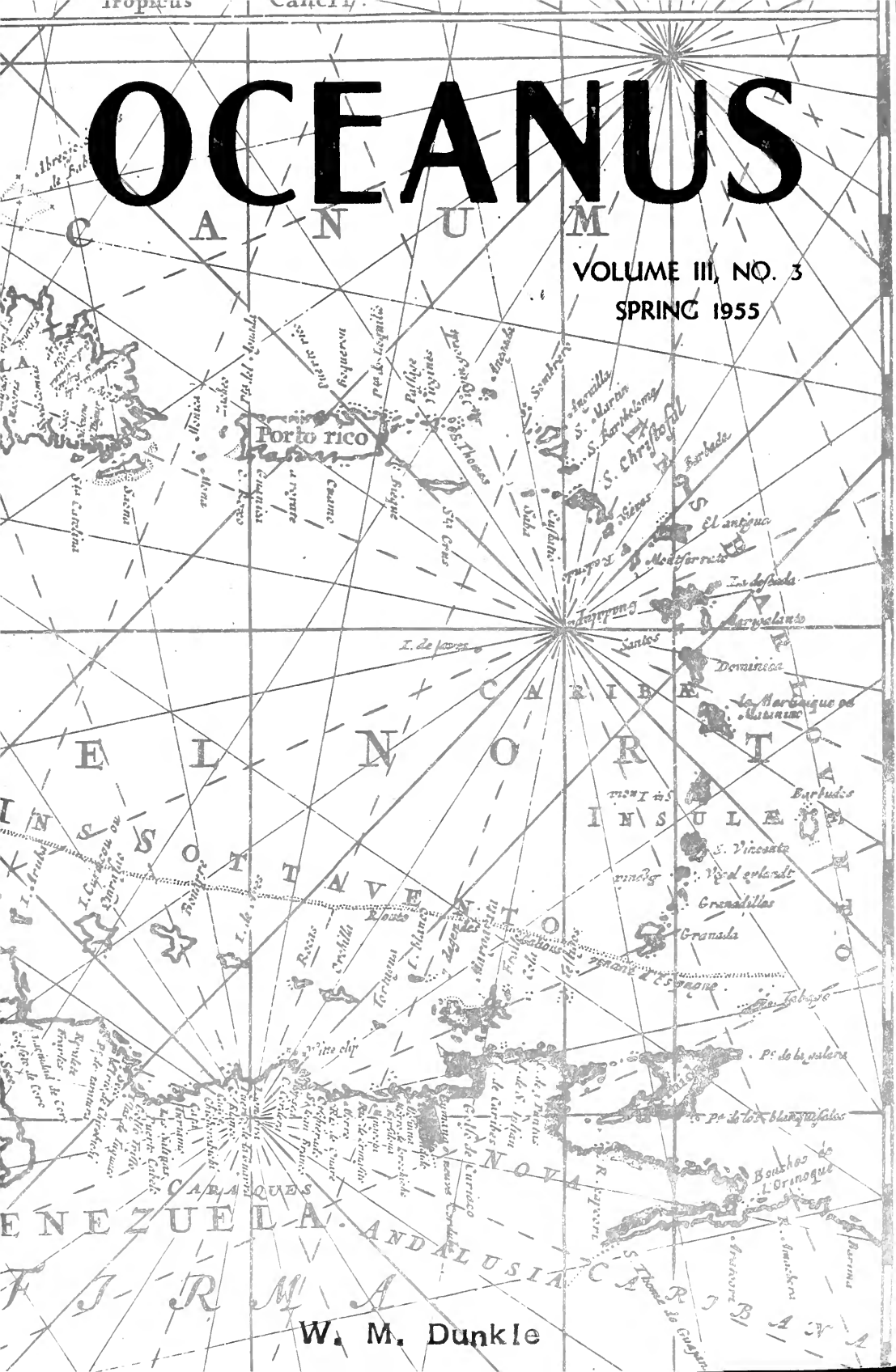
OCEANUS

VOLUME III, NO. 3
SPRING 1955



W. M. Dunkle

OCEANUS

EDITOR: JAN HAHN

Published quarterly and distributed to the Associates of the Woods Hole Oceanographic Institution and others interested in Oceanography.

The Preface

There are three Principal Points worth the curious reader's Observation in the following Treatise:

(1.) *A description of the* NEW KNOWLEDGE *concerning the Sea of Carib, alias the West Indies Sea, the discovery of its bottom and the manner in which it is explored, having not been treated of so circumstantially, as far as I know, by any other author before.*

(2.) *An account of divers voyages, made by the command of scientific curiosity, for the discovery of a* DEEP HOLE *in the sea, the success of which proved very fortunate, as will be evident from the ensuing Treatise.*

(3.) *A succinct account of that monstrous fish called the* SHARK *and the manner how it is taken. The whole of which I have comprehended in several draughts obtained from the eminent engraver D. M. Owen and others. Farewel.*

EDITORIAL

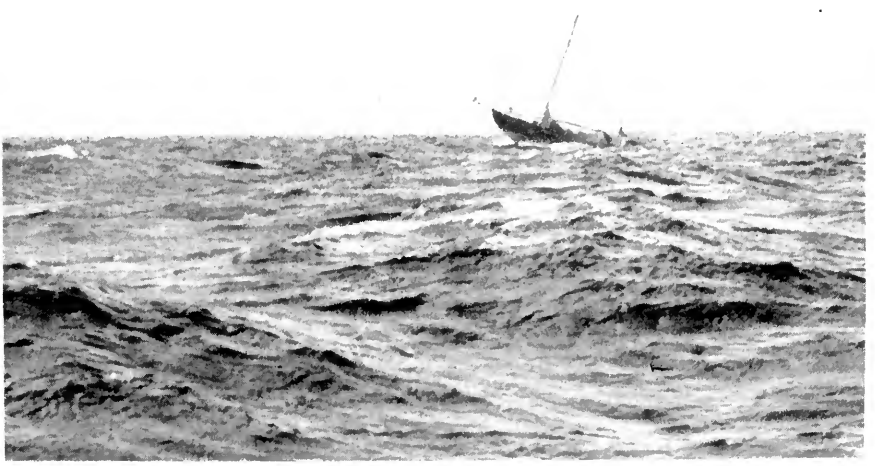
W. M. Dunkle

Soon after the voyage of Columbus, the Antilles were well explored, first by the Spanish and Portugese, later by the Dutch and English and the French. Still later, geologists studied the rock formations of islands and shores; but the Caribbean basin remained an unknown territory.

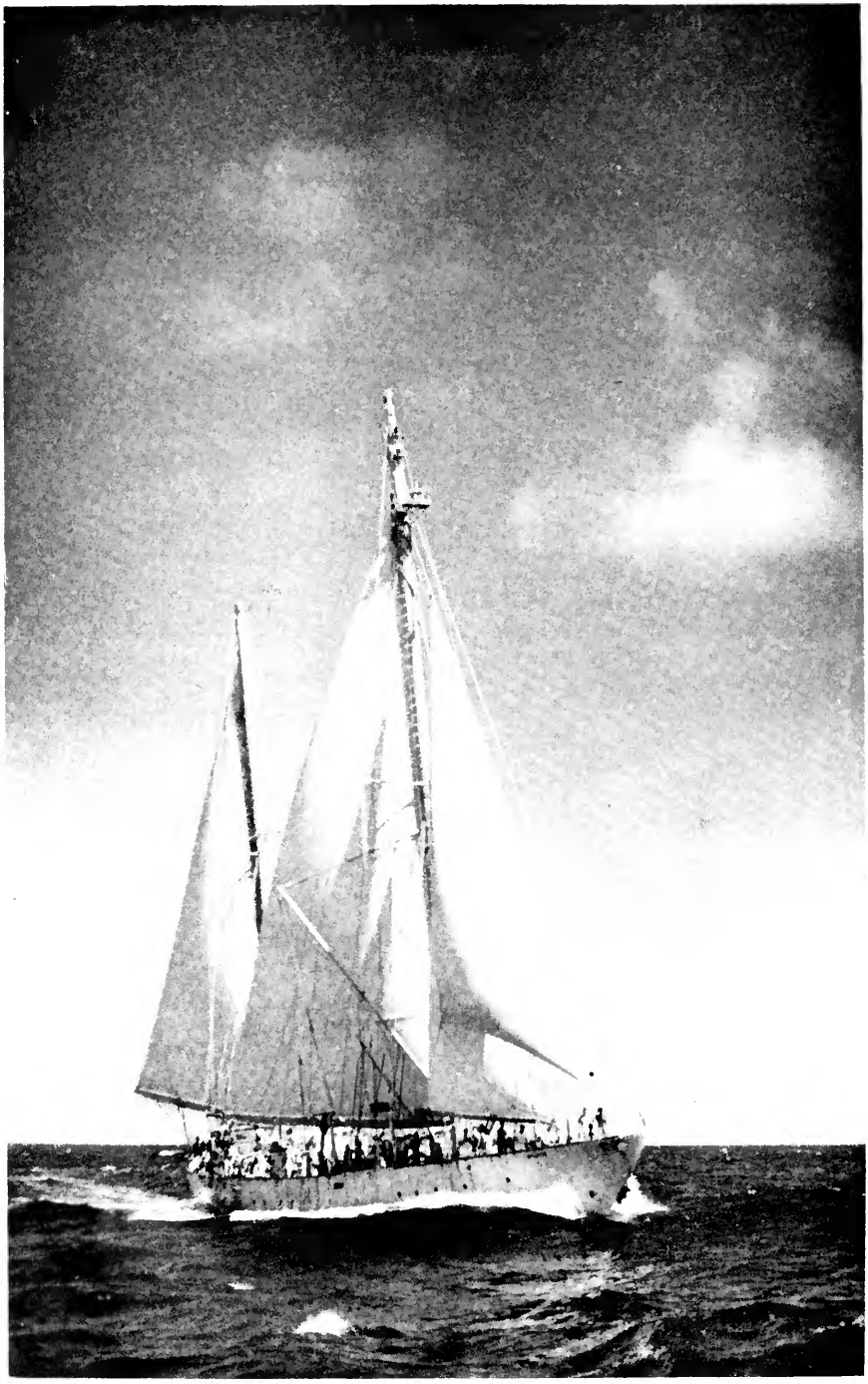
Few oceanographic investigations were made in the area, until it became a favorite haunt for the Woods Hole Oceanographic Institution, when, during the winter months, work in the stormy North Atlantic is not practicable for our small vessels. However, one must not think of the Caribbean as a smooth sea. The past few months saw more bad weather than good, with days on which the northeast Trade Winds were absent and it blew hard from the southwest.

Often called the American Mediterranean—which includes the Gulf of Mexico—the Caribbean Sea yielded many of its secrets, as Dr. Officer points out in his article.

The Associates of the Institution may be proud that their fund was used to support in part the work in the Caribbean, which has added to our store of knowledge of the earth.



The Caryn shows her keel on a blustery day in the Caribbean.



Atlantis under full sail entering St. Thomas. *D. M. Owen*

Martinique

by C. B. Officer

Exploring The Caribbean

An account of the winter cruise of the R.V. Atlantis and the R.V. Caryn.

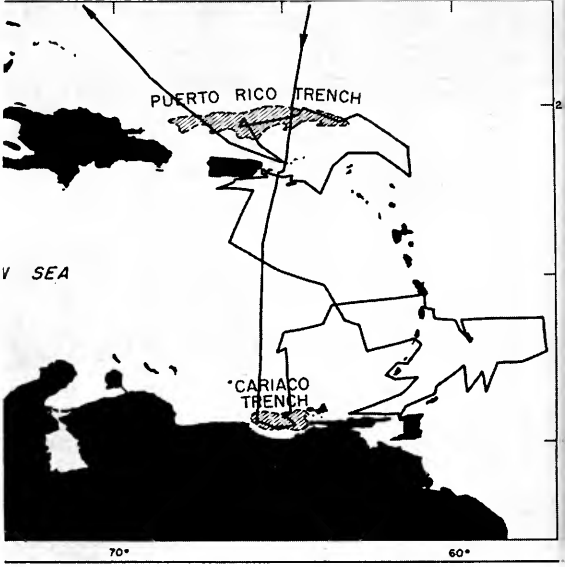
ONE of the more fascinating phases of oceanographic science in the recent years has been the geophysical investigation of the geological structure below the oceans. Largely through the impetus of Professor Maurice Ewing, Director of the Lamont Geological Observatory and long a member of the staff of the Woods Hole Oceanographic Institution, the work in this field has progressed at a rapid rate. In 1947 and 1948 the first seismic measurements over deep water were made from the research vessel ATLANTIS. In 1949, 1950, and 1951 many seismic refraction profiles were taken from the ATLANTIS and CARYN over the Western Atlantic, the approaches to the North American continent, to tie in with Professor Ewing and his collaborators earlier work over the continental shelf, and to a smaller degree in the Caribbean. These profiles led to a basic understanding of the geologic structure of the oceanic areas and how they graded into the continents. From 1952 on, the work has continued from our ships and others extending the coverage over the eastern and Southern Atlantic, the Mediterranean and Norwegian Seas, and the Gulf of Mexico.

Gaps in knowledge

At the time of the present cruise one of the biggest gaps in geologic knowledge was that of the structure of the Caribbean, the island arc of the Antilles, and the associated Puerto Rico trench (the deepest part of the Atlantic Ocean). It also turns out that an understanding of such an area is most important to the basic questions in geology, for these are the active areas of today; and much of the land geology that we walk across points to the hypothesis that once they were similar in structure.

The geophysical equipment on both the ATLANTIS and CARYN was such that measurements were obtained of the topography of the ocean floor from

precision echo sounder recordings,* the upper portion of the sedimentary column from seismic reflection profiles, and the total sedimentary column and underlying crystalline rocks down to the substrata from seismic refraction profiles. In addition measurements of sound transmission in the ocean were obtained over the differing water and bottom types encountered. A seismic profile is made by one ship, say the ATLANTIS, heaving to and preparing to listen and record from sensing elements in the water. The second ship, the CARYN, then proceeds away from the ATLANTIS on a prescribed course firing explosives, gradually increasing in size from one half pounds of TNT to 350 pounds, out to a distance of 40 to 50 nautical miles. The CARYN then heaves to and prepares to listen, and the ATLANTIS gets underway firing charges up to her to complete the profile.



The track of the vessels, the Puerto Rico Trench and the Cariaco Trench.

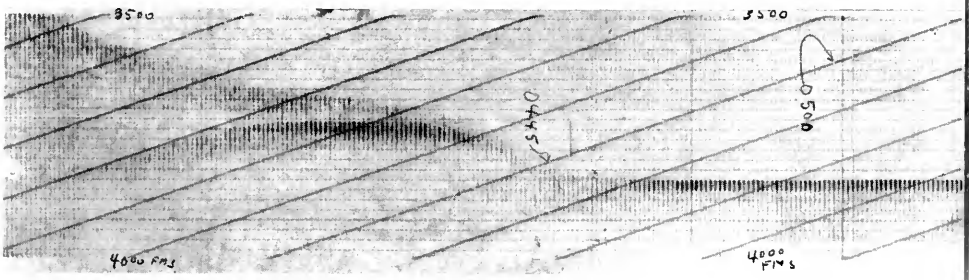
Some Statistics

Twenty-three tons of explosives were used to fire about 2,000 shots in the completion of 47 seismic refraction and reflection profiles. The ships each sailed more than 4,500 miles, so that 9,000 miles of bottom records were charted by echo-sounding. The scientific data obtained during the cruise weighed approximately 500 pounds and the laboratory analysis of these records will take at least six months.

Those primarily responsible for the geophysical work were Mr. Richard

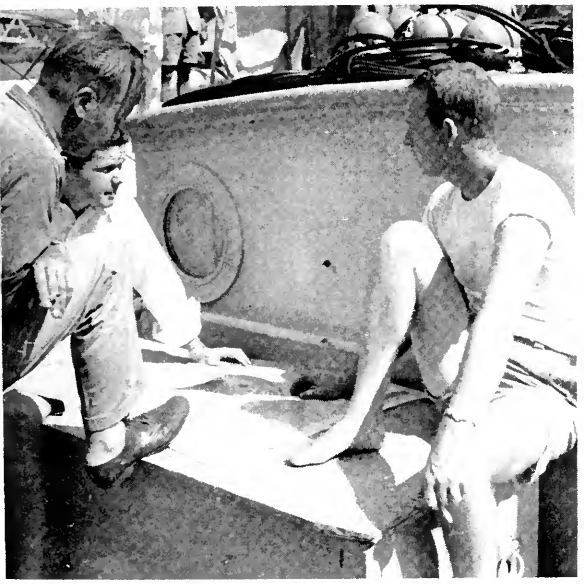
* See: "New Instruments", Oceanus, winter 1955.

'And there I was hacking me way through the sargassum'—Milton (Bucko) Rutstein—best beard—inveterate story teller.



Profile of the eastern end of the Puerto Rico Trench made with the Alden recorc

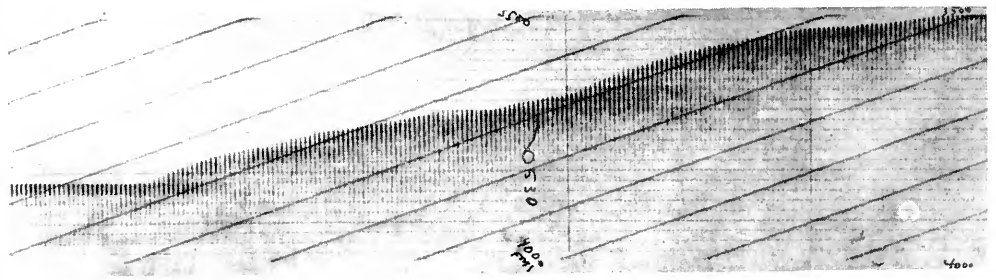
Captain Bray holding a struggling oceanic bonito, one of many game fishes caught on the cruise.



A conference in Trinidad. Dr. Officer (seated left), Henry Johnson and John Ewing discuss sailing plan.

Edwards and the author on the ATLANTIS and Mr. John Ewing from Lamont Geological Observatory and Mr. Henry Johnson on the CARYN. The geophysical equipment on the ATLANTIS came from the Woods Hole Oceanographic Institution and that on the CARYN from Lamont Geological Observatory and Woods Hole Oceanographic Institution. Other programs that were carried out con. currently were one in chemical oceanography by Dr. Francis Richards and Mr. Ralph Vaccaro, joined for a portion of the trip by Mr. Sayed Wardani from Scripps Institution of Oceanography; one in marine biology by Dr. John Ryther, and one in a combination acoustical and optical investigation of the deep scattering layer by Messrs. Johnson and David Owen.* Also aboard engaged in one or another of the phases of investigation for a portion or all of the cruise were Messrs. Alvin Bradshaw, William Dunkle, Gerrit Duys, Jan Hahn, William Hudson from Bell Telephone Laboratories, William Moss, and Milton Rutstein.

The ships left Woods Hole on the nineteenth of January, stopped at Bermuda, and arrived in St. Thomas on the second of February, after an extremely stormy passage. The work in the Caribbean area was along tracks from St. Thomas south to the coast of Venezuela and up to Martinique, from Martinique out to the Atlantic and back to Trinidad, from Trinidad north along the Grenadine Islands and across to Puerto Rico, from Puerto Rico east



ing system and the Edo echo sounder. Depth of flat bottom is 3828 fathoms (22,968 ft.)

Loading explosives and clean laundry in Port of Spain. Each box contains one 350 lb. aerial bomb. Ralph Vaccaro has just handed Dr. Richards a pile of pillow cases.

"Over the side!" Dick Edwards firing a ½ pound block of TNT with a 24-second fuse.

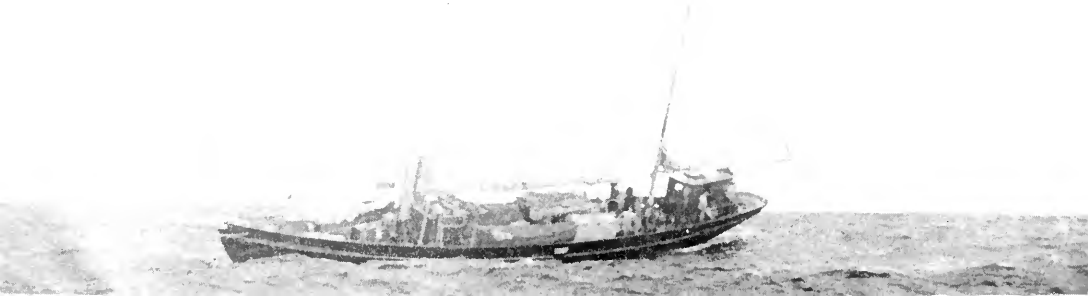
toward Antiqua and back to the west; north of the islands, and into St. Thomas on the twenty-third of March.

Was the cruise a success? We definitely think so. We obtained almost twice as much geophysical information as we had planned, and we feel that we have the data in hand to determine the geologic structure and variations in geologic structure over the various features of the Caribbean area.

The cruise was supported in part by the Associates through payments for most of the operating expenses of the CARYN. I wish to express my thanks to them for this support.

It was a blow to all of us to learn on returning to Woods Hole that one of our group, Mr. Gerrit Duys, had died of a heart attack. Mr. Duys had become sick during the cruise from a virus infection. He was left at Barbados and upon recovering returned to Woods Hole. I know that the other members of the scientific party and the officers and crew of the ships join me here in expressing their sympathies at the loss of such a fine person. He was one of the most generous and kind hearted persons that I have known.

The Caryn rolling on "silent ship" station.



Gamefish Studies

OUR game fish expert, Frank J. Mather III, is presently on board the FWS Oregon in the Gulf of Mexico. Through the courtesy of the Fish and Wildlife Service, U.S. Department of the Interior, Mr. Mather is able to observe "long line" techniques for the catching of large tuna, marlin and swordfish. This method is a modification of the successful Japanese long line trawls. Mather hopes to use long lines in his tagging program, so that more fish can be tagged than with the present, more interesting but slow, method of rod and reel fishing.

Proceeding to Bimini in May, where all tuna caught in the annual tournament are released, Mr. Mather hopes that the participants will aid his studies by marking fish with the new dart tag he developed during the past winter. From Bimini he will go to Cat Cay, to work in cooperation with scientists of the University of Miami's Marine Laboratory to study the migration of giant tuna during the annual Cat Cay tournament.

All northern tuna anglers and their clubs are urged to participate in the dart-type tagging program during the coming summer. Tags have now been produced in quantity and may be obtained, free of charge, from the Woods Hole Oceanographic Institution.

Down To The Sea In Ships

THE officers and crews of our research vessels are often taken for granted. It may be appropriate, in this Caribbean issue, to salute Captain Scott Bray of the Atlantis, his engineers, mates, steward, cooks and seamen for their part in making our scientific work a success. There were many days at sea and but few in port.

Captain Arvid Karlson and his officers and crew had an even more difficult task. Due to the small size of the Caryn her fuel and fresh water capacity was often stretched to the limit of endurance. Lack of washing facilities in a warm climate can be most unpleasant. Due to engine trouble, engineers Sutherland and Leslie spent five days crawling in the crowded engine room, where the temperature must have been over 100 degrees.

The cruise started with an extremely stormy passage from Woods Hole to Bermuda and, for the Caryn at least, ended in the same way. That the scientific results were successful is in no mean way contributable to these men and to Port Captain John Pike, who is responsible for the safe and smooth operation of the ships.

In Memoriam

William D. Winter

Associate William D. Winter was a member of the Executive Committee and one of the most active members of the Corporate Committee. In addition he was a member of the Corporation of the Woods Hole Oceanographic Institution since June 30, 1952.

One of his last acts on our behalf occured last January when, retiring as President of the Life Saving Benevolent Association of New York, Mr. Winter gave an address which largely concerned itself with the activities of this Institution. Mr. Winter explained that the causes resulting in exposing men and women to the hazards of the sea could be removed, in a wider sense, by encouraging scientific investigation of the oceans.

The Woods Hole Oceanographic Institution and its Associates can ill afford the loss of this Benefactor.

ASSOCIATE NEWS

LATE in February the Executive Committee and the Corporate Committee held a joint meeting at the New York Yacht Club, to discuss the growth and the activities of the Associates Program.

Admiral Smith explained current activities at the Institution and made special mention of the fact that the cruise of the R.V. ATLANTIS and R.V. CARYN in the Caribbean Sea was financed in part by Associate funds.

Other uses to which your contributions are being applied were mentioned by President Swope. $4,300 provides for the salary of Miss Beatrice Stern to operate a spectroscope in the tracing of "tagged water" (see *Oceanus* III, 1). Also supported are six lectures to be given this summer by Dr. Gifford C Ewing of the Scripps Institution of Oceanography. Dr. Ewing will also act as consultant oceanographer during the summer months. Further funds are applied to basic research, a fellowship and the making of a motion picture on oceanography.

A report on the vigorous activities of the Committee on Corporate Associates was presented by Chairman Noel B. McLean. Mr. McLean noted that about $3,500. was received in addition to $16,000 obtained from member corporations and companies.

Mr. M. C. Gale reported that he had explored the need and cost of a game fish library to be established at the Institution. It was thought that such a library would be useful but not essential, and the proposal was tabled. It was suggested that an exploratory article might appear in Oceanus asking for an expression by the individual Associates.

Finally, it was reported, that a plan to be known as the Woods Hole Oceanographic Associate Fellowship, will provide funds to permit an outstanding young person to obtain a doctorate degree in the earth sciences and, it is hoped, a career in oceanography at the Institution. One fellowship will be awarded this year, two the next year, and three yearly thereafter. "Thus", Admiral Smith concluded, "Oceanography and the Institution will be nourished with new talent by the use of funds made possible by the Associates."

New Corporate Associates

General Dynamics Corporation, New York

The Glenn L. Martin Company, Baltimore, Maryland

Socony-Vacuum Oil Company, Inc., New York

Sperry Gyroscope Company, Great Neck, New York

In addition to welcoming many other individuals, we are pleased to introduce our first foreign Associate, Senor A. E. Llavallol of Buenos Aires, Argentina.

THE CARIACO TRENCH

by Francis A. Richards

A basin of stagnant water was found in the Caribbean Sea and proves of great aid in studying the nutrient cycles in the sea and the formation of petroleum in sedimentary basins.

THE Cariaco Trench* is a basin just north of Venezuela, in the southeastern Caribbean. About 780 fathoms at its greatest depth, the trench is shut off from the rest of the sea by a sill which permits no ocean water to enter from depths greater than about 80 fathoms.

Before any observations were made there, a study of bottom charts showed that the configuration of the trench and the isolation of its deeper water made it interesting, since it seemed possible that the trench might contain stagnant water and thus afford a place where biochemical processes were taking place in an essentially static part of the ocean, thus simplifying investigations by eliminating the time-motion factors which are so difficult to evaluate in the open ocean.

First Visit

The trench was first visited by ATLANTIS in December 1954, at which time L. V. Worthington found that the water was anaerobic—free of dissolved oxygen—from about 1,600 feet down. This showed that the place was static—at least much more so than any known part of the open ocean where dissolved oxygen is present at all depths. At that time, it was obvious from the odor of the water samples that hydrogen sulfide was present, although the ship was not equipped to determine the substance chemically.

* See chart on Page 4.

Similar situations are known to exist in the Black Sea, in threshold fjords and in certain semi-enclosed basins, all of which receive considerable land drainage. This drainage supplies an abundance of nutrients, principally nitrate and phosphate, which so fertilize the upper layers that a greater than usual amount of organic matter is produced by the growth of plants—the microscopic phytoplankton. Upon sinking into the stagnant layers, this organic matter decomposes, using oxygen until all the oxygen is gone. After that, bacterial decomposition continues, but the oxygen is supplied by the sulfate in sea water, thereby reducing the sulfate to sulfide. During this decomposition the organic compounds of nitrogen and phosphorus which were bound in the bodies of the organisms during their growth in the upper layers, are again released to the water in solution as inorganic compounds of nitrogen and phosphorus.

In the deep water of the open ocean, the supply of organic material from the surface is so slow, and is so balanced by fresh supplies of waters that were at one time aerated in the surface layers, that anaerobic conditions do not arise. The ocean circulation also probably brings about a slow return of inorganic nutrients to the surface layers. In anaerobic parts of the sea, such exchanges either do not occur or are very slow, and processes of deoxygenation,

sulfide formation and the regeneration of nutrient salts are uninterrupted.

The trench differs from the other known anaerobic parts of the sea, because it receives little land drainage, and its upper layers, almost completely open to the sea, are far from semi-enclosed. Therefore, the manner in which nutrient materials are brought into this marine environment are quite different and give us a new field for study.

Exciting Discovery

The fact that the Cariaco Trench is anaerobic was a rather exciting discovery. Woods Hole scientists were anxious for additional information, and a return visit was made in February of this year. The lower laboratory of ATLANTIS was equipped for the determination, at sea, of dissolved oxygen, hydrogen sulfide, nitrate, nitrite, ammonia, phosphates, and other chemical properties of the water, Mr. Ralph F. Vaccaro, bacteriologist, who studied the nitrogen compounds, Dr. John H. Ryther, microbiologist, who conducted experiments to determine the productivity of the plankton population, and the writer, who did other chemical and hydrographic work, were aboard. Mr. Sayed Ali el Wardani, of Scripps Institution of Oceanography, came on board at St. Thomas, Virgin Islands, and did the determinations of sulfides and hydrogen ion concentrations, subjects in which he has specialized at Scripps. Water samples were taken from the surface to the bottom at several places in the trench, and core samples of the bottom were obtained. The work was carried on in conjunction with Dr. C. B. Officer's geophysical cruise which is described elsewhere in this issue.

Only preliminary studies have been made of the data obtained on the cruise, but they should prove helpful in understanding the nitrogen and phosphorus nutrient cycles in the sea, the microbiology of an anaerobic environment, the circulation of the trench, and sedimentation processes which may be of application to studies of the formation of petroleum.

GIFTS AND GRANTS

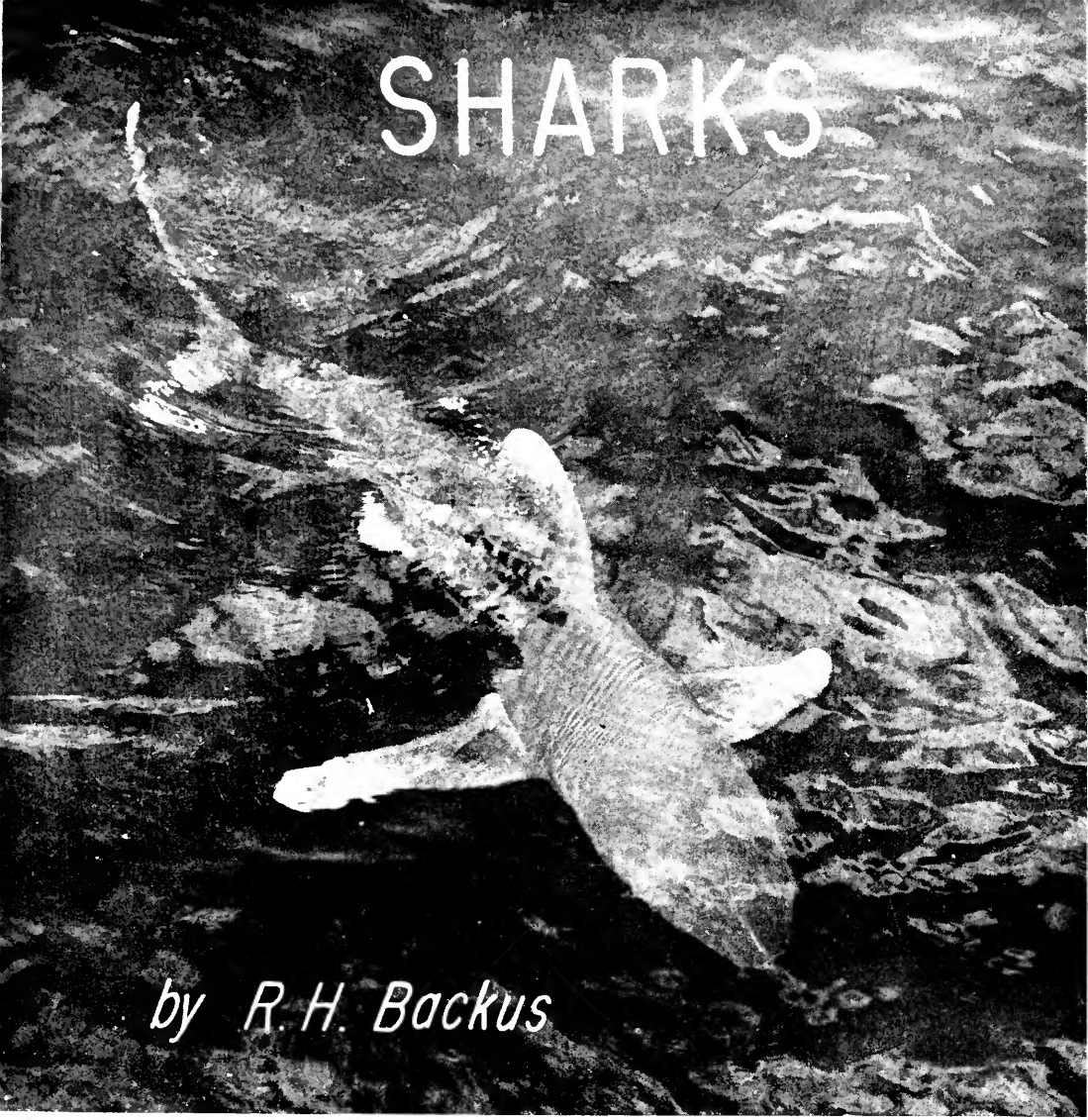
With pleasure we report that the following gifts and grants have been received:

Alfred P. Sloane Foundation, Inc. ..... $5,000.
Shell Company Foundation $ 500.

Both grants have been made to contribute toward the cost of making a motion picture on oceanography, the purpose of which is to inform the public and especially prospective college students about the science of the sea. The final draft of the motion picture script is presently in preparation.

In addition to the above, the Institution received a check for $5,000 from Mr. N. B. McLean, President of the Edo Corporation, College Point, New York.

Although the annual Corporate Associates contribution is $1,000, Mr. McLean sent his larger contribution with the statement: *"We sincerely believe that the basic research being done at Woods Hole contributes immeasurably to the industry in which we are interested and also to the welfare and support of our country".*



SHARKS

by R. H. Backus

Not as often encountered at sea as they are in popular literature, much remains to be learned of their behavior.

A problem that has always faced the naturalist who is interested in the ocean's larger creatures, is that he rarely can spend enough of his time at sea to accumulate a significant number of observations. The whales, porpoises, sea turtles, sharks and large fishes are less often encountered than one might suppose from reading much of the literature of the sea. At the Institution, those who see such animals most often are the officers and crews of our vessels whose job may keep them at sea almost continually. It is in this field that these men can best contribute directly to our scientific endeavors.

Illustrative of this is the shark-fishing program in which the ATLANTIS has been engaged during the last couple of years. With some extra effort in examining specimens and keeping careful records, what was formerly sport or the seaman's traditional vengeance, has been turned into science.

During the last nine months, led by Captain Scott Bray, First Mate A. D. Colburn, Boatswain Carl Speight, and former Radioman Thomas Lyon, the ATLANTIS has preserved data from 45 sharks.

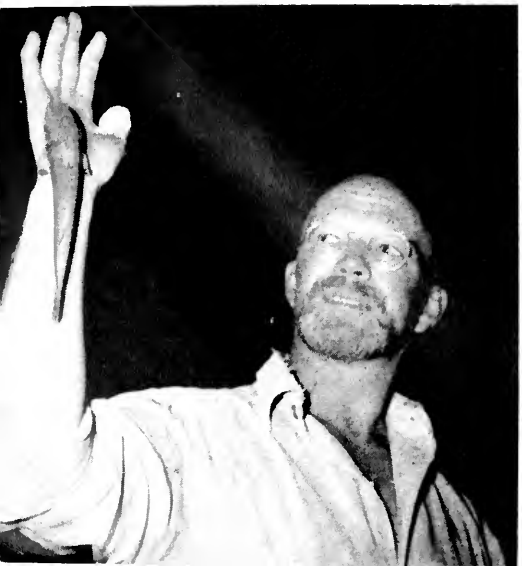
Whenever the ATLANTIS is hove to for coring, hydrographic stations, or is the "silent ship" in an underwater sound exercise, a couple of stout lines with chain-leadered hooks are thrown over, bearing table scraps provided by amiable Steward Joe Lambert. Generally the cry of "Shark!" even brings up "the watch below". The hooked shark is dispatched by a volley of rifle fire by the ATLANTIS' gunbugs. The moribund shark is hauled aboard, whereupon it is measured and cut open. Sharks are hard to kill and more than once the fishermen have had to take to the rigging to avoid the snapping jaws and flailing tail of a supposedly deceased specimen.

The open ocean shark, widespread in the warmer parts of the Atlantic and common in the Caribbean, is the white-tip shark about which, in spite of its commonness, little is known. It is a brownish shark easily identified by its rounded dorsal fin, the tip of which is white. This shark is usually the nucleus of an interesting aggregation of other animals. The silver and black-barred shark pilot* often accompanies it, but, contrary to legend, generally swims above and behind the shark rather than in the lead. One or several remoras, or shark-suckers, are almost always adherent to the white-tip, and so persistent is their grip that they are hauled aboard with the shark. Sometimes a small school of the beautiful blue-green-yellow dolphin fish swims with the white-tip. These are often caught as they swim near the hooked shark.

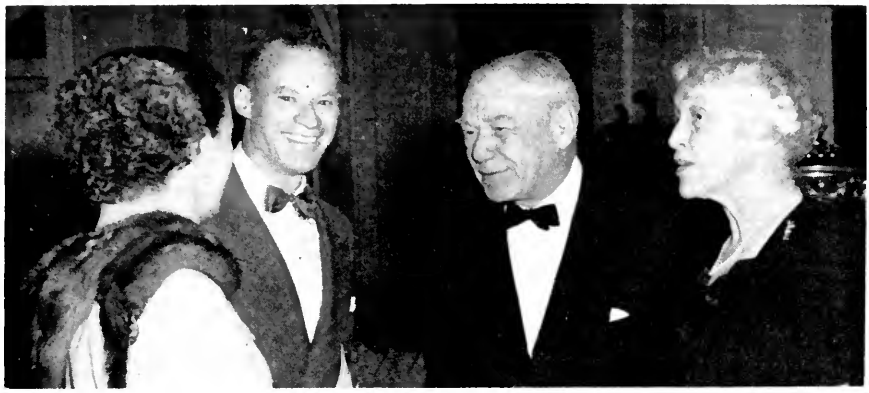
ATLANTIS records have shown much about the white-tip's food, breeding habits, and behavior. One of the more interesting points revealed is the tendency for large areas to contain predominantly male white-tips, while the females are predominant in another area. This phenomenon is little understood, but continued efforts on the part of the ships' crews should lead us to the answer to this question and many others about some of the ocean's bigger animals.

* Two 'pilots' may be seen on page 11 just to the left of the shark's dorsal fin.

Remora



Coming on board.



At the Third Annual Associates Dinner: Mr. & Mrs. Gerard Swope, Jr. (left) and Mr. & Mrs. George H. Richards.

In the model room of the N. Y. Yacht Club before the dinner, from left to right: Mr. F. L. LaQue, Mrs. T. H. Wickenden, Dr. A. C. Redfield, Mr. T. H. Wickenden, Mrs. F. L. LaQue.

Third Annual Associates Dinner

The Third Annual Associates Dinner took place on April 19 at the New York Yacht Club. The 140 Associates and guests present, heard an address by Mr. Robert H. Simpson, hurricane specialist of the U.S. Weather Bureau, and saw a motion picture of Hurricane "Carol's" havoc at Woods Hole. The picture was made last fall from the Institution's windows by oceanographer Wm. S. von Arx.

SPRING CRUISE OF THE BEAR

by J. B. Hersey

From the deepest spot in the Atlantic Ocean to the Blake Plateau, the Bear had some rough going.

THE research vessel *Bear*, a 103 foot motor vessel, departed Woods Hole on the first of February for St. Thomas, V. I. She was held in Bermuda for several days by very rough seas, eventually reaching Charlotte Amalie about the middle of the month. With the aid of our new precision echo-sounder recorders we made surveys of the Caribbean approach to the Anegada Passage in the Virgin Island area and made various studies of sound scattering including lowerings of the acoustical view finder camera (see *Oceanus* III, 2) and other purely acoustical observations. Continuing this work off the southern coast of Puerto Rico we sailed to Mayaguez, a seaport on the western coast of Puerto Rico.

There, the scientific party visited the Department of Biology of the University of Puerto Rico and were treated to a very pleasant tour of the newly established marine biological station and zoological garden, being set up on an island off the southern coast by Dr. Juan Rivero, as part of the University's instructional and research program. Dr. Rivero not only welcomed us most cordially to the University but was most helpful in solving some logistic problems that would otherwise have delayed our work considerably.

Departing Mayaguez on February 28th, we kept rendezvous with the R/V *Vema* of the Lamont Geological Observatory at a point northwest of Puerto Rico near the deepest part of the North Atlantic, the Puerto Rico Trench. The *Vema* was equipped with a precision echo sounder of Lamont's design and together we were able to make tracks of parallel soundings over the deep ocean just east of the Bahama reefs, from the Trench to the Northeast Providence Channel of the Bahamas. The Puerto Rico Trench has a flat bottom (see page 4) over which both ships passed on somewhat different tracks. We were gratified to find that soundings taken by the two ships agreed within two or three fathoms on the flat bottom, at a depth considerably over four miles.

A number of seismic refraction profiles were made on the continental shelf and the Blake Plateau between the Bahamas and Charleton, S. C., continuing a study commenced by the *Atlantis* and the *Bear* last year. During March, sailing out of Charleston, the *Bear* under the leadership of Mr. Ralph Wyrick of this Institution, and the *Vema* under Dr. John Nafe of Lamont, continued the seismic studies in this area until the end of the month when the *Vema* left us and the *Atlantis* joined in the work, after completing her Caribbean work under Dr. Officer. The special target of the work in March had been to study the geologic structural relations between the 2600 fathoms deep ocean to the east, the Blake Plateau, which rises to a depth of 200-700 fathoms in the middle and the less than 100 fathoms deep continental shelf on the western side of the area. During April, with Messrs. Henry Johnson and Richard Edwards on *Atlantis* and the writer on the *Bear*, we studied the structures where the Blake Plateau narrows down between

the shelf and a topographic ridge which extends outward from the continent into the adjacent ocean basin. In one month, we could hope to do little more than draw a rough outline of the underlying structure. A preliminary examination of the results tells us that the topographic ridge is indeed a surface expression of a large fold involving the whole outer crust of the earth here. We believe that further study of our present data will tell us at least part of the relationship between this folded structure and the deep ocean basin, the North America basin, to the east.

In addition to the seismic observations, the *Atlantis* obtained a few cores of bottom sediment while the *Bear* made more lowerings of the acoustical view finder camera. The weather, which had been remarkably good until the middle of April, became about equally poor for the remainder of the cruise. As a result the last part of the planned program had to be abandoned. After nine days of nearly constant seas of about twelve feet high, we were relieved to cross the Gulf Stream and find much calmer seas for our return to Woods Hole early in May.

* * *

Oceanography?

Oceanology?

JUST about when *oceanography* has become rather widely known, up comes Commander C. P. N. Hall, R.N., to suggest in the journal DEEP SEA RESEARCH, that we use the word *oceanology* since this describes the science of the ocean or ocean study while *oceanography* means description of the ocean.

Some European scientists jumped into the fray and have started to use *oceanology* and before you could say *geomagnetic electrokinetographic observations* there was a sign on Dean Bumpus' door stating: Laboratory of Oceanology.

This is all very well, but we have heard many people mispronounce oceanographic in various ways and we fear to think what they might do to: Woods Hole Oceanological Institution, if this ever came to pass.

The difficulty with this science is that it is no science at all, but rather a series of sciences. Many people still appear to think that an oceanographer is someone who catches and looks at strange fishes, not realizing that physicist, chemist, biologist, geologist, meteorologist, geophysicist and almost every other 'ist' but the astrologist have a part in the study of the ocean. Finally, this study of the sea is also but ONE of the earth sciences while at the same time containing all of the disciples who study the earth sciences.

By this time we are almost—but not quite—as confused as our readers and can only suggest that you peruse this once more carefully and you will know more about oceanography or oceanology than we can hope to tell you for some time to come.

In the next issue of DEEP SEA RESEARCH, Dr. J. N. Carruthers of the British National Institute of Oceanography will refute Commander Hall and his use of the term oceanology.

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Whenever in or near Woods Hole, Associates are cordially invited to attend our weekly staff meetings, held Monday evenings at 8:00 p.m. in the Conference Room of the Laboratory of Oceanography. At these meetings one of our staff members or a visiting scientist gives an informal account of the latest developments in his work or field.

CURRENTS AND TIDES

Dr. M. S. Longuet-Higgins, of the British National Institute of Oceanography, visited in April and lectured on "Analyzing the sea surface."

Staff members on the air. On June 21 from 9:30 to 10:00 DST, and on June 23 from 8:30 to 9:00 DST, you will be able to hear a shoal of staff members discoursing on NBC's program "New England, a Regional Survey". The interviews, recorded last winter, are part of Program number 7 of the NBC series which will start on May 3.

On a recent visit to U.S. Coast Guard Headquarters in Washington, Admiral Smith demonstrated a model of the new Air Sea Rescue buoy developed for the Navy by our Messrs. Harold E. Sawyer, F. deW. Pingree and Robert G. Walden. The exhibit model is on loan to the Office of Naval Research and was designed by Mr. G. G. Pasley.

Plans to invade a "foreign ocean", are being made by Mr. Henry C. Stetson, submarine geologist on our staff. Mr. Stetson plans to take ATLANTIS to the South Pacific next fall. This would be the first time the ship has left the Atlantic Ocean and adjacent seas.

Many grade and high schools featured the oceans in their science programs this spring. A flow of material was sent in reply to dozens of letters from many states. The largest single group of letters came from Mitchelville, Iowa, which we have not been able to find on a map. Such requests are suggestive of a growing interest in oceanography.

A record of whale noises, made by our ketophonist Mr. W. E. Schevill, was sent to the Gilbert School in Winsted, Conn., to be used during a literary discussion of Moby Dick and other whaling books.

Seventy-three newspaper feature writers, editors and TV men from the West and mid-West visited the Institution in April under the auspices of American Airlines. They made a cruise on the CARYN from New Bedford to Woods Hole and were given a guided tour of the laboratories. During the cruise they witnessed the rescue of our overeager Public Information Officer, who followed a plankton net over the stern.

"The Continental Shelf", is the title of an article by submarine geologist Henry C. Stetson, in the March issue of "Scientific American."

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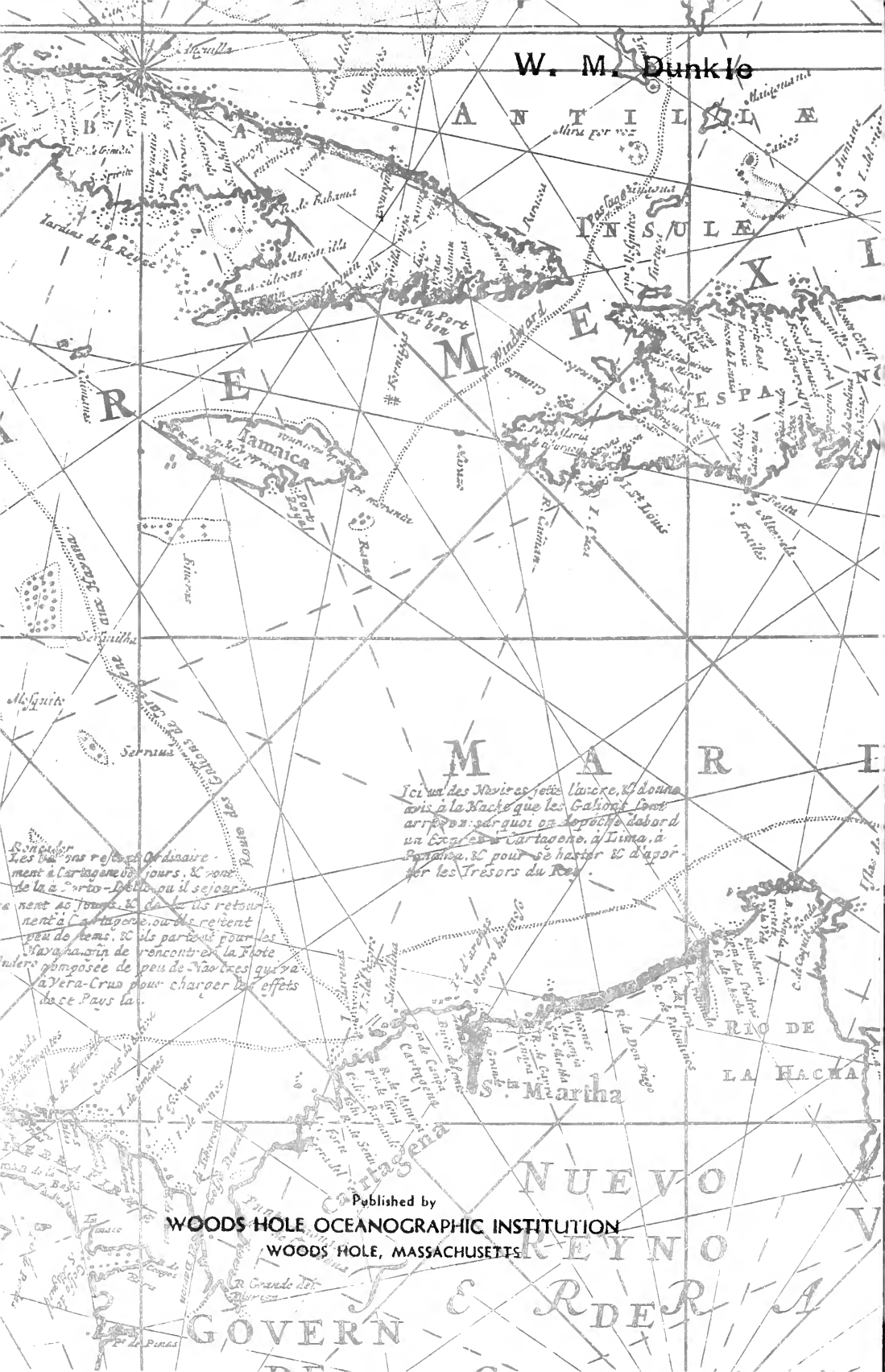

Published by
WOODS HOLE OCEANOGRAPHIC INSTITUTION
WOODS HOLE, MASSACHUSETTS