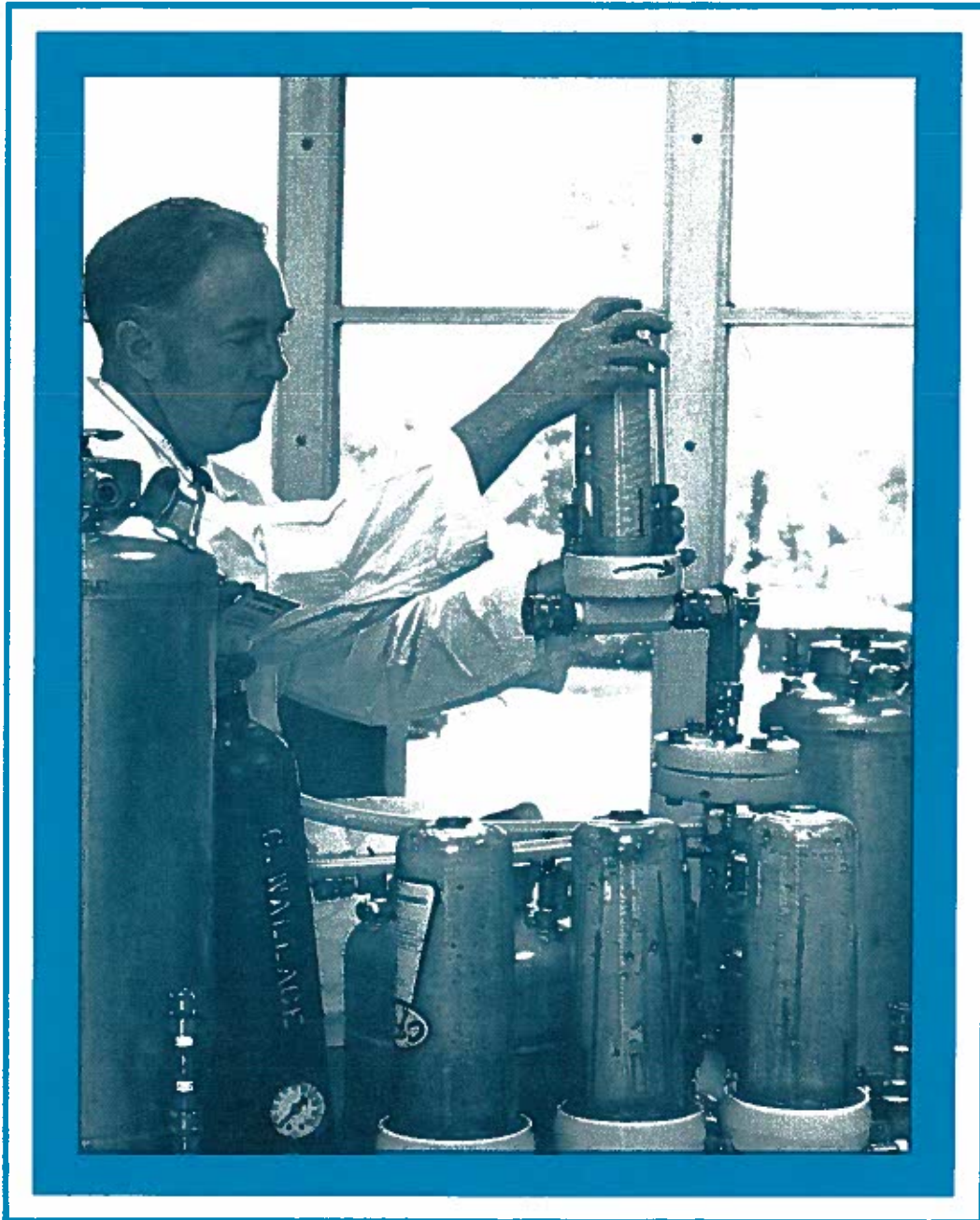
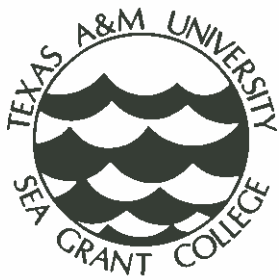


The University and the Sea

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Texas A&M University's multi-million dollar Sea Grant Program is under new leadership today with the arrival of Robert C. Stephenson as director.



New Leader for A&M Sea Grant

Robert C. Stephenson, former executive director of Ohio State University's Research Foundation, became the new director of Texas A&M University's Center for Marine Resources, headquarters for the university's Sea Grant College Program, Wednesday, November 1.

"I am pleased to have been selected to assist in the further development of marine resources and related programs of the university," Stephenson notes. "The record of accomplishments and the reputation of Texas A&M in these areas is well recognized."

Stephenson succeeds **John C. Calhoun, Jr.**, who has been Sea Grant director since its beginning in 1968 and director for the Center, established in 1971. In September 1971, under Calhoun's leadership, A&M received Sea Grant designation, one of four universities named in the nation at that time.

"Texas A&M is very fortunate to have a man of Stephenson's caliber join our growing marine sciences program," says Calhoun, who is now vice-president for academic affairs at A&M. Stephenson's experience at Ohio State in university-wide programs such as the Lake Erie Research Center will be directly applicable to the state-wide program for marine resources in Texas."

As new director for the Center, Stephenson will be considered the university spokesman for marine resources, overseeing state-wide Sea Grant activities and projects. **Willis H. Clark**, associate director of the program, will assist Stephenson with his new duties.

Previously, Stephenson served nine years as the executive director of Ohio State's Research Foundation in Columbus. He was also executive director of the

American Geological Institute under the National Academy of Science in Washington, D. C., for eight years.

Among his areas of specialization are environmental programs, interdisciplinary program planning, graduate education, academic administration, academic resources management and curriculum development.

Stephenson, a member of 11 scientific and technical societies, is a specialist in economic geology of industrial and metallic minerals, structural geology and general geology. He is listed in **American Men of Science** and **Who's Who**. Stephenson has also had related experience in scientific society management, scientific information systems, science education, magazine editing and fund raising.

Currently, he is serving his second three-year term on the Committee on Governmental Relations of the National Association of College and University Business Officers. He has been a consultant to the Middle East Technical University in Ankara, Turkey, and to the Federal University of Parana in Brazil.

Stephenson received an A.B. degree in geology in 1938 from Miami University, Oxford, Ohio, and his Ph.D. degree in geology in 1943 from Johns Hopkins University in Baltimore, Maryland.

During its four years of operation Sea Grant at Texas A&M has invested more than \$5.8 million in programs of research, education and advisory services aimed toward wise use and development of coastal and marine resources. The Sea Grant Program is conducted through seven colleges of the university, other educational institutions in the state and industry. Currently, Sea Grant receives \$1.5 million from the National Oceanic and Atmospheric Administration within the U. S. Department of Commerce and \$750,000 from non-federal sources. ■

Cover: *Theodore Metcalf, visiting professor of virology and epidemiology at Baylor College of Medicine, secures collecting filter onto the virus isolator. See story page six.*

Coastal Zone Management Most Urgent Issue

The nation and its people must be prepared to make the adjustments needed to deal with the growing problems of the oceans and atmosphere, advises the National Advisory Committee on Oceans and Atmosphere (NACOA) in its first annual report to President Richard M. Nixon and the Congress.

The 25-member advisory panel was created by Congress last year to study four major topics—law of the seas, fisheries, weather modification and coastal management. After a year of investigation under the chairmanship of **William A. Nierenberg**, director of Scripps Institution of Oceanography, the Committee found a common pattern of problems arising “from the behavior of a system that takes action only in a crisis. Man’s increased power to exploit the environment and destroy it, has brought an end to the era in which societal decisions could be based on a frontier philosophy. We no longer deal with unlimited resources of energy and materials.”

Specific suggestions for wise management of the limited resources of air and sea are spelled out in the 44-page report. The findings and recommendations of the Committee concern some of the key economic and environmental issues facing the nation today.

LAW OF THE SEAS

The issue facing the United States regarding “the laws of the seas” is, as the President has stated, **whether the oceans will be used rationally and equitably for the benefit of mankind or whether they will become an arena of unrestrained exploitation and conflicting jurisdictional claims.**

NACOA suggests positions that the United States should take on three important issues under the broad grouping of law of the sea—freedom of passage, fisheries and freedom of research. The Committee, according to Chairman Nierenberg, based the statements on satisfaction of U. S. national interest, on good conservation principles and the best arrangement leading to an amicable international situation and the common good. The statements are as follows:

- Regarding the **issue of free passage**, “the U. S. policy for free passage in waters outside the 12-mile territorial limit and in classical straits must remain unmodified.”
- Regarding **fisheries**, “management of ocean fisheries as a resource should be separated from territorial concepts and managed by the adjacent coastal nation with priority given to conservation of the resource.”

- Regarding **freedom of research**, “the U. S. policy on freedom of research on the open sea should remain firm.”

“Our principal recommendation is to engage other countries, particularly developing nations, in as many joint projects with the United States as possible and in as great a variety as reasonable,” reports Chairman Nierenberg.

To increase international understanding of the problems and techniques of ocean research, the Advisory Committee recommends eight courses of action: the Department of State’s Office of the Coordinator of Ocean Affairs and Special Assistant for Fisheries and Wildlife be strengthened and other government agencies be used more effectively in international ocean programs. NACOA specifically recommends that marine matters be most logically assigned to the Sea Grant Program within the Commerce’s National Oceanic and Atmospheric Administration (NOAA).

“A new candidate for international programs, the U. S. Sea Grant Program, by analogy with our Land Grant Program, offers great promise. Although we cannot properly compare the fledgling Sea Grant Program with Land Grant activity developed over the



Sea oats and morning glories blanket the shores of Padre Island, stabilizing the sand dunes against wind and rain. (Texas Highway Dept.)

past century, the potential is there. One possibility has already been noted. The Sea Grant Program could be made even more valuable by introducing an exchange program for foreign students, particularly from developing countries."

The Committee further recommends the role of the Intergovernmental Oceanographic Commission be re-examined; international participation, at high levels in the International Decade for Ocean Exploration be increased; the National Marine Fisheries Service's role in exchanges with foreign governments be enhanced and strengthened; the U. S. Navy extend its relationships with foreign navies in the exchange of research programs and techniques; and that international cooperation in the NOAA buoy development program and air-sea interaction experiments be increased.

FISHERIES

NACOA's approach to fisheries management is basic and research-oriented. Reviewing the problems of rehabilitating the U. S. fisheries, the report notes that, on the average, 55-60 percent of the fish products consumed in the nation is imported. The Committee proposes that the United States establish a target of increasing domestic production sufficiently to reduce this dependency on imports.

"The six steps by which a plan for an increased share of U. S. market may be developed are to deter-

Oil Spill Effects Revealed

Effects of the Santa Barbara Oil Spill of January 24, 1969, are the subject of a recently released 377-page publication.

The proceedings are from the Santa Barbara Oil Symposium (December 1971) sponsored by the National Science Foundation and the Division of Graduate Education in Science and the Marine Science Institute, University of California.

Purpose of the symposium was to discuss effects of the spill in a broad context and to review the impact of the spill on government, industry and the citizen. Reproduction of the formal presentations and edited versions of the discussions has been made possible by the U. S. Geological Survey.

Included in the text are excerpts on the importance of offshore petroleum resources, detection and measurement of oil films, ecoethics and oily demons.

Also included are discussions ranging from the effect on marine intertidal invertebrates and fishes, to legislation on environmental quality. A third section includes discussions on control of oil spills. ■

mine (1) the present productivity of the fishing areas of interest to the U. S., (2) their potential under ideal conservation conditions, (3) the necessary critical conservation methods, (4) the agencies which should bear the responsibility, (5) the increased supply of fish which would be available to the domestic market, and (6) a market penetration schedule." NACOA recommends that NOAA be assigned as lead agency for developing this plan.

WEATHER MODIFICATION

Concerning weather modification, the Committee concludes that "the potential benefits from weather control and conscious climate modification are very large, and so are the potential risks." NACOA's recommendations come in the form of action in areas of legislation and regulation; research and technology; hurricane control; assessment of public policy with careful technological assessments of the consequences of weather modification. Other recommended courses of action cover international agreement; and finally, NACOA takes the position of the National Academy of Sciences recommending adoption of "a resolution dedicating all weather-modification efforts to peaceful purposes and establishing, preferably within the framework of an international nongovernment scientific organization, an advisory mechanism for consideration of weather-modification problems of potential international concern before they reach critical levels."

COASTAL ZONE MANAGEMENT

Management of the coastal zone is the most urgent issue recognized by the Committee. NACOA recommends prompt enactment of coastal zone legislation at all levels of government "devoted exclusively to management unencumbered by the larger issue involved in land-use legislation applicable to the entire nation. We feel it is vital that this legislation also provide for the establishment of research and technical advisory sources closely coupled to each level in the management hierarchy including local, state, and federal echelons."

NACOA regrets that it was unable to address the important topic of **marine transportation**. The Committee recommends that the Secretary of Commerce undertake a study of the nation's marine transportation system as it relates to economic growth, social costs and benefits, and environmental goals.

Texas A&M University's Vice-President for Academic Affairs, **John C. Calhoun, Jr.**, is a member of the National Advisory Committee on Oceans and Atmosphere. Calhoun has previously served as Sea Grant Program director at A&M since 1968.

Copies of the annual report are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, at 40 cents per copy. ■

Floating Extravaganza!

Texas / International Trade Fair

Plans for a **gigantic floating trade fair** designed to aid Texas industries reach international trade markets throughout North Africa, the Middle East and Europe are underway according to the Texas Industrial Commission.

Scheduled to run for 60 days sometime in 1974, the fair is unique in that it will be held aboard the ocean liner, the **QUEEN ELIZABETH 2 (QE-2)**. Final approval for the floating venture came during the Commission's September regular quarterly meeting at College Station after a presentation by Richard B. Patton, president of Cunard Lines, owners of the huge ship.

Chester Wine of Corpus Christi, chairman of the nine-member state commission, says the floating trade exposition will enable major Texas industries to display their products to prospective buyers in world ports.

"The Texas Industrial Commission has undertaken many trade missions around the world, but this will be the first time that the participants in such missions will be able to take products as large as oil derricks with them to call on prospects," Wine adds.

The QE-2, known as the "greatest ship in the world," is an attraction herself. Plans are to convert the six spacious decks into more than 500 strategically located exhibition booths. Majestic public rooms aboard the ship will become industrial pavilions, and staterooms and suites will also house many of the exhibits.

Conferences, audio-visual presentations and live shows highlighting the contributions of Texas know-how to the industrial and technological development of the United States and the world will be held in the 500-seat theatre aboard the huge ocean liner.

More than 1,000 visitors per hour can be accommodated on the QE-2, moving with ease from corridor to corridor and from deck to deck, and be effectively exposed to every exhibit on board.

Assisting in planning for the 1974 floating world's trade fair are International Enterprises, Inc. of Washington, D. C. and Travel Planners, Inc. of San Antonio, Tex.

"The trip can be the greatest economic shot-in-the-arm ever offered to Texas-based industry," says Wine.

THE UNIVERSITY AND THE SEA is published bi-monthly by the Texas A&M University Sea Grant College Program, College Station, Texas 77843. Leatha Miloy, Head, Department of Marine Resources Information; Ronda Reagan, Editor. Vol. 5, No. 5. September-October 1972. Second-class postage is paid at College Station, Texas 77843.

"The Texas Industrial Commission has been very fortunate in the field of international trade in the past, but this stands to be the most exciting venture we have been able to participate in for Texas industry."

The Industrial Commission recently returned from the first trade mission behind the Iron Curtain by any state, followed with a visit to Brazil, and is presently preparing to participate in a November trade fair in San Salvador for Texas businessmen. Their Russian trade mission generated an estimated \$45 million in sales for Texas products.

The Commission is the only state agency operating a foreign trade office in Latin America with the opening of its International Trade Office in Mexico City last year. It has previously been honored by the U. S. Department of Commerce with the coveted "E" Award for its work in export development. ■

SOS Books

Over 3,000 environmental service and technology books are listed in a 224-page catalog entitled **SOS Books**.

Published by Snyder Oceanography Services, the loose-leaf catalog represents a single source for books from over 400 publishers and organizations covering 15 countries. Listed books are offered at publishing prices.

Designed to benefit executives, scientists, engineers and science teachers, **SOS Books** is organized into six major subject categories: environmental sciences, engineering and technology, commerce, natural resources, glossaries and juvenile books. Each section is further sub-divided to make location of books more efficient.

Alphabetical author index, an alphabetical cross-reference index with 443 subject entries and pertinent publications of major engineering societies are included.

To order copies, write Snyder Oceanography Services, P. O. Box 98, Jupiter, Fla. 33458.

Subscribers will receive periodic new title lists which insert easily into the loose-leaf catalog. ■

PUBLIC HEALTH HAZARDS IN TEXAS' COASTAL WATERS:



The "Mini" Pollutants

Water pollution encompasses more than accidental oil spillage, industrial effluent discharges or solid material tossed overboard on a fishing trip or recreational cruise. **Theodore Metcalf**, visiting professor of virology and epidemiology at Baylor College of Medicine in Houston, is undertaking extensive research on a group of "mini" water pollutants capable, perhaps, of posing a "maxi" threat to public health — viruses.

Under the leadership of **Joseph Melnick**, virologist and epidemiologist and chairman at Baylor's department, Metcalf's quest is to assess potential public health hazards which could result from consumption of shellfish harvested from Texas' coastal waters polluted by domestic waste discharges.

SHELLFISH — A VALUABLE RESOURCE

*The shellfish industry in Texas represents a valuable natural resource. In 1971, over 4.7 million pounds of oysters were harvested in the boundaries of Texas' coastal waters at a dollar value of over \$2.3 million. Total pounds and value of the state's shellfish catch for the same year were more than 97 million pounds at a dollar value over \$67 million.

"Viruses in a living state get into the human intestinal tract, multiply, are excreted and then pass

*Texas Landings, "Fisheries of Texas," Orman H. Farley, National Marine Fisheries Service, U.S. Department of Commerce, Galveston, Tx., and Texas Parks and Wildlife Service, Austin, Tx.

through waste treatment plants along the Houston Ship Channel. At this point the viruses may accumulate in shellfish," says Metcalf. The cycle then repeats itself, turning back to the human who consumes the virus-carrying shellfish.

"Through identification and direct enumeration of viruses found in shellfish, we will be able to better assess public health dangers posed," explains Metcalf.

To date, the only infections clearly attributed to a shellfish source have been outbreaks of hepatitis following consumption of raw or improperly cooked shellfish. **Metcalf and his fellow researchers are convinced the opportunity for infection by other enteric viruses occurring in shellfish is possible and intend to search them out.**

A cooperative research endeavor between Baylor's College of Medicine and Texas A&M University, the project is supported by an institutional Sea Grant to Texas A&M from the National Oceanic and Atmospheric Administration, U. S. Department of Commerce.

SANITARY WATER FROM A PUBLIC HEALTH POINT OF VIEW

When a virologist like Metcalf thinks of the sanitary quality of water, he thinks in terms of bacterial and viral pathogens that may exist in the water.

"The current sanitary water control measurement used by state health officials," says Metcalf, "is based on the coliform indices which measure *Escherichia coli*, an organism found in the human or animal gastro-intestinal tract. Measurement of *E. coli* content is direct, microbiologically speaking; but its use to indicate the presence of viruses must be considered indirect." Evidence exists which indicates that the method may not

be an accurate measure of enteric virus content of shellfish or shellfish-waters previously judged microbiologically acceptable on the basis of *E. coli* content.

ACCUMULATING THE FACTS

Gathering scientific background data on the relationship of pollutant viruses to shellfish and the water in which they live has been a prerequisite for Metcalf's survey.

He has been gathering information on the kinds of viruses found in the Houston Ship Channel and Galveston Bay for five months. Data on types, numbers, distribution and persistence of viruses released from waste treatment plants are an integral part of his work.

Assisting the Baylor virologists in the recovery or collection stage of the project is Texas A&M's Department of Civil Engineering. From aboard their 56-ft. water quality research vessel, the R/V EXCELLENCE, hundreds of gallons of water are pumped through the virus isolator, collecting the "mini" pollutants as they pass through.

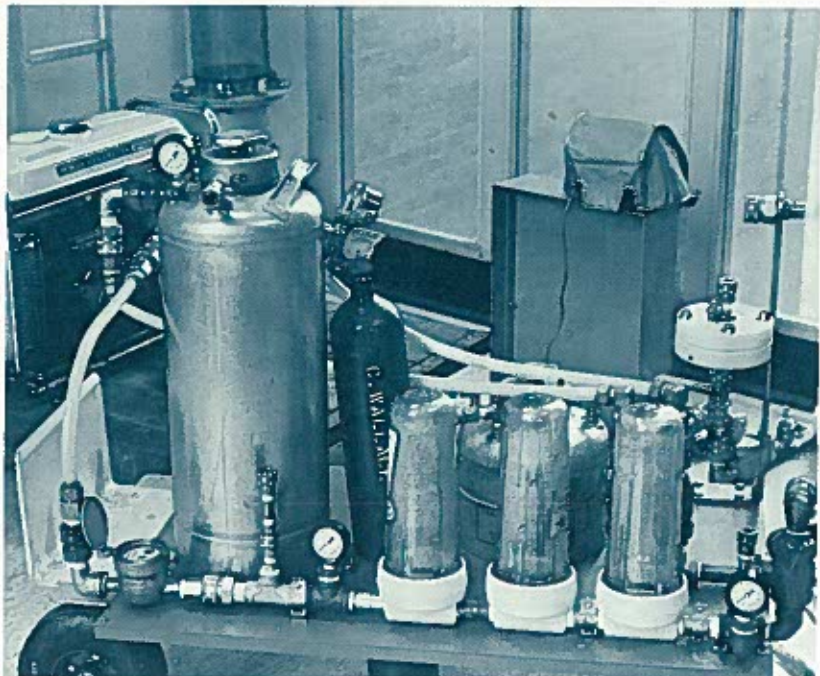
Collecting stations have been strategically chosen near major sources of domestic waste discharge into the Houston Ship Channel. To determine virus survival and dissemination downstream, sampling has also been conducted at Morgan's Point at Galveston Bay. "Virus content of surface water at Morgan's Point is usually considered to be at its height in the summer and early fall, points out Metcalf.

ENTERIC "MINI" POLLUTANTS

The viruses Metcalf and his team are studying concern public health. Classified within the enteric

Left: Tin cans, paper plates, rotting lumber, ropes and fishing nets heaped along a Texas waterway are water pollutants more easily recognizable than the viruses Metcalf is searching for.

Right: The portable virus isolator, specifically designed for Metcalf's work by Craig Wallis, is a technological breakthrough in virologic examination of water. Used aboard the R/V EXCELLENCE, the apparatus collects the "mini" pollutants from the Houston Ship Channel and Galveston Bay.



virus group, each member can be carried by shellfish and may be transmitted to humans.

Metcalf has isolated more than 500 types of viruses since June 1. "One virus found in the surface waters of the Houston Ship Channel is the polio virus," reports the virologist. He believes the presence of poliomyelitis is a result of domestic waste discharges into the water after a city-wide vaccination program.

The Enteric Cytopathic Human Orphan (ECHO) strain is another group Metcalf has taken from the channel. He is also searching for adenoviruses, a group containing at least 28 different types of enteric viruses found in the human intestinal tract.

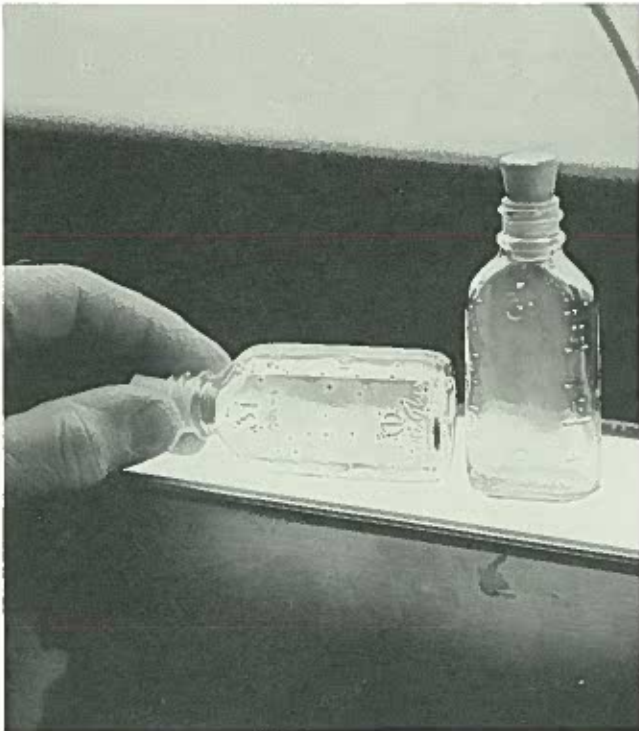
Most dangerous of all the enteric viruses is hepatitis. The number of types of hepatitis is not known, according to Metcalf, as the virus has yet to be defined in laboratory cell culture systems. It is known that infectious hepatitis can be passed by contaminated food or water.

The Coxsackieviruses, named after a town in New York where first isolated, represent another group Metcalf is studying. Within the Coxsackieviruses, two subgroups exist with 23 members in one and approximately six in the other.

SPECIALIZED EQUIPMENT—A BREAKTHROUGH

"We are working with new equipment and methods of sampling specifically designed and developed by my colleagues, **Craig Wallis** and **Melnick**.

"The virus concentrator, as it is called, makes it possible to recover small numbers of viruses from



Growth of the polio virus, taken from the Houston Ship Channel, is indicated by the black ink spots on the culture bottle on the left. A virus taken from waters near a waste treatment plant grows in the second bottle. White spots form as the virus grows.

large volumes of water, for the first time, with a confidence not previously possible," says Metcalf. When operating from aboard the **R/V EXCELLENCE**, the ship's submersible pumping system is utilized, pumping water samples at a rate of up to six gallons per minute through the virus isolator. The water first passes through three 10-inch clarifying filters of textile manufacture to remove silts and debris; the viruses pass on through. Aluminum or magnesium salts are added at this point to react later in actually "catching" the viruses. After the pH is adjusted, the water passes through the fourth filter, where the viruses are adsorbed, or literally grabbed, as a result of an electrostatic charge enhanced from the addition of salt.

Hundreds or thousands of gallons of water can be sampled in this manner from one location.

Next the viruses are eluted (washed off), from the adsorbent filter and collected in a two liter volume. Reconcentration of the virus with ultimate recovery in a final eluate volume of 5-10 milliliters is accomplished by sequential virus adsorption to and elution from a membrane filter. Before the virus is inoculated on an appropriate cell culture monolayer, the pH and tonicity are adjusted.

ISOLATING THE "MINI" POLLUTANTS

Because viruses will grow only in living cells, after collection they must be inoculated onto a single layer of living cells for growth to occur. As a virus grows, killing the living cell culture, the virologist is able to identify its type by serum neutralization tests. Primate kidney tissues are used as a culture medium. Metcalf says, "These (monkey) cells are among the best mediums to allow growth of an enteric virus."

FORESIGHT—SIGNIFICANT RESULTS

"Our goal is to develop the most sensitive method of collecting and isolating viruses from water—the very best way—which could be used everywhere to detect viruses in shellfish," he reports.

If the equipment—the virus concentrator—proves successful in this experimental stage, Metcalf hopes it will lead to development of a standard method for virologic examinations which could be used worldwide.

Metcalf is assured that his research will be ultimately beneficial to the shellfish industry as a protective device.

"Through use of the virus concentrator to detect viruses, the sanitary quality of shellfish-growing waters can be determined, virologically speaking. This will enable the industry to know when to treat their product to render it virus-free," says Metcalf.

By the process of depuration, placing shellfish in enormous shallow trays and allowing clean estuarine water to flow over them for several days, shellfish cleanse themselves of harmful viruses. This process can be monitored by the virus concentrator.

Metcalf predicts that as a result, the public will more readily accept shellfish, confident of a virus-free food product. ■

Fisheries Specialists Confer in Miami

The Playboy Plaza Hotel at Miami Beach, Fla., will be the site for the **Twenty-fifth Annual Meeting of the Gulf and Caribbean Fisheries Institute**, November 26-30.

A technical session on territorial seas will open the conference Monday, with talks on the implications to both the South and North Atlantic fisheries of preparatory sessions on law of the sea, Mexico's concept of the patrimonial sea and management of shrimp stocks under the U.S.-Brazil Agreement.

Remaining sessions will cover technology and management, Sea Grant, and fisheries and estuaries.

A&M SEA GRANT EXTENDS

Mrs. Leatha Miloy, head of Texas A&M University's Department of Marine Resources Information, headquarters for the university's Sea Grant College Program, will serve as a member of the discussion panel for the session on Sea Grant.

Seafood technology specialist, **Ranzell Nickelson**, also of Texas A&M University's Sea Grant Program, will speak Wednesday on "Quality Control — A Solution to Fish Inspection." Nickelson has initiated and authored a series of advisory bulletins directed to Gulf Coast commercial fishermen and fish-plant operations in all stages.

Highlights of GCFI meeting include the annual banquet and a tour of the Turkey Point aquaculture facility at the University of Miami. A pre and post convention cruise aboard the **NASSAU/FREEPORT**, a luxurious 485-ft. party vessel, is also offered.

GAME FISH RESEARCH CONFERENCE

Held in conjunction with GCFI's meeting will be the **Fifteenth International Game Fish Research Conference**, December 1-2.

Non-technical topics for the Game Fish Conference are geared toward anglers, fishing guides and boatmen as well as scientists. Trends in sportfishing and new areas to fish will be discussed. The biological nature of sailfish, striped bass and tarpon are other items on the agenda.

A panel session to evaluate and recommend how anglers can contribute to research will conclude the Game Fish meet.

Registration information for the Gulf & Caribbean Fisheries Institute may be obtained from the Executive Secretary, GFCI, 10 Rickenbacker Causeway, Miami, Fla. 33149.

For further details on the Game Fish Research Conference, write to D. P. de Sylva, 10 Rickenbacker Causeway, Miami, Fla. 33149 or call (305) 361-1176. ■

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 included where applicable.

PROCEEDINGS OF THE MARINA MANAGEMENT AND OPERATION SEMINAR

Kathryn M. Delaune, TAMU-SG-72-105. May 1972, 78 pp. Cost: \$3.

Proceedings of the March 28, 1972, meeting in Arlington, Texas include presentations on the Sea Grant program, marina insurance, facilities, sanitation, safety and anti-pollution laws.

A HYDROPHONIC STUDY OF THE FEEDING ACTIVITIES OF WESTERN ATLANTIC PARROTFISHES

John D. Sartori and Thomas J. Bright, TAMU-SG-72-203. August 1972, 86 pp. Cost: \$3.

A passive acoustic technique distinguishes feeding differences between small and large parrotfishes and reveals a relationship between amount of substrate removed during feeding and number of audible feeding sounds.

ELECTRICAL RESISTIVITY LOGGING IN UNCONSOLIDATED SEDIMENTS

William E. Sweet, Jr., TAMU-SG-72-205. August 1972, 142 pp. Cost: \$3.

The industrial development and current status of electrical resistivity instruments and logging techniques, developed for unconsolidated aquatic sediment use, are discussed. Special mention is made of sedimentary units, core logs and relationships with geological and geotechnical properties of sediments.

THE CAGE CULTURE OF SOME MARINE FISHES IN THE INTAKE AND DISCHARGE CANALS OF A STEAM-ELECTRIC GENERATING SYSTEM, GALVESTON BAY, TEXAS

Rocco Anthony Marcello, Jr. and R. Kirk Strawn, TAMU-SG-72-206. September 1972, 267 pp. Cost: \$3.

Discussed are the results of a study to determine survival, food conversion, length-weight relationships, condition and growth in caged species of croaker, pinfish, pigfish, Gulf kingfish, spot and black drum, pompano, silver perch and white mullet.

KEY TO THE ESTUARINE AND MARINE FISHES OF TEXAS

Jack C. Parker, et. al., TAMU-SG-72-402. May 1972, 177 pp. Cost: \$7.

A revision of an illustrated laboratory manual for marine ichthyology, this second edition is a compilation on estuarine, marine and some freshwater adult fishes found along the Texas coast from Sabine Pass to the Rio Grand River mouth.



While touring the Texas A&M campus, Howard Pollock (C), deputy administrator of NOAA, received explanation of the coastal and ocean engineering division's wave tank monitoring device. Robert Schiller (L) of COE and John C. Calhoun, Jr., vice president for academic affairs, look on. Above: Recipient of the 1972 Sea Grant Award, Athelstan Spilhaus, is considered the "father of the Sea Grant idea."

sea grantees record successful year

"Sea Grant is one of the most stimulating, creative, and productive efforts the Federal science structure encompasses," **Howard W. Pollock** told over 200 Sea Grantees gathered in Houston for the Fifth Annual Meeting of the Association of Sea Grant Institutions October 10-12. Pollock is the deputy administrator of the National Oceanic and Atmospheric Administration in the U. S. Department of Commerce.

"The program is beginning to capture the attention and support it so richly deserves," he continued, "so it is especially fitting that you have set the theme of this meeting as 'A Year of Achievement.' From time to time, we must stop to examine our accomplishments and the directions of our efforts."

Pollock cited four major areas for Sea Grant to emphasize this year — assessment of program efforts on a continuing basis, use of the systems approach to problems, conscious communication and coordination on all levels, and involvement with user communities.

The NOAA official also outlined four areas toward which his organization is now directing particular attention — disaster warning systems, internal NOAA coordination, government/industry partnerships, and resolution of the conservation versus development conflict, particularly in the coastal areas.

"Athelstan Spilhaus recently summed up neatly what this latter area of NOAA emphasis is all about," Pollock explained. "He spoke of the need for moving toward an 'eco-librium' position — balancing the desired ecology with the necessary economy."

The meeting, hosted by Texas A&M University, was highlighted by naming of Spilhaus as recipient of the 1972 National Sea Grant Award. "The father of Sea Grant" was presented an engraved silver tray and \$500 by 1971-72 Association President **Herbert Frolander**, director of Oregon State University's Sea Grant College Program. In 1963, Spilhaus urged the nation to create a program much like land grant established under the 1862 Morrill Act so that "the United States take steps to make a lasting commitment to the sea."

Spilhaus' idea came to fruition in 1966 with passage of the National Sea Grant College and Program Act. Currently, six Sea Grant Colleges have been recognized and nine other institutions have major Sea Grant programs. The national Sea Grant program now has almost \$22.4 million invested in programs of research, education and training, and advisory services in 27 states.

The Association of Sea Grant Institutions was formed in 1970 as an organization of the colleges, universities, and other institutions concerned with Sea Grant's broad objectives. Membership is now 51, with

15 institutional members, 32 regular members and four associate members.

Keynote speaker at the kick-off luncheon was **Ralph K. Huitt**, executive director of the National Association of State Universities and Land Grant Colleges. "Land Grant and Sea Grant are much alike in many ways—certainly in the emphasis of improving the material aspects of life and the emphasis on the practical," Huitt noted.

Deepwater terminals and Sea Grant/industry relationships were topics for concurrent sessions during the three-day conference.

Proceedings of the conference will be available in January. Non-attendees may order copies for \$3.00 from Center for Marine Resources, Texas A&M University, College Station, Texas 77843. ■

Human Response To A Hurricane

Action to provide warning, protection, rescue and relief for community members who cannot benefit from present loss-prevention mechanisms lies far in the future, reports Texas A&M University's environmental quality research team, Ruth C. Schaffer and Earl Cook.

Schaffer, research sociologist for the Environmental Quality Program and Cook, program director, developed and administered a study of human response to a natural disaster — Hurricane Celia, which struck the Gulf Coast August 3, 1970.

Attitudes and concerns of Corpus Christi residents were probed by means of questionnaires mailed four weeks after the hurricane struck.

Questionnaires were mailed to 630 persons of whom 235 or 37.3 percent responded. Respondents showed characteristics of being well-educated, comparatively young and had had considerable hazard experience.

A small number of respondents had served in a volunteer capacity in evacuation and storm relief after Celia. As a group, they had weathered the storm at home or at their place of business. Most of the preparations they had made for storm protection were classified as minor and were relegated to the securing of household, house and boat property.

Respondents suggested various protective programs to limit future storm damage and loss such as stricter building codes and better warning systems.

The study also revealed that property loss by respondents was minimized due to insurance protection. In addition, respondents felt that the chances of another hurricane striking within the next few years was unlikely.

Schaffer's and Cook's findings are available in published form through the Environmental Quality Program under the title **Human Response to Hurricane Celia**, EQN-08. ■

sea notes

► **Martha R. Scott**, Texas A&M chemical oceanographer, recently received a 24-month National Science Foundation grant for \$55,400 to conduct research on the absorption chemistry of thorium and protactinium in the marine environment. Scott will study how trace elements are incorporated into manganese deposits growing on the ocean floor.

Minoru Tsutsui, Department of Chemistry, and William M. Sackett of the oceanography department are co-investigators.

► Coastal marina owners, managers and operators met in Corpus Christi, Texas, during October to discuss their business—"Marina Management and Operation."

H. R. (Red) Stanford, marine sales assistant for Phillips Petroleum Company, addressed the crowd on "So You Want to Run a Marina." Having 16 years of experience in marina work, Stanford believes, "Anybody can run a marina, but running a marina successfully depends on performance of products, services, facilities and people."

Co-hosted by Texas A&M's Industrial Economics Research Division and the Sea Grant Program, the one-day seminar was designed to serve public and private organizations, providing information and assistance in terms of economic growth.

Other forums included discussion on the Federal Boat Safety Act, the Texas Water Safety Act, the Occupational Safety and Health Act and the Texas Water Quality Act. Insurance and financing were also on the agenda.

► "**FLARE**" — an acronym for Florida Aquanaut Research Expedition — is the title and subject of a new 14-minute, color, 16mm film just released by the Department of Commerce, National Oceanic and Atmospheric Administration.

Available for free loan, the film is almost entirely underwater scenes of the various teams of scientists who used the first "mobile" underwater habitat off the coast of Florida to study the environment of a coral reef including health aspects, geology, marine life and plants. A man-made reef consisting of 600 rubber tires were also investigated.

Direct requests to the Chief, Motion Picture Service, National Oceanic and Atmospheric Administration, 12231 Wilkins Avenue, Rockville, Md. 20852.

► Gulf coast area people are invited to attend the **Fifth Annual Dredging Seminar**, Friday, Nov. 17, in the Roofroom of Houston's downtown Rice Hotel. Hosted by Texas A&M's Center for Dredging Studies, Department of Civil Engineering, the seminar which will begin at 9 a.m. includes eight half-hour presentations on such topics as "The Offshore Dredge—A Solution to Beach Restoration."

Registration fee is \$9 to cover luncheon expenses, coffee breaks and facility rental.

► **Mrs. Leatha F. Miloy**, head of Texas A&M's Department of Marine Resources Information, recently assumed additional duties as assistant for publications to the Vice-President for Academic Affairs, **John C. Calhoun, Jr.**

"Improving the quality of all publications which reflect Texas A&M University's academic programs is Mrs. Miloy's primary responsibility in this role," says Calhoun. Under this newly created position, she will assist with catalogs, brochures, newsletters, public events, annual reports and similar activities through the Vice-President's office.

Mrs. Miloy, who has organized and directed all publications and information services of the A&M Sea Grant Program since 1969, will continue her duties in this capacity.

► The Florida Department of Commerce announces the creation of a Section of Technology and Coastal Resources Development, reinstating its previous program of marine science and technology. **James S. Cullison, II**, program administrator, says the purpose of this new organization is the development of marine science, marine oriented and coastal resources industries. Other responsibilities are increase of commercial utilization of Florida's ports and waterways, transfer of

technology for academic and Department of Defense sources to commercial utilization and development of mineral resources.

► "**Applications of Commercial Oxygen to Water and Wastewater Systems**" is the theme of the sixth symposium on water resources November 13-15, co-sponsored by the Environmental Health Engineering, Civil Engineering Department, College of Engineering and the Center for Research in Water Resources at the University of Texas at Austin.

Purpose of the gathering is to provide a state-of-the-art review and forum for dissemination of current technology on commercial oxygen uses in water quality improvement. Emphasis will be on practical and economic aspects of design and operation.

All technical sessions will be held in the Joe C. Thompson Conference Center on the UT campus.

For additional information and preregistration, contact Engineering Institutes of the College of Engineering, Box K, Division of Extension, The University of Texas, Austin, Tx. 78712. ■

LEATHA MILOY, Head of the Department for Marine Resources Information; **RONDA REAGAN**, Editor for **THE UNIVERSITY AND THE SEA**.

Texas A&M University's Sea Grant College Program is made possible through an institutional award from the National Oceanic and Atmospheric Administration, U. S. Department of Commerce. More than 60 individual marine resource development projects are carried out under the program involving 18 departments and divisions of the University. Dr. Robert C. Stephensen is Sea Grant director.

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