WE WELCOME YOU TO THE
VIRGINIA INSTITUTE OF MARINE SCIENCE

Today we are saluting two Virginians of a century ago, MATTHEW FONTAINE MAURY and JOHN MERCER BROOKE, who brought honor to themselves and our Commonwealth through their contributions to the science of Oceanography. Both were officers in the navies of the United States and of the Confederate States.

Our first permanent laboratories were named in honor of these two men. Today bronze plaques to mark the buildings have been presented to the Institute by the Confederate Memorial Society of Richmond. We are grateful to the Society for their generous gifts.

The Virginia Institute of Marine Science is an agency of your state government. It has two purposes: instruction in marine science and basic and applied research on matters important to the commercial, industrial and recreational development of the state.

We invite you to tour the laboratories, see the demonstrations prepared and talk with the staff. We hope you will find our work interesting and valuable.

December 14-15, 1963
Gloucester Point, Virginia
It is fitting that the first permanent marine science building in Virginia should carry the name of Matthew Fontaine Maury. He was among the first oceanographers in the world. The great thought on which Maury was to build—that the sea, if investigated, would be found to have laws as constant, as uniform, as invariable as those of land—came to him in 1831. Pursuing this thought, he was able to publish in 1855 his "Physical Geography of the Sea", and thus inaugurated a new science.

Maury Hall, completed in 1950, houses administrative offices, library and several laboratories. The exhibit room, for the benefit of interested visitors, also serves as a classroom for visiting science classes. Special programs relative to marine science can be arranged for students from the third grade through college.

Mounted on the roof of Maury Hall is an Epply pyrheliometer which records the amount of solar radiation day after day. A wind gauge mounted on the cupola indicates wind direction and velocity on instruments in the front office or the first floor.
Physiology

The ways in which environmental factors affect the organ systems and behavior of marine invertebrates constitute an important area of interest called physiological ecology, and it is in this area that scientists in this group are working.

Reproduction, and functions related to the endocrinology of fish, are being studied and the respiratory enzymes of molluscan embryos are being isolated.

Problems on the physiology of important invertebrates are being investigated. Special emphasis has been placed on the reaction of oyster drills to odors and taste, to salinities and to toxic materials. Many of these studies are directed toward the control of drills.

Applied Science

This department is investigating ways to increase the commercial production of shellfish by applying techniques and methods suggested by fundamental research. Methods for increasing yield of oyster meats by supplementing the natural diet of oysters with minute quantities of starch are being tested.

Field tests on the use of chemicals to control oyster drills are in progress, and the use of 2,4-D to control water milfoil is being tried out.
The U. S. Atomic Energy Commission is financing experiments to determine the rates at which oysters and clams remove solid particles and attached radionuclides from the water, and to ascertain how these particles are deposited in bottom sediments and their fate after deposition.

**Mollusks**

Most of the work done in this section concerns oyster diseases, their occurrence and spread and the life histories of organisms causing them. Since the most hopeful attack on these diseases is the development of resistant strains, a selective breeding program has been started for oysters and clams.

The biology of drills and other predators of oysters is being studied in search for clues as to control.

In the field regular checks are made on public oyster grounds to determine success of the annual set, the number of available market oysters and presence of diseases and predators. The possibility of developing new seed areas is also being explored.
Brooke Hall commemorates John Mercer Brooke, Maury's assistant at the Naval Hydrographic Office in Washington, D.C. He invented a successful deep-sea sounding device for oceanographic studies. While in the Confederate Navy he was responsible for redesigning and refitting the U.S.S. Merrimac, renamed C.S.S. Virginia, as an ironclad destined to revolutionize naval ship construction following her encounter with the U.S.S. Monitor in Hampton Roads in 1862. Brooke became a professor at V.M.I. following the Civil War.

In addition to laboratories and offices, Brooke Hall houses the student lounge.
Crabs

Members of this section regularly sample crab populations and study commercial records as a basis for predicting future crab catches.

For several years extensive tests have been made on crab pots to find the best mesh for retaining the maximum number of legal sized crabs while automatically culling out small ones.

A continuing project is the identification and appraisal of the possible commercial value of other crustaceans, of which there are over 200 species in Chesapeake Bay and adjacent waters.

Fishes

Members of the department over the past three years have made monthly or seasonal cruises out as far as the Gulf Stream to take samples of fish eggs and larvae at set stations. These studies are contributing to knowledge of the biology of fishes of the Virginia coast, where and when they breed, and how the young are dispersed from spawning to nursery grounds.

Eggs and young stages that cannot be identified are cultured in the laboratory until recognizable stages appear. The National Science Foundation has made a three-year grant for this part of the work.

On the cruises the Institute works with the U.S. Navy in releasing drift devices from Naval aircraft in order to plot current patterns.
Commercial and sport fisheries are constantly monitored to detect changes in abundance of fishes and to try to find reasons for fluctuation.

**Physical Oceanography and Geology**

Hydrographic knowledge of marine waters, including temperature and salinity characteristics, is essential to understanding the environment of marine organisms. This department is studying circulation patterns pertinent to distribution of larval oysters, crabs, and fishes. Information compiled by scientists in this department is useful in predicting possible effects of proposed channel dredging and dam construction in tributary rivers.

In cooperation with Federal agencies, beach erosion at Virginia Beach is under investigation. It is hoped that suitable sand deposits can be found offshore to replenish resort beaches.

Institute geologists have located valuable buried oyster shell deposits, and have surveyed soil disposal sites for the U.S. Army Corps of Engineers.
Ecology-Radiobiology

The research program of this department is centered around studies of natural marine conditions and how plants and animals may be affected by the by-products of man's activities.

The kinds and numbers of bottom-dwelling animals are indicators of the conditions of the water above them. Inventories are being prepared of these benthic organisms.

Tests are being run to determine the effects of heated water and heavy metal toxicants on marine organisms, and the fate of radionuclides in the marine system is being explored.

The U.S. Corps of Engineers, the U.S. Navy, private, municipal and industrial agencies frequently call upon this department for aid in local problems.

Analyses are made for other departments and are available to other state agencies. Close liaison is maintained with state and federal health agencies and the State Water Control Board.

The Head of the department works actively with the Governor's Committee on Environmental Health.

- 11 -
The microbiology-pathology building is named in honor of Dr. Donald W. Davis, for many years head of the Department of Biology at the College of William and Mary.

Dr. Davis early advocated the establishment of a state marine laboratory as a part of the Department of Biology of the College of William and Mary. He suggested that one function of the laboratory would be to train men for employment in the oyster industry who would apply scientific knowledge to solving its problems.

In a paper presented to the National Shellfisheries Association in 1930, Dr. Davis stated: "The work of the biologist in the oyster industry is not to render judgment (on the part of the operators) unnecessary but to provide a significant basis of information on which more reliable judgment may be based."

Much of the work done in Davis Hall is related to various diseases of marine organisms, including oysters and fishes.

Studies of free-living marine bacteria and plankton are also being made. Work on marine parasites has long been in progress.

Davis Hall contains laboratories, offices, a conference room and a cold room for special bacteriological studies.
Microbiology-Pathology

Thousands of slides prepared in this department are used in studying diseases of oysters, crabs and fishes. Stained mounts of tissues of parasites and other marine animals are prepared for use in other departments.

Marine bacteria are being studied to determine their contribution to the welfare of associated organisms as well as pathogenic relationships. Single kinds are being isolated from water, mud and living organisms. Up to 86 pure cultures are being maintained for study.

Here tissues of sick or dead marine animals are studied to seek the causes of disease. Tissues of fishes and other animals are cultured in flasks to learn more of disease-causing viruses.

Algae from rivers, bays and the Atlantic Ocean are being identified and their seasonality recorded. Some are cultivated to feed oysters, clams, and larval fishes.
Parasitology

Through grants from the National Science Foundation and from the National Institute of Health, it has been possible to pursue studies of the monogenetic and digenetic trematodes of the world. These parasitic flatworms are of interest for their own variety of forms and life cycles. Some are injurious to their hosts. The present study is largely concerned with the identification and classification on a worldwide basis.

The U. S. Fish and Wildlife Service has cooperated with this Institute in furnishing specimens for the study of parasites on menhaden fish.

Parasites are useful natural tags for tracing the origin of populations of fishes. Fish pick up specific parasites in nursery areas which differ from those found on the same species growing up in other localities.

Parasites are useful in classifying fishes, for it has been shown that certain parasites are specific for a given genus or species of fish.
SALT WATER LABORATORY BUILDING
(Wet Laboratory)

Originally built as a maintenance shop in 1950, this building was enlarged and converted into a salt water laboratory in 1961 to meet the needs of an expanding research program. At the present time a second addition is being made.

Free-flowing river water is utilized on the first floor front section to facilitate crab and oyster drill research, and for breeding disease-resistant oysters. The back section is utilized for studies of deposition by filter-feeding organisms and for experiments on fattening oysters through supplementary feeding. A part of this back section is used for experiments on heat pollution.

On the second floor rear, fish eggs and larvae are raised to identifiable size. The front section is used for toxicity studies, measuring the effects of various industrial pollutants on marine organisms.

The addition now being made to this building will facilitate the culture of algae for feeding larval fishes and oysters and for other experimental purposes. Space will be provided for culturing clams and oysters selected for their rapid growth and resistance to disease.
VIMS PIER

Floating Equipment

**RV Langley (80' x 32')**

Serves as a self-propelled floating laboratory and work platform for investigations within Chesapeake Bay and its tributaries.

**RV Pathfinder (55')**

A specially built research vessel for operations over the Continental Shelf as well as in protected waters.

**RL Captain Hoxton (30')**

**RL Observer (27')**

The Institute also owns several small boats with outboard motors.

These various types of vessels are used for visiting stations along the Tidewater rivers, Chesapeake Bay, and the Atlantic Ocean out to the Gulf Stream. The larger boats are berthed at a landing in a sheltered cove in Sarah's Creek.

**Equipment on Dock**

A temperature gauge records water temperature at all times, and a tide gauge plots time against the rise and fall of the river.

Trays of oysters, shellbags, shell strings, and wooden blocks are suspended from cat-walks. They provide information about oyster diseases, set of larval oysters and fouling organisms.

Pumps on the dock supply river water to many laboratories in Maury Hall and the Salt Water Building.

- 19 -
EASTERN SHORE STATION
WACHAPREAGUE, VIRGINIA

In 1959, a temporary field station was set up at Wachapreague, primarily for monitoring oyster diseases on both sides of the peninsula. The station became permanent in February 1962 with completion of a masonry building. This is a convenient base near marshes, barrier reefs, and the ocean for collecting and class field trips.

Scientists stationed at Wachapreague cooperate with the staff at Gloucester Point in investigating diseases of oysters and seeking means of controlling oyster drills and in other applied projects.

Keys to the larval bivalves (about seventy species) of Virginia are being prepared in this station. Marsh ecology studies are presently in progress. The laboratory has cooperated with the U.S. Department of River Basins in a survey of Metompkin Bay.

Note: Pictures of the laboratory at Wachapreague are displayed in the lounge in Brooke Hall.