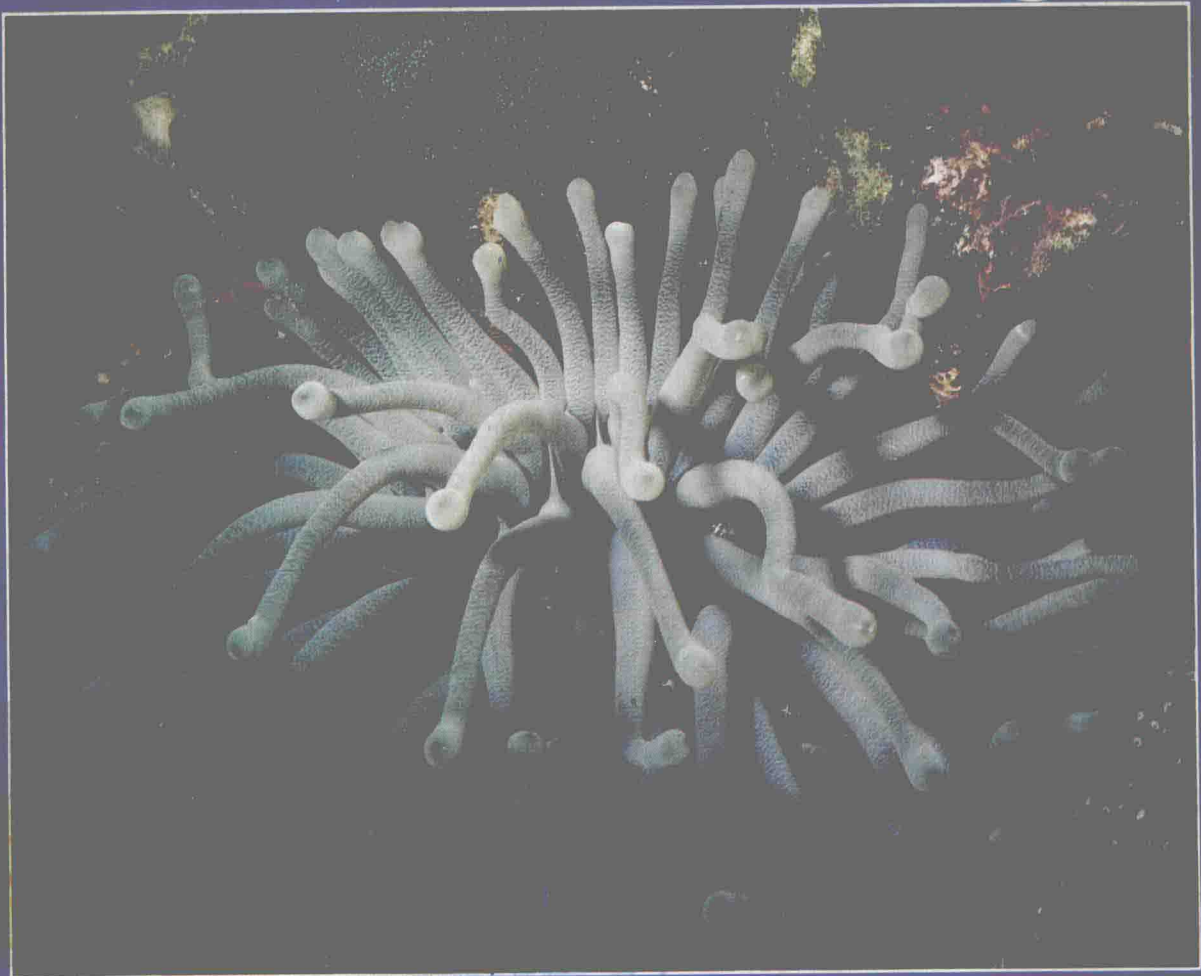


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marine biology



john reseck

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marine
biology



The coral reefs present an unlimited number of microenvironments for animals to live in.

Dedication

To my several thousand students over the last fourteen years who have formed my thinking on how marine biology should be taught.

John Reseck Jr.

Preface

This book is written in the simplest possible terms. Its purpose is to acquaint the student with the marine environment—not to create a marine biologist. The information is basic, and presented in a light readable style. The book is designed for the student to read and enjoy, not to serve as a reference text. There are many good reference texts in every school library. It is not logical to make the student buy one. The book the student buys should cover general principles of the field, major taxonomy, and basic ecology. It should cover these subjects in a manner which is easy to read and understand. It is hoped by the author that this book performs these functions in a way that makes it useful to instructors and students alike.

John Reseck Jr.

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Sponges are a major part of the filter feeding community of the coral reef regions.

Contents

Preface

xiii

PART I BASIC UNDERSTANDINGS

1

Chapter 1 Succession and a Few Other Basic Principles, 3

Chapter 2 A Few Physical and Chemical Considerations, 17

Tides, 17

Waves, 20

Currents, 23

General Circulation of Oceanic Waters, 23

The Ocean Floor, 31

Chapter 3 Energy as Fuel for Life, 37

Chapter 4 Man and the Sea, 45

Recreation, 45

A Place to Dump, 46

Transportation, 48

Commercial Fishing, 50

Mining the Sea, 55

Fresh Water, 56

Electricity from the Sea, 57

Farming of the Sea, 58

PART II ENVIRONMENTS OF THE OCEANS

59

Chapter 5 Environmental Subdivisions, 61

The Coastal Environment, 61

Zonation, 63

Offshore Divisions, 70

- Chapter 6 The Drifters, 73
 - Groups of Drifters, 73
 - Conditions Affecting Population Density, 76
- Chapter 7 Some Benthic Environmental Considerations, 81
 - The Photic Zone-Soft Substrate (Beaches and Bays), 82
 - The Photic Zone-Hard Substrate (Rocky Shores and Coral Reefs), 87
 - Deep Aphotic Benthic Conditions (Muds, Silts and Oozes), 88
- Chapter 8 Arctic and Antarctic Environments, 91
- Chapter 9 Tropical Environments, 97
 - Corals, 97
 - Mangroves, 101
- Chapter 10 North American Marine Environments, 105
 - Currents, 105
 - Temperature, 106
 - Regions, 106

PART III ANIMALS OF THE MARINE ENVIRONMENTS

117

- Chapter 11 A System of Naming the Main Groups, 119
- Chapter 12 Protozoa, 127
 - The Class Ciliata, 128
 - The Class Rhizopod, 129
 - The Class Flagellata, 132
- Chapter 13 Porifera, 135
- Chapter 14 Coelenterata, 141
 - The Class Anthozoa, 144
 - The Class Hydrozoa, 149
 - Class Scyphozoa: The Jellyfish, 150
- Chapter 15 Mollusca, 153
 - The Class Polyplacophora, 155
 - The Class Gastropoda, 156
 - The Class Bivalvia (Pelecypods), 161
 - The Class Cephalopoda, 163
 - The Class Scaphopoda, 166
- Chapter 16 Arthropoda, 167
 - The Class Arachnida, 168
 - The Class Crustacea, 168
- Chapter 17 Echinodermata, 183
 - The Subclass Asteroidea, 186
 - The Subclass Ophiuroidea, 188

	The Class Crinoidea, 189
	The Class Echinoidea, 190
	The Class Holothuroidea, 194
Chapter 18 Miscellaneous Phyla, 197	
	Ctenophora, 197
	Platyhelminthes, 198
	Nematoda, 199
	Nemertea, 199
	Sipunculoidea, 200
	Echiuroidea, 201
	Chaetognatha, 201
	Phoronida, 202
	Brachiopoda, 203
	Bryozoa, 203
	Rotifera, 204
	Annelida, 205
	Enteropneusta (Hemichordata), 208
	Urochordata, 208
	Cephalochordata, 210
Chapter 19 Chordata: Fish, 211	
	Class Cyclostomata, 212
	Class Chondrichthyes (Elasmobranchs), 213
	Class Osteichthyes (Teleost Fishes), 219
Chapter 20 Chordata—Reptiles—Birds—Mammals, 225	
	Class Reptilia, 225
	Class Aves, The Birds, 229
	The Class Mammalia, 233
Suggested Readings, 241	
Index, 245	

Part I

Basic Understandings

- 1 Succession and a Few Other Basic Principles**
- 2 A Few Physical and Chemical Considerations**
- 3 Energy as Fuel for Life**
- 4 Man and the Sea**



The intertidal zone on a rocky shore is a fascinating place to study. When the tide is out, the entire area can be easily observed.

Chapter 1

Succession and a Few Other Basic Principles

DEFINITION OF TERMS USED IN CHAPTER 1

Algae: A group of plants that in spite of their appearance do not have true roots, stems or leaves. Generally found in water, such as seaweed.

Anguilla: North Atlantic eel

Balanus: Acorn barnacle

Climax community: A well-established group of organisms which dominate a given area and remain stable inhabitants until some major environmental change takes place.

Clupea: White-bait

Donax: Bean clam

Dynamic: Used here to mean everchanging.

Emerita: Mole crab

Evolving: Undergoing a gradual generation-to-generation change in the heredity of an organism.

Genetic: Relating to the hereditary factors which control the

makeup of an organism.

Haliotis: Abalone

Impact: Having to do with the effect of external factors on an organism, such as the wave impact (physical force) or the impact of DDT (chemical) on an organism.

Larva: Any early or immature form of an organism.

Ligia: Shore louse

Littorina: Periwinkle

Mytilus: Mussel

Oncorhynchus: Salmon

Phyllospadix: Surf grass

Physiology: The functions (mainly chemical) of a living organism.

Postelsia: Palm kelp

Tivela: Pismo clam

Tolerance: Range within which an organism can endure changes in any of the environmental factors, such as temperature, and survive.

In the study of any biological science, which is, in fact, the study of life, one of the things we must come to grips with is death. In all living communities death is as important as birth because without it there would be no room for those that are born. Each type of living thing needs a special set of circumstances for

4 SUCCESSION AND A FEW OTHER BASIC PRINCIPLES

it to live in a healthy manner. Humans, for example, need food, clothing, and shelter (among numerous other things such as oxygen, water, etc.). Each of these needs has a level or optimum at which the individual functions best, as the need of a human for food illustrates. If someone gets no food, he dies. If he gets too little food, his physical form changes and he cannot function well. With just the right amount of food, he looks good and functions well; but with too much food his physical form changes, and again he can't function at his best level of efficiency. This relationship is true with all species and all factors which affect them.

Because the environment (that is, the total of all physical and biological factors which affect an organism) changes, some of the essential factors for each organism also change. As these factors change, they become either more nearly optimal or less nearly optimal for the organism. These changes will affect the health not only of an individual, but also of the entire population of like individuals—e.g. all the gulls, or all the abalones. Sometimes these changes in the environment are slow, like the coming of an ice age which takes thousands of years. Sometimes the changes are fast, like a rain storm that dumps fresh water and silt from runoff on land into a salt water tide pool. Whether slow and unnoticed or rapid and catastrophic, these changes have the same effect: they change the environmental factors. Whatever the change, it will be bad for some living things and good for others.

Because of our dynamic, or ever-changing, environment, living things



Figure 1-1 Fresh water run-off from land cuts a route through the beach sand to join the sea. The resulting change in salinity is a major influence on intertidal life.

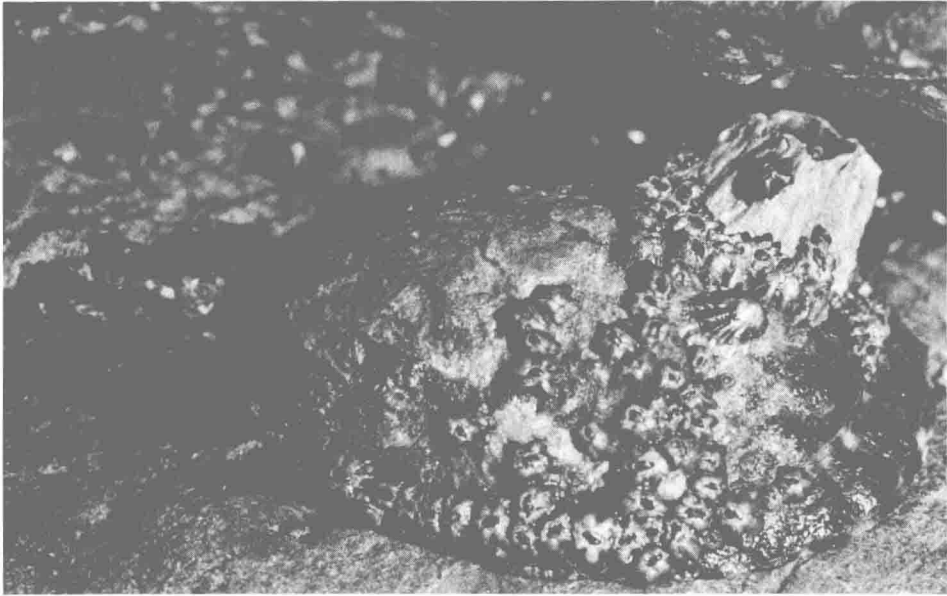


Figure 1-2 This small limpet has two types of barnacles and other limpets on its shell. Finding space to live is perhaps the greatest single competition among marine organisms.

must also change. They do so in two ways. One way we call *adaptation*, or *evolution*, a slow process that occurs from generation to generation through the process of genetics or heredity. This type of hereditary process allows a species or population to adjust or evolve to slow changes in its environment. We have long known that a species must adapt to its environment to survive over hundreds or thousands of years. This type of change keeps the organism attuned to the slower changes and, because of its great complexity, is considered to be irreversible. As the organism becomes more adapted to a certain set of ecological factors, it will continue to adapt and become even more suited to that particular environment. Because of this trend to become specifically adapted to a particular set of circumstances, the entire population may become extinct if those circumstances change too rapidly.

The second type of change the ecologists call *succession*. Succession generally happens over a short period of time—sometimes days, sometimes years. The major difference is that a genetically adapting population may survive but in the case of major change, it may become extinct. In succession the population is replaced by another population for which the new environmental factors provide the newcomers' optimum living conditions and thus enable them to successfully supplant the original population. If one population were to be-