COMMERCIAL FISHERIES REVIEW

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PROGRAM OF THE TECHNOLOGICAL SECTION OF THE SERVICE'S BRANCH OF COMMERCIAL FISHERIES

INTRODUCTION

Field research and Service activities of the Technological Section of the Service's Branch of Commercial Fisheries are centered in four Service laboratories located in Boston, Mass.; College Park, Md.; Ketchikan, Alaska; and Seattle, Wash.

Three mobile or trailer laboratories are maintained for chemical or bacteriological studies in out-of-the-way places or in locations some distance from stationary field stations.

One experimental technological research trawler, M/V Delaware, was obtained on loan from another Federal Government agency for the freezing-fish-at-sea project and related studies.

Funds for technological research are provided by the Federal Government and must be used to carry out studies of greatest importance to the fishery and allied industries as a whole. However, the Fishery Products Laboratory in Ketchikan, Alaska, is operated and supported jointly by the Service's Branch of Commercial Fisheries and the Fisheries Experimental Commission of Alaska.

FISHERY TECHNOLOGICAL LABORATORY, 61 SUMNER STREET (LOCKWOOD BASIN), EAST BOSTON, MASS. BUILDING ON LEFT HOUSES LABORATORY (THIRD FLOOR) AND ADMINISTRATIVE OFFICES. BUILDING ON RIGHT HOUSES PILOT PLANT FOR FREEZING-FISH-AT-SEA STUDIES, COLD STORAGE ROOM, AND OFFICES FOR PILOT PLANT AND ENGINEERING PERSONNEL.

University and Industrial Fellowships are sponsored in all laboratories. Limited laboratory facilities are available by contract for University, State, or Industrial sponsored projects. Results of any such research becomes public property and is available to industry.

FISHERY PRODUCTS LABORATORY IN KETCHIKAN, ALASKA. OPERATED JOINTLY BY THE U.S. FISH AND WILDLIFE SERVICE AND THE FISHERIES EXPERIMENTAL COMMISSION OF ALASKA.

In order to develop the program for the Fiscal Year 1952, beginning July 1, 1951, and ending June 30, 1952, the Chiefs of the Service's laboratories met in Washington, D. C., the last week of June 1951. On June 27, 1951, members of the fishing and allied industries attended the conference and offered their comments, criticisms, and suggestions on the previous year's program and the proposed program for this fiscal year. The following program was developed after taking into consideration industry recommendations:

PART I - FISHERY TECHNOLOGICAL RESEARCH PROGRAM, 1951-52

NUTRITION

1. Investigation of the toughening of frozen blue-crab meat (continued project). There is little information of a definite character available to guide the crab-meat packers in proper techniques for the freezing preservation of their products. Attempts to hold crab meat in frozen storage have not been successful except for very short periods. The work to date has shown that one or more enzymes may probably be responsible, at least in part, for the short storage life and additional work is contemplated to identify these. (College Park)

2. Feeding studies with gums extracted from Irish moss (continued project). Gums are being extracted from Irish moss and derivatives of these could be used in many foods and pharmaceutical preparations. Very little applicable data are available on nutritive value and wholesomeness of these products. Such data are required by Federal and State Regulatory Officials before new products are permitted to be used. Data are also needed in order to indicate the best use of a natural resource growing in fairly limited areas. (College Park)

3. Chemical and physical properties of fish and shellfish proteins: (1) Relationship between protein and water (continued project). The effect of controlled grinding on the water-binding characteristics of fish proteins has been investigated. Further work will be carried out on the effect of temperature on the water-binding properties of fish and shellfish protein. This investigation is directed toward providing basic information which might lead toward a better understanding of the tough-

ening of fish and shellfish in cold storage, of the nature and control of drip, and of the chemical and physical changes in dried or dehydrated fish and fish meal. The work on shellfish will deal primarily with the protein of oysters from the Gulf of Mexico and the East and West Coasts. (Seattle)

4. Thiaminase content of certain species of fish used in feeding fur animals. Certain species of fish contain an enzyme known as thiaminase which is capable of destroying the vitamin thiamin. When fish containing thiaminase are fed to fur animals, the animals develop Chastek's paralysis unless such fish are specially treated, as by cooking. Efforts are being made to utilize certain fish waste as a fur-animal feed. Often the first question potential users of such fish waste ask is regarding the thiaminase content. Inadequate information is available on this subject particularly with respect to the thiaminase content of the waste as contrasted to the meat. It is proposed to analyze a few of the most important types of fish waste, such as salmon-cannery waste and fillet waste, from a few of the commercially-important species of the Pacific Northwest for thiaminase so that this information will be available to potential users of waste for fur-animal feeding. (Seattle)

REFRIGERATION

1. Freezing fish at sea, defrosting, filleting, and refreezing the fillets (continued project). The research vessel M/V Delaware, now converted for large-scale commercial testing of freezing round fish at sea, will be operated during the first part of the year on a semi-commercial scale to test, and if necessary, modify freezing equipment and to provide commercial-size samples for pilot-plant and laboratory research. These tests will serve to furnish information on:

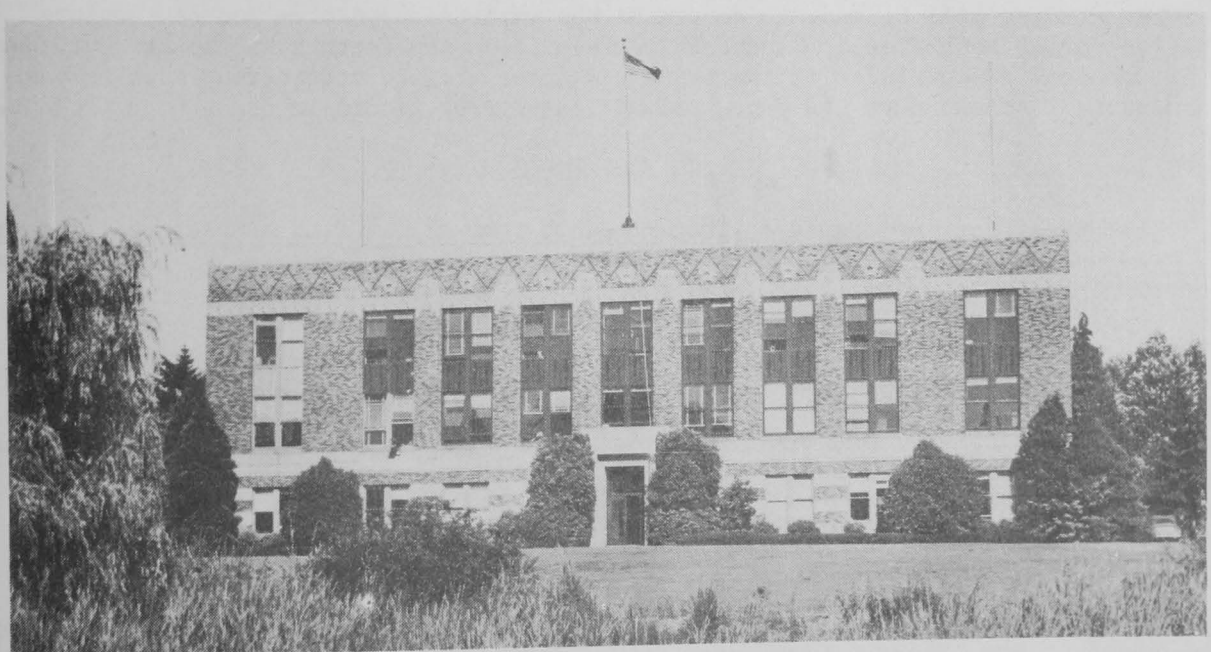
A. EFFECT OF PROLONGED STORAGE OF ROUND FROZEN FISH PRIOR TO DEFROSTING AND FILLETING;

B. RATIO OF BRINE TO FISH NECESSARY FOR OPTIMUM FREEZING;

C. ABSORPTION OF BRINE BY FISH;

D. FILLET AND VISCERA YIELD FROM ROUND FISH;

E. PREPARATION OF FISH STEAKS FROM ROUND FROZEN FISH;



FISHERY TECHNOLOGICAL LABORATORY IN SEATTLE, WASH., WHERE BOTH TECHNOLOGICAL AND BIOLOGICAL FISHERIES RESEARCH ARE CONDUCTED.

F. COMMERCIAL THAWING METHODS; AND

G. PALATABILITY OF FISH PRODUCTS PROCESSED FROM ROUND FROZEN FISH.

After information on the above points is secured, the vessel will be operated on a full commercial basis and an economic study will be made on operational and handling costs. (Boston)

2. Freezing and storing Alaska shrimp and Dungeness crab (continued project). Studies will be continued on use of improved cooking methods and packaging procedures for frozen shrimp and crab. The effect of lower storage temperatures will be tried. (Ketchikan)

3. Preparation of a manual on the refrigeration of fish (continued project). This project will be continued. Important chapters will be written first and will be issued separately as completed. Later, all chapters will be combined into a complete manual. (College Park)

4. Effect of the cycle of different storage conditions encountered in marketing upon the quality of frozen fish: (1) Effect of storing glazed whole fish in rooms provided with air circulation. In recent years, many cold storage plants have been constructed primarily for storage of packaged frozen foods in which refrigeration is supplied by means of unit coolers employing a blower. This results in rapid circulation of air which is not harmful to well packaged foods but rapidly removes the glaze from frozen whole fish which, if not reglazed at weekly intervals, soon become badly desiccated. This project will consist of studying the effect of protecting such whole fish against dehydration by storage in wooden boxes or cardboard cartons with and without protective paper liners in order to determine the simplest method of storing such fish without the necessity or frequent reglazing. (Seattle)

5. Study of cause of texture change of canned salmon prepared from frozen fish. Previous experimental work has shown that freezing salmon prior to canning causes adverse quality changes in the final product, especially with regard to texture. Further studies will be made to determine the importance of time and temperature changes during both freezing and heat processing on the texture of the product. Special problems associated with the texture changes will be considered, such as the formation of excess curd and decreased yields of free liquid in the canned product.

PROCESSING AND PRESERVATION

1. Development of specialty food products from Alaska fish and edible fish trimmings. One of the serious economic problems in Alaska is the seasonal aspect of the most important fisheries. In order to encourage the development of off-season industries, studies will be made of the preparation of specialty food products from fish and edible parts of fish waste which are not being fully utilized. The study will include the determination of processing recommendations and palatability tests of products. The edible parts of salmon waste, butter clams, and herring are to be investigated first. Fish will be pickled, smoked, or canned in order to develop the most suitable products for preparation in the off-season. (Ketchikan)

ANALYSIS AND COMPOSITION

1. Chemical composition of fish: (1) menhaden (continued project). There is considerable concern by members of the menhaden industry as to the future demand for the products now produced from these fish. Information will be obtained on the chemical composition of various products and tissues of menhaden. These data should permit an evaluation of possibilities for developing entirely new industrial or agricultural products. (College Park)

2. Cooperative work with the Association of Official Agricultural Chemists on the determination of oil in fish meal (continued project). The present accepted method for the determination of oil in fish meal is tedious and time-consuming. Studies will be directed toward developing a more rapid test and possibly toward improving the accuracy of the present method. (Seattle)

3. Composition and cold-storage life of fresh-water fish. Virtually nothing is known about the composition and cold-storage life of lake and river fish taken in the central portion of the United States. Because of the location of the Service's technological laboratories along the seaboard, technological work has been concentrated on marine fish, and work on fresh-water fish has been neglected. The 150,000,000 pounds of such fresh-water fish taken commercially each year make up a significant portion of the food fish production. On numerous occasions lack of information on these fish has been a serious handicap. It is planned to make a careful sampling of the more important commercial fresh-water fish and conduct analysis for moisture, oil, protein, and ash, and to make observations on the cold storage life of these species. (Seattle)

BYPRODUCTS

1. Vitamin content and nutritive value of fishery byproducts (continued project). The fishery byproducts and feed utilization industries are handicapped by the lack of information on the nutrient content of fishery products. Chemical microbiological, and biological assays will be conducted to determine the vitamin B_{12} and niacin content and possibly also of other growth factors in fish meals and condensed fish solubles. Also studies are contemplated to determine with chicks the comparative nutritive value of the protein of the different products. (Seattle and College Park)

2. Utilization of viscera from round (whole) fish frozen at sea. The research vessel M. V. Delaware while engaged in the freezing-fish-at-sea project will make

FISHERY TECHNOLOGICAL LABORATORY IN COLLEGE PARK, MD., LOCATED ON THE CAMPUS OF THE UNIVERSITY OF MARYLAND.

available large quantities of viscera for use in feedstuffs or pharmaceutical compounds. A cooperative study will be undertaken with fish meal and oil processors, pet food manufacturers, and pharmaceutical manufacturers to determine the most suitable uses for the viscera. (Boston)

3. Study of pharmaceutical and other industrial products from salmon eggs. Every year salmon canneries in Alaska discard millions of pounds of salmon eggs. Of the various portions from salmon cannery waste, the eggs offer the most promise for the production of pharmaceutical and other industrial products. Both the oil and protein fraction of the salmon eggs are to be investigated in order to determine those constituents which might be profitably extracted and marketed. (Ketchikan)

SANITATION AND BACTERIOLOGY

1. Industrial waste pollution study (continued project). This is a cooperative project with the Atlantic States Marine Fisheries Commission to determine the extent and effect of industrial wastes on the marine fisheries. The first phase of the study, namely, an inventory and analysis of prior pollution studies, is complete and reports are currently being prepared for distribution. The second phase of the study will cover the economic aspects of the effects of industrial wastes on the marine fisheries. (Boston)

REPORTS ARE TO BE COMPLETED ON THE FOLLOWING PROJECTS (Research work on these projects has recently been completed):

1. UTILIZATION OF SALMON CANNERY WASTE FOR HATCHERY FOOD. (SEATTLE)
2. CLAM PROCESSING METHODS AND CLAM TOXICITY SURVEY. (KETCHIKAN)
3. STUDY TO DETERMINE THE HEMOPOIETIC (BLOOD-PRODUCING) VALUE OF FISH. (COLLEGE PARK)
4. DETERMINATION OF FOOD VALUE OF FISHERY PRODUCTS AS PREPARED FOR SERVING. (COLLEGE PARK)
5. STUDIES ON METHODS OF HANDLING FROZEN SALMON FOR CANNING. (KETCHIKAN)
6. FREEZING PINK SALMON. (KETCHIKAN)
7. PALATABILITY AND COLD STORAGE LIFE OF VARIOUS SPECIES OF PACIFIC COAST ROCKFISHES. (SEATTLE)
8. CORRELATION OF BIOLOGICAL AND SPECTROPHOTOMETRIC METHODS FOR THE DETERMINATION OF VITAMIN A POTENCIES. (COLLEGE PARK AND SEATTLE)
9. UTILIZATION OF SALMON CANNERY WASTE FOR ANIMAL FOOD (COOPERATIVE TESTS WITH THE PETERSBURG, ALASKA, EXPERIMENTAL FUR FARM). (KETCHIKAN)
10. REVISION OF BOOKLET "ALASKA SEAFOOD RECIPES." (KETCHIKAN)

PART II - INFORMATION ON PROGRESS OF TECHNOLOGICAL PROJECTS

Current information regarding the progress on the various projects is presented in Commercial Fisheries Review (CFR) in the section "Research in Service Laboratories."

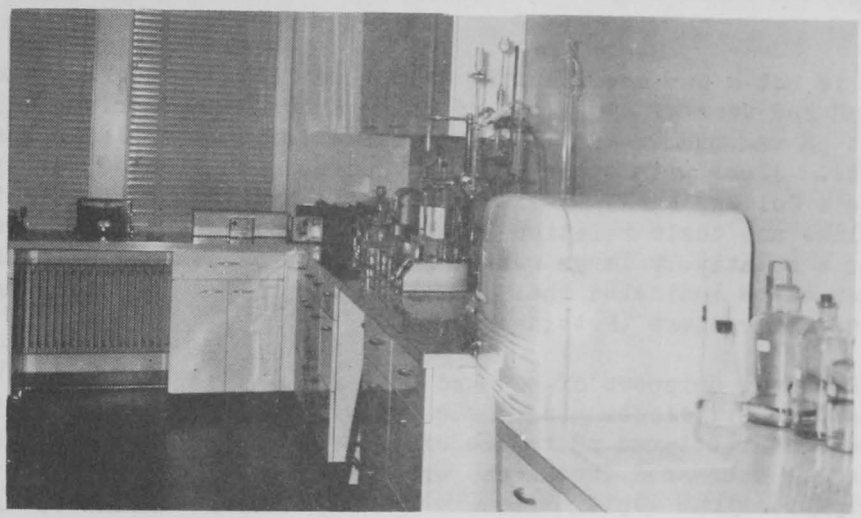
More detailed information on the projects may be obtained by the fishery and allied industries by writing directly to the Branch of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C., or to the laboratories;[1/] or by consulting with members of the Technological Section. Phase or final reports on projects are usually

1/SEE INSIDE BACK COVER OF THIS ISSUE FOR ADDRESSES OF LABORATORIES.

published in Commercial Fisheries Review, as fishery leaflets (FL) or scientific reports, or in non-governmental scientific journals. Abstracts of these and other current information pertaining to commercial fisheries are available in Commercial Fisheries Abstracts (CFA).

CFR, CFA, FL, and most scientific reports are available free to members of the fishery and allied industries on request. Some of the special scientific reports are sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

SECOND FLOOR OF KETCHIKAN LABORATORY ALMOST COMPLETED



A SECTION OF THE BACTERIOLOGICAL LABORATORY ON THE SECOND FLOOR OF THE KETCHIKAN FISHERY PRODUCTS LABORATORY.

During the past year, the second floor addition to the Ketchikan laboratory was completed: however, lack of funds precluded installation and equipment of all the various individual laboratory units. During this fiscal year, the bacteriology laboratory was completed using special funds appropriated by the Territory of Alaska through the Fisheries Experimental Commission. The bacteriological laboratory will provide facilities for the current project on the study of pharmaceutical and other industrial products from salmon eggs.

Besides the bacteriology unit, the second floor addition provides space for much-needed offices, biology laboratory, photographic darkroom, test kitchen, conference room, and storage. The test kitchen has already been in operation for some time. The home economics staff is currently engaged in completion of the material for the revised Alaska fish-recipe booklet.