Marine Resource Bulletin

A SEA GRANT ADVISORY SERVICE OF THE COLLEGE OF WILLIAM AND MARY

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In this issue- Virginia's Oyster Industry • Tides and Tidal Predictions • Facts About Hypothermia • PCA's Aquatic Loan Program • Virginia BAC Asks Boaters' Advice

PHOTOGRAPHS: KY YOUNG

Virginia's Oyster Industry

The world's richest oyster bottoms are in the Chesapeake Bay, but Virginia's oyster production just isn't what it used to be. The State's 1958-59 oyster harvest yielded over 4 million bushels of oysters. Total production for the 1978-79 season was only slightly over 1 million bushels.

"We don't have as many oysters as we'd like to have," says O. A. Spady, owner of Battery Park Fish and Oyster Company. "Why don't we have them? Is it pollution? Is it mother nature? There could be 100 reasons and we can only speculate."

What caused the 20-year decline of Virginia's vital oyster industry? In a fishery as complex as the oyster industry, it is difficult to pinpoint causes.

"We can't answer our own questions," Spady continues, "We must look to scientists and researchers for answers."

Scientists at the Virginia Institute of Marine Science, School of Marine Science of the College of William and Mary, have studied Virginia's oyster industry since the 1940's. The 1078 page VIMS report entitled "The Oyster Industry of Virginia: Its Status, Problems and Promise,"* published by VIMS Sea Grant Marine Advisory Services, continues to be the industry's most comprehensive source of information. The report reveals a complex series of events combining disease, weather, pollution, and socio-economic aspects that has undermined the production of Virginia's most valuable fishery.

In the 1950's, Virginia's oyster industry thrived. The State's 240,000 acres of public bottoms produced about 550,000 bushels of oysters a year. Approximately 100,000 acres of private bottoms produced about 2,600,000 bushels a year. Oystermen had learned to deal with the two greatest menances to their oyster crops - the oyster drill, (a marine snail that preys on young oysters) and the oyster pathogen known as "Dermo." The scientific name for "Dermo." *Perkinsus marinum,* was named after VIMS scientist Dr. Frank O. Perkins, who has made major contributions to the study of the disease.

In the late fall of 1959, a mysterious disease known as "Multinucleate Sphere Unknown" or "MSX" *(Minchinia nelsoni)* entered the Chesapeake Bay. Scientists at VIMS had closely monitored early signs of MSX in the Delaware Bay and predicted its appearance in Virginia waters. But none expected its drastic effect on Virginia's oyster crops. MSX devasted oyster populations on high-salinity bottoms, causing mortalities as high as 100% on the largest, most productive grounds in the Bay.

Oyster production on private bottoms declined drastically. It was an

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* **The Oyster Industry of Virginia: Its Status, Problems and Promise.** *Dexter S. Haven, William J. Hargis, Jr. and Paul C. Kendall. Special Report No. 4, 1078 pages.*

The Oyster Industry of Virginia: Its Status, Problems and Promise.- Executive Summary. *Dexter S. Haven, William J. Hargis, Jr. and Paul C. Kendall. SRAMSOE No. 168, 149 pages.*

economic risk to lease bottoms, buy and plant oyster seed, hire labor for harvest, and then to have crops wiped out by MSX. Naturally productive public bottoms kept producing oysters but at a slightly lower rate due to the fact that these bottoms were in regions of moderate to low salinity where MSX was not as active. Also, increased oyster seed repletion by the Virginia Marine Resources Commission (VMRC) helped maintain public grounds.

Throughout the decade of the 60's, MSX continued to suppress private oyster production on many desirable, high-salinity bottoms. The cost of running an oyster business increased against a relatively stable wholesale oyster price. Rising costs of fuel, equipment and labor rendered relocation to many of the smaller low-salinity oyster grounds economically impractical.

Oddly enough, MSX did not cause high mortalities in Virginia's Eastern Shore oyster populations. Oyster production on the Eastern Shore, however, declined largely because of economic conditions in the 60's.

The 1970's brought a decade of above average rainfall that lowered salinities throughout the Bay. In 1972, millions of dollars worth of oysters were killed when tropical storm Agnes dropped unprecedented amounts of fresh water on the upper tributaries of the Bay. But the low salinities also eliminated oyster drills and reduced the impact of MSX on many areas where it formerly caused great damage.

Oyster production on many public grounds began to recover in the "wet" 70's. However, overall private production remained slow due to rising costs of fuel, supplies, labor, and the lack of experienced oyster shuckers. Contributing to the private sector's decline was the price of seed purchased from public seed beds, which had more than doubled since 1960. Private growers historically had produced more oysters at a lower cost per acre than public harvesters. But in the 1978-79 season, oyster production from public grounds totaled 614,000 bushels, while production from private grounds totaled

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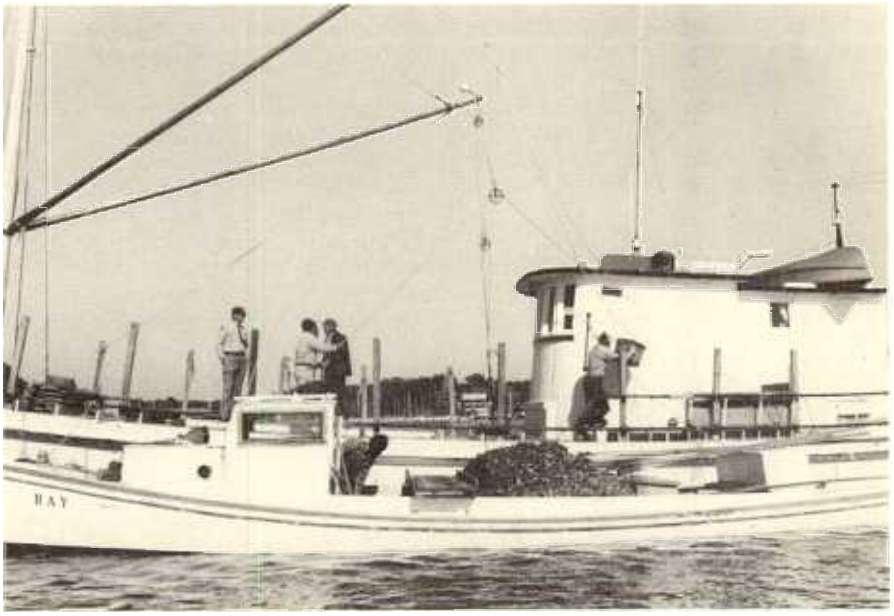
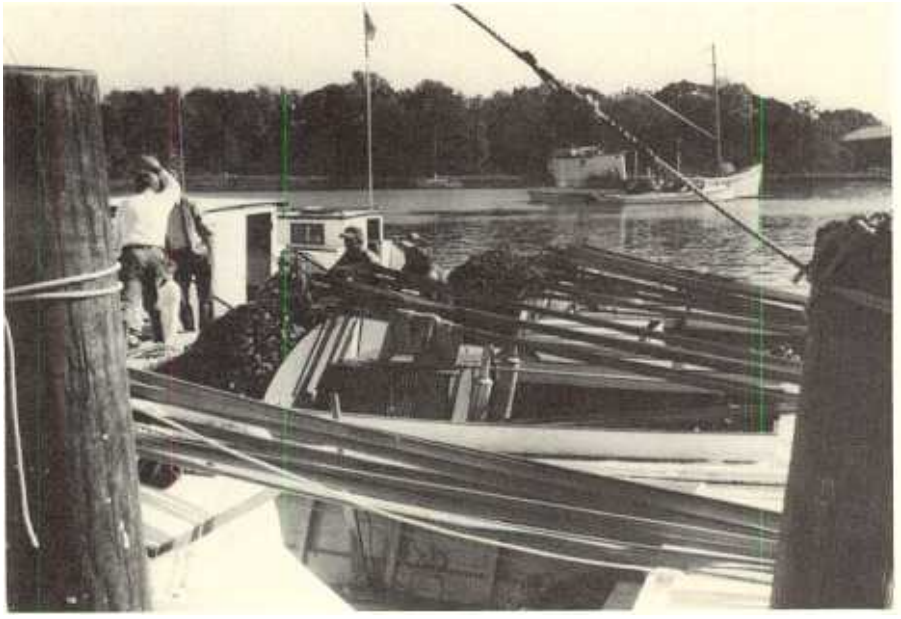


Opposite page: *Tonging for oysters on the James River public bottoms near Menchville, Virginia.* **This page clockwise from top:** *Some oyster tongers sell and offload day's catch onto large "buy boats" in the Menchville harbor. At the dock, other oystermen sell and unload day's catch by transferring bushel buckets of oysters onto moving conveyor belt and into waiting trucks. Oyster boats line up at the dock to wait their turn unloading - "Buy boat" is in background.*



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only 443,000 bushels.

What does the decade of the 80's have in store for Virginia's oyster industry?

Weston Conley, owner of RCV Seafood, Inc. in Morattico, Virginia, and president of the Oyster Packers Association, says that the yield of this season's oyster crop is down more than one pint per bushel, and quality of the oyster meat is not uniform. Consequently, tongers are not getting as much money for oysters and the high cost of shucking makes it hard for oyster processors to make reasonable profit. "The name of the game is yield," says Conley. "If the overall quality of the oysters is poor, the effects are felt by the tongers, the processors, and the customers."

The oyster industry is faced with continuing escalations in costs of seed, labor, marine equipment, vessels, supplies, and borrowed money. The drought of 1980 has increased salinities throughout the Bay and has brought back the threat of MSX and oyster drills. "We can't help it if the oysters aren't fat - that's an act of mother nature." says O. A. Spady. "But if we just don't have enough oysters - there is a lot we can do to help."

The VIMS Oyster Industry Report outlines many aspects of Virginia's oyster industry and recommends possible lines of action that could bring Virginia's oyster industry to higher levels of production. Some of the recommendations include:

* *Increase production of public oyster grounds by increasing Virginia's public seed renewal and repletion programs.* This could be accomplished either by increasing state expenditures and expanding the existing program or making the current seed renewal program more cost efficient by introducing supervised mechanical harvesting and replanting of seed.

* *Take steps to make growing oysters more profitable to private owners by making low-cost, high-quality seed from the State's public bottoms available.* The adoption of more modern harvesting techniques would greatly reduce the cost of seed.

* *Make unused public grounds available for lease by private interests in order that private owners might benefit from these more productive bottoms.*

* *Increase the demand for Virginia oysters through promotional and marketing campaigns.*

Other avenues for increasing production are discussed in the VIMS Oyster Industry Report, one of which is developing disease-resistant oyster seed in hatcheries. Dr. Jay D. Andrews of VIMS has studied MSX since its appearance in the Bay and has developed an MSX-resistant strain of oysters. Hatchery-reared, disease-resistant seed remains an attractive alternate for the future.

"If we wish to increase statewide production," emphasizes Dexter S. Haven, head of the VIMS Department of Applied Biology, and one of the authors of the Oyster Industry Report, "We cannot take just one step - we must do several things at the same time."

Per capita consumer demand for oysters has decreased. Increasing the demand for Virginia seafood through modern marketing techniques and educational projects will be a major objective in the 1980's of the Virginia Seafood Council (VSC) and the Virginia Marine Products Commission (VMPC).

Keith Porter, executive director of the VSC feels that farsightedness is essential in dealing with the problems facing Virginia's oyster Industry. "We need to address long range problems and concentrate on long-range solutions," says Porter. "And the key element of marketing any seafood is in the education area. For example, consumers need much more education in the handling, storage, and preparation of a seafood like oysters than, say, a red meat like hamburger."

Jim Wallace, director of the VMPC, feels that the oyster industry's problems go much deeper than lack of consumer awareness. "There are problems out there that must be solved before you can expand consumer demand," says Wallace.

There will be no simple solution to improving Virginia's oyster industry. The 20-year decline in oyster production from Virginia's waters has occurred and has persisted due to complex relationships of environmental problems, diseases, pollution, and lowered quality of seed stocks combined with rising production costs, stagnant dockside prices, and the failure to utilize cost effective planting and harvesting techniques. Many of the current practices and management of the industry are outmoded, and the oyster industry, like most fisheries, is resistant to change.

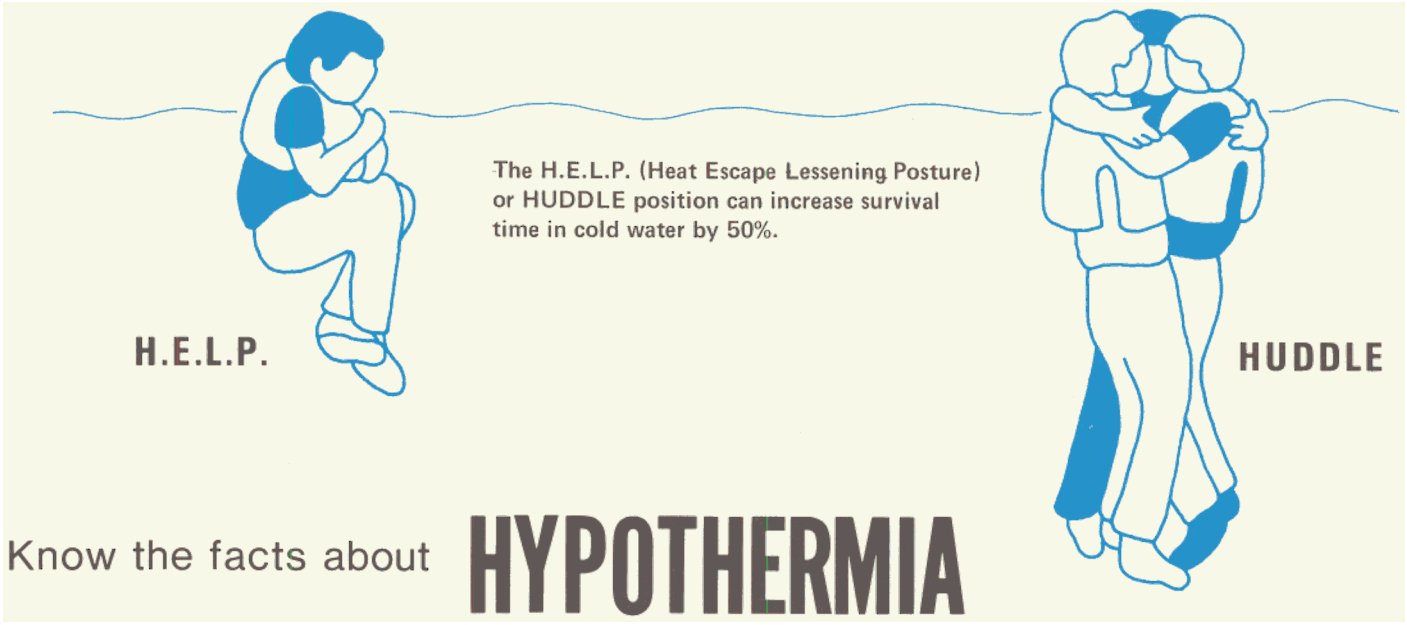
"The problems are mostly of our own making," says Cranston Morgan, owner of C. F. Morgan and Sons, Inc. and president of the Oyster Growers and Dealers Association, "Problems like overharvesting or improperly developed systems can be easily solved with the scratch of a pen." Morgan feels that one of the industry's main problems is in the social field - distrust among watermen and packers, distrust among scientists and politicians. "Our problem is more psychological than actual," he says.

In order for Virginia's oyster industry to get on the road to recovery, it will be necessary to have a combination of efficient management and continuing scientific and engineering guidance. All facets of the industry are not equally understood and further study is needed.

One point, however, is quite evident. It is not a question of *can* Virginia's oyster industry be saved, but *how.*

-Kym Young

Lone oyster tonger on the James River.



Know the facts about HYPOTHERMIA

Hardy sailors, fishermen, and waterfowl hunters eagerly anticipate the beauty and solitude of fall and winter boating. But big winds, rough seas and unpredictable weather could mean a capsize, and winter's cold water can be a silent killer.

In 50° F water, which Virginia generally experiences by November, a person can tread water for approximately two hours before deep chilling of the body, or hypothermia, results in heart failure. In fact, falling overboard in waters as warm as 70° F can quickly result in hypothermia. Drowning or heart failure may follow.

A drop in body core temperature of as little as 6° F can result in death. It takes 10-15 minutes in water under 70° F before the temperature of the heart and the brain begins to drop. The body's condition deteriorates quickly from shivering to loss of manual dexterity and muscle rigidity.

As cooler and cooler blood circulates to the brain, a state of mental confusion can develop, rendering a person powerless to help himself. Unconsciousness follows, generally at a body core temperature of 90° F. If the victim doesn't drown due to losing consciousness, when core temperature reaches 85° F, heart failure usually occurs.

As winter progresses and Virginia's waters become cooler, the danger of hypothermia becomes very real. VIMS Sea Grant Marine Advisory Services has conducted over a dozen Hypothermia Awareness Workshops designed to acquaint people with cold water survival techniques, cold water survival gear, and the treatment of hypothermia victims.

Boaters thrown overboard into cold water must conserve body heat until they are rescued. Always wear warm clothes, a wool cap and a personal floatation device. Even better, wear a float coat specially designed for hypothermia protection. If thrown overboard or capsized in cold water, don't try to swim. Keep the head out of the water, and adopt either the HELP or HUDDLE positions to conserve body heat.

Hypothermia victims should be taken to medical facilities immediately, even if apparently recovered. And even if victims appear drowned, don't give up hope. Cold water drowning victims have a good chance of revival if resuscitated vigorously.

VIMS Sea Grant Advisory Services' Jon Lucy will conduct a series of Hypothermia Awareness Workshops at the Williamsburg Hilton and National Conference Center as part of the Hilton's Chesapeake Weekends Program.

These informative workshops and in-the-water demonstrations will be part of day-long seminars that include an oyster roast lunch on January 17, February 28, and March 21. Contact the Hilton's Nancy Cole at 804/220-2500 for further details.

Lucy will also conduct a Hypothermia Awareness lecture and slide presentation during the East Coast Commercial Fisherman's Trade Exposition February 6-8 at the Baltimore Convention Center.

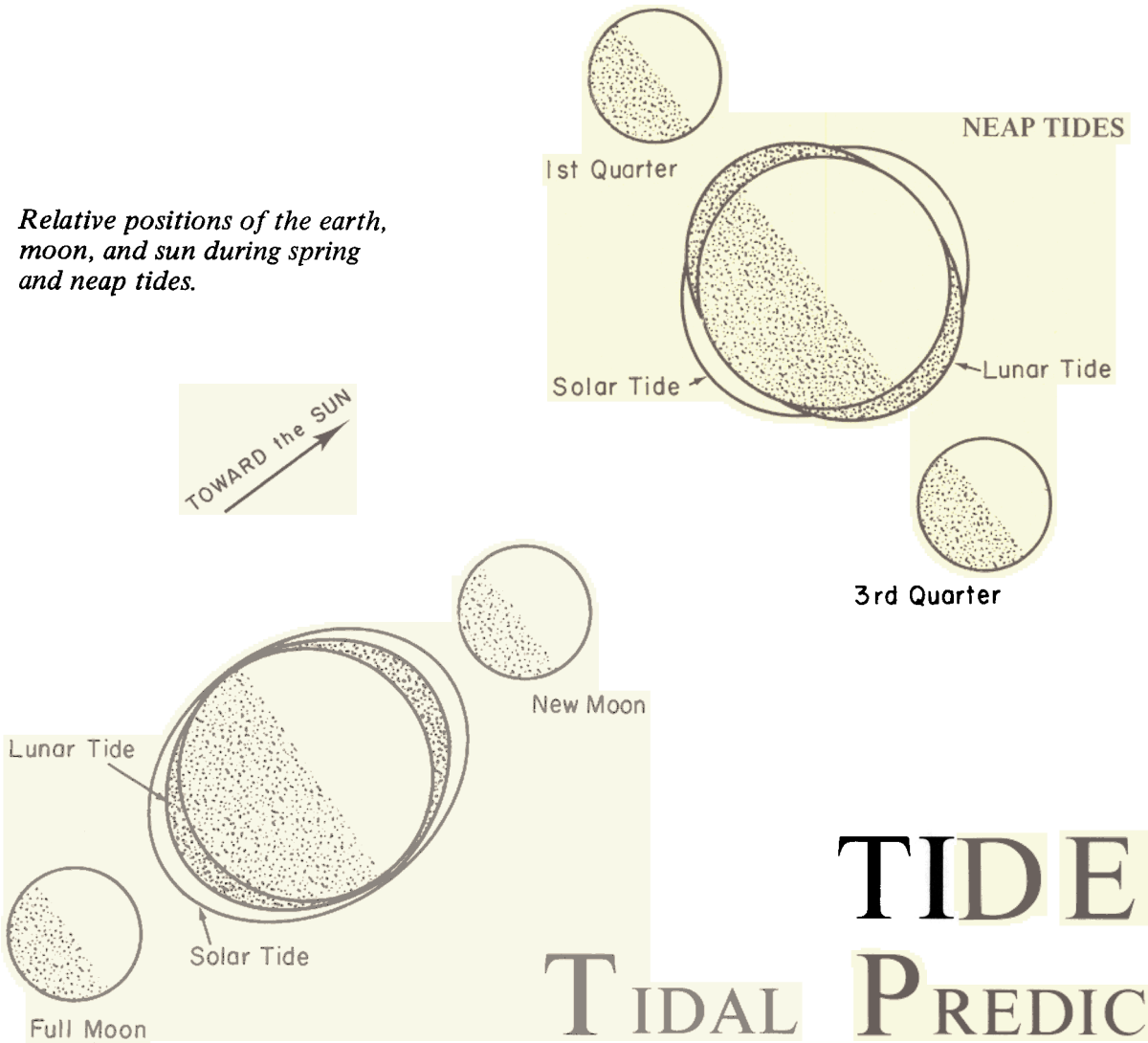
VIMS Sea Grant Advisory Services, the Virginia Boating Advisory Committee, the U.S. Coast Guard and the Coast Guard Auxiliary will conduct a Hypothermia Workshop at Eastern Shore Community College in Melfa, Virginia, on March 4th from 7:30 - 9:30.

VIMS Sea Grant Advisory Services' 24-page "The Chesapeake: A Boating Guide to Weather" contains valuable information on boating in the Bay, and addresses the prevention, symptoms, and treatment of hypothermia. Copies can be ordered for $1.00 from Sea Grant Publications, Virginia Institute of Marine Science, Gloucester Point, VA 23062.

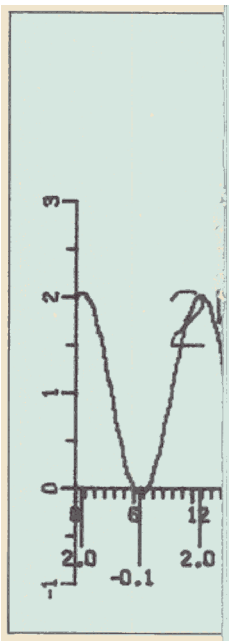
The Bay's cold winter waters can be beautiful, but deadly. Watermen and recreational boaters owe it to themselves to know the facts about hypothermia. For further information concerning workshops, call or write Sea Grant Advisory Services, 804/642-2111, Ext. 190.

PHOTOGRAPH: KYM YOUNG

Lucy coaches Hypothermia Awareness class to float in the life-saving H.E.L.P. position.



Relative positions of the earth, moon, and sun during spring and neap tides.



TIDES and TIDAL PREDICTIONS

SPRING TIDES

Tides, the familiar rise and fall of sea level, have been studied and recorded since man has inhabited coastal regions. Pliny the Elder (A.D. 23-79) correctly attributed tides to the effects of the sun and the moon, but it was not until the Seventeenth century that Sir Isaac Newton developed the foundation for understanding the mechanics of tides with his theory of universal gravitation.

In the late 1800's machines were developed in England and India to mechanically produce tidal predictions. A complicated series of rotating gears and cranks could be adjusted to represent the various tide-generating forces of the moon and sun and the activated machine guided a pen that drew tide graphs. This rather large machine remained the basic mechanical method of tidal prediction until the advent of electronic computers.

Now, two scientists at the Virginia Institute of Marine Science, School of Marine Science of the College of William and Mary, are using a microcomputer the size of a typewriter to produce tide predictions in a variety of graphic forms.

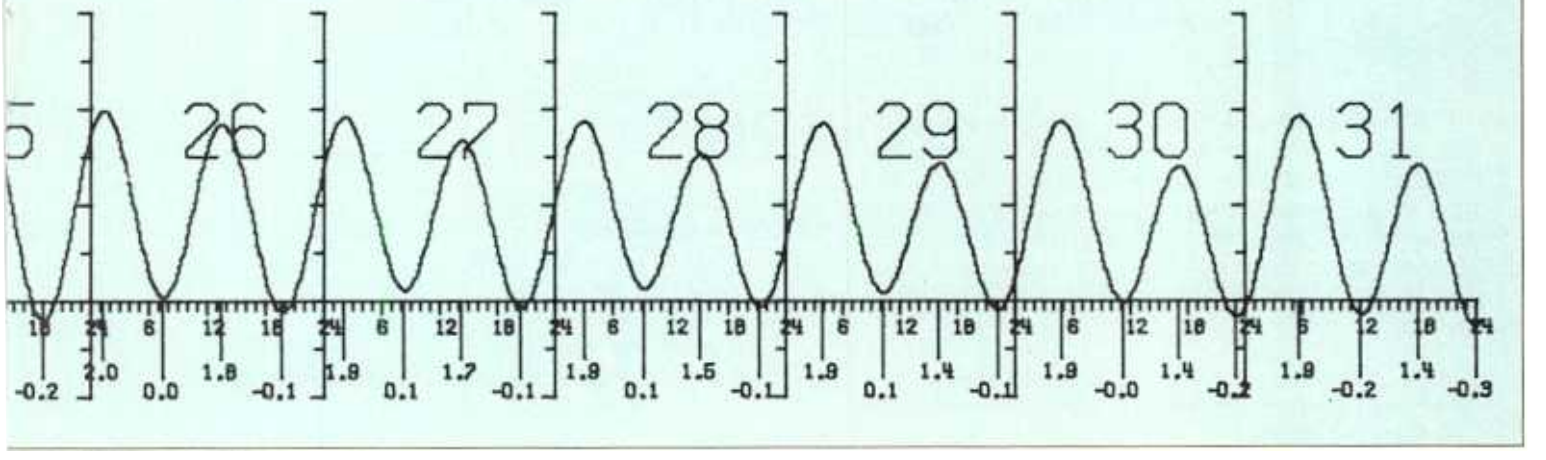
Dr. David A. Evans, head of Data Processing and Statistical Services, and Dr. John D. Boon, associate marine scientist in the Department of Geological Oceanography can program their computer to print out tidal predictions in daily, weekly, or monthly graphs. And, given the proper tidal constants for a particular harbor, tidal graphs can be produced for any time in the past, present or future.

"The virtues of the computer are many," says Evans, "Given the correct tidal constants, we could produce tide graphs for any place in the United States, or in the world, for that matter."

Boon explains that the modern method of tidal analysis and prediction is based on a technique known as *harmonic analysis.* Because of different dimensions, coastlines, depths, and ocean floor topography, various water bodies will respond differently to each tide-generating force. In tide prediction these responses, known as the *tidal constants* for a given location, must be determined and combined.

Boon and his associates determine

Figure 1. Example of tide graph format available to the public. This particular example shows tides for Hampton Roads, Virginia, January 25th-31st, 1980 (the last week of January). Numbers at bottom of graph indicate feet above or below Mean Low Water (MLW).



the values of tidal constants for a particular harbor by analyzing observed tides recorded by a tide gage. The tide gage, a "stilling well." records the water's rise and fall with an electronic clock that punches a paper tape every six minutes. These records are checked against height measurements taken from a nearby graduated marker staff. Tidal observations for a minimum of 29 consecutive days (the lunar month) are needed for accurate predictions.

In order to understand the complexities involved in tidal analysis, it is necessary to understand why tides occur. It is the combination of gravitational forces of the sun and moon on earth and centrifugal forces due to the revolving earth-moon system that causes the earth's water masses to be raised as two tidal "bulges." Because of its proximity, the moon has the greatest influence on earth's tide.

As the earth rotates and places on earth change their positions relative to the moon and the two tidal "bulges," an earth-bound observer will note the passage of two high and two low waters every 24 hours and 50 minutes. This is a lunar day, or the time required for the earth to complete one rotation with respect to the moon. A lunar day is approximately 50 minutes longer than a solar day (24 hours).

This aspect of the lunar tide cycle explains why a given high or low tide occurs 50 minutes later with each new day - high tide occuring at 8:00 a.m. one day will occur at 8:50 a.m. the next day, 9:40 the next, and so on.

Spring tides occur when the sun, moon, and earth are in line with each other. This combination of the moon and sun's tide-generating forces on earth results in tides of maximum range. *Neap tides* occur when the moon is at right angles to the earth-sun line. Tide generating forces oppose one another, resulting in minimum tidal range (See illustrations).

Two spring tides and two neap tides occur as the moon completes one revolution about the earth - a period of about 29 ½ days, or one lunar month.

Because of the complexity of the tidal interactions that occur in many coastal regions with large tidal ranges, such as Alaska, over 100 tidal constants may sometimes be needed to make accurate tidal predictions, though usually less than 40 will be sufficient. Boon explains that in the complex science of tidal prediction, it happens that when a change occurs, such as the dredging of a harbor or canal, the tide itself may change requiring the determination of new constants.

Boon and Evans are now producing tide prediction graphs for Wachapreague, on the Eastern Shore of Virginia, based on Boon's personal observations made there since 1969. The scientists are also producing tide prediction graphs for the major Virginia harbor of Hampton Roads, using traditional tide table data published by the National Ocean Survey.

VIMS Sea Grant Marine Advisory Services plans to make quarterly tide graphs for Hampton Roads and Wachapreague available to the public, free of charge. These sets of tide graphs will be published in three month packages. Each month's tidal graph will appear on one 8 X 10 sheet of paper - with two weeks on each side (Figure 1). A list of tide variations for other Virginia harbors will be included.

This publication of tide graphs offers a unique service to Virginia's boating industry. The monthly tide graphs can be easily viewed for future trends and have a wide range of practical applications for fishermen, engineers, scientists, sailors, and the public in general.

It is necessary to view future tidal trends, for instance, in the construction of piers, bridges, and other structures for which the tidal condition is an important matter. The ability to view future weekend tide graphs and plan accordingly could be a great convenience to recreational boaters, sailors, and waterfowl hunters. The monthly tide graphs will be adjusted, when necessary, to daylight savings time.

The January-February-March 1981 tide graphs for Hampton Roads and Wachapreague are now available. Anyone wishing to subscribe to this free tide graph service should write Sea Grant Marine Advisory Services, Tide Graphs, Virginia Institute of Marine Science, Gloucester Point, VA 23062.

-Kym Young

Fish House Kitchen

Oyster Stew, Scallop Chowder AND CLAM PIE

Cold weather and hot soup - the two are perfect mates. Nothing warms the soul on a chilly fall night better than a steaming bowl of oyster stew or a hearty scallop chowder. The clam pie recipe is tried and true and highly recommended. (The secret to clam pie is to fry the onions so delicately that they will be missing in the pie). Enjoy!

Oyster Stew

1 qt. fresh-opened oysters with their juice
1 qt. milk
¼ lb. butter
Salt and pepper to taste

Wash oysters in their own juice, strain juice to get out sand and bits of shell. Cook oysters in their own juice until their edges begin to curl, or about five minutes. Heat milk in large double-boiler. Add oysters and liquor to milk; add butter and seasoning and heat thoroughly. (Use white pepper to eliminate black specks in this creamy white stew). Serves 4 to 6.

Scallop Chowder

1 pt. scallops
2 small onions, sliced
4 T. butter
2 c. chicken broth
1 c. diced potatoes
4 c. scalded milk
Salt and pepper

Melt butter and cook onions 5 minutes. Remove onions and cook scallops 5 minutes. Remove scallops. Combine boiling chicken broth, onions, and potatoes and simmer ½ hour. Add scallops and scalded milk and simmer 5 minutes. Season to taste.

Clam Pie

2 c. fine-chopped clams
1½ c. clam liquor
1 two-inch cube salt pork
1 thin-sliced onion
¼ c. flour
3 medium-size potatoes
Enough pie crust for 2 crusts in a large pie plate

Open enough clams to give 2 cups meat, saving liquor in pan under a colander. Chop clams fine - do not grind. Strain liquor to take out sand and shell pieces. 1½ c. clam juice, or at least 1 cup juice and ½ c. milk is needed.

Cut salt pork into tiny cubes and fry. Drain clear fat into a tin cup and wipe residual salt from frying pan. Put clear fat again in pan and gently fry thin-sliced onion to a golden brown. Drain onion slices with salt pork scraps on paper towel.

Mix in pan, chopped clams, clam liquor, salt pork scraps, fried onion, enough flour to thicken. (May substitute ¼ c. cracker crumbs for thickening). Add dash pepper, no salt, and cook slowly for about 20 minutes, stirring occasionally to blend.

Line large pie plate with pie crust, line shell with peeled, thinly sliced raw potatoes. Add half clam mix. Add another layer of thin-sliced raw potatoes. Add rest of clam mix, top with third layer of potatoes, put on top crust. Prick crust with fork to let out steam. Cook two hours in a slow oven.

Flavor of the pie is better the next day, warmed up. If reheated pie seems dry, fry a few more salt pork scraps, and add them to white sauce made with a cup of milk, 2 T. fat and 2 T. flour, cooked slowly and stirred with a whisk to eliminate lumps. Pour sauce over re-heated pie.

Marine Schoolhouse Series No. 11
by Elizabeth A. Cornell

Steps to a Better Science Fair Project

PART II

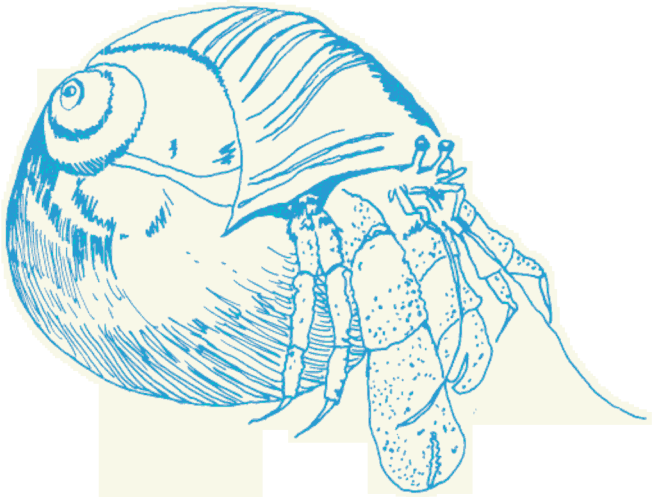
Part I of "Steps to a Better Science Fair Project" (see Spring issue) explained the scientific method for investigation and experimentation, which included: *making observations, making inferences, formulating a hypothesis, and collecting data.* Part I also outlined an orderly format for presenting a science fair project including an *introduction, methods and materials, results, discussion, references, and resources.*

Part II of "Steps to a Better Science Fair Project" presents a specific example of a marine science experiment and should clarify the steps outlined in Part I.

CUT ALONG DOTTED LINE

SAMPLE SCIENCE FAIR PROJECT

(1) Student Mary Lou Jones observes that the hermit crabs in her saltwater aquarium at home appear to spend most of their time near coral and rocks in the tank. Her list of questions about her observations include: Why do crabs seem to prefer the portions of the tank with coral and rocks? How can I change their behavior? Can I make them move across a tank? Does it appear that crabs see or feel their environment?



Hermit Crab

(2) Mary Lou feels that the rocks and coral offer protection for the hermit crabs and they prefer to hide in the rock and coral formations. As her teacher, you help Mary Lou refine her inference into a testable hypothesis: Given a choice between a bare tank and one containing places to hide (i.e. rocks and coral); hermit crabs prefer (choose) a habitat with places to hide.

(3) Mary Lou reads in an oceanography text that many marine organisms live in coral reefs and rock formations because they afford protection from predators. Mary Lou finds several articles about fish hiding in coral reefs in the tables of contents of the journals National Geographic and Animal Behaviour.

(4) Mary Lou collects 6 hermit crabs for her study. She plans to test her hypothesis by placing each crab in the middle of a tank which has crushed oyster shell on the bottom and rocks on only one half. After waiting 60 minutes to see what each crab does, Mary Lou records which half of the tank the crab is in (rock half or bare half). Mary Lou tests each crab by itself because she feels that crabs can influence each other's behavior. Mary Lou knows that the more times she tests a variable the more reliable her results will be. She also tests crabs in a tank which has no rocks at all to be sure they are not somehow influenced by a variable for which she is not testing (this is her control).

(5) These are Mary Lou's results which she feels uphold her hypothesis. These tables are probably the best format for her results.

TEST

Crab	1	2	3	4	5	6	Total
Rock Side							
Bare Side							
No. of Trials							

CONTROL

Crab	1	2	3	4	5	6	Total
Right Bare Side							
Left Bare Side							
No. of Trials							

Mary Lou's Data Tables

Whether she should manipulate this data or perform statistical analysis depends upon her age, background and level of sophistication.

(6) Mary Lou concludes that the crabs were not biased by any external influences in her tests, and the results reflect the influence of the variable she was testing. She feels that the crabs clearly preferred the rock side of the tank over the bare side. According to other studies she read, crabs are similar to other marine organisms which prefer to live near rocks and coral in order to protect themselves from predators. Next year she plans to test whether crabs prefer natural hiding places in their habitat (rocks, coral and plants) versus introduced materials (tin cans and bottles) provided they are nontoxic.

(7) Mary Lou's final task is to write her report, design illustrations (e.g. poster) and display her apparatus for the fair. She is also prepared to explain her research and answer questions.

SEA GRANT PUBLICATIONS

The publications listed in this section are results of projects sponsored by the VIMS Sea Grant Marine Advisory Program. Order publications from Sea Grant Marine Advisory Services, Publications Office, Virginia Institute of Marine Science, Gloucester Point, VA 23062.

HANDLE WITH CARE: Mid-Atlantic Marine Animals That Demand Your Respect.- *J. Lucy. $1.00*

Generally speaking, the marine organisms found along middle Atlantic shores are not considered threatening to people. However, some of these animals can cause problems, like aggravating stinging nettles or unpredictable sharks and stingrays. This illustrated publication describes nuisance and potentially harmful marine animals and is presented to help coastal residents and visitors become aware of how problems might develop, how they can be avoided, and how certain injuries should best be treated if they occur.

TAX GUIDE FOR COMMERCIAL FISHERMEN.- Department of the Treasury, Internal Revenue Service. Publication 595 (Rev. Nov. 80).

Tax Guide for Commercial Fishermen is for the commercial fisherman who is a sole proprietor and who reports profit or loss on Schedule C (Form 1040).

This publication will be helpful to most commercial fishermen. It will help fishermen become familiar with the federal tax laws as they apply to the fishing business. For example, it explains when and how certain kinds of income are taxed, and when and how certain expenses may be deducted. This information will enable fishermen to pay only the correct amount of tax.

THE CHESAPEAKE: a BOATING GUIDE to WEATHER *J. Lucy, T. Ritter and J. LaRue. Educational Series. $1.00.*

A PRELIMINARY EVALUATION for a SHARK FISHERY in VIRGINIA. *SRAMSOE No. 234.- J. A. Colvocoresses and J. A. Musick. First copy free to Virginia residents, all other copies $1.00.*

LOCATION of FOREIGN FISHING VESSELS HARVESTING SQUID in the MID-ATLANTIC REGION of the UNITED STATES: 1970-1976. *SRAMSOE No. 235.- J. Zaborski. First copy free to Virginia residents, all other copies $1.00.*

HEALTH CARE for SEAFARERS. *HHS Publication No. (HSA) 80-2016.- by the Public Health Service, A Guide to Care and Services.*

The purpose of this booklet is to tell the seafarer of his eligibility for care, what care PHS provides, and how and where to get care. These are only general guidelines on the rights and responsibilities for obtaining care from the Public Health Service (PHS).

COMMERCIAL FISHING NEWSLETTER. *Quarterly. Subscriptions available without charge.*

CHART of FISH HAVENS OFF CAPE HENRY, VIRGINIA. *18" X 36" chart, $1.00.*

Chart shows true bearings from well-known points of reference to "fish havens" (wrecks, obstructions, rocky bottom areas) off Cape Henry, Virginia. Designed as an aid for sportfishermen, this chart is not to be used for navigational purposes.

THE ECONOMIC IMPACT and STATUS of VIRGINIA'S OFFSHORE FISHING INDUSTRY. *SRAMSOE No. 225. W. DuPaul and S. Baker. First copy free to Virginia residents, all other copies $1.00.*

THE MARINE TURTLES of VIRGINIA.- *J. A. Musick. Field guide. $1.00.*

TIDAL WETLAND PLANTS of VIRGINIA.- *Gene Silberhorn. Booklet. $3.00.*

SENSING THE SEA.- *Ellen Odell-Fisher and Ronald N. Giese. Curriculum guides, grades K-One (OR) Two-Three. $2.00 each.*

VIRGINIA MSD PROBLEMS and OPTIONS.- *Jon Lucy. Advisory No. 19. Free.*

THE ECONOMIC IMPACT of the SEA SCALLOP *(Placopecten magellanicus)* **FISHERY in VIRGINIA.** *SRAMSOE No. 222.- W. DuPaul and S. Baker. First copy free to Virginia residents, all other copies $1.00.*

A REPORT to the OYSTER INDUSTRY of VIRGINIA on the BIOLOGY and MANAGEMENT of the COWNOSE RAY *(Rhinoptera bonasus,* Mitchill) **in LOWER CHESAPEAKE BAY.** *SRAMSOE No. 216.- J. Merriner and J. Smith. First copy free to Virginia residents, all other copies $1.00.*

SHARK AS SEAFOOD.- *Prized for centuries on foreign tables, shark meat has made its American debut. Free brochure.*

PCA's Aquatic Loan Program - Financing for Watermen

On February 9, 1981 from 6:30 p.m. to 8:30 p.m. a seminar on the Aquatic Loan Program of the Production Credit Association and appropriate financial record keeping systems will be presented at the North Campus of the Rappahannock Community College in Warsaw, Virginia. Free to the public, the program is sponsored by VIMS Sea Grant Marine Advisory Services and the Community College's Continuing Education Program.

The seminar will provide an overview of how watermen can use the Aquatic Loan Program to establish long term financing for boat and dockside facilities construction. In addition, financial record-keeping systems essential to securing loans will be discussed. The program may benefit boatbuilders as well as watermen by presenting information on how long-term financing can be made available for boat construction and re-construction of commercial seafood harvesting vessels.

Jim Johnson of the Production Credit Association in Tappahannock and Tom Murray, a resource economist in VIMS Sea Grant Marine Advisory Services, will present the program. The public is invited to attend.

BAC Asks Boaters' Advice

The Recreational Boating Safety and Facilities Improvement Act (known as the Biaggi Bill) was signed into law October 14, 1980. The Biaggi Bill authorizes Congress to transfer $20 million per year for the period 1981-1983 from motorboat fuel tax collections to appropriate state boating programs through the Coast Guard's Office of Boating Safety.

The $20 million dollar fund is to be equally divided between programs for boating safety and programs for boating facilities improvement. The Virginia Boating Advisory Committee of the Virginia Office of Commerce and Resources invites members of the boating public and industry to submit suggestions for how Virginia's share of these funds should be used.

The Boating Advisory Committee is particularly interested in suggestions or ideas concerning development and improvement of boating facilities. Direct suggestions and comments to Mr. Bill Breen, Secretary - Virginia Boating Advisory Committee, Office of Commerce and Resources, 9th Street Office Building, Richmond, VA 23219.

How would you like to see Virginia's share of this $20 million spent?

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Cover Note

Oyster tongers on the James River near Menchville, Virginia. November 1980

Photograph: Kym Young

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