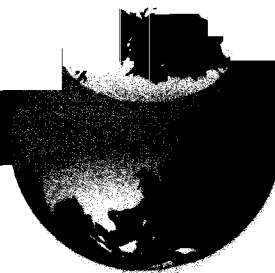


# CONTENTS



Preface	ix
Acknowledgments	xi
Introduction	xii



<b>CHAPTER 1</b>	
<b>MAPPING THE OCEANS</b>	<b>1</b>
Lucas Janszoon Waghenauer and His Mariner's Mirror	3
John Seller and His Atlas of the Ocean	5
Gerardus Mercator and His Map Projection	8
<i>Maps: Drawing a Sphere on a Flat Surface</i>	10
James Cook, the Greatest Chart-Maker	15
Robert FitzRoy, Surveying South America	21
<i>FitzRoy and Darwin</i>	26
Matthew Fontaine Maury, Ocean Currents, and International Cooperation	29



<b>CHAPTER 2</b>	
<b>THE ORIGIN OF THE OCEANS</b>	<b>34</b>
The Contracting Earth	35
James Dwight Dana and the Origin of Ocean Basins	37
Osmond Fisher and the Origin of the Pacific Basin	40
<i>Conservation of Angular Momentum</i>	41



<b>CHAPTER 3</b>	
<b>STUDYING THE OCEAN FLOOR</b>	<b>44</b>
<i>HMS Challenger</i>	45
Charles Wyville Thomson, Scientific Leader of the <i>Challenger</i> Expedition	48
Charles Bonnycastle and the Dream of Charting the Ocean Floor	52

Reginald Fessenden and His Echo Sounder	54
Mid-Atlantic Ridge	58
William Maurice Ewing, Mapping the Ocean Floor	62
Mariana Trench	65
Harry Hess, Robert Dietz, and Seafloor Spreading	68
Tethys, Panthalassa, Pangaea, and the Drifting Continents	72
<i>The Geologic Timescale</i>	77
Plates, Ridges, and Trenches	79



#### CHAPTER 4

### **MEASURING THE DEPTH AND FLOW** **85**

Ferdinand Magellan, Measuring the Deep	85
<i>El Niño</i>	87
Lord Kelvin and How to Take Soundings from a Moving Ship	89
Antoine-Jérôme Balard and the Chemistry of the Oceans	93
Benjamin Franklin and the "River in the Ocean"	96
James Rennell, Who Mapped the Atlantic Currents	100



#### CHAPTER 5

### **JOURNEYS TO THE BOTTOM OF THE SEA** **104**

Diving Bells and Diving Suits	105
<i>Pressure and Depth in the Ocean</i>	106
Paul Bert and the Bends	108
Charles William Beebe and the Bathysphere	111
Auguste Piccard and the Bathyscaphe	115
The <i>Trieste</i> and Its Voyage to the Challenger Deep	119
<i>Aluminaut, Alvin</i> , and the Deep-Sea Submersibles	122



#### CHAPTER 6

### **LIFE IN THE ABYSS** **127**

HMS <i>Porcupine</i> and Life in the Porcupine Abyss	128
<i>Galathea</i> and the Philippine Trench	130
Inhabitants of the Dark Depths	133

<i>Bioluminescence</i>	136
Robert D. Ballard, Black Smokers, and Life at the Extremes	137
<i>Extremophiles</i>	142



<b>CHAPTER 7</b>	
<b>MONSTERS</b>	<b>145</b>
Mermaid	147
Sea Monsters	150
Leviathan	152
Sea Serpents	155
Giant Squid	159
Oarfish, Sunfish, and Megamouth Shark	164
Sea Snakes	168
Coelacanth	170
<i>Living Fossils</i>	174



<b>CHAPTER 8</b>	
<b>MODERN EXPLORERS</b>	<b>176</b>
Deep-Sea Drilling	177
<i>Glomar Challenger</i>	179
International Council for the Exploration of the Seas	180
Conclusion	184
Glossary	186
Further Resources	195
Index	199