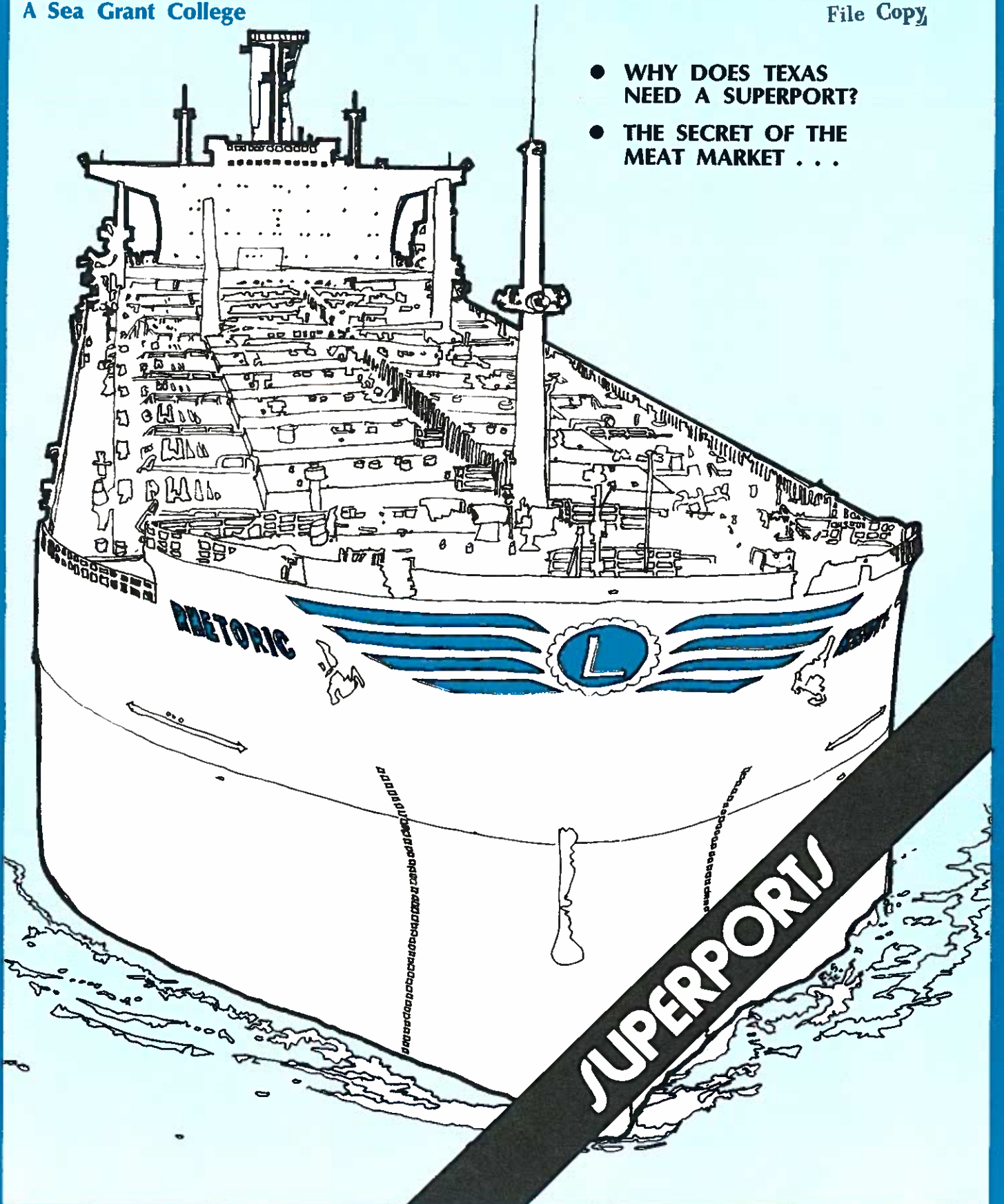


The University and the Sea

Texas A&M University
A Sea Grant College

File Copy

- WHY DOES TEXAS NEED A SUPERPORT?
- THE SECRET OF THE MEAT MARKET . . .



fresh finfish from hook to home

Total edible finfish landings in Texas for 1971 reached over 6.6 million pounds, a dollar value of \$1.6 million at 23 cents per pound. Add to the Texas catch approximately five million pounds imported from Mexico, and the total becomes more than 11 million pounds of finfish available for human consumption in Texas alone, creating one of the biggest and most profitable food industries in the state.

As with most industries dealing with perishable items, the Texas fresh seafood industry faces many problems — problems associated with quality, governmental regulation, harvesting restrictions, supply and demand, and marketing.

Texas A&M University Department of Marketing Professor **Samuel M. Gillespie** has been conducting research for over a year as leader for two Texas A&M Sea Grant projects concerning the fresh finfish industry in Texas. The research has included assessment of distribution channels of fresh finfish taken from the Texas Coast and determination of efforts of various merchandising strategies on the retail seafood supermarket.

Research Review

"For purposes of the marketing and distribution channel study, the wholesale trade level was directly investigated through personal and telephone interviews," states Gillespie. "Data and information obtained from 27 Texas wholesalers became a descriptive



Red Snapper caught at Tampico off the Gulf of Mexico and brought into Brownsville's Port Isabel are pulled from the fishing vessel's storage hold. The catch is then loaded aboard an ice truck enroute to the local fish plant.

framework of the market structure for fresh finfish, from point of origin to the ultimate consumer."

His studies dealing with fresh finfish catch in Texas were based on six major species: the Red Snapper, Black Drum, Redfish, Flounder, Sea Trout and the Sheepshead. "These six species," notes Gillespie, "have been identified as the most common commercially harvested and sold for final consumption in the state."

The Texas Gulf coast is divided into five fishing districts as defined by the National Marine Fisheries Service and the Texas Parks and Wildlife Department. These districts are Sabine, Galveston, Matagorda, Aransas and Laguna Madre. Mexican imports are received at Brownsville.

Gillespie defines the overall distribution channel structure of the Texas fishing industry beginning with the institutional components in terms of their functions and role. Succeeding points of distribution are producers or harvesters — coastal dealers — inland wholesalers and retailers (retail markets, restaurants and institutions) — ultimate consumers. "According to my findings, 78 percent of the total volume of fresh finfish at the coastal wholesaler trade level was distributed through this channel," adds Gillespie.

Other important marketing channels identified through this study were (1) harvesters — coastal wholesalers — ultimate consumers, accounting for 14 percent of the finfish distributed and (2) harvesters — coastal wholesalers — retailers — ultimate consumers, through which the remaining eight percent of the volume of fresh finfish was distributed.

(For detailed information, see Gillespie's published report, TAMU-SG-71-220, Sept. 1971, available from the Texas A&M University Center for Marine Resources.)

Seafood Merchandisers Workshop

"Information obtained from these studies," says Gillespie, "identifies a significant need for meeting with Texas retail seafood merchants periodically to disseminate latest findings of institutional researchers and to share and exchange expertise of the operation of a fresh seafood retail market." **Bill Schwartz**, marketing specialist for Texas Parks and Wildlife Department, further identified this need through regular communication with Gillespie.

Organized by Gillespie and Schwartz, the state's first Retail Seafood Merchandising Workshop was held in Houston, May 21, drawing 28 seafood merchandisers from 14 Texas firms.

Co-sponsored by the Texas Parks and Wildlife Department and Texas A&M University's Sea Grant Program, the workshop program emphasized fresh seafood with discussions on new merchandising ideas,



Seafood counter displays like this one found in Dallas offer the consumers fresh frozen finfish, filleted or whole.

buying practices, display strategies and processing techniques pertinent to successful operation of a seafood market. Workshop participants included professionals from the industry, government officials, independent seafood retailers, supermarket meat managers and university personnel.

"The most important result of my research efforts," states Gillespie, "is documented in a **Seafood Merchandisers Manual**, which was distributed at the workshop. Plans are to publish the manual, making it available to all areas of the seafood marketing channels," he adds. The manual includes sections on Profit Potential for Fish; Consumer Buying Attitudes; How to Buy Fish: Determining the Quality, Seasonal Supply of Species and Sources of Supply; Care of Seafood; and Merchandising: Product Assortment, Dressing Fish, Pricing and Merchandising Display.

Promotion of seafood by personnel within a store, through mass advertising and promotional materials is also reported. Other topics include laws regulating retailing of seafood, accounting and financing.

Program speakers for the workshop included Henry Boies, National Marine Fisheries Service; Clint Amox, Tom Thumb Supermarkets; O. T. McCullough, Quality Seafood; Bryant Cobb, Texas A&M Department of Animal Science; Bill Schwartz, Texas Parks and Wildlife Department; Marie Gimino, Tom Thumb Supermarkets; and Mary Ann Beard, Texas A&M research assistant, Department of Marketing.

"Workshop participants overwhelmingly approved the program," reports Gillespie. "This workshop is just the first in a series of meetings with Texas seafood retailers."

August 13-15, a mini session will be conducted on "The Best Kept Secret in the Meat Market—Seafood" at the Texas Retail Grocers state convention in San Antonio. ■

Short Course In Dredging

Enrollment applications are now being accepted for a short course in hydraulic dredging, slated for August 7-11 at the TAMU Center for Dredging Studies.

A presentation of the Civil Engineering Department's Coastal and Ocean Engineering Division in cooperation with the TAMU Sea Grant Program and the Texas Engineering Experiment Station, the 4-day seminar will feature lectures and laboratory work in the following areas:

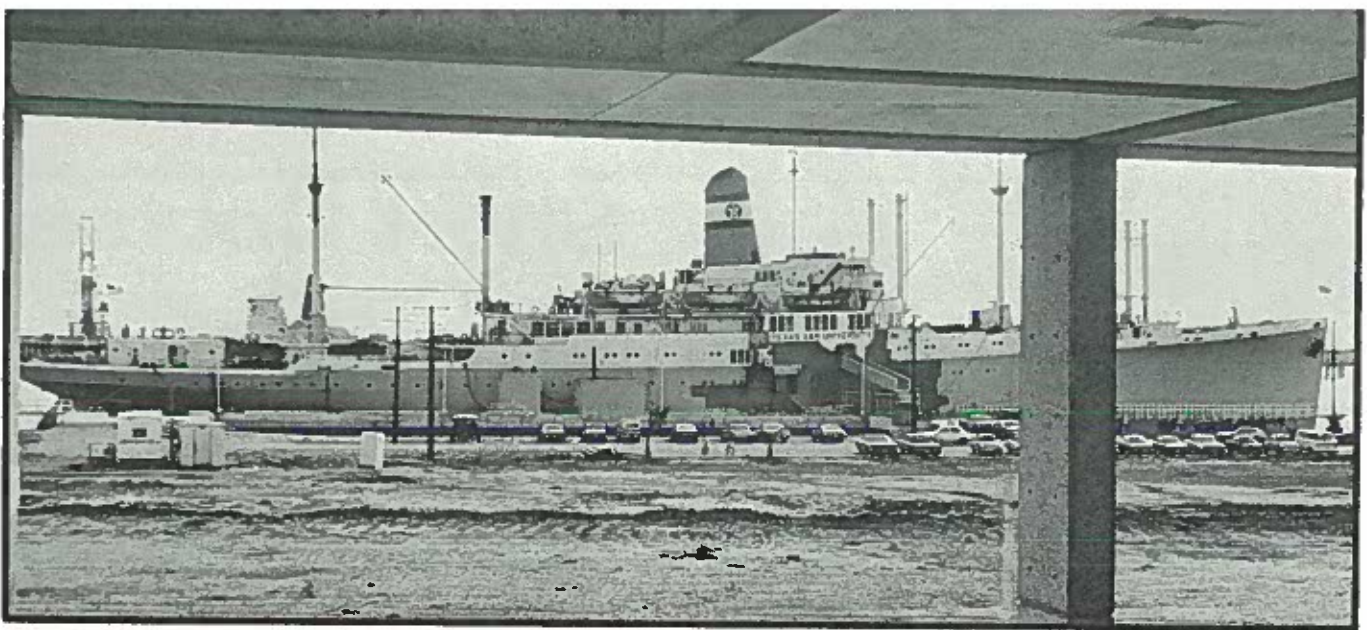
- **Elements of Hydraulics** — fluid properties, manometer, buoyancy/floating stability, and flow/sediment transport in pipelines. (Schiller, Sorensen)
- **Dredge Pumps** — theory of centrifugal pumps, cavitation, performance/system curves, jet assist, effects of solid-liquid mixtures on performance. (Basco)
- **Soil Mechanics** — physical and engineering properties of soils, soil classification, sampling techniques and strength characteristics influencing dredging. (Dunlap)
- **Sediment Bypassing** — transport of beach sand past harbors and coastal inlets. (Sorensen)
- **Offshore Dredging Problems** — effect of waves and currents on the dredge—pipeline system, beach rehabilitation, continental shelf and deep ocean mining. (Basco)
- **Dredging Systems** — application of basic dredge laws to design of a modern hydraulic dredging system. (Turner)
- **Instrumentation** — flowrate, density, discharge, input torque viscosity. (Denning)

Instructors, as shown by last name in parenthesis in the above listing, include **T. M. Turner**, vice president of the Engineering Dredge Division, Ellicott Machine Corporation; **Rick A. Denning**, assistant chief of Marine Division, North Atlantic Division, Army corps of Engineers; and **Jack M. Farmer**, vice president of the Atlantic, Gulf and Pacific Company.

Texas A&M instruction will be from **Robert E. Schiller**, professor of coastal and ocean engineering (COE) in the Department of Civil Engineering; **Robert M. Sorensen**, associate professor, COE; **David Basco**, assistant professor, COE; **Wayne A. Dunlap**, associate professor, COE; and **Jack W. Anderson**, assistant professor of biology.

Discussion of laboratory assignments followed by a banquet that evening will conclude the course on Thursday.

For application, contact **R. M. Sorensen**, Department of Civil Engineering, Texas A&M University. ■



Limelight: A&M's Marine College

Newest of the nation's six major maritime academies and the only one located on the Gulf Coast, the Texas Maritime Academy is in its tenth year of operation. Established in 1962 on Galveston's Pelican Island, the Academy is now part of Texas A&M University's College of Marine Sciences and Maritime Resources, created in 1971.

The maritime college was made possible through legislation introduced in the 62nd Legislature by Sen. A. R. Schwartz of Galveston and Rep. Bill Presnal of Bryan.

land-based curriculum

The Maritime Academy will expand its curriculum guidelines for fall 1972 to include students pursuing land-based maritime careers.

Students enrolling in this special program will have the same opportunity as TMA cadets to earn a bachelor of science degree in either marine engineering or marine transportation. These students, however, will not be required to live on the Galveston campus, participate in the corps of cadets or go on the annual summer cruises. Technical and management courses will be the basis for land-based marine oriented degrees rather than the naval science courses currently required for cadets.

William H. Clayton, dean of the TAMU marine college and acting TMA superintendent, emphasizes that the special program will not include eligibility

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for Coast Guard licenses or reserve commissions; in addition, the students under this new program will not receive federal subsidy such as awarded to TMA cadets.

Clayton foresees many career possibilities ashore as well as at sea. For example, a graduate from this program might choose a career as port engineer, manager or one of many other managerial positions.

Interested students may enroll in this program either as a freshman or transfer student with up to two years at another college or university. Coeds are eligible for the curriculum as day-students only.

Although living in campus housing, currently provided during the regular school year aboard the academy's training vessel, **TEXAS CLIPPER**, or participating in the summer cruise is not mandatory, young men following this program may apply for both.

mediterranean cruise

The **TEXAS CLIPPER** departed June 7 on a 13,000 mile summer cruise of the Mediterranean Sea.

In addition to 60 TMA cadets, approximately 70 spring high school graduates are aboard the **CLIPPER** as participants of TAMU's Summer School at Sea Program. Dean Clayton said the students enrolled in this freshman program earn six hours of college credit in English, history or mathematics while on the cruise.

Also on board for this year's cruise is **Diane Denman**, the newly appointed academic counselor of the TAMU Galveston college, marking the first time in the history of the Academy that a woman has participated in the two-month cruise. A native of Beaumont, Miss Denman holds a master of education degree in guidance and counseling from Stephen F. Austin State University. In 1957, she received her undergraduate degree in English from the University of Houston. Miss



Academic counselor Diane Denman waves bon voyage from aboard the TEXAS CLIPPER. She is the first woman ever to participate in the summer cruise.

Denman previously served as counselor and English teacher at Ball High School in Galveston.

Prior to crossing the Atlantic Ocean, the **CLIPPER** received Coast Guard Inspection and American Bureau of Shipping Certification while dry-docked at Jacksonville, Fla., earlier this month.

Ports-of-call include Valencia, Spain; Palma, Balearic Island; Las Palmas, Canary Islands and Split, Yugoslavia. Before returning to Galveston August 6, the **CLIPPER** will visit the Port of New Orleans, La., and Freeport, Texas.

Operating the ship are TMA cadets under direct supervision of Coast Guard licensed academy personnel including **Capt. A. R. Philbrick**, ship's master; **R. W. Armstrong**, first officer; **William Riley**, chief engineer; and **Owen Arkison**, first assistant engineer. **Commander John Lane** is cadet commandant.

campus dedicated

The College of Marine Sciences and Maritime Resources recently held formal ceremonies dedicating the first two buildings of the planned 20-building complex. Included in the dedication activities were Coast Guard licensing and naval reserve commissioning ceremonies for eighteen 1972 graduating TMA cadets.

The campus' first buildings are an administration-classroom center and engineering laboratory, constructed with assistance of a \$1 million grant from the Moody Foundation.

Helen Delich Bentley, chairman of the Federal Maritime Commission, served as keynote speaker for the activities. She told the guests, "A major reason that the U.S. has lost its maritime heritage is the failure of our educational systems to teach subjects related to the oceans."

The American people must realize, Mrs. Bentley continued, what the oceans mean to our country and the world and what maritime power means in terms of safety and solvency.

Mrs. Bentley added, "The citizens of Galveston and Texas are to be congratulated because the new College of Marine Sciences and Maritime Resources is emerging as a true leader in the field of ocean education."

The Sea Grant Program, she said, might just be the real key to a true American reorientation in marine affairs.

"Texas A&M's designation as a Sea Grant College," Mrs. Bentley stressed, "will generate a significant increase in coastal zone activities of all types in the state of Texas; hence a corresponding increase in the scope and nature of TAMU participation in these activities should follow."

"It is reasonable to expect that this new College will become the nucleus for a marine university in Texas that can serve the state and Gulf Coast in the same way Scripps Institute of Oceanography and Woods Hole Oceanographic Institution have served — and are serving — their particular coastal areas."

Presenting Coast Guard licenses was Rear Admiral **John B. McCubbin**, commandant of the 8th Coast Guard District. Rear Admiral **Robert A. MacPherson**, commanding officer of the 8th Naval District, presented the naval commissions. TMA graduates also earn bachelor of science degrees in marine transportation or marine engineering.

Master plan for the campus calls for it to be divided into two areas — an academic core on the east side of Pelican Bridge and a recreation-living core on the west. Plans currently are being compiled for the campus' first residence hall, which will accommodate nearly 200 students. ■

FMC Chairman Helen Bentley and TAMU President Jack K. Williams discuss the State's maritime needs at the College's dedication ceremonies.





*Dan Bragg

In the past three decades, the economic base of Texas has changed from one dominated by agriculture to one oriented toward minerals and manufacturing with a strong dependence upon water transportation. Petroleum refining and petrochemical-based industries have grown especially fast during this period due to Texas' plentiful supplies of essential raw materials.

However, prospects for continuation of present levels of oil-related business in Texas appear to be in jeopardy. Although Texas has traditionally been a net exporter of crude oil, natural gas and refined products, today's economic incentives are not sufficient to encourage much petroleum exploration and the state's reserves of oil and gas are rapidly being depleted. As a result, Texas' dependence upon imported crude oil will become more significant in the near future. It is estimated that by 1980 Texas will be importing 3,500,000 barrels of crude oil per day, increasing to more than 5,500,000 barrels by 1985.

THE AGE OF THE SUPERTANKER

During World War II, the standard oil tanker was the T-2, a vessel with a cargo capacity of 16,600 tons (about 115,000 barrels) that required water depths of 30-35 feet when it was fully loaded. The depth of water in substantially all of the world's harbors was adequate for this size carrier. As recently as 1960, the largest

*Assistant Research Engineer, Texas A&M University, Industrial Economics Research Division

tanker in the world was 69,000 deadweight tone (dwt)* requiring between 40 and 45 feet of water depth. (*Deadweight tonnage, customary unit for measuring tankers, refers to combined carrying capacity of a vessel's cargo, stores, water bunkers and fuel, in 2,240-pound tons.) Today, more than 150 ships over 200,000 dwt and several measuring 326,000 dwt sail the world's oceans.

"Supertankers," as these large vessels are called, dwarf all previous liquid-hauling tank ships, averaging over 1,100 feet or about three football fields in length and as much as 180 feet in width. These tankers are much larger than any vessel that ever sailed the seven seas, including huge aircraft carriers of World War II.

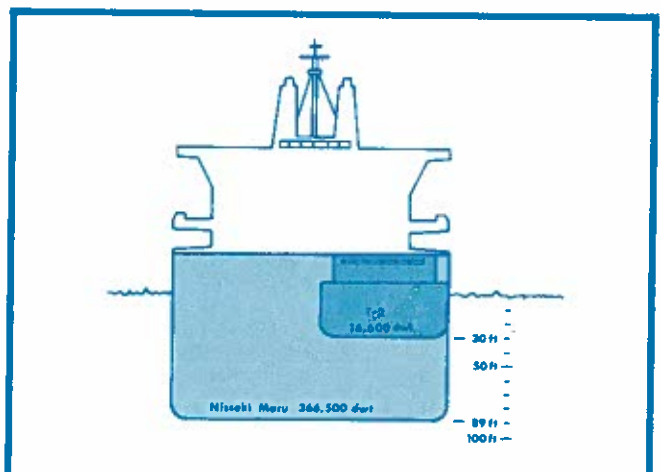
Rate of growth for ships does not stop here. The theoretical upper limit of ship size exceeds the present size far more than with any mode of transportation. Ships of up to 470,000 dwt are presently under construction, and super-tankers up to one million deadweight tons are on the drawing board. In Japan, a shipyard with capabilities of launching and dry docking tankers of the one million dwt size is under construction today.

Some favorable aspects of supertankers include: the per-barrel cost of transportation is much lower than with conventional-sized tankers; their owners and operators claim they are safer because their size makes them more seaworthy; and the increased use of automation on supertankers reduces manpower required aboard ship as well as at loading/unloading terminals, thereby reducing the effect of labor strikes.

However, the very size of these giant ships that provides inherent cost advantages is also the one factor that curtails their flexibility in choice of routes and ports. This dimensional factor is the ship's draft, or depth in the water, which becomes deeper as the deadweight tonnage is increased.

NEED FOR A U. S. PORT

Tremendous growth in length and draft of today's supertankers has forced a revolutionary change in the



The standard oil tanker of the 1940's had a draft of 30 feet in comparison to the supertanker NISSEKI MARU which requires a water depth greater than 89 feet.

design and construction of port and terminals needed to service these gigantic vessels. Water depth at the terminal site must exceed the maximum fully loaded draft by 15 percent. For example, the average draft for a supertanker of 200,000 dwt is about 61 feet. Ships of the future reaching one million dwt will have a draft from 100 to 120 feet.

With the exception of just a few East and West Coast locations—such as Machiasport in Maine, the Long Beach and San Pedro areas in California, Seattle, Washington and Valdez, Alaska, which are capable of accommodating vessels of 100,000 dwt—no port or harbor in the U. S. has a water depth greater than 45 feet. According to figures from the U. S. Army Corps of Engineers, 50 harbors in the world are deep enough to handle 200,000 deadweight ton tankers; however, none of these are in the United States. This startling fact has generated considerable amount of discussion regarding the need for establishing deep-sea terminals for the U. S., and especially for Texas.

TEXAS PORTS

The problem of ship size versus port depths assumes a more critical nature in the Texas Gulf Coast region due to the state's heavy dependence on the hydrocarbon processing industry and the industry's need for adequate supplies of raw materials.

More than 40 percent of the nation's petrochemicals are produced in the Texas Gulf Coast areas of Port Arthur, Beaumont, Galveston and Houston. During the last decade about 118 new chemical and allied materials plants located in this area, and 272 plants expanded. This concentration of industry comprises more than one-third of the nation's entire oil refining capabilities and more than 50 percent of the nation's petrochemical processing ability.

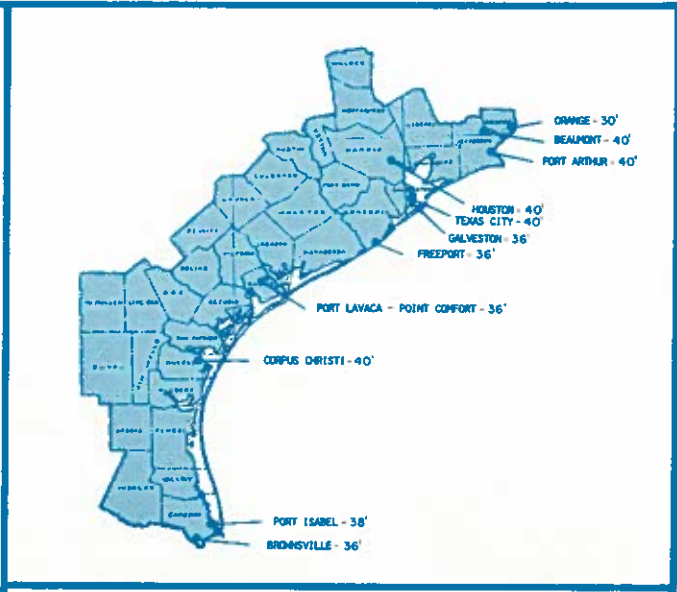
In 1970 over 185 million tons of cargo went through Texas' 12 deep water ports in comparison to 192 million tons handled through the ports of New York. Of the 185 million tons moved in Texas, 140 million tons consisted of liquids, mainly petroleum and chemical products.

At the present time, no ship larger than 80,000-90,000 dwt can enter Texas ports. Yet today's world tanker fleet includes more than 700 ships that exceed this size and therefore cannot dock in Texas. To compound the problem, it is predicted that by 1983, more than 1,400 of the projected world tanker fleet of 4,300 ships will be unable to enter Texas ports.

Deepest berths along the Texas coast are currently 40 feet at Beaumont, Port Arthur and Houston while other major Texas ports average 30 to 38 feet. Although several of these are in the process of deepening to 45 feet, the fact remains that Texas ports are only one-half to two-thirds as deep as need be to accommodate supertankers.

WHAT IS THE SOLUTION?

Obstacles, both natural and man-made, will prevent most ports from following conventional practices like dredging and widening to update their facilities. Such things as pipelines, telephone cables and vehicular



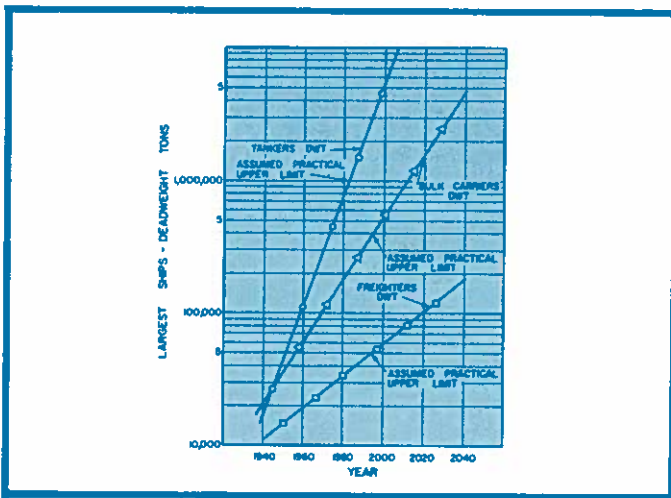
Deepest ports along the Texas coast are currently 40 feet.

crossing structures almost certainly will preclude the deepening of most channels and established ports throughout the world. Another major factor preventing channel enlargement is the expense.

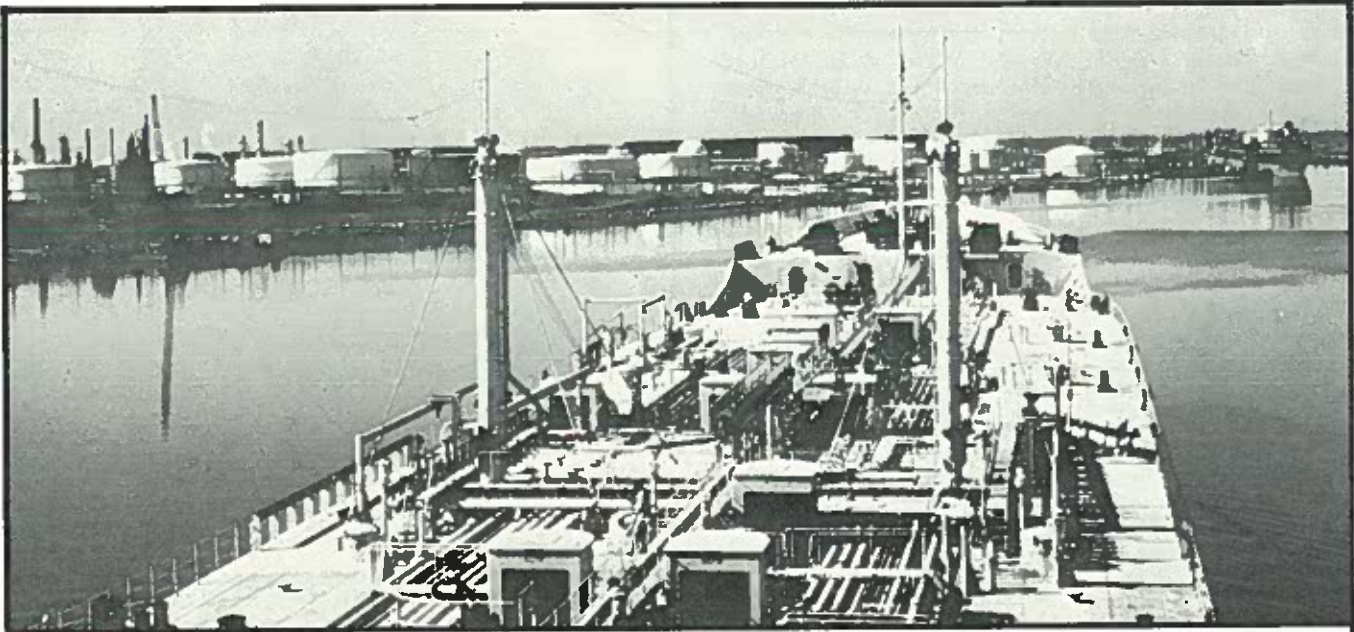
A feasible alternative to dredging is the off-shore terminal. This type of structure, which either floats on the water surface or rests on the ocean floor, is designed for mooring of supertankers. The "superport" facility would contain provisions for loading and/or unloading bulk cargoes of liquid commodities and non-liquid commodities where justified.

THE WORK PLAN

Observing world trends in ship sizes and considering the needs of Texas for imported crude oil and gas in the near future, the South Texas Regional Export Expansion Council (STREEC), in 1970, recognized that an analysis for a deep water port for Texas, should be



Projected deadweight tonnage of large ships to the year 2040 is shown in this chart as based on trends from 1937-67.



As seen from its bridge, the 39,000 dwt VALLEY FORCE approaches a refinery along Houston's ship channel. Draft for this liquid product carrier is 36 feet; the average channel depth here is 40 feet.

made. STREEC, a quasi-governmental organization of businessmen dedicated to development of foreign trade for this region, contracted with the Industrial Economics Research Division of Texas A&M University to make a study of an offshore port facility for Texas.

Financially supported by the Sea Grant Program of Texas A&M and by ports of Freeport, Galveston and Port Arthur, the study, one of the first in-depth analyses ever done concerning an actual deep water port facility to serve a specific market region, was completed in July 1971. Results of this study are reported in the publication **WORK PLAN FOR A STUDY OF THE FEASIBILITY OF AN OFFSHORE TERMINAL IN THE TEXAS GULF COAST REGION** (TAMU-SG-71-212) which may be obtained from the Center for Marine Resources, Texas A&M University, College Station, Texas 77843.

The work plan defines in detail five recommended studies to determine the feasibility of an offshore port for Texas. These studies include:

- Engineering and Environment — conceptual designs, site studies, environmental impact statement.
- Socio-Economic — present economic base, impact of new port, cost/benefit studies.
- Site location — tentative site locations, existing facilities, final site locations.
- Legal—jurisdiction, liability, legislation, safety. State, Federal, or international law.
- Port Management — type of operating entity, organizational structure, participation by others.

Total estimated cost for the entire feasibility study is \$460,000; calendar time to complete the overall phase is estimated at 18 months.

Conversion of the offshore ports from a mere concept into a reality remains ahead. There are many obstacles standing in the way of fulfillment of this project. Many of these obstacles, although quite sizable, are nevertheless relatively tangible in nature and can be resolved through the application of good planning and hard work, while some are more difficult to grasp.

Construction of a deepwater terminal off Texas presents a clear opportunity for the industrial community to grow. Industrial expansion would follow in companies using imported oil and gas to produce finished products for export and domestic consumption. Service industries to support and maintain the superport and related onshore facilities would show dramatic growth. Direct benefits would accrue, for instance, to firms manufacturing and coating pipe, to firms providing barge and tug services as well as to other transportation links like rail and truck services. Also included would be technical and scientific firms, repair and maintenance oriented companies and a host of service and supply firms related to the construction and operation of gathering stations, piping stations and onshore pipeline facilities.

Ray Brimble, president of the Texas Superport Study Corp., a nonprofit agency, estimates that an offshore terminal would save about \$700 million yearly in transportation costs and provide 300,000-500,000 new jobs during the first decade of operation.

To achieve the goals of greater employment and growth in marine related industries in Texas, to help alleviate the growing energy crisis and, at the same time, reduce the potential for ocean pollution, Texas must coordinate its efforts to construct the offshore port terminal. To date, the challenge and the opportunity have been recognized. The task at hand now is to determine how this need can be met realistically. ■

Flower Gardens Coral Reef

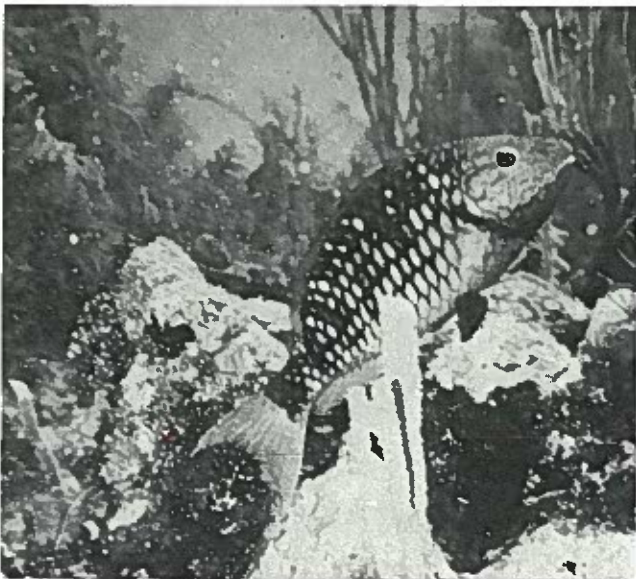
Tenth Undersea Investigation

The Flower Garden Ocean Research Center of the Marine Biomedical Institute is conducting a major exploration of the West Flower Garden Coral Reef Bank using the research submersible **Nekton**. The effort, which began June 5, is funded by the Manned Undersea Science & Technology Program (MUST&T) of the National Oceanographic and Atmospheric Administration.

Goal of the submersible venture is geological and biological exploration of the lower slopes of the West Flower Garden area, a small prominence on the outer Texas continental shelf that is crowned by a fully developed tropical coral reef. Water over the reef is as shallow as 48 ft., while depths surrounding the prominence are about 400 ft.

Investigators participating in the exploration, tagged as Flower Garden Ocean Research Center Cruise 72-0605-X, include **Robert Alderdice**, deputy director for programs of FGORC; Texas A&M University scientists **Thomas Bright**, biological oceanography; **Richard Rezak**, geological oceanography; and **William Bryant**, geological oceanography. Also, **James B. Urban**, assistant professor of geology at the University of Texas at Dallas; and **R. U. Gooding**, Division of Crustacea, The Smithsonian Institution. Other participants include scientists from the University of Houston, the University of Texas at Austin and the University of Texas Medical Branch at Galveston.

Cruise FGORC 72-0605-X is the tenth undersea exploration voyage to the West Flower Garden area conducted during this series. Work involved includes



Of the many fishes characteristic to the Flower Gardens coral reef is the parrot fish.

a comprehensive biological baseline survey of the reef system, a sophisticated mapping effort, studies of surface currents in the Western Gulf of Mexico and studies of subsurface currents across the reef top.

The submersible used is the **Nekton Gamma**, built by General Oceanographics, Inc. of Newport Beach, Calif. A two-man research submersible with a maximum operating depth of 1000 ft., the **Nekton** is capable of taking biological and geological samples using external manipulators. Internal cameras and internal TV recording systems are also employed.

Support vessel for the cruise is **Miss Freeport**, a 135-ft. research support ship belonging to Dearborn Marine, which has been under long-term lease to the FGORC program during 1971-72. **Miss Freeport** carries a scientific crew of 24 and a ship's crew of five. ■

new publications

The following new publications are available from the Texas A&M University Center for Marine Resources, College Station, Texas 77843. Please request by title and by publication number; prices are indicated where applicable.

CONTROL OF OIL SPILLS

John B. Herbich, TAMU-SG-72-102. March 1972, 36 pp. Cost: \$3.

The use of a pneumatic barrier and the Texas A&M Low Tension Barrier to contain an oil spill is explained in detail.

MARINE RESOURCES CAPABILITIES IN TEXAS: DIRECTORY OF PERSONNEL IN EDUCATIONAL INSTITUTIONS

Norman C. Whitehorn, TAMU-SG-72-604. June 1972, 191 pp. Cost: \$3.

Included are 389 names and identifications of persons with marine-related expertise from 29 Texas educational institutions. Printed as an updated revision of the 1971 directory of the same title.

EFFECTS OF INCLINED AND ECCENTRIC LOAD APPLICATION ON THE BREAKOUT RESISTANCE OF OBJECTS EMBEDDED IN THE SEA FLOOR

John L. Colp and John B. Herbich, TAMU-SG-72-204. May 1972, 91 pp. Cost: \$3.

Forces required to break out model circular plate anchors embedded in three soil materials at various depths when under several inclined and eccentric load applications are described.

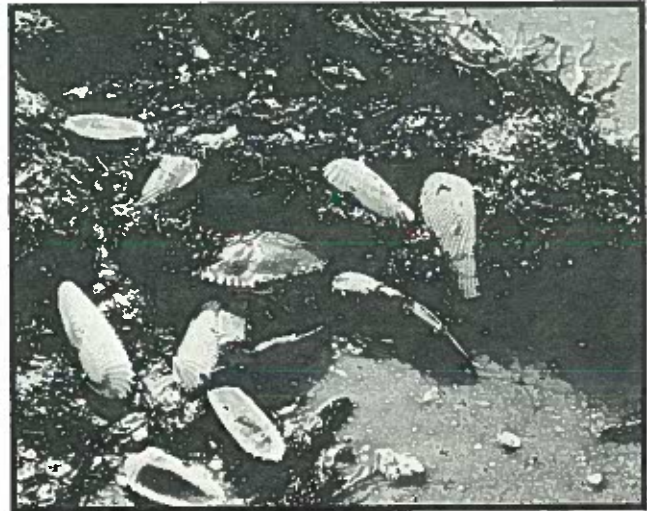
EFFECT OF FISH REMOVAL ON THE GROWTH AND CONDITION OF WHITE SHRIMP, *Penaeus setiferus* (LINNAEUS), IN BRACKISH PONDS

Jack C. Parker, et. al., TAMU-SG-72-701. June 1972, 12 pp. Cost: \$3.

Effects of fish removal on growth and condition of pond-reared juvenile white shrimp were studied using two brackish ponds near West Galveston Bay, Texas. Length-weight relationship on shrimp in each pond is presented. ■



Sea oats and railroad vines protect the sand dunes along the Texas coast from wind and erosion.



This blue crab is one of many marine animals to be found combing Padre Island's shores.

Educators' Aid for Marine Conservation

Wise utilization of marine resources in the future depends largely on the attitudes and knowledge of today's public school students. Teaching materials emphasizing the natural characteristics of the coastal zone, its features and methods for their conservation, are being prepared cooperatively by Texas A&M University's Sea Grant Program, the university's Department of Educational Curriculum and Instruction and the Region II Education Service Center in Corpus Christi.

Initially, a series of four multi-media teaching units has been developed and will be made available through the Education Service Centers during the 1972-73 school year. The units, originally prepared by public school teachers participating in the six-week Coastal Zone Problems Institute during 1971 (see Vol. 4, No. 4 of *The University and the Sea*), have been extensively field-tested by both students and teachers.

Along Nature's Pathway, a 70-slide presentation with taped background music, exposes students to undisturbed scenes of nature along the Texas coastline. Adaptable to a variety of grade level and subject matter classroom situations, the unit is designed to stimulate further investigations into the living things portrayed. Billie Davis, Victoria Independent School District teacher, originally developed the material.

A unique sound track on **Plants and Animals of Padre Island** features descriptions of the 50 slides from a "bird's eye view." A Padre Island resident, the blue heron, "narrates" descriptions of plants, animals and conservation principles. A Chapman Ranch teacher, Genevieve Barnett, planned the presentation.

The third unit, **Value of Dunes Along A Coast**, includes 46 slides with a taped narration. Natural construction of dunes on a barrier island, the systematic manner in which different factors interact with one another to achieve dune construction, the value of a barrier island with its dunes and grasslands, and the problems affecting continuing processes of formation

of these structures are discussed. Originator of this unit is Dorothy Spurlin, Flour Bluff I.S.D. teacher.

This Land stresses the concept that each person must participate in pollution control. The 50 slides are arranged to contrast nature in its undisturbed state with nature as desecrated by man's negligence and wastefulness. Specific actions to enhance environmental quality are presented in the unit, developed by Darlene Gooris, teacher in Tuloso-Midway I.S.D.

Fifty-one state-wide representatives, from sixteen school districts, two universities, the Texas Education Agency and three Education Service Centers, participated in a conference May 23 to view and react to the four units. Teachers, consultants, supervisors and other staff members, most of them science-oriented, participated representing Austin, South Park in Beaumont, Brazosport, Chapman Ranch, Corpus Christi, Flour Bluff, Houston, Laredo, Pasadena, Robstown, Spring Branch, Tuloso-Midway, Victoria, West Orange-Cove and West Oso. As a result of their critical review, the units are being refined with public release expected in late summer.

Teacher's guides with recommended student activities and evaluation instruments will accompany the units. Objectives and activities of the units reflect results of field testing in the Corpus Christi classrooms of Robert Gibson and Catheran Whitfield (John F. Kennedy Elementary) and Mary Frances Swanson (South Park Junior High).

Sea Grant Education and Training Coordinator Roger D. Anderson is overseeing the project. Personnel from the Department of Curriculum and Instruction include project leader Glenn Johnson, Delmar Janke, Walter Stenning, Jean Marie Anderson, Ronald Becker, Robert Holick and James F. Ward. Mildred Norris, Education Service Center Region II, coordinates that agency's participation. ■

Oceans--World Crisis for Study

Marine Policy and Ocean Management is the title of Woods Hole Oceanographic Institution's (Woods Hole, Mass.) newly created post-doctoral program.

The research program focuses on social and political problems generated by increasing uses of and demands on the world's oceans with emphasis on problems associated with advanced technology. A significant part of the program is the sponsorship of post-doctoral fellows during each academic year.

PROGRAM PURPOSE

Purpose of the fellowships is to support research efforts of highly qualified doctoral graduates. Although eligibility is limited to candidates who have completed the degree within three years prior to application, the Institution has not rigidly defined the range of acceptable research under the marine policy program and is receptive to original proposals.

FIELDS OF STUDY

On-going studies presently receiving support include an investigation of international laws on oil pollution in the oceans, analysis of the structure and processes of U.S. government agencies regarding ocean issues, and modeling and decision analysis for fisheries management.

Additional topics suggested for possible research include: problems in implementing an international regime for the seabed; arms control and disarmament at sea; legal problems in delimiting sovereignty of the high seas and the seabed; and protection of endangered marine species. Economic, political and legal problems associated with marine resources and a wide variety of marine environmental issues are also among supportable research topics.

Fellows are required to conduct one or more major research projects in an approved area with results being applicable to the field and of a quality suitable for input to governmental decision-making and/or publication.

RESEARCH FACILITIES

Postdoctorates are based primarily at Woods Hole. However, since the research also requires access to major policy study centers, Woods Hole fellows have been granted visiting scholar privileges to Harvard University's Policy and International Affairs Center, the Massachusetts Institute of Technology and the Fletcher School of Law and Diplomacy of Tufts University.

FINANCIAL AID AND APPLICATION

Stipend for the program is \$9,500 annually, plus a dependency allowance of \$500 per dependent with

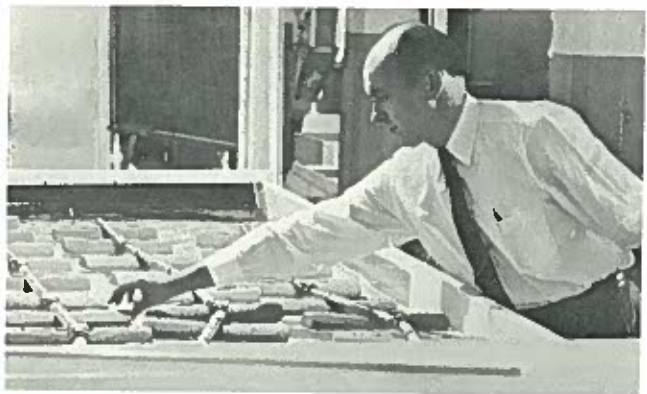
a maximum of three. Fellows may choose a 9-, 12- or 15-month appointment. Limited research expenses are supported by the Institution.

Applications should be made to Paul M. Fye, President, Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543. ■

sea notes

► **John B. Herbich**, head of the Coastal and Ocean Engineering Division of TAMU's Civil Engineering Department and director of the Center for Dredging Studies, is on his way to Poona, India to serve a one-year United Nations appointment as coastal engineering advisor to India.

On a leave-of-absence from TAMU, he will head an international team of coastal engineers in planning and developing a national coastal engineering research center in Poona. The assignment includes program development ranging from establishment of training programs for Indian personnel to determination of the nation's research needs.



John Herbich has directed extensive research with this wave tank in TAMU's hydromechanics laboratory.

► Texas State Representative **Ray Lemmon** and his Committee on Coastal and Marine Resources met in Washington, D. C., May 6-7 to discuss several national planning programs and their relation to the future of Texas. The committee met with officials of the Environmental Protection Agency, the National Science Foundation, the National Oceanic and Atmospheric Administration, House and Senate committee leaders, the Department of Interior and a large representation from the Texas Congressional delegation.

► Texas' first marine-oriented agricultural research and extension center, being established at Corpus Christi, recently received a \$17,000 appropriation from the Texas A&M University System Board of Directors. The new allocation for detailed design supplements a previous appropriation of \$14,000.

Proposed research for the new Center includes studies in mariculture, aquatic foods and coastal engineering problems as well as agricultural studies. The College of Agriculture and the College of Engineering will operate the Center.

► **Robert R. Berg**, associate dean of geosciences at Texas A&M, will assume new duties as head and director of research in the newly created Office of University Research beginning July 1.

Texas A&M President **Jack K. Williams** said the new position and office is being created as a coordinating nucleus for development and support of research programs conducted outside agricultural and engineering experiment stations.

Williams notes the main purpose in establishing this new office, which will operate under the Vice President for Academic Affairs, **John C. Calhoun, Jr.**, is to enhance and more closely coordinate research throughout the university.

Berg's selection as director of research, adds Williams, was partially based on his great sensitivity to the university's needs in the arts and humanities, in addition to his excellent reputation and skills in science and technology.

► **Sayed Z. El-Sayed**, Texas A&M oceanographer who specializes in Antarctic primary productivity, has been appointed to the National Academy of Science Committee on Polar Research.

Veteran of numerous polar cruises including a recently completed expedition that put in at McCurdo Station, El-Sayed has had an Antarctic glacier named in his honor. On an ice-breaker cruise into the Weddell Sea in 1968, he discovered a rich algal bloom that caused considerable excitement in biological oceanographic circles.

He was appointed to the 15-member committee by Philip Handler, NAS president, upon nomination by Laurence M. Gould, chairman. The appointment is for three years, through March, 1975. ■

LEATHA MILOY, Editor; **RONDA REAGAN**, Assistant Editor

Texas A&M University's Sea Grant Program is made possible through an institutional award from the National Oceanic and Atmospheric Administration, U. S. Department of Commerce. More than sixty individual marine resource development projects are carried out under the Program which involve 16 departments and divisions of the University. Dr. John C. Calhoun, Jr., is Sea Grant Program Director.

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The University and the Sea

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