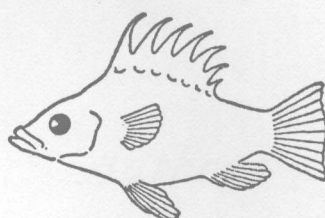


MEMOIR
SEARS FOUNDATION FOR MARINE RESEARCH
Number I
Fishes of the
Western North Atlantic



PART SIX

Order Heteromi (Notacanthiformes)

HALOSAURIDAE, NOTACANTHIDAE, LIPOGENYIDAE

Suborder Cyprinodontoidei

Order Berycomorphi (Beryciformes)

POLYMIXIIDAE, BERYCIDAE, DIRETMIDAE, TRACHICHTHYIDAE,
ANOMALOPIDAE, HOLOCENTRIDAE, ANOPLOGASTERIDAE

Order Xenoberyces (Stephanoberyciformes)

GIBBERICHTHYIDAE, STEPHANOBERYCIDAE, MELAMPHAIDAE

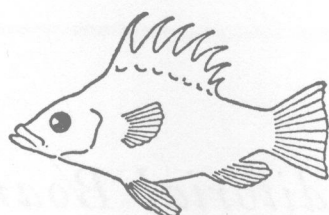
Order Anacanthini (Gadiformes)

in part
MACROURIDAE

NEW HAVEN, 1973

SEARS FOUNDATION FOR MARINE RESEARCH, YALE UNIVERSITY

Fishes of the Western North Atlantic



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BILL SCHROEDER

on board the CAP'N. BILL II, 1953, with *Harriotta raleighana*.
(Courtesy of the late Jan Hahn, W.H.O.I.)

WILLIAM CHARLES SCHROEDER was born on Staten Island, New York, 10 January 1895, the son of William and Emma (Caffrey). He married Adah Jensen in 1916, and there are two children, William Herbert Earl Schroeder (Lt. Comdr., U.S. Coast Guard, ret.) and Gloria M. (Mrs. William F. Gallagher).

He has followed a career in science devoted to studying the ichthyofauna of the western North Atlantic. He became a Scientific Assistant in the United States Bureau of Fisheries at the age of 22, a post he held for the next 15 years and which, for a time, placed him in charge of the Department of Scientific Inquiry. His first papers (1920 and 1924) dealt with the clam industry of southern Florida; his first publication on fishes, co-authored with H. B. Bigelow in 1927, was concerned with the sharks and skates of the northwest Atlantic [*Bull. Harvard Mus. Comp. Zool.*, 68 (5), 239-251]. The classic Hildebrand and Schroeder "Fishes of Chesapeake Bay" followed in 1928.

Over the next 20 years he published individually or co-authored with Bigelow a series of 30 ichthyological notes and papers, the most substantial of which were his studies on the cod (*Bull. U.S. Bur. Fish.*, 46, 1-136, 1930) and his guide to Caribbean commercial shark fishing in 1945. Then, in 1948, he and Bigelow produced the sections on the Cyclostomes and Sharks for Part One of this Memoir series, and in 1953 those on the Sawfishes, Guitarfishes, Skates, Rays, and Chimaeroids for Part Two. The year 1953 also marks the appearance of the indispensable Bigelow and Schroeder "Fishes of the Gulf of Maine".

Nearly all this while (1932-1952) he was Business Manager of the Woods Hole Oceanographic Institution; he became its Ichthyologist in 1952, and was a Senior Scientist from 1964-1968. He was also Associate Curator of Fishes at Harvard, 1936-1961. An additional 23 papers between 1950 and 1968 bear his stamp, bringing the grand total to well over 3,000 pages and 1,000 illustrations. With Bigelow he described one new family, seven genera, and 42 new species from amongst the Cyclostomes, Elasmobranchs, and Chimaeroids. He has served as a member of the Board of Editors of "Fishes of the Western North Atlantic" since the inception of the series.

It has been said of Bill Schroeder that he neither looks nor acts as if he were important. Cape Cod fishermen accept him as an equal. And scientists name new species after him: a mollusk (Clench and Aguayo, 1938), a crustacean (Chase, 1939), an anchovy (Hildebrand, 1943), a carp (H. M. Smith, 1945), a freshwater ray (Fernandez-Yepez, 1960), a sawshark (Springer and Bullis, 1960), a bathyclupeid (Dick, 1962), and a new genus of cat sharks, *Schroederichthys* (Springer, 1966).

"Honest men esteem and value nothing so much in this world as a real friend". In that spirit, and with rare appreciation, this sixth Part of Memoir 1, "Fishes of the Western North Atlantic", is dedicated to Schroeder, William C.

Introduction

WITH the publication of this sixth part of *FISHES OF THE WESTERN NORTH ATLANTIC* it seems desirable to reaffirm the objectives of the series. In this respect, two statements in the PREFACE to Part One, published in 1948, are particularly pertinent.

"The reason for the present series of volumes is to correlate the contents of the rich storehouse of knowledge relating to the fishes that live in the waters of the western North Atlantic."

"It has been written on the premise that it should be useful to those in many walks of life—to those casually or vitally interested in the general phenomena of life in our waters, to the sportsman whose interests are closely associated with pleasure and relaxation, to the fisherman whose livelihood depends upon knowledge of where fishes are gathered together, as well as to the amateur ichthyologist and the professional scientist."

Secure in the wisdom of hindsight we must also call attention to a statement in the INTRODUCTION to Part One, which notes that a widely accepted general outline of classification will be followed. Although such may have existed in 1948, a decade of research by a number of ichthyologists studying both recent and fossil fishes has demonstrated that there does not presently exist any easy way to chart the family tree of fishes. Although the overall study of fish phylogeny is now an active field, the end point, an adequately documented and widely accepted classification, is not yet available. For this reason, and because of the great difficulty in bringing to completion at approximately the same time, sections by many authors studying groups requiring varying amounts of basic research, this series no longer will adhere strictly to a particular sequence of presentation. Instead, accounts of coherent groups, will be published as they become available. Authors are free to treat major group relationships, but phylogeny will not necessarily be reflected by order of appearance.

One other policy change should be noted. In hopes of lessening the proliferation of preliminary literature which has preceded the appearance of previous Parts, in this volume, for the first time, original descriptions are presented; included herein are the original accounts of a previously unrecognized family and several genera, species, and subspecies.

Included in this Part is a comprehensive treatment of the benthic, deep-sea, eel-like fishes of the Order Heteromi, including many extralimital forms.

The Cyprinodontoidei, or killifishes and their relatives, are treated in a fashion that departs widely from previous format. Although many species are significant constituents of the brackish-water fauna, these fishes are headquartered in fresh-waters, and to treat the genera and species in standard fashion would be neither possible nor desirable. Instead, a general discussion of the group is presented along with an illustrated key to salt and brackish-water forms that are known to occur within our area. Cyprinodontoids are one of the groups whose phylogenetic placement is presently under debate. The present account treats a coherent taxonomic unit, whatever its ultimate placement in a phyletic scheme.

The order Berycomorphi includes fishes from tropical shores, the continental slopes, and the bathypelagic realm. At the inception of this series a complete account of this group would have been impossible; however, exploratory fishing, deep-water oceanographic cruises, and extensive tropical shore collecting has provided a wealth of new material for study.

Xenoberyces, included by some ichthyologists with the previous order, contains deep-water pelagic fishes. Again, a modern treatment of these would not have been possible a quarter of a century ago.

The account of the Anacanthini, or cod-like fishes, is commenced in this Part with the treatment of the largest family, the Macrouridae or rattails, abundant fishes of the continental slopes and abyss. As with the Heteromi, exploratory fishing and oceanographic expeditions have recently provided the bulk of material upon which the present account is based. Other anacanthine families will be treated in a subsequent volume.

The following abbreviations have been used throughout in order to avoid repetition of the names of natural history collections housing the preserved specimens upon which the accounts have been based.

AMNH	—	American Museum of Natural History, New York
ANSP	—	Academy of Natural Sciences, Philadelphia
BLBG	—	Biological Laboratory, National Marine Fisheries Service, Brunswick, Georgia; collections now at USNM, UF, UMML
BMNH	—	British Museum (Natural History), London
BNM	—	Zoologisk Museum, Bergen
BOC	—	Bingham Oceanographic Collection, Yale University
CAS	—	California Academy of Sciences, San Francisco
CNHM	—	Field Museum of Natural History, Chicago
FMNH	—	Field Museum of Natural History, Chicago
IFAN	—	L'Institut Fondamental d'Afrique Noire, Dakar
KU	—	Department of Biology, Kochi University
MCZ	—	Museum of Comparative Zoology, Harvard University
MOM	—	Musée Océanographique, Monaco

MMF	—	Museu Municipal do Funchal, Madeira
MNHN	—	Muséum National d'Histoire Naturelle, Paris
MRAC	—	Musée Royal de l'Afrique Centrale, Tervuren
MSNG	—	Museo Civico di Storia Naturale, Genoa
SAM	—	South African Museum, Cape Town
SU	—	Stanford University Collections, now in the California Academy of Sciences
TABL	—	Tropical Atlantic Biology Laboratory, National Marine Fisheries Service, Miami; collections now at USNM, UF, UMML
TU	—	Tulane University, New Orleans
UF	—	University of Florida, Gainesville
UH	—	University of Hawaii, Honolulu
UMML	—	University of Miami Marine Laboratory
USNM	—	National Museum of Natural History, Washington, D. C.
ZMUC	—	Universitetets Zoologiske Museum, Copenhagen

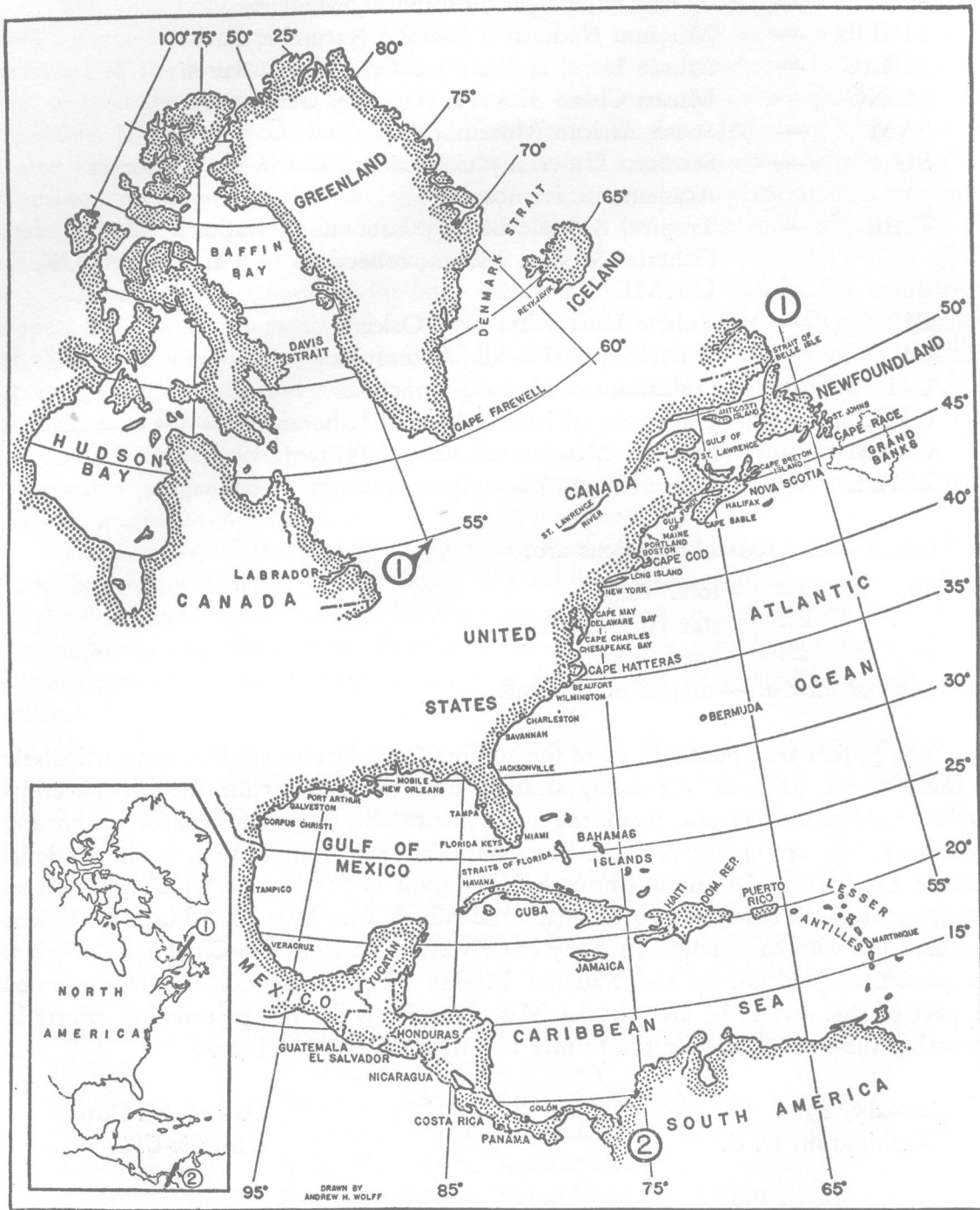
Other often used abbreviations are:

TL	—	total length
SL	—	standard length
hl	—	head length
m.w. or m.w.o.	—	meters of wire out

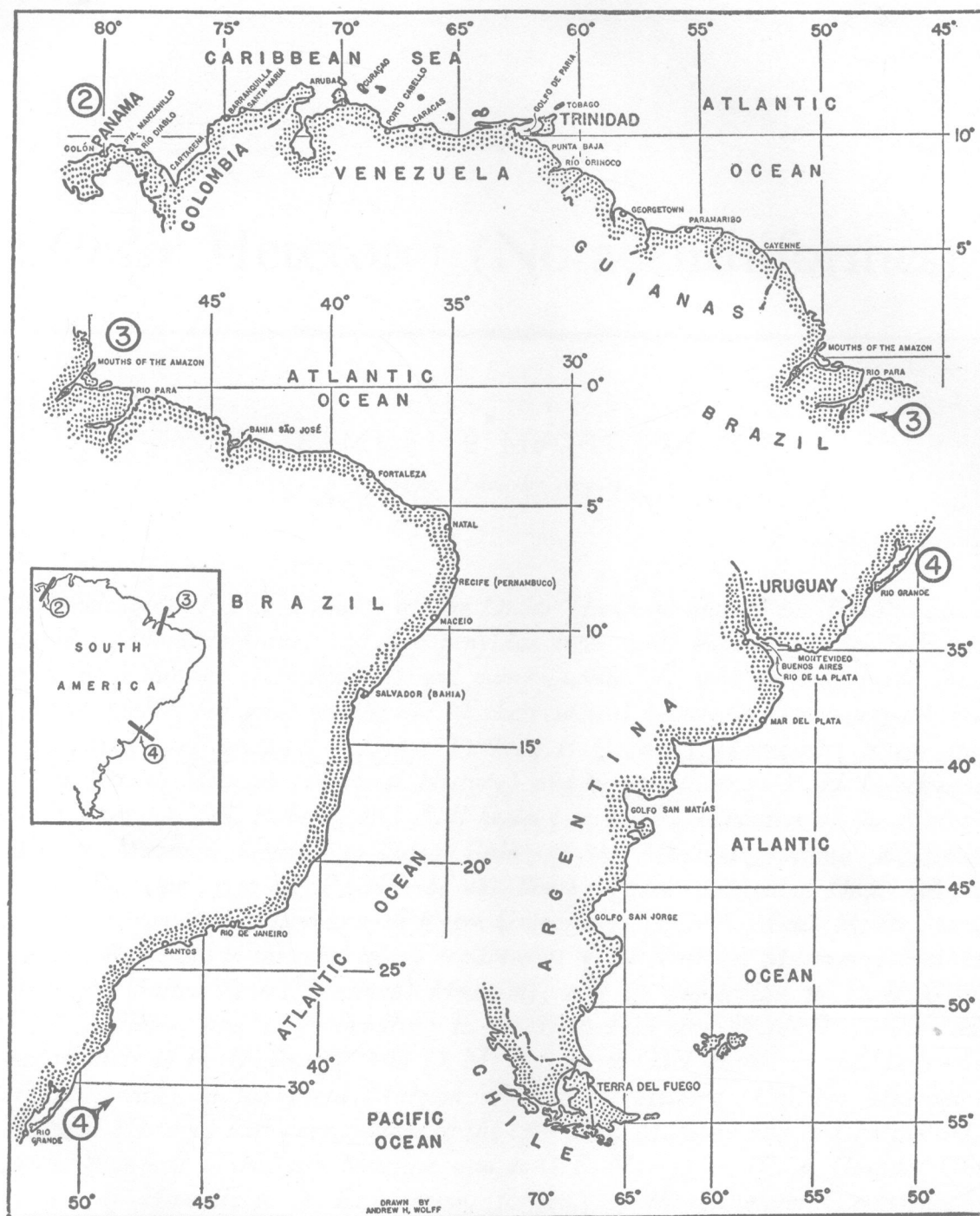
The editors are grateful to all of the authors for their cooperation, but particularly to those whose patience was sorely strained over the years while their manuscripts awaited publication; we also thank the home institutions of the authors for supporting their work. We are indebted to the Sears Foundation for publication, to the National Science Foundation for funds (through NSF grant G 7123) with which to assist in defraying research costs, and to the many individuals who have contributed specimens and data and who have helped in many other ways. The Editor-in-Chief acknowledges his particular gratitude to the National Marine Fisheries Service for its continued support of this series; he also thanks Mrs. Jane Shaw for her painstaking efforts in preparing the manuscript for the printer and in compiling the index.

January, 1972
Washington, D. C.

DANIEL M. COHEN
Editor-in-Chief



North America



South America

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Order Heteromi (Notacanthiformes)

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