niña 68-69
 Prestrud Bank 485

- prevailing winds 54, 58
 Priapulid Worm 314
Priapulid caudatus 314
 Pribilof Islands 458
 Prickly Redfish 312
 primary consumers 212
 primary producers 212
 Prince Albert Peninsula 424, 426
 Prince Albert Sound 424, 426
 Prince Charles Island 426
 Prince Edward Fracture Zone 446, 482
 Prince Edward Islands 431, 446, 482
 Prince of Wales Island 424, 426, 459
 Prince of Wales Strait 426
 Prince Patrick Island 424, 426
 Prince Regent Inlet 424, 426
 Prince William Sound 459
 Principle 443
 Prison, Fairy 388
Prionace glauca 332
Pristiophorus cirratus 326
Pristioplectron 333
Pro-Form racing yacht 57
 Proboscis Monkey 135
Procellon, symbiosis with
 Colonial Sea Squirt 319
 producers, primary 212
 productivity 213
 Prodie Longa 424
 Prodie Vil'kitskogo 425
Prognathodon davidi 228
Prohodoceras vittatus 271
 Protector Basin 444
 Protector Shoal 445
 protists 207, 234
 protoplanetary disc 40
 Providence Reef 454
 Priday Bay 447
Pseudanthias spumipinnis 358
Pseudobates lentiginosus 333
Pseudobates bedfordi 272
Pseudobates megalonyx 316
 Pseudobiotus Water Bear 316
Pseudoceros dimidiatus 272
Pseudoceros imitatus 272
Pseudocolochirus violaceus 312
 Pterobranch Worm 314
Pterodroma hypoleuca 388
Pterois volitans 357
 pteropods 180, 181
 pterosaurs 228
Phaenocarpa australis 311
Philonotus guneyi 266
 Ptolemy Seamounts 439
 Puerto Rico Trench 169, 183, 428, 429, 441
 Pufferfish, Star 367
 Puffin, Atlantic 399
 Puget Sound, glaciation 102
 Pukapuka 476
 Pule coral 235
 Punalu'u Beach 112
 Punta Gallinas 441
 Punta Patiño Nature Reserve 135
Paparia pupa 284
 Purple Acorn Worm 314
 Purple Sea Fan 156
 Purple Sea Urchin 310
Pusa lupida 406
 Pymy Seahorse 365
Pyrosoma antarcticum 383
Pyrosomella halodroma 255
 Pyrosome, Giant 256, 319
Pyrosomella spinicornis 319
Pyrosoma spiniferum 319
- Q**
 Qamar, Ghulbar al 449
 Qeqertarsuaq 425, 426
 Qeshm 449
 quartz 42, 116
- quaternary consumers 212
 Queen Angelfish 154, 365
 Queen Charlotte Islands 457, 459
 Queen Elizabeth Islands 423, 424, 425, 426
 Queen Mand Gulf 424, 426
 Queen Scallop 149
 Queensland Plateau 472
 Quest Fracture Zone 444
 quicksand
 Alaskan mudflats 129
 Morecambe Bay 127
 Quinn Seamount 459
 Quôc 465
- R**
 Rabaul caldera, New Britain 472
 Rabbit Fish 324
 Race, Cape 431
 racing, ocean yacht 56–57
 Radarsat satellite 187
 radioactive decay 40
 radiolarians 181, 234, 237
 radula 278
 Rae Strait 424, 426
 rafting, ice 195, 198
 Ragged Tooth Shark *see*
 Sandtiger Shark
 Ragworm, King 275
 ragworms 217
 Rai'l'atea, Society Islands 161
 Rail
 Clapper 127
 Flightless 158
 Zapata 133
 rainbands 70
 rainfall 64
 raised beach 89, 96
Raja undulata 333
Ramalina siliginosa 255
 Raman Guyot 449
 Rapa Nui *see* Easter Island
 Rarotonga 476, 477
 Rat Islands 458
 Ratak Cham 467
 Ratfish, Spotted 324
 Rathlin Island 81
 Raukumara Plain 481
 Ray
 Eagle 158, 160, 204
 Manra 158, 160, 334
 Painted 333
 Spotted Eagle 335
 rays
 anatomy 322
 reproduction 323
 Raz, Pointe du 437
 Razor Shell 281
 Razorfish 365
 Re, Ile de 437
 rebound, post-glacial 88, 96
Recurvirostra avosita 394
 recycling, nutrient 212
 Red Abalone 284
 Red Bandfish 359
 Red Coral, Mediterranean 266
 Red Crab, migration 302, 303
 Red Mangrove 130, 132
 Red Phalarope *see* Grey
 Phalarope
 Red Sea 422, 446, 448
 coral reefs 158
 Red Sea Fault Coast 28
 Red Sea Lionfish 158, 170
 red seaweeds 244–45
 red tide toxin 164, 236
 Red-billed Bluff Turkey 135
 Red-billed Tropicbird 390
 Red-breasted Merganser 381
 Red-breasted Paradise Kingfisher 135
 Reddish Egret 132
- Redfish
 Laguna Madre 117
 Prickly 312
 Reed Bank 465
 reef crest 154–55
 reef flat 154, 155
 Reef Hermit Crab 297
 Reef Lizardfish 347
 reef zones 154–55
 Reef-forming Sponge 258
 reefs
 coral 152–55
 biodiversity 154–55
 cold-water 179
 destruction 155, 160
 formation 153
 warm-water 153
 zones 154–55
 reflective beach 106, 107
 refraction, wave 77
Regulus glene 348
 Regan's Angler 351
 Reinga Ridge 441
 Reinga, Cape 481
 Remotely Operated Vehicle (ROV) 173
Remora 173
Global Explorer 172
 Renaud Island 484
 Rennell 473
 reproduction, animals 257
 reptiles 368–69
 anatomy 368
 classification 209, 369
 exploitation 368
 feeding 368
 giant, Mesozoic 228
 habitat 368
 reproduction 369
 Researcher Seamount 441
 residence time, ion 32
 Resolution Island 426
 Reticulate Whipray 335
 retreat, managed 105
 Réunion 446, 454
 Réunion, hot spot 49, 455
 Revillagigedo Islands 469
 Reykjavik Basin 423, 429, 430
 Reykjavik Ridge 423, 429, 430
Rhabdopleura compacta 314
 Rhéus Ocean 44
 Rhéus Macaque 134
Rhinodimaria pacifica 324
Rhinodolium typus 328
Rhinomonaster quasitus 342
 rhinophores 286
 Rhu, Cap 437
 rhizoids 249
Rhizophora stylus 252
 Rhodes 439
 Rhodes Basin 439
 Rhodophyta 244
 Rhône Fan 438
 ris 88
 Devon Coast 96
 Falmouth Bay 148
 Tasmania 88
 Ribbed Mussel 127
 Ribbon Ed 342
 Ribbon Worm 273
 Richardson Hills 441
 richness
 mid-ocean 42, 174, 182, 185
 sea-level change 88
 riding, ice 198
 Rittenman Bank 465
 Rift Shrimp 139
 rifting 44–45
 Red Sea 44, 98
 Rings, Gulf of 433
 Right Whale 408
 Southern, migration 417
 Riser–Larsen Ice Shelf 192–93, 484
 Ring of Fire, Pacific Ocean 174, 184, 456, 458
- Ring-tailed Cardinal Fish 359
 Ringed Seal 406
 Rio de la Plata 118
 Rio Grande Fracture Zone 423, 429
 Rio Grande Rise 423, 429
 Rio Jucu 117
 river currents 110
 ripples 76
 rise, continental 177
Risa indatyla 397
 Risso's Dolphin 414
 Ritchie Bank 454
 River Lamprey *see* Lampern
 Rivera Fracture Zone 469, 478
 rivers
 Amazon 65, 118, 442
 Amudbionara 134
 Amur 65
 Brahmaputra 134, 450
 Changiang *see* Yangtze
 Chao Phraya 465
 Congo 114, 443
 Danube 439
 Dignil 135
 Dordogne 120
 Gambia 120
 Garonne 120
 Ganges 134, 177, 450
 Huang He *see* Yellow River
 Humber 119
 Indus 448
 Kikori 135
 Komoe 121
 Lena 200, 424
 Limpopo 158
 Mississippi 116
 Murray 121
 Neman 119
 Niger 443
 Nile 97
 Orange 443
 Ouse 119
 Paraná 118
 Pearl 122
 Peat Estuary 118
 St. Lawrence 116, 431
 Scheldt 104, 119
 Susquehanna 116
 Trent 119
 Uruguay 118
 Vellar 134
 Xi Jiang 122
 Yangtze 122, 464
 Yellow 464
 Roaring Fories 54
 Robber Crab 297
 Robbie Ridge 476
 Robertson Island 484
 Roca, Cabo de 437
 Rochebonne, Plateau de 437
 Rocher Percé 431
 Rock Springtail 304
 Rockall 430, 432
 Rockall Bank 429, 430, 432
 Rockall Trough 432
 Rocket, Sea 242
 Rockhopper Penguin 444
 Rockling, Shore 349
 rocks
 formation 42
 igneous 42
 metamorphic 42
 sea bed 142–43
 sedimentary 42
 Rodgers Seamount 442
 Rodinia 44, 227
 Rodrigues 447, 455
 Rodrigues Ridge 455
 Rose Bank 430
 Ross Welcome Sound 426
 Rougeveer Basin 423, 457, 479
 rogue waves 70
 Ronaire Fracture Zone 429, 442
 Rorua Basin 484
 Rorua Ice Shelf 423, 483, 484
- Roo Rise 451
 Roosevelt Island 483, 485
 torquais 409
 Rosalind Bank 441
 Roseate Spoonbill 132
 Rossmoryn Bank 430, 432
 Ross Bank 485
 Ross Ice Shelf 192, 422, 457, 483, 485
 Ross Island 485
 Ross Sea 422, 457, 483, 485
 Ross, Sir James Clark (1800–62) 192, 485
 Ross Bank 425, 427, 433
 Rothchild Island 484
 rotifers 317
 Roughy, Orange 175, 333
 Round Stringray 334
 Roundworm 314
 ROV *see* Remotely Operated Vehicle (ROV)
 Rowley Shelf 447, 451, 472
 Rowley Shoals 451, 472
 Royal Bishop Banks 465
 Royal Charlotte Bank 442
 Royalist Bank 465
 Ruddy Turnstone 395
 Rugen 433
 Ruppert Coast 485
Ruppia maritima 148
 Rydberg Peninsula 484
Ryuguia niger 398
 Ryukyu Islands 464, 465, 466
 Ryukyu Ridge 464, 466
 Ryukyu Trench 422, 456, 464, 465, 466, 467
 Ryurik Seamount 449
- S**
 "sea gliders" 187
 "stringray city" 335
 Saaremaa 433
 Saba Bank, biodiversity 211
Sabellaria alveolata 275
Sabellastarte magnifica 275
 Sable Island 431
 Sable, Cape 451
 Sablefish 176
 Saccharina lanosima 148
Saccharophax lorenbergi 343
Sacchariza polyschides 148
 Saccalinia 217, 290
 Sado 464
 Sado Ridge 461, 464
 Saemangeum Wetlands 129
 Saffir–Simpson scale (hurricane categories) 71
 Sagur Kanva Seamount 449
 Sahul Banks 451, 472
 Sahul land bridge 46
 Sahul Shelf 447, 451, 472
 Salfish, Atlantic 364
 sailing
 long-haul 55
 ocean yacht racing 56–57
 Sallor's Iceberg 247
 Saint Elias, Cape 459
 Saint Helena 443
 Saint Helena Fracture Zone 426, 443
 Saint Lawrence Island 458
 Saint Matthew Island 458
 Saint Paul Fracture Zone 479, 442
 Sagan 466
 Sakhalin Island 460
 Sakhalinsk Zhibo 461
 Sakhalin-shoro 464, 466
 Sals y Gosmer 479
 Sals y Gosmer Ridge 457, 479
 Saldanha Bay 148
Salsomma europaea 251
 Salsom, Ponta das 443

- salinity 35
- Arctic Ocean 65
- Baltic Sea 432
- Black Sea 439
- Coorong Lagoon 121
- Dead Sea 35
- early oceans 43
- Eastern Mediterranean 438
- epicontinental seas 45
- and freezing point of seawater 35
- Gulf of Mexico 440
- Gulf of Thailand 465
- inverse estuary 122
- Laguna de Términos 148
- under ice shelves 193
- and underwater circulation 60
- see also salt, in seawater
- Salisbury Island 426
- Salmo salar* 346
- salmon 339
- Atlantic 346
- Coho 346
- migration 220
- Pacific 459
- salmon farming 336, 346
- Salp 319
- Salp chain 12
- salt
- in seawater 32, 35
- see also salinity
- salt harvesting, Guérande 128
- Salt Marsh Moss 249
- salt marshes 124-25
- Bay of Fundy 124
- biodiversity 125
- Cape Cod 126
- conservation 125
- fauna 125
- formation 124
- Guérande 128
- Mimas Basin 126
- Morecambe Bay 127
- Saemangeum Wetlands 129
- South Carolina Low Country 127
- the Wash 128
- Wadden Sea 127
- zones 124
- salt pans, Guérande 128
- silt-wedge estuary 114, 116, 118
- salination 107
- Salternford 81
- Saltmarsh Sparrow 126
- Saltmeadow Cordgrass 126
- Saltstraumen, tidal race 81
- Saltwater Crocodile 135, 166-37, 369, 377
- saltwater, global 64
- Salim, Gulf of 439
- Salvinella alpina* 346
- Samar 465, 466
- Samosa Basin 457, 476
- Sampfler, Marsh see Common Glasswort
- San Agustín, Cape 465, 466
- San Andreas Fault 123, 469
- San Andrés Trough 441
- San Cristobal 473
- San Francisco Bay 123, 469
- influence of California Current 67, 469
- tide rip 82
- San Lucas, Cabo 469
- San Martin Canyon 484
- San Pablo Bay 123
- sand
- beach 107
- sea bed 144
- sand belt, Nile Delta 97
- Sand Bubbler Crab 290
- Sand Crocus 242
- Sand Dollar 310
- sand dunes 107
- Banc d'Arguin 110
- Cap Ferret 110
- Carelian Spit 119
- sand dunes cont.
- destabilization 113
- Ninety Mile Beach 112
- North Jutland 109
- Oregon National Dunes 113
- Skeleton Coast 98, 100-101
- stabilization 105
- see also Marram Grass
- Sand Eel 361
- commercial fisheries 165, 355, 399
- Sand-hill Screw-moss 249
- Sand Hopper 295
- sand scour 143
- Dungeness Spit 113
- sand spits 93, 108, 110
- Dungeness Spit 113
- Sandtiger Shark 328
- sandflats 124
- Mimas Basin 126
- Sandpiper
- Semipalmated 126
- Spoon-billed 129
- Saugr, Kepulauan 465, 466
- Santa Cruz Basin 473
- Santa Cruz Islands 473
- Santa Inés, Isla 444
- Santa Isabel 473
- Santa Maria 436
- Santomni 439
- Santos Plateau 429
- São Jorge 436
- São Miguel 436
- São Roque, Cabo de 442
- São Tomé 443
- São Vicente, Cabo de 437
- Sarawat mountain escarpment 98
- Sarcophyton trochilophorum* 264
- Sardina 438
- Sardina Terrace 438
- Sardina-Corsica Trough 438
- Sardinops sagax* 344
- Sargasso Sea 170, 423, 440, 441
- European Eel 342
- Sargassum muticum* 239
- Sargassum natans* 235
- Sargassum, Brown 235
- Sargassumfish 170, 215, 351
- Sarmiento Ridge 479
- Sars Bank 444
- satrugi 193
- satellite oceanography 186, 187
- Meteosat 187
- RadarSat 187
- Saunders Coast 485
- Saury Seamouth 441
- Saury, Atlantic 352
- Sava'i 473, 476
- Sava Basin 451, 472
- Savu Sea 451, 472
- Sawfish, Smalltooth 333
- Sawshark 323
- Longnose 326
- Saya de Malha Bank 455
- scales, fish 336
- Scallop
- Great 280
- Queen 140
- Scalloped Hammerhead Shark 332
- Scandinavian Ice Sheet 46
- Scarba 81
- scatterometer 54, 187
- scavengers, deep-sea 182, 223
- scavenging, Herring Gull 396
- Scudidium maritimum* 249
- Schoppe Ridge 459
- Scholle, Isles of 432, 437
- scierites 260
- Scorpaenopsis* 361
- Scorpaenopsis scariosa* 352
- Scorpaenopsis plumieri* 357
- Scorpionfish 216
- Spotted 357
- Scotia Arc 445
- Scotia Plate 423, 444, 445
- Scotia Sea 423, 429, 444, 445, 482, 484
- Scott Canyon 485
- Scott Coast 485
- Scott Island 485
- Scott Seamouths 485
- Scott, Cape 459
- scour, sand 143
- Scrawled Filefish 366
- scrimshaw 401
- Sculpichirus antarcticus* 310
- Scurvy-grass 252
- Syngnathus niger* 329
- sea anemones, anatomy 260
- Sea Apple 312
- sea arch 92
- Sea Bamboo 148
- Sea Beech 244
- sea bed
- rocky 142-43
- sandy 144-45
- Sea Birdtail 304
- Sea Butterfly see Three-tooth Cavoline
- sea cave 93
- sea colour 37
- Sea Cow see Manatee
- Sea Cow, Steller's 419
- Sea Cucumber 144, 181, 221, 312
- sea cucumbers 306
- sea daisies 306
- Sea Eagle, White-bellied 393
- Sea Fan
- Common 265
- Purple 136
- Sea Goldie 152-53
- Sea Grapes 247
- Sea Hare 286
- Sea Ivory 255
- sea knolls 174
- Sea Kraat, Yellow-lipped 368, 374
- Sea Lamprey 321
- Sea Lavender 124
- Common 252
- Sea Lettuce 246
- sea lilies 306
- Sea Lily 223, 311
- Sea Lion
- Australian 404-405
- Californian 403
- South American, breeding colonies 401
- sea lions, anatomy and physiology 400
- Sea Mayweed 243
- Sea Mouse 144, 274
- Sea of Azov 439
- Sea of Cortez see Gulf of California
- Sea of Japan/East Sea 150, 460, 461
- Sea of Marmara 439
- Sea of Okhotsk 460, 461
- Sea Otter 151, 401, 402
- Sea Owey 127
- Sea Palm 238
- Sea Pen 144
- Orange 266
- Slender 266
- Sea Pink 250
- Sea Potato 311
- Sea Rocket 242
- sea skaters 30
- Sea Slater 295
- Sea Slug
- Chromodorid 286
- Hermisverbia 286
- sea slugs 247
- sea smoke 59
- Sea Snake
- Beaked 374
- Leaf-scalded 375
- Olive 375
- Turtle-headed 375
- Yellow-bellied 374
- sea snakes 368-69
- Sea Sparkle 236
- Sea Spider, Giant 293
- sea spiders 292
- Sea Squirt
- Colonial 319
- Common 318
- Star 319
- sea stack 93
- Marilyn Beach 97
- Twelve Apostles 20, 99
- sea stars 306
- Sea Strawberry 108
- Sea Tulip 319
- Sea Urchin
- Edible 310
- Long-spined 310
- Purple 310
- sea urchins 142, 306, 310-311
- control by Sea Otter 151
- sea walls 105
- Sea Whip, White 265
- sea-ice 31, 198-99, 430, 445
- cycle 65
- Greenland Sea 427
- Northwestern Pacific 460
- satellite monitoring 187
- Southern Ocean 482
- sea-level
- change 47, 88-89
- Acadia National Park 94
- Big Sur 103
- geological past 89
- Grumard Bay 96
- rise
- Bangladesh 91
- global warming 91
- Pacific islands 91
- southeastern USA 91
- see also tides
- Sea-star Shrimp 308
- seabirds
- anatomy 378
- breeding 380
- classification 380
- feeding 379
- habitat 378
- migration 380
- threat from fishing 379
- seafloor spreading 45
- and sea-level change 45
- seagrass 146, 243, 250
- Gazi Bay 149
- Laguna de Términos 148
- Lombok 149
- meadows 117, 146-47
- Monterey Bay 151
- Shark Bay 150
- seahorse
- camouflage 135
- Pygmy 365
- Short-nouted 356
- Seal
- Antarctic Fur 403
- Common 406
- Crab-eater 407
- Elephant 35, 61, 222
- Northern 407
- Grey 119, 406
- Harbour see Seal, Common
- Harp 406
- Kurile Harbour 460
- Leopard 407
- Mediterranean Monk 406
- New Zealand Fur 123
- Northern Fur 403
- Serpent Star 309
- Scotian Bank 449
- Seven Arm Starfish 308
- Seymouria Zemlya 422, 425
- Seward Peninsula 424, 458
- Seewell Rise 450
- Seychelles 422, 446, 455
- Seychelles Bank 446, 454, 455
- Shackleton Coast 485
- Shackleton Fracture Zone 444
- Shad, Allis 344
- Shikal, Ras 448
- Shandong Banda 464
- Shantarskiye Ostrova 461
- seamounts cont.
- Emperor, Hawaii 468
- Gulf of Alaska 459
- Pacific Ocean 467
- sea, epicontinental 45
- Seaside Moss 249
- Seaxual, Violet 214, 256
- seawater
- chemistry 32-33
- density 35
- freezing point 198
- effect of salinity 35
- gases 33
- ions 32
- nutrients 33
- pressure 35
- salinity 35
- temperature 34
- Seaweed
- Cotton's 245
- Flaccid Green 246
- seaweed zone 142
- seaweeds
- Brown 238-39
- green 243, 246
- anatomy 246
- habitat 246
- harvesting 151, 233
- see also agar, gel, alginate
- extraction
- red 244-245
- anatomy 244
- distribution 244
- habitat 244
- Sea Beech 244
- secondary consumers 212
- sediment
- biogenic 180, 181
- Black Sea 439
- continental shelf 177
- continental shelf 144-45
- continental slope 176
- deep-sea 180
- deposition, Nile Delta 97
- Humber Estuary 119
- mangrove swamps 133, 134
- mixed 144
- ocean floor 180-81
- terrigenous 180
- Tigris-Euphrates Delta 99
- see also mud, sand, silt
- sediment plan 149, 182
- sediment predators 140
- sedimentary basins 47
- oil deposits 47
- sedimentary rock 42
- scree, cold 189
- Seme Plan 437
- Sense Seamount 437
- seismic monitoring 49
- Selut Mentawai 451
- Semibalanus balanoides* 294
- semidiurnal tides 78
- Semipalmated Sandpiper, 126
- Seneca the Younger, hydrologic cycle 65
- Senkaku Islands 464, 466
- Sepia opima* 289
- Sentinel-6 satellite 187
- Serang, Pulau 465, 466, 472
- Serranid Seamount 449
- Sergeant Major 358
- Sermilik Valley 430
- Serpent Star 309
- Scotian Bank 449
- Seven Arm Starfish 308
- Seymouria Zemlya 422, 425
- Seward Peninsula 424, 458
- Seewell Rise 450
- Seychelles 422, 446, 455
- Seychelles Bank 446, 454, 455
- Shackleton Coast 485
- Shackleton Fracture Zone 444
- Shad, Allis 344
- Shikal, Ras 448
- Shandong Banda 464
- Shantarskiye Ostrova 461

- Sharbat, Ras 449
Shark
 Basking 170, 328
 Blue 332
 Bluntnose Sixgill 325
 Caribbean Reef 229
 Cookiecutter 326
 Copper 211
 Fruited 325
 Goblin 329
 Greenland 326
 Grey Nurse *vs* Shark, Sandtiger
 Grey Reef 229
 Hammerhead 18-19, 322-23
 Lemon 321
 Meganomus 328
 Omic Whitetip 14-15
 Pacific Angel 326
 Port Jackson 327
 Ragged Tooth *vs* Shark,
 Sandtiger
 Sandtiger 328
 Scalloped Hammerhead 332
 Sharpnose Sevengill 325
 Trophy Nurse 327
 Tiger 332
 Whale 256, 328
 White 329, 330-31
 Whitetip Reef 332
 Zebrá 327
Shark Bay 451
Shark Bay, Western Australia 111,
 150
sharks
 anatomy 322
 attacks on humans 110, 329
 classification 323
 hunting senses 323
 reproduction 323
 Sharktooth 322, 364
 Sharpnose Sevengill Shark 325
 Sharky Rise 456, 461
 Shearblow Seamount 451
 Shearwater 380
 Great 389
 Short-tailed 389
 Sheathbill, Snowy 394
 Shelduck, Common 381
 continental 140-41
 geology 141
 shell break 176
 Shelkova Zaliv 461
 Shelkof Strait 459
 Shell Beach, Shark Bay 111
 shells, beach 107
 Sherard, Cape 425, 426
 Shetland Islands 423, 433
 Shikoku 456, 461, 464, 466
 Shikoku Bay 456, 464, 466
 Shikoku Island 83
 Shimada Seamount 469
 Shinka submersible 168
 Shinkai 6300 submersible 173
 Shipunsky, Mys 458
 Shipworn 280
 shipwrecks
 diving 475
 as habitat 145
 Skeleton Coast 98
 Shiraho Reef 160
 Shirase Coast 485
 Shirshov Ridge 458, 461
 shoaling
 fish 256, 338
 waves 77
 shocked quartz 116
 Shore Bredtail 304
 Shore Rockling 349
 Short-snouted Seahorse 356
 Short-tailed Shearwater 386
 Short-tailed Albatross 389
 Shrimp
 Anemone 296
 Banded Coral 217
 Grant Mussel 295
 Halequim, moulting 291
 Peacock Mantis 295
 Rift 189
 Sea-star 308
 Spotted Cleaner 290
 Toxouma 149
 shrimp farming 131
 shuga 198
 Shuangim Islands 459
 Shuyak Island 459
 Sun Ka'an Biosphere Reserve
 132
 Siberia Seamount 461
 Siberian Ice Sheet 46
 Sicily 438
 Sicily, Strait of 438
 Sierra Leone Basin 423, 429, 443
 Sierra Leone Rise 442
 Sigsbee Escarpment 440
 Sigsbee Plain 440
 silica 181
 hydrothermal vents 188
 in sponges 258
 silicuous ooze 181
 silt 180
 Alaskan mudflats 129
 River Plate estuary 118
 Yangtze Estuary 122
 see also sediment
 Silurian, ocean life 227
 Simpson Peninsula 424, 426
 Sines, Cabo de 437
 Singapore Harbour 92
 sink
 carbon 33
 ion 32
 sinkhole, Great Blue Hole 157
 Siphonaria compressa 148
 Siple Coast 485
 Sipuecos Fracture Zone 428
 Sir Edward Pellew Group 472
 sirenia 400-401
 early 228
 Sirius Bank 442
 Sirtis Rise 439
 Sirtis, Gulf of 439
 Sivuchiy, Mys 458
 Spælland 433
 Skagerrak 432, 433
 phytoplankton bloom 33
 Skate, Blue 333
 Skater, Marine 292, 304
 skates 323
 Skeleton Coast 98, 100-101,
 383, 443
 Skathiou Island 419
 Skimmer, Black 398
 Skjervetadstøf 81
 Sklinna Bank 433
 Skookumchuck Narrows Tidal
 Race 82
 Skua
 Arctic 398
 Great 398
 Skye, Isle of 432
 Sleeping Shark 323
 Slender Sea Pen 266
 Slender Snipe Eel 342
 Slipper Limpet, sex change 279
 Stoan's Viperfish 346
 slope, continental 176
 Slough-na-moo Tidal Race 81
 Smallmouth Sawfish 333
 Smelt 339, 345
 Smertanin Seamount 461
 smokers
 black 188
 white 188
 Smith Condrags 124, 126, 127
 Smiley Island 484
 Snake Eel, Banded 343
 Snake Pipefish 356
 Snappers, Bluntnose 167, 361
 Snout Infantfish 161
 Snout Petrel 388
 Snow Petrel 388
 snowball events 46
 snowfall 64
 Snowhill Island 484
 Snowy Shearbill 394
 Society Islands 161, 457, 476
 Society Ridge 476
 Socotra 446, 449
 sodium chloride 32
 sodium ions 32
 Sodwana Bay, continental slope
 176
 Sofala, Baía de 454
 SOIAR channel 37
 Sogrefjorden 433
 Solum Plain 423, 429, 441
 solar heating 54, 66
 Solar System, early 40
 Soldierfish, Whitetip 352
 Solea solea 366
 solerogasters 279
 Solennomula variabilis 179
 Solennomula paxillifera 356
 solid-state creep 41
 Solomon Basin 473
 Solomon Islands 456, 472, 473
 Solomon Sea 422, 456, 472
 Microplate 472
 Somali Basin 422, 446, 449, 454
 Somali Current 446, 447
 Somateria mollissima 381
 Somerset Island 424, 426
 Somniosus microcephalus 326
 Somniani Bay 449
 Sooty Albatross 386
 light-mantled 386
 Sooty Tern 184
 Sora Trough 466
 Soudan Bank 454
 Soutriere Volcano, Montserrat 440
 Sound Fixing and Ramping
 channel (SOIFAR) 37
 Sound of Barra 148
 sound, underwater 37
 Souca chinensis 414
 South American Fur Seal 403
 South American Pill-lard 344
 South American Plate 423, 442,
 444, 479
 South American Sea Lion,
 breeding colonies 401
 South Atlantic Gyre 428
 South Atlantic Plate 445
 South Australian Basin 422, 447
 South Australian Plain 422, 447
 South Bank 433
 South Carolina Low Country
 127
 South China Basin 422, 456,
 465
 South China Sea 422, 456, 465
 South East Point 480
 South Equatorial Current 442,
 446, 447, 451, 455, 456, 473,
 477, 479
 South Fiji Basin 422, 457, 473,
 476, 481
 South Georgia 423, 444, 445,
 482
 South Georgia Ridge 444, 445
 South Georgia Rise 442, 447,
 483, 485
 South Indian Basin 422, 447,
 483, 485
 South Indian Gyre 446
 South Island 457, 481, 483
 South Makassar Basin 451
 South Orkney Islands 444, 445,
 482, 484
 South Pacific Gyre 477, 479
 South Pole 483
 South Sandwich 445
 South Sandwich Fracture Zone
 482, 484
 South Sandwich Islands 444, 445,
 484
 South Sandwich microplate 445
 South Sandwich Trench 183,
 428, 429, 445, 482, 484
 South Scotia Ridge 444, 445
 South Shetland 484
 South Shetland Islands 444, 482,
 484
 South Shetland Trough 444, 484
 South Solomon Trench 473
 Southampton Island 426
 Southeast Indian Ridge 422, 446,
 447, 483
 Southeast Monsoon 457
 Southeast Pacific Basin 423, 457,
 483
 Southern Beach Moss 249
 Southern Cook Islands 457,
 476
 Southern Giant Petrel 388
 Southern Ocean 482-83
 circulation 201, 482, 483
 depth 169
 iceberg 195
 ocean floor 482
 winds 482, 483
 yacht racing 57
 Southern Right Whale 408
 migration 417
 Southern Stingray 334-35
 Southwest Indian Ridge 422,
 446, 455
 Southwest Monsoon 446, 447
 Southwest Pacific Basin 423, 457,
 476, 480, 481, 483
 Spatz Island 484
 Spanish Dancer 287
 specific heat capacity 31
 Spencer Gulf 122
 Spencer Whale 222, 412
 Spheniscus demissa 383
 Spheniscus magellanicus 383
 Sphyrna lewini 332
 Spider Monkey 132
 spilling breakers 77
 Spiny Lobster 297
 Caribbean, migration 220
 Spirorbanchia gigantea 275
 spits, and 93, 108, 110, 113
 Spitsbergen 423, 425, 427
 Spitsbergen Fracture Zone 425,
 427
 Spitsbergen 31
 split-fin kelp 148
 Spongia americana 280
 Sponge
 Barrel 258
 Boring 217
 Breadcrumb 259
 Coralline 259
 Flesh 259
 Lenion 259
 Mediterranean Bath 259
 Reef-forming 258
 Tube 154, 259
 sponges 298-309
 anatomy 258
 Spongia officinalis 259
 Spookfish 324
 Browsnout 171
 Spoon-billed Sandpiper 129
 Spoonbill, Roseate 132
 Sporophore 311, 314
 Sporodon 439
 Spotted Boxfish 366
 Spotted Cleaner Shrimp 290
 Spotted Cuck-eel 349
 Spotted Eagle Ray 335
 Spotted Garden Eel 343
 Spotted Lanternfish 347
 Spotted Ratfish 324
 Spotted Reef Crab 360
 Spotted Scorpionfish 358
 Spratly Islands 465
 spreading, seafloor 45
 Springuga 226
 spring tides 79
 Springtail 290
 Rock 304
 Spurdog *vs* Piked Dogfish
 Squalus acanthias 325
 Squat Lobster 143, 173, 178, 179
 Squalus californicus 326
 Squid
 Big-fin Reef 171, 279
 Common 289
 Firefly 36, 224
 Glass 289
 Humboldt 277
 Vampire 289
 Sr Lanka 422, 447
 St. George's Channel 432
 St. Helena 185, 442
 St. James, Cape 459
 St. Lawrence Estuary 116, 431
 St. Lawrence Seaway 431
 St. Lawrence, Gulf of 429, 431
 St. Lucia Channel 441
 St. Lucia, For Pitons 95
 St. Niina's Tambora 108
 St. Paul Island 447
 St. Peter and St. Paul Rocks 442
 St. Vincent Channel 441
 St. Malo, Golfe de 432, 437
 stack *vs sea* stack
 Staked Jellyfish 262
 standing warm 79, 82
 Star Pufferfish 367
 Star Sea Squirt 319
 Starfish Island 476
 starfish 306
 Crown of Thorns 158, 161,
 307, 309
 Gonoseoid 308
 Seven Arm 308
 Stargazer, Common 358
 stercocyst 317
 Steamer Duck, Flightless 381
 Steele Island 481
 Stefansson Island 424, 426
 Stegonotus fraxionum 327
 Stella's Sea Cow 419
 Stenella longirostris 414
 Stenocranus papillatus 398
 Stenocranus lewis 398
 Stewart Island 481
 Stewart Seamount 442, 465
 Stickleback, Three-spined 357
 silt fishing 355
 Silt-mangrove, Pacific 252
 Silt, black-necked 394
 Stinger, Mauve 225, 263
 stringing cells 260
 Stringing Hydrozoa 262
 Stringray
 Blue-spotted 335
 Round 334
 Southern 144-45, 334-35
 Storks Seamount 447
 Stonefish 142, 357
 stony coral 153, 158
 stony coral tissue loss disease 269
 Stoutfish Inosagay 347
 Stor Bank 425, 427
 Storfordrenna 425, 427
 Stork
 Jabiru 131, 132
 Wood 132
 storm
 tropical 70-71
 see also hurricanes
 storm beach, Chesil Beach 109
 Storm Petrel
 Leach's 389
 Wilson's 389
 storm surge 71
 storm-surge barriers 105
 Easter Scheldt Estuary 104,
 119
 Strabo Trench 439
 Strait of Dover 433
 Strait of Gibraltar 438
 closure 47
 Strait of Hormuz 448
 Strait of Magellan 444
 Strait of Malacca 450
 Strait of Messina 82, 438
 Strait of Sicily 438

