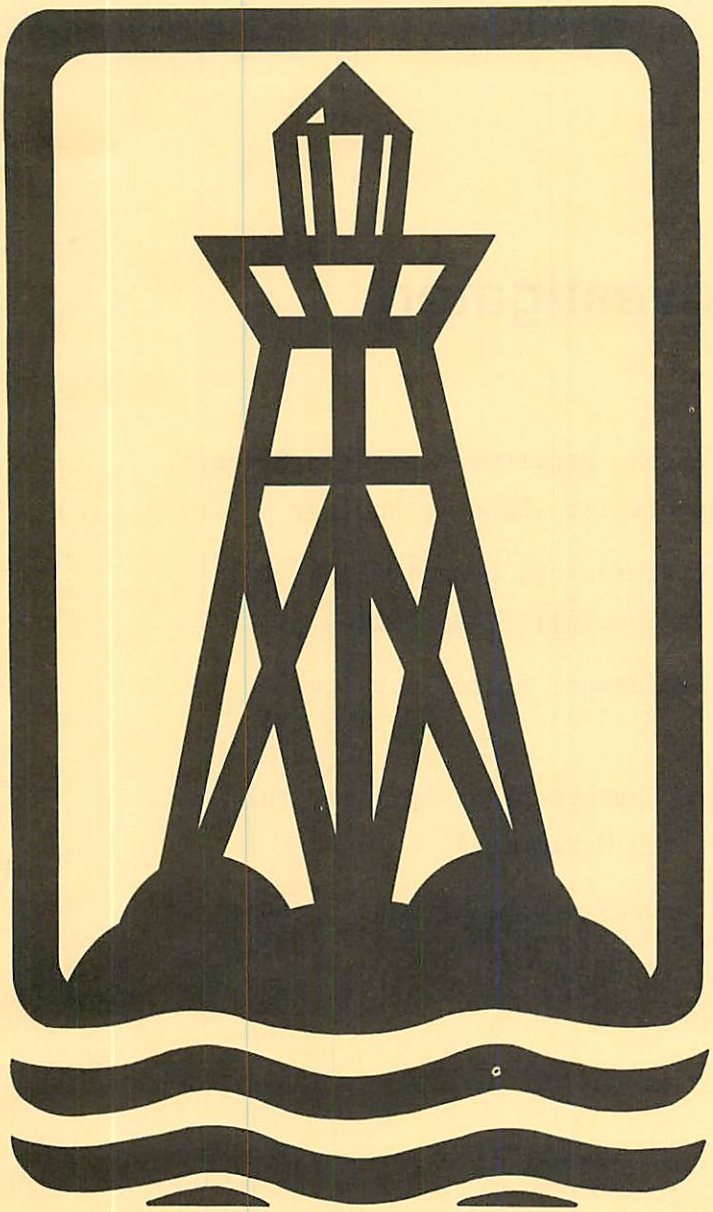

Sea Grant at Virginia Tech

Second Annual Report ● February 15, 1974 to February 14, 1975

Principal Investigators

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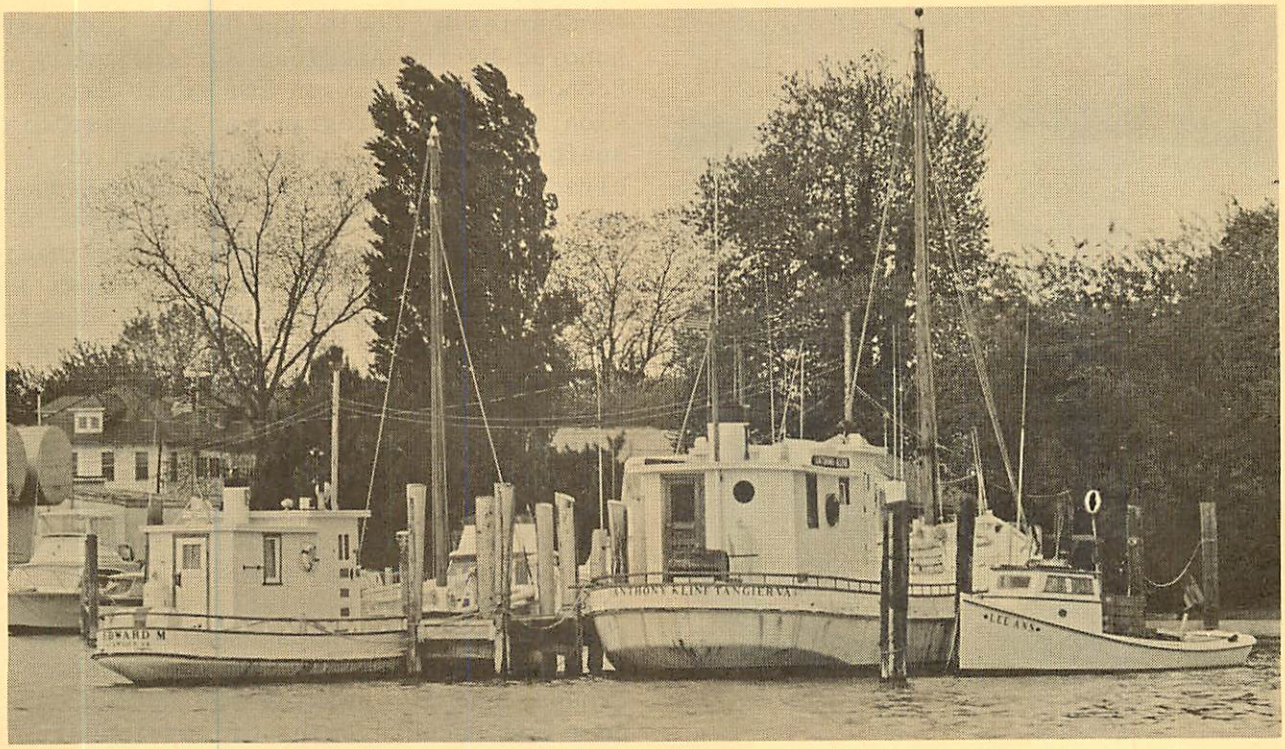
COOPERATIVE EXTENSION SERVICE, EXTENSION DIVISION, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Sea Grant at Virginia Tech — 1974

One of the major efforts during the first period of Sea Grant at Virginia Tech was to define the problems of the seafood industry in Virginia. Once defined, then solutions could be searched for. Those problems, in summary, were identified as:

1. deterioration of the ecological system in the Chesapeake Bay, due to
   a. runoff of industrial wastes and pesticides;
   b. increase in population;
   c. fresh-water flooding by hurricanes, especially in 1969 and 1972;
   d. diseases and predators of oysters;
   e. competitive use of water resources.
2. international competition, causing
   a. depletion of fish stocks;
   b. lower prices for imported seafoods than local operators could offer.
3. competition between commercial seafood industry, sports fishermen, and industrial and military interests.
4. inefficiency and obsolescence, including:
   a. low productivity,
   b. hand labor,
   c. low wages,
   d. inefficient marketing system,
   e. small, family operations.
5. cash flow problems because the seafood industry buys new products for cash, extends credit to wholesalers, and is seasonal in expenditures and income flows.
6. lack of organizational unity.

During the first grant period, these problems were attacked from a number of directions. During the second period, that of this report, several projects were continued and new ones were initiated. Four principal workers -- food technologist, mechanical engineer, business management specialist, and extension agent -- planned, organized, and carried out these projects, sometimes working with other Sea Grant



personnel or others in the university community, and sometimes working individually.

INTERAGENCY AGREEMENT

A landmark interagency agreement was signed in November which provided new impetus and support for the Sea Grant at Virginia Tech program. Under the agreement, the Extension Service of the United States Department of Agriculture representing the State Cooperative Extension Services, and the National Oceanic and Atmospheric Administration of the United States Department of Commerce, will work together to provide extension-type services to the marine community. This agreement made available to the seafood industry in Virginia all the resources of the well-established Cooperative Extension Service, and provided a forum for further educational and informational activities of the Sea Grant at Virginia Tech personnel.

COALE AND LONG HONORED

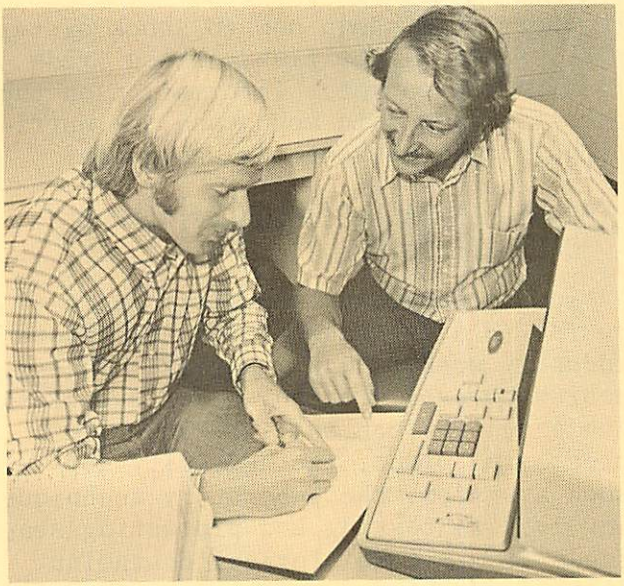
Charles W. Coale and Don L. Long were honored by the American Agricultural Economics Association for their Extension economics program for the Virginia seafood industry. Their program was cited for its originality, effectiveness, and contribution to the state, especially to the rural areas of eastern Virginia; for having recognized in its program an educational opportunity for an industry not traditionally served by Extension programs, in areas of marketing and management not traditional either; for encompassing a wide range of problems from marketing to ecological and a wide audience embracing labor and management, federal and state officials, professionals, and the general public; for the effective use of newsletters, individual firm visits, workshops, seminars, conferences, and regional public interest groups; and for gaining the active support and encouragement of key industry and government organizations.

Continuing Activities — 1974

Agricultural Economics

The case study featuring a Virginia seafood firm was further developed and published under the title: *A Seafood Marketing Firm: Feasibility, Management by Objectives, A Predictive Economic Model, and Profitability Based on Predetermined Goals*. About 500 persons -- industry and professional -- requested this publication. The booklet addresses such topics as pricing structure, corporate objectives, engineering methods analysis, job profiles, sales revenue, role of supervisors, retail marketing, profitability.

This comprehensive management audit of the case firm had two major objectives: first, to aid the firm in its own analysis of problems and solutions; second, to establish procedural guidelines for other firms, or advisory personnel, to analyze their own operations with the intent of modernizing and increasing profits.



This case study was a feature presentation at the Fish Expo held in Norfolk in November, and a series of workshops are planned next year to present the material to seafood industry personnel, in cooperation with the Virginia Seafood Council.

Engineering

Noise surveys were made in enough processing plants to provide a cross-section of the types of noise problems, and to determine whether or not seafood processors are having problems in complying with OSHA standards. Because of requirements for sanitation, the conventional sound-absorbing materials cannot be used in food processing plants; at the same time, the sanitary surfaces necessary may cause reverberations that allow a single noise source to permeate an entire area, thus causing excessive noise levels.

Automated sea clam processing plants were determined to have major noise problems. The rest of the industry is either in compliance with OSHA standards, or can be in compliance with a minimum of effort.

In one major frozen seafood processing plant, we determined that the chief noise maker was the blower on a breading machine. The blower was brought to our laboratory, where we devised a simple method to reduce the noise, and informed the processor how to take corrective action in his plant.

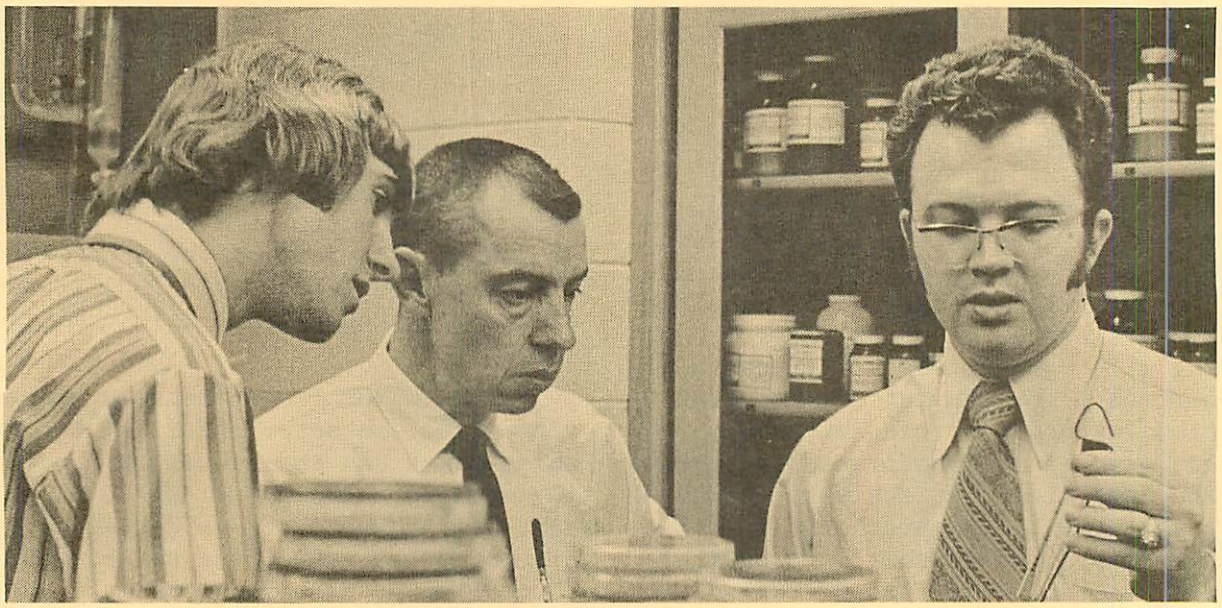
Food Science and Technology

SEAFOOD PRODUCTS SHORT COURSE

In March, Norfolk City Home Economics teachers met for a 3-hour in-service training course in seafoods. The teachers were shown how to shuck oysters, pick crabs, fillet fish, choose fresh fish in the market. Information on the use of seafoods in menus and the nutritional value of seafoods was given.

MICROBIOLOGICAL TECHNIQUES IN FOOD QUALITY CONTROL

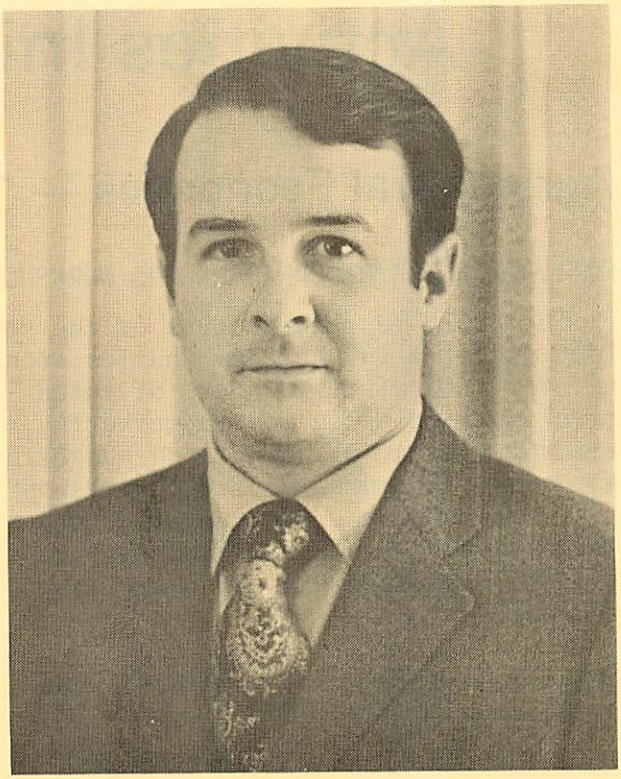
In September, a laboratory short course (3 days) was offered to seafood industry workers and managers. The course covered procedures for establishing a quality control laboratory in a processing plant, the necessity for such a system, the laboratory techniques involved in testing and protecting seafoods from microbiological contamination, use of index organisms like coliform and enterococci bacteria, and procedures for control of sanitation in the processing plant. Participants spent three afternoons in the Food Science and Technology laboratory, actually carrying out the laboratory procedures and tests.



Training Sessions For Extension Agents

FOOD PRESERVATION WORKSHOP

In April, a Food Preservation Workshop (3 days) was offered to Virginia Cooperative Extension agents who have Family Resources as one of their assignments. The agents were given information on market forms of seafoods, species available fresh and/or frozen and/or canned, grading of seafoods, federal Food and Drug standards of quality, and procedures for processing and preserving seafoods at home. The agents spent time in the laboratories of the Food Science and Technology building practicing these procedures.



COMBINED IN-SERVICE TRAINING PROGRAM

In September, a one-day in-service training program was held in Hampton, to inform extension agents in the coastal zone of some of the problems in the seafood industry in Virginia and to give an overview of the Sea Grant at Virginia Tech program. The 26 agents who attended have mostly been trained in the agricultural area, and have concentrated their efforts on agricultural problems; this introduction to marine products, particularly seafoods, should enhance their ability to serve those persons who both live and work in the coastal areas of Virginia. The agents were also informed of ways in which the resources of Virginia Polytechnic Institute and State University could be tapped when necessary to aid the seafood industry in their counties.

Activities Initiated in 1974

Agricultural Economics — 1974

MOTIVATION FOR MODERN MANAGERS WORKSHOP

In April, representatives of the seafood industry in the Cape Charles area met for a total of 12 hours of intensive instruction in modern marketing, transportation, planning, and budgeting methods. The purpose of the workshop was to enhance the profitability of these seafood processors and thus to aid the depressed Eastern Shore economy.

QUALITY MAINTENANCE AND FAIR PRICING OF SEAFOODS WORKSHOP

In November, in cooperation with the Virginia Seafood Council, processors, university and Sea Grant personnel, and other interested persons met to discuss problems and possible solutions in maintaining the quality of seafood at a fair price throughout the marketing channel. A publication, *Quality Maintenance and Fair Pricing of Seafoods and Seafood Products*, summarized the panel discussions and highlighted the problems in each section of the seafood marketing channel.

OTHER FIRM MANAGEMENT ACTIVITIES

In cooperation with the Virginia Seafood Council and the area extension agent for seafood, we conducted a tour for educators working with the seafood industry in North Carolina. Two members of the North Carolina State University Sea Grant staff and four Virginia staff participated.

Initial planning was undertaken for a Management Development Workshop to deal with defining and analyzing the five functions of management, and for a workshop for lending agencies in the Chesapeake Bay region to inform them of the special problems and needs of the seafood industry for credit.

Seafood marketing educators from the southeast met with Columbia Bank for Cooperatives, Federal Land Bank,to discuss the "state of the art" and to

plan future educational programs. Ten professionals from Sea Grant programs in the South participated, as well as the staff of the Columbia Bank and the Farm Cooperative Service.

An overview of seafood marketing was presented to extension agents from 20 states at the National Marine Extension Workshop sponsored by Cornell University. The illustrated talk dealt mainly with techniques of marketing.

Preliminary plans were developed for converting the economics research of the "case study firm" project, jointly sponsored by the Virginia Seafood Council, to a remote computer terminal application. The purpose of this effort will be to allow analysts to perform economic analyses on the firm concerned within the plant location, and will result in a personalized analysis with immediate solutions to the objectives established by the participating firm.

CITIZEN'S PROGRAM FOR CHESAPEAKE BAY, INC. (CPCB)

In the summer of 1973, Charles W. Coale, Jr., received a two-year grant under Title I of the Higher Education Act, entitled "Rehabilitation and Development of the Chesapeake Bay Environs." Objectives of this project are:

1. to hold two interstate conferences to identify problems and establish cooperative relationships with other organizations in solving these problems;
2. to assemble representatives of the eight task forces of the citizen's group and to publish reports from these groups;
3. to work with local leaders in a series of tri-state meetings;
4. to develop a set of recommendations for local, state, and federal action from the task group findings, and to disseminate these recommendations to agencies and citizens of the three states;
5. and to hold an in-service training program for extension agents concerning these problems and recommendations.

The study of the Chesapeake Bay problems is divided into eight task group areas:

1. industry, commerce, and transportation, including port development;
2. land use, including agriculture, forestry, wetlands, preservation, and estate holding;
3. commercial fishing, seafood, and water ecology;
4. municipal requirements, including population trends, sewer, water, and power needs;
5. boating, fishing, recreation, marine and shoreline development;
6. special task force on organization and structure for the planning committee;
7. special task force on financing the planning committee and programs;
8. special task force on technical, scientific, and educational matters.

Cooperating agencies in this comprehensive effort include the University of Virginia, Smithsonian Institution, Johns Hopkins University, Christopher Newport College, University of Maryland, Virginia Institute of Marine Science, and Virginia Social Sciences Association.

In the first six months of the grant, CPCB participated with the U.S. Army Corps of Engineers in a preliminary analysis of existing conditions. We developed and delivered 5,000 copies of a membership brochure in support of the program, and 3,000 pieces of stationery for the program.

Engineering — 1974

New rules and regulations took effect in July under the Boiler and Pressure Vessel Safety Act, and the State Technical Services staff developed some guidelines for seafood processors to ensure that their operations complied with the new rules. In some cases, technical assistance was provided.

A list of processors with retorts was supplied to the newly formed Boiler Inspection Division of the State Department of Labor, so that they could provide a safety inspection for the processors.

A processor furnished a retort which he had built for use in his plant, and we developed and supplied to him a necessary safety feature.

Food Science and Technology — 1974

FOOD EDITOR'S CONFERENCE AND SEAFOOD SEMINAR

One of the major projects for 1974 was the effort to educate under-informed food editors and writers about seafoods, particularly Virginia seafoods.

Writers representing six states gathered in Blacksburg for a conference sponsored jointly by the Institute of Food Technologists, Sea Grant at Virginia Tech, and the Food Science and Technology Department of VPI&SU.

Speakers for the conference came from industry, federal and state government regulatory agencies, and university research programs. Topics covered included the benefits and risks of using nitrite as a food preservative, the relationship between nutrition and mental development in children, nutritional labelling, new terminology for retail meat cuts, plant proteins as human foods. In addition, a taste panel of new food products introduced some new foods like marinated squid, breaded squid strips, stuffed quahogs, clam fritters, oyster cocktail.

After two days of lectures, discussions, and tours in Blacksburg, the conference moved to Hampton, Virginia, where the editors were given a tour of the Wilkerson oyster hatchery and a lecture on the experimental development of disease-free seed oysters, a project being supervised by the Virginia Institute of Marine Science.

The Virginia Marine Resources Commissioner, James E. Douglas, Jr., took the editors on a tour of the Chesapeake Bay to inspect fishing and shellfishing operations, such as the old-fashioned tonging for oysters and clams.

Safety of seafoods and water quality testing by Virginia authorities were explained, and the editors were given a demonstration on shucking oysters, picking crabs, filleting fish, and processing of other seafoods.

The positive effects of this effort were demonstrated by the news stories that later appeared in various publications discussing aspects of the conference.

OTHER ACTIVITIES, 1974

At the Fish Expo in October, we participated in an industry conference on seafood laboratories. Its purpose was to explain what they are, what they are doing, and how industry can use them.

In January 1975, in cooperation with the Virginia Seafood Council, four Town Hall meetings were organized in four Virginia towns, attended by seafood industry representatives and the general public, to explore problems and needs of the seafood and marine industries, in relationship to the possible expansion of the U.S. territorial limits to 200 miles. These meetings were organized to inform the House Subcommittee on Fisheries and Wildlife Conservation and the Environment, chaired by Representative Thomas N. Downing, about attitudes of Virginians to this proposal.

In August 1974, George J. Flick and two other Virginia Tech professors -- Harold M. McNair of Chemistry and Anthony Lopez of Food Science and Technology -- taught a 3-week short course at the National University of Mexico in Mexico City, as Visiting Professors for the Regional Scientific and Technological Development Program of the Organization of American States. Members of the food processing industry of Mexico, university personnel, and representatives of local and national health agencies attended the short course on food chemistry and seafood processing. Flick spoke on the processing of crabs and oysters and the smoking of finfish, describing the equipment and processes used, the chemical and microbiological methods of quality control, and quality defects in fresh and processed products and their causes. Also he explained research being done at Virginia Tech under the Sea Grant program on spoilage and pasteurization of crab meat, and showed slides of the Virginia oyster and blue crab industries, from harvest through processing. Crabs, according to Flick, are an underutilized species in Mexico.

SCHOOL FOOD SERVICE CONFERENCE

School food service personnel have not, in the past, received information and training in the preparation, storage, and serving of seafoods and seafood products. As a result, improperly prepared seafoods have made the product unattractive and unappealing and have caused a negative attitude on the part of the public to institutionally prepared seafoods. Two 3-day conferences were held, with Continuing Education Units credit, for a total of 200 food service personnel. Topics covered included work simplification, handling complaints of workers, time management, USDA regulations, child nutrition. Speakers came from USDA and various VPI&SU departments and services.

Applied Research — 1974

PICKLED HERRING NODULES

The white nodules which form on pickled herrings after they have been stored for about 12 months were determined not to be toxic, by Charles F. Shoemaker and Ross Brown of VPI&SU. The amorphous nodules were found to be 99 percent pure tyrosine, an amino acid, one of the building blocks of proteins.

Work is continuing to attempt to find a way to retard the growth of the nodules, which cause the herring fillets to lose market value on storage. Three methods of analysis were used: infrared spectroscopy; carbon, hydrogen, and nitrogen content; and amino acid analysis. The purity of the nodules was a cause for remark.

PASTEURIZATION PROCESSES

We developed a bulk process for in-plant pasteurization of crab meat for one processor, saving $10,000 annually in processing costs.

We developed pasteurization processes for another processor of frozen foods, to pasteurize crab soup, clam chowder, and seafood mixes, thus allowing them to expand their line of institutional foods. Total new sales are expected to amount to $200-300,000 during the first year the new foods are available.

A study has been initiated concerning heat stability of enzymes during retort operations and pasteurization in blue crab meat. The enzyme activity appears to be reduced by heating for only about two weeks in cold storage, and then is regenerated.

COOPERATION WITH OTHER RESEARCHERS

Sea Grant at Virginia Tech personnel cooperate in many marine- and seafood-related research studies undertaken by other VPI&SU staff not funded by Sea Grant. Such studies in 1974 included the effects of septic effluents in the coastal plain, flood damage prevention in coastal areas, effects of cost-sharing fees for users of the inland waterways, central planning for the Chesapeake Bay, catfish culture, use of underutilized species.

Information Services — 1974

The quarterly newsletter, *The Virginia Marine Times*, continued to be published, covering such material as new patents for seafood products; FDA, OSHA, and EPA regulations; research projects underway at VPI&SU, VIMS, and other institutions; human interest information related to seafoods and the Virginia coast; educational and informational programs available.

A monthly television show, aired in the Hampton, Norfolk, and Newport News areas, has been allocated time during prime viewing hours because of the local interest in marine resources.

Fifty-two news releases on seafoods and seafood products and on other marine resources were released to the newspapers and to radio and television stations throughout the state.

The telephone tip-line continued in the Tidewater area. The pre-recorded messages give specific information on purchasing, processing, preparing, and serving seafoods and general information on market styles, food safety, and nutrition. The messages are changed weekly.

Preparation began for a color movie on picking of crab meat.

In cooperation with the Virginia Seafood Council, a public information program was initiated to keep seafood processors informed on proposed changes in FDA rules and regulations, so that processors can respond in a timely way to such proposals and protect the industry from regulations harming the industry while not adding safety to the consumer.

Advisory Services — 1974

TRI-STATE SEAFOOD COMMITTEE

The Tri-State Seafood Committee consists of a food technologist, the director of the state Health Department, and a seafood processing industry representative from each of the three states, Virginia, Maryland, and North Carolina, and a marine scientist from the Virginia Institute of Marine Sciences. The committee meets regularly to ensure that conflicts and duplications of services do not occur between the closely related states, and to plan further future cooperative programs.

INDUSTRY ADVISORY COMMITTEE

Representatives of the Virginia seafood processors, Virginia Health Department, Virginia Seafood Council, National Marine Fisheries Service, National Fisheries Institute, Virginia Marine Resources Commission -- make up this committee, which meets twice yearly to:

1. review proposed educational and extension programs,
2. determine priorities for referred problems and workshops,
3. evaluate publications and place priorities on information to be disseminated,
4. identify and obtain financial support for additional research and extension activities,
5. refer information from the seafood industry to the research and extension personnel at VPI&SU.

Publications — 1974

Flick, George J. Information on fish and shellfish. Pp. 1-13 in *Seafood Information for Consumers*. Norfolk City Schools, Home Economics Department, Norfolk, Virginia.

Flick, George J., Charles F. Shoemaker, Gerry Scheeler. *Picking the Blue Crab*. 8 mm color movie, with narration. Available for rental or sale. VPI-SG-75-02.

Guidelines for Energy Conservation for Immediate Implementation: Small Business and Light Industries. Prepared by Office of Chief Engineer, Federal Power Commission; reprinted by Virginia State Technical Services. 18 p.

Jarvis, Norman D. *Spiced and Pickled Seafoods*. Revision of *U. S. Fish and Wildlife Service Research Report* 18: 146-164. 18 p.

King, F. J., and George J. Flick. Beefish patties pass sensory tests. *The National Provisioner* 171(10):34.

Long, Don L., and C. W. Coale, Jr. *Seafood Consumption Patterns: Two Virginia Metropolitan Areas*. March 1972. MB-182. (omitted from Annual Report I).

Mashburn, William H. *Directory of Metal Finishing Services in Virginia, 1974*. 2nd ed.

Savage, Ellen, Editor. *The Virginia Marine Times*. Quarterly newsletter of Sea Grant at Virginia Tech.

Smith, Bonnie. *Equipment for Microbiological Quality Control*. VPI-SG-75-01.

Budget* — 1974

Salaries and Wages	$30,635.00
Expendable Supplies and Equipment	600.00
Travel	4,000.00
Communications	2,800.00
Publication Costs	3,950.00
Indirect Costs	10,722.25
TOTAL EXPENDITURES	$52,707.25

* includes both federal funds and university cost sharing.