SEAFOOD PRODUCTS EDUCATION

CONFERENCE PROCEEDINGS
MAY 15-16, 1980

EDITED BY

SANDRA E. HOWLETT

SPONSORED BY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY AND SEA GRANT

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Camera-ready transcript prepared by Pat O'Shea

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TABLE OF CONTENTS

INTRODUCTION

The relationship between diet and health is of increasing concern in the United States as is consumer interest in additional information regarding the food that is included in the diet. A specific recommendation of the Dietary Goals for the United States is to decrease consumption of red meats and increase consumption of poultry and fish. Though consumption of fish has risen slightly, seafood remains a much underutilized protein source in the American diet. Some reasons for this underutilization are a lack of teacher preparation and instructional materials for teaching about seafoods. Realizing the significance of this void, the Department of Commerce and Virginia Tech provided funding for a three year Seafood Products Education Project to address the need for the development and availability of information for use by classroom teachers. To meet this critical need, instructional materials featuring seafood products have been produced for home economics and occupational food service teachers as well as school food service personnel at the secondary school level.

The primary thrusts of Seafood Products: An Instructional Guide for Home Economics Programs; Seafood Products: Food Service Program Guide; Seafood Manual for School Food Service Personnel; and 101 Bulletin Board Ideas for Seafood Products Education are nutrition and consumer education in accordance with the Vocational Education Amendments of 1976. The materials are competency based and activity oriented to capture the interest of teachers and students. An appendix in each of the instructional guides contains pictures of fish species as well as other visuals appropriate to the course of study. An inservice course is available to prepare teachers to include seafood education as a part of their foods courses as well as to introduce the instructional materials. The Seafood Products Lecture Guide is used as a text for the Marine Foods Products course and is a valuable resource for teachers in the field. All materials are now available to teacher use and copies of each were distributed to conference participants.

SEAFOOD PRODUCTS EDUCATION CONFERENCE

Sponsored by VPI & SU and Sea Grant

Thursday, May 15, 1980

12:00-1:30 P.M.	Registration
1:00-1:15 P.M.	Welcome
1:15-1:45 P.M.	Keynote - Seafood Products: Industry and Education Working Together. Dr. Roger Anderson, Executive Director, Gulf and South Atlantic Fisheries Development Foundation
1:45-2:00 P.M.	Nutrition Break
2:00-2:30 P.M.	Overview - Seafood Products Education Project. Dr. Anita Webb/Sandra Howlett
2:30-3:15 P.M.	Concurrent Sessions - Home Economics and Seafood at the Intermediate/Secondary Level. Doris Wimmer, Home Economics Supervisor, Hampton, Virginia; Sue Smith, Home Economics Teacher, Hampton, Virginia - Pre-Service/In-Service Training for Marine Food Products at the Collegiate Level. Dr. George Flick, Professor of Food Science, Virginia Tech; Mary Parks, R.D., Hampton Institute - School Food Service and Seafoods. John Miller, Director of School Food Service, State of Virginia; Cordelia Powell, Food Service Supervisor, Boydton, Virginia; Carol Whitaker, Assistant Professor, Berry College, Georgia
3:15-4:00 P.M.	Repeat of Concurrent Sessions
4:00-4:45 P.M.	Seafood Nutrition. Dr. Virginia Sidwell, National Marine Fisheries Service
4:45 P.M.	Adjourn
5:00-6:15 P.M.	Social Hour
6:15 P.M.	Dinner at Dulles Marriott Seafood is our Sal(i)vation. Dr. Hall Goodwin, Marine Educator, Maryland

Friday, May 16, 1980

8:30-8:45 A.M. Group Session

8:45-9:30 A.M. Concurrent Sessions

- Underutilized Species.
  Sally Patrenos, Merchandising Manager, Florida Department of Natural Resources
- Role of the Federal Government in School Food Service Using Seafoods.
  Beverly Barton
  National Marine Fisheries Service
- Inspection & Grading.
  Lu Kissell
  National Marine Fisheries Service

9:35-10:25 A.M. Repeat of Concurrent Sessions

10:25-10:45 A.M. Nutrition Break

10:45-11:30 A.M. Concurrent Sessions

- Selection and Purchasing of Seafood.
  Laurie Dean, Seafood Home Economist, Virginia Tech-Hampton
- Seafood Education in Texas.
  Annette Reddel, Seafood Consumer Education Specialist
  Texas A & M University

11:30-12:00 P.M. Concluding Remarks - Where Do We Go From Here?

12:00 P.M. Adjournment

WELCOMING REMARKS

Sandi Howlett

I'd like to welcome you to the Seafood Products Education Conference. This conference is the culmination of a three year project that's been on-going at Virginia Tech in Blacksburg, Virginia sponsored by VPI and Sea Grant, a division of the Department of Commerce.

I'd like to recognize some people that have been crucial in the development and also the continuation of this project, and have certainly been of great assistance to me. First is George Flick. Dr. Flick is in the Food Science Department at Tech and he is invaluable for technical assistance. He has developed many educational materials and an in-service course on marine food products. The second individual to be recognized is Dr. Joanne Pearson. Dr. Pearson is in the Home Economics Education program area, in Vocational-Technical Education and has worked with me this year on the project. Also Anita Webb; Dr. Webb is now on the staff of Illinois State, but is pretty much the mother of the project as far as its conception and continuation. She has continued to work closely with me throughout this year via many telephone calls. A special thanks to all three of them.

When you registered today you received a bag of resource materials to be used during the conference as well as in your school setting upon your return home. The bag should include copies of the project publications including:

Seafood Products: An Instructional Guide for Home Economics Programs

Seafood Products: Food Service Program Guide

101 Bulletin Board Ideas for Seafood Education

Seafood Products Course Lecture Guide

Seafood Manual for School Food Service Personnel

You should also find a copy of the Conference program as well as some blank paper for any notes you would like to take. Without further delay, let us begin the program.

The first speaker we have this afternoon is Roger Anderson. He's going to talk about the seafood industry and education working together.

SEAFOOD PRODUCTS: INDUSTRY AND EDUCATION WORKING TOGETHER

Roger Anderson

It's a pleasure to be with you today. First of all let me thank you for the work that you've done. Very seldom does the fishing industry have the opportunity to say thank you. Perhaps it's because we're a fragmented sector of the business community with harvesting, processing, and marketing components. It's often that we don't get together the people that have provided a great deal of assistance to us. I will share with you where I think we're going in the perspective of the commercial fishing industry; and how I think you're going to play an increasingly important role.

As I've come to work with the commercial fishing industry and people like you, I've begun to be aware of the fact that those of us in the industrial community and in the business community have taken advantage of some of the things you and others do. What I'm going to do today is talk about some of the things you're going to be doing and we're going to be doing and how I think the two can relate. First of all you need to recognize that the commercial fishing industry in this country, although a historical industry, has not really established itself as a main line component for the food industry. But it's going to be. It has to be. You and people like myself are beginning to realize that seafood and poultry resources are becoming increasingly important in the diet. Why? One, in many cases they are far less expensive than some of the red meat products that have historically played a major role in some of the consumer patterns. And two, the dieting patterns of this country, with more senior citizens, demand changes in diet. You as consumer educators, nutritionists, and food service educators are aware of these factors. In addition, price has become a very important concept in all buying patterns. Many of the prices on seafood products that you see in the market place are high. They are high because they include traditional items, such as shrimp, lobster, tuna, and ground fish fillets from the Northeast. I'm going to suggest to you that that's going to change too. There are many seafood resources in this country on the Atlantic coast, off Alaska, and the Pacific coast that are going to be available in the market place in the future. Whether they appear in food service or whether they appear in the retail market place, they're going to become more and more of a predominant item. The reason they're going to become predominant is because they're inexpensive, they're available in large volume, and nutritionally, they're quite satisfactory. They are as nutritious as any other product currently available. We in our sector of the industry have not gotten that product to the consumer yet. But you're going to help us. That's what we're going to talk about today; the role that people like you are going to play as we go after what some people ten years ago referred to as the trash fish. Then they dressed it up a little bit and called it underutilized species. Governor Busby of Georgia told me a year ago that they're now referred to as non-traditional species in his state. I'm not sure what we're going to call them a year from now, but they're still fish.

Through the marketing evolution, things like shrimp, and lobster, and others became more popular and we all had come to believe that that's the best. Not so; not so at all, because you haven't tried shark, or squid, or other things. We could serve it to you today or tomorrow and many of you who have already tried them would not know the difference. We've got a lot of work to do but we're going to do it together, because the consumer needs this resource due to diet changes and economic factors. Let's go on a tour and take a look at where the commercial fishing industry is coming from and where we think we're going and see how you're going to relate to these trends.

As I mentioned to you before, most people look at the commercial fishing industry in this country as a relatively backward industry. Frankly, in many ways it is. In the world market place if you take a look at the fishing industry in countries like Japan or Russia or some of the other more advanced fishing nations, you'll see we are 20 to perhaps 25 years behind. As large companies such as General Mills and Quaker Oats have come into the fishing industry, changes have occurred. One of the most important improvements has been in the quality of food. The number of quality controlled seafood products available in the market is on the rise. Technology is on the rise, transportation is improving, cold storage is improving and so the traditional fisheries are changing. Consumption is up world wide. In Japan the average person consumes up to 50 pounds of seafood products a year. In the United States we're hovering around 15 pounds, but is is gradually going up. It's because of changes in consumer patterns, whether they be dietary, price, availability, or whatever, but it's on the rise. World wide as well as domestically, it is on the rise. In our country we have suffered a very strange economic situation in that a great share of the seafood resources that are enjoyed by Americans are imported. Imported shrimp from Central and South America, tuna from Hawaii, cod and haddock are brought in from Iceland, as well as a host of other species brought from abroad. As the result of this tremendous influx we have suffered a very significant economic trade problem and that is a two billion dollar trade deficit in fishery products alone. In other words, you hear about the deficit in petroleum all the time, but you're probably not aware that of the five or ten major items that are involved in trade and in the negative impact on the U.S. economy, fisheries is about fifth or sixth. We have an enormous imbalance, importing more fishery products than we're exporting, and the economic impact has created a two billion dollar deficit on our economy. Obviously the government of this country, whether it be at the state level or the federal level has a commitment to make that change, either to balance, or make the U.S. an exporter of fish. About 20 percent of the world's fishery resources lie within 200 miles of the continental United States. The Congress in 1976 enacted the 200 mile bill or the Fishery Conservation Management Act. This provides that all those living resources in a band stretching approximately 200 miles along our coast, are now the sole responsibility of the United States of America. One of the problems that had created this piece of legislation was the tremendous influx of foreign fishing activity in New England and in Alaska, by the Russians, Spaniards, East Germans, and others. As a

result, they had over fished many of the stocks. Not only had they over fished them, but they had taken over our resources and sold them back to us. These foreign fleets were harvesting these fish off the Florida Keys. They were harvesting U.S. resources, processing them on their ships, and selling them to us. It took Congress two hundred years to pass the bill but we now essentially are the custodians of these resources. Twenty percent of the world's fishing resources are now within jurisdictional limits of the United States of America. We in the industry have a responsibility now to harvest those resources not only for you and the other consumers of this country but also to meet the world market place.

About a year or two ago the capture of the U.S. fishery products per year was 2.8 billion pounds. Although this sounds like a lot, it isn't. A lot of that capture is non-edible. It reflects some of the fish used in poultry related products such as fish meal and also in those products that are used in the pet food industry. The potential capture is 24 billion pounds. In other words, we're harvesting right now one tenth of that which is currently available. We've got a long way to go. We catch most of the shrimp, tuna, and flounder, but we're not catching many of the other species that are available in abundant quantity.

I talked about a fragmented industry; the catching, processing, storing, selling, and transporting is all broken up because we have many different companies. What we have in our country to some degree is gaps that must be filled. I would also add that what some people refer to as inadequacies, in other words our processing capability, our storage capability, our transportation capability just cannot respond to growth, as we try to reach this 24 billion pound harvest capability. The people I work for are all interested in one thing; you're interested in educating, but the people I work for are interested in something a little bit different called making money. They want to sell products. They want to use your system and the capabilities you have to sell those products. If they can't make money they are out of business. They have a job to do and they're going to be calling upon you.

What we've tried to do is to develop a tremendous marketing program. What I'm referring to here is in the Southeastern part of the United States. We have gone into the Mid-west, Canada, New England and other areas where people, like Sally Patrenos and Annette Reddel are going to get involved and alert the consumers in non-coastal areas to the availability of the product. One of the problems we've had is although these products are landed at the Gulf coast or the Atlantic coast, they have not been transported into the central part of our nation where many of the consumers reside, so we've established a marketing and promotional network to make that possible. How have we done this? We've used the mass media; we've used television. Last year for example, Sally and the people that work for her did over 350 television shows on seafood marketing. You can reach a lot of consumers with 350 television shows, and of course you also use other traditional mass media vehicles in order to sell seafood products. You as educators and I representing industry can work together as we jointly try to take the very simple concept and move it forward.

(Dr. Anderson's presentation was accompanied by slides.)

PROJECT OVERVIEW

Anita Webb

Roger shared with you many of the kinds of things that have been happening in the seafood industry, and I hope you picked up on their efforts to educate us as consumers at the same time they're involved in making money. Put all that aside for a minute, hold on to it, but let's focus back into the world of education. Go back in time with me about four or five years. If you recall it was about this time, in 1975-76, that there were some major changes taking place in the world of home economics education. The vocational amendments of '76 told us that we need to emphasize some kinds of things that have been neglected in home economics education. More specifically, consumer education and nutrition education. It was also about the same time that the U.S. Senate Select Committee came out with the relationship between diet and health. We in home economics education were debating these issues. We were trying to look at the impact upon the public school, the kinds of changes that would be appropriate, how we could better meet the needs of consumers as well as best serve our students in home economics education. We were going through these kinds of issues and their impact on our lives.

I recieved a phone call one day from George Flick, and he said, "Anita, what are you doing in home economics in seafood?" Here we had the dietary goals that tell us we need to cut down on red meat and increase consumption of fish and poultry. We were looking at how we could really implement that in home economics education, and I said, "George, let me get back to you, O.K.?" At that time I was teaching a class in Virginia Beach as a part of the masters program we had at Virginia Tech, and so I asked my class of 32 home economics teachers that Thursday night, "How many of you teach anything in your foods units in your home economics programs about fish or seafood?" They all looked at each other and said, "We all do tuna salads." I thought: I don't think that's exactly what George had in mind. We began looking at home economics text books. If you look at the texts you're using and you have a pre-1979 publication, you'll find an interesting kind of thing. There will be in the neighborhood of 50 to 60 pages on beef and pork, and in one case, one of the leading home economics text books had two pages on fish. So these home economics teachers I asked, "What are you doing in the classroom with fish?", were saying that they didn't know what to do. It's not in the text books. Many pamphlets and posters are available from the beef industry or egg board, but we don't get anything on fish and seafood. We were taught how, in our training programs and in our food labs, how to cut up a chicken or a cut of red meat. We can't educate the students in seafood until we are educated and have enough resources to use in the classroom. I went back to George and said, "O.K. George, here's what I found out." I told him the bit about the tuna and he responded, "There are over 300 seafood processing plants in the state of Virginia and not a one of them is in tuna. We have this resource right

here in our own state and it's not even being used." We began talking about how we could remedy this problem, how we could eliminate some of the kinds of gaps that existed.

As a result of our conversations, investigation of what was going on in the home economics classrooms, the need to implement the dietary goals and the kinds of things that were happening in the fishing industry, we realized the time had arrived for action in this very important area of education. We wrote a proposal. It was titled Seafood Products Education Program for Intermediate, Secondary, and College Students, and Faculty. Basically we wanted to address subject matter information. How can we provide teachers with the kinds of things that are not in the text books they have? Then we wanted to look at all the kinds of educational materials that you may find in curriculum guides that didn't exist in state programs and try to address those kinds of gaps. We also wanted to look at the in-service training of teachers. How can we get those kinds of experiences so that we feel more comfortable in the classroom and are better able to deliver some kind of instructional package to home economics students? In developing all these materials we felt a distinct need to pilot test them, and that became a component of our efforts. We also knew that it was important that we pilot test them in both coastal and non-coastal areas. They were actually used by home economics teachers in their classrooms in a coastal and a non-coastal area; in Roanoke, Virginia and Hampton, Virginia.

We then looked at how these materials would be helpful in the schools. We realized there was an area that had to be included that was being addressed more and more and that's our own coordination with school food service activities. We felt it was necessary to look at this component of the public education system and develop some kind of plan or materials for coordinating activities with school food service. Our ultimate goal after we had done all those things, was to bring people together and share these efforts, and that's why you're here today. What we will do during this conference is share with you the kinds of things that we've been doing for the past three years that have culminated in the materials you now have available.

(Dr. Webb's presentation was accompanied by transparencies.)

PROJECT OVERVIEW

Sandi Howlett

The first year of the project, one very important component was securing staff. Carol Whitaker and Anita Webb, worked to identify an advisory committee; people from food service areas, from home economics areas, and from marine education; who had some background in each of those areas as well as an interest of seafood products in meeting the needs of the classroom teacher as well as food services personnel. The advisory committee met, outlined goals, and determined what the best plan of action should be. During the first year, a tremendous amount of time was spent selecting materials. There was very little information available in text books, but there are many agencies that do have information, if only they can be identified and contacts made. My experience has been that those with information are glad to share it with others in hopes of making as many people as possible aware of fishery materials. A result of these efforts is two filing cabinets literally full of materials that we have collected from throughout the country, from extension service, National Marine Fisheries, and other seafood agencies in addition to teacher developed curriculum. We have quite a resource center at Virginia Tech.

The next objective was to conduct a food service training program. A determination was needed as to what information food service people really needed to implement seafood products into the school lunch program. Following the needs assessment, the Seafood Manual for School Food Service Personnel was written. It contains consumer information concerning nutrition, selection, purchasing, and storage of seafood, and merchandising information. During this first year, George Flick, as a part of the project, wrote the Seafood Products Course Lecture Guide. This publication has served as a very important resource for our work as well as a text for the Marine Food Products course he developed and taught for home economics personnel.

The second year of the project began my initial involvement. The goals for the year included the development, field-testing, and evaluation of instructional materials concerning seafood products for home economics teachers. The two instructional guides Seafood Products: An Instructional Guide for Home Economics Programs and Seafood Products: Food Service Guide are the result of many re-writes based upon in-put from teachers in Virginia as well as out-of-state reviewers. The materials were field tested in a coastal as well as an inland site to determine appropriateness and generality of the contents. The Hampton City Home Economics teachers were the coastal test site populations. They had an intensive marine food products experience in the form of a two week course taught by George Flick. In Roanoke, our inland field test site, a one afternoon in-service program was conducted highlighting only the main points involved in handling seafood products. With this preparation and some instruction on our behalf the teachers began to field test the instructional materials. Incidentally, the guides they

received were approximately one-half the size of the final document. In writing and evaluating these materials, we were particularly careful to avoid bias in any sense whether it be racial, sexual, ethnic, or geographic. The materials are appropriate for varying levels of student ability as well as the handicapped or disadvantaged student. The second year of the project also yielded a book of bulletin board ideas as well as an annotated bibliography of seafood related publications. Both of these have served as excellent supplemental resources for teachers in the field.

We are currently in the third and final year of the Seafood Products Education Project. Our primary goal this year has been information dissemination. In an effort to achieve this goal, project staff have made presentations and/or featured an exhibit at over ten state home economics association meetings as well as a variety of marine education gatherings. Two mini units have been developed for use with junior high students. Dr. Flick is revising and expanding the Seafood Products Course Lecture Guide for the third time as well as continuing to offer the collegiate level course. Also, a transparency set featuring a variety of marine species and related diagrams is currently being finalized. The highlight of our efforts is your presence here at the National Seafood Products Education Conference. In the next two days, it is my wish that we can share with you our information and experiences so that you can teach your students about the advantages and benefits of including seafood products in their diet patterns.

(Ms. Howlett's presentation was accompanied by transparencies.)

HOME ECONOMICS AND SEAFOOD AT THE INTERMEDIATE/SECONDARY LEVEL

Doris Wimmer

Sue and I are here today to talk about home economics at the secondary level. We have really been having a great time in Hampton with seafood. We do go back a long way. The first contact I had with this was a letter from George Flick saying that the graduate course had been developed in seafood and it would be available for home economics teachers and he was wondering if anyone would have any interest in this. I surveyed 26 teachers and I found that our knowledge and our skills related to seafood was very limited. We weren't teaching much and the teaching resources available to us were very limited. Consequently, the very first summer, 12 of my staff in Hampton enrolled in the Marine Food Products course offered by Virginia Tech. It proved to be a very enjoyable experience. You might say that in 1977 we set sail on an adventure that now involves 19 teachers in the city of Hampton who have completed the requirements for this graduate course. Sue and I have served on the advisory committee of this project. Our students have field tested seafood recipes. Several teachers have field tested the instructional guides and we have participated in the evaluation. At this point in time we feel much more confident in our ability to teach seafood. We've had some very interesting experiences with it. Just to get you thinking about seafood, I have a pretest for you. When you are in education, one of the first things that you want to do is to test the students to find out how much they know about seafood. The first place to start is with a pretest. I want you to imagine yourself in a secondary classroom with the pretest and see if you can answer these seafood riddles. I can't take credit for this exercise that I have just given you.

Open your instructional guides to the blue section. Here are your seafood riddles and all of the correct answers. Check yourself to see if in fact you made 100 or just where you stand on your knowledge of seafood. I used this exercise simply to show you that this is just one idea that is in your instructional guide. If you were in the classroom and teaching intermediate or secondary home economics this would be available for you to use with your students. It might be an interesting exercise to introduce a unit of instruction or it could be used as an evaluation following the unit. This is simply an illustration of one activity which you will find. I am going to take just a few minutes to give you a brief overview of the instructional guide and then Sue is going to give you an in-depth study of how we use the instructional guides in the City of Hampton to teach seafoods.

There are many features which make these guides practical for use by the classroom teacher. The consumer and homemaking guide is color coded for easy reference to the three home economics levels it addresses. In the

front of the guide is a section entitled "Casting Ahead." This section informs the teacher of any and all advance preparation needed prior to teaching the lesson. All lessons are written in competency-based format with concepts, generalizations, objectives, and evaluation components. Each instructional guide has an extensive bibliography and appendix containing diagrams suitable for making transparencies. The emphasis on the information in the guide is nutrition and consumer education in accordance with the 1976 Vocational Education Amendments. The contents of these resource guides can be integrated into the existing foods unit or taught independently.

HOME ECONOMICS AND SEAFOOD AT THE INTERMEDIATE/SECONDARY LEVEL

Sue Smith

There are three major problems that probably caused home economics teachers to avoid teaching seafood in the class during their food units. One is limited resource materials and this has been solved for you. You have the instructional guides here and they have many excellent resources. A second is limited teacher knowledge, and that's been touched on too. I have to admit that it was a personal problem. I can't recommend the marine products course highly enough. I understand I have earned a reputation from that course. The first time I filleted a fish, I picked it up with a paper towel and proceeded to try to fillet it wholly. By the end of the lab, I was picking the fish up with my hands and filleting it like an expert. We don't know enough about seafood to feel confident teaching it.

The last problem is probably the most difficult one to solve because it involves attitudes. I have found that many of my students, even in the coastal area, are very resistent or negative about eating or working with seafood. I think that one way we can overcome this is by helping them to be more familiar with the products. For my classes, this has been letting them actually clean the fish as well as prepare it. An additional problem that some of you may have if you are in an inland area is that you may not have all of the market forms available to you. You may not have fresh fish so you may have to supplement or substitute with frozen or canned forms. I would recommend that you try to find in local sources a seafood resource.

To reiterate much of what Doris Wimmer has told you, the instructional guides are comprehensive as well as flexible and may be used for many levels of student ability. There is a wide variety of instructional methods suggested which should appeal to most any student in your class. A portion of the guide which is particularly helpful is entitled "Supplemental Activities." It includes games, puzzles, and activities which may be used for exceptional students who work faster than other class members or for extra credit or time fillers when your plans end before the class period does. The book 101 Bulletin Board Ideas is particularly effective in getting students attention as well as using as a teaching tool. The ideas it contains are flexible and may be adjusted to fit other lessons as well.

Of course the highlight of our seafood unit is the lab time where the students put into operation the many concepts they have learned. It is with much pride the students serve the dishes they have prepared from the food's natural state, realizing how very much they have learned. I would like to reinforce the idea that we need to make the students more familiar with seafood products; that's the only way we're going to change their attitudes.

(Ms. Smith's presentation was accompanied by transparencies.)

PRE-SERVICE/IN-SERVICE TRAINING FOR MARINE FOOD PRODUCTS AT THE COLLEGIATE LEVEL

George Flick

The purpose of the course as I saw it wasn't to fillet fish and teach people to be "A-Number-One" fish eaters. I think we hoped we were going a little deeper than that. Why do we need to shuck an oyster? If you're going to have oysters Rockefeller, it's served on a half shell. It's very difficult to buy oysters on the half shell and you may wind up having to do it yourself. If you aren't careful and you don't do it properly it can be a very dangerous thing. It really isn't that dangerous if you do it right, you just can't be careless.

The Marine Food Products course was on the fundamentals of distribution, processing, preservation, packaging, storage, and marketing of fishery products. With the shellfish and the finfish we looked at the criteria for quality evaluation techniques for home preparation and processing, federal inspections and grades, and other market forms available, classification of shell fish, and growing water areas. What do you do if someone says "Here's an oyster I got myself - do you eat it or not?" And if many of you are from the South, one of the states had a problem with hepatitis and you can't blame the shellfish...it's probably the fact that people took it from polluted waters and passed it on. So we do tell teachers something about shellfish water growing areas and what's being done to protect them. What about red tide? You've heard don't eat oysters in the summer. There may be some basis for that but it may not be necessary. What about factors of quality? What about seafood toxins and infection? You hear a lot of that in the paper. We don't go into great detail but provide some background for those who need it. What about contaminate pollution? There's a lot about that in the newspaper. If you live in Virginia you've heard of kepone in the James River. It turns out it wasn't much of a problem at all. People never knew the James River was a sea oyster area; that oysters transplanted to other areas filter out the kepone after a short period of time. Unless you know something about the industry you're going to have a tough time as a consumer deciding what to eat; is it safe or not? You don't expect everybody to know everything about everything. We should work with other people and hopefully pick up a few facts and have a little better appreciation for it. We do talk about the nutritional value of seafood and we depended heavily on Dr. Sidwell to talk on that; that was an area I knew very little about. Now we have Laurie Dean and I'm sure that she can make some contributions in that area.

We talk about green products, the seaweed, animal feed, by-products and fertilizers. We give a great appreciation but we spend little time on it. Seaweeds are used quite a bit in our food supply. Baby foods and ice cream contain carrageen. Algae is used in many products. We do have many green based products we use but know little about. We talk about the con-

centrates: the meals and oils. We talk about the use of green products and other products, such as chemical property modifying.

We had a laboratory that went with it and we did talk about how do you shuck, pick, fillet, skin, and perform those skills. Again I don't think anybody will come out wanting to take a job as a fish filleter, and I don't think that's important. I don't think it's important they be able to come out and shuck oysters like a champ, but again if they want to do six to twelve oysters at home they have the basic skill. When we had that course in Hampton we found we had teachers from Nebraska and other inland states and they weren't able to teach the kids about their local source of food. It is unfortunate that kids grow up in Hampton and don't know anything about seafood. They ought to be able to appreciate it because it's the freshest and least expensive they'll find anywhere. They have quite a big fleet in Hampton: 120 boats. Kids know very little about it. We tried to go through them all. We talked about the minced fish, we looked at the different grades, what is shrimp, what's a good deal. The truck comes in town selling shrimp at $4 a pound. You go to the store and see it for $6, what's the better deal, what are the rules of thumb you can use, and so forth? We took a boat ride and I think that was important. The teachers found out what it was like to get up at 3:00 in the morning and meet a boat at 4:00, and they even got a chance to experience seasickness. It's at least a good appreciation.

(Dr. Flick's presentation was accompanied by slides.)

PRE-SERVICE/INSERVICE TRAINING FOR MARINE FOOD PRODUCTS AT THE COLLEGIATE LEVEL

Mary Parks

In terms of pre-service training at the collegiate level there are two areas where we can make an impact concerning educating others to marine education food use. One is to offer courses for people seeking a career in a seafood area of marine science or in human ecology. In the second area, courses may be offered for people in the seafood area, for restaurant and school personnel, and for others seeking additional information. Much training can be done through summer courses and workshops. The impact can be felt greatly in those directions. In terms of human ecology, I'm limited a little bit, as you are in public education, by the time factor in that every subject area is calling for more time. I can work it into basic food preparation, some in meal management; I do some work with seafood products in advanced experimental foods as well as a course in special problems. So yes, we can do some work with fishery products in these courses though as yet we cannot offer a full course as VPI does.

With my students this last semester I asked them to write a paper. I asked them to write about how they feel about seafoods. Some of the questions I asked them to consider were: Does your family like seafood? How often is it eaten? What are four or five favorites? At what meal is it eaten? How is it most often prepared? What are your sources? Describe any unusual seafood recipes. I thought I'd kind of pick their minds and see how they felt about it. It was interesting. Predominately, they like seafood. There were only two that said they didn't like it too much; one said they did not like it at all and they did not consume it, and the others liked it. How often is it eaten? The answer most often given was tuna, two times a week. Friday was often mentioned. What are your four or five favorites? Interestingly they suggested convenience foods. They liked Long John Silver's and McDonald's fillets. Crab, shrimp, scallops, and tuna they liked. Once in a while they mentioned bass and flounder but this was not predominant. We do have a lot of crab around, but many of my students don't necessarily come from Hampton. Hampton Institute draws students from all over the United States. At what meal is it eaten? Anytime; several mentioned breakfast, but mostly it was lunch or dinner. How is it most often prepared? It is almost always fried; that's the way they want it. What are your sources? Very few go fishing or enjoy this form of recreation; most go to the grocery store or fish market. Of the 34 papers I only got two unusual recipes. Most recipes involved working in or with corn meal. A big area we could do more in is the creative use of seafood, unusual recipes, working with more species. Very seldom in the papers did they mention casseroles. Most of my students enjoy working with seafood and are eager to do so. We need to give more emphasis to seafood education at the pre-service collegiate level.

(Ms. Parks' presentation was accompanied by transparencies.)

SCHOOL FOOD SERVICE AND SEAFOODS

John Miller

As we have fewer school food service people here than home economics teachers, our remarks will be directed a little more towards telling the others about the food service program and the relation of seafood to it. The use of fish in the lunch program is not new. We've served fish for years. It used to be an every Friday occurrence that you had fish. It's changed though today, and fish is served any day of the week. You'll find it offered in schools several days a week where there are choices of items available to the children. It used to be in the past that schools purchased the frozen or fresh filleted, rolled it in corn meal, and deep-fried or oven fried the fish. Today you're seeing that the schools are buying breaded, cooked fish portions or fish sticks. One of the big problems that we face in the school food service is being sure that the fish we purchase provides the amount of meat required by the USDA for the lunches. To be sure that the serving contains two ounces of cooked meat, the USDA has developed a purchase guide or buying guide for use in school programs. Like everything else with the federal government, nothing is constant; everything is changing. We received revisions of the buying guide last January and had started the process of doing an update for the buying guide to get 2,000 copies printed and distributed to schools only to find that about a week after we started it the USDA was developing a new buying guide. This is the revision we received in January. The new buying guide has still further changes on the fish. At that time the buying guide said a fried breaded 65% fish four-ounce portion provides about 1.8 ounces of cooked fish. A raw breaded 75% fish four-ounce portion provides about two ounces of cooked fish. Under the new buying guide the USDA recognized that the yield was low, so they made changes; for example the four-ounce portion will now in the new guide provide about 2.2 ounces of cooked fish. The problem is knowing whether the product that says four ounces will provide the amount specified. The USDA is recommending that in your purchasing, you try to select companies whose product labels provide qualitative and quantitative information such as the raw and cooked weights of the ingredients, processing procedures, quality control program acceptable to the U.S. Department of Agriculture as well as bear information on portion size and control.

For school food service programs it is important that they be able to tell what is being purchased for use in the school lunch program. A four-ounce portion containing two ounces of fish does not mean that it contains two ounces or will provide two ounces of cooked fish which must be served. We're seeing that primarily in the school food service program, the schools are using the fried or breaded, precooked fish portions. However we do have one or two schools that at times during the year expand their fish offerings to include shrimp. You wouldn't think of shrimp as

being served in schools, but one high school manager I know of in a rural area away from the seacoast wanted her high school students to know how shrimp tasted. She wanted to provide them with a new food experience not usually available to them. I applaud that person for looking ahead, not only for the food she was offering, but also for the educational benefit she was giving the children of her food service program.

SCHOOL FOOD SERVICE AND SEAFOODS

Cordelia Powell

I believe I have learned more than I will ever be able to share from participating in this conference. Certainly there is a great deal to know about seafood. In the school lunch program we find that fish portions are acceptable and used for many reasons. One is because of the labor involving preparation. The second reason is the ease of keeping up with the count, whether batter dipped or pre-portioned. However, there is a problem involved in preparation. In the manual that has been prepared for school service people, we find specific directions. Also, we find in the recipe card file prepared for school food service use, a certain section devoted to preparation and serving of seafood. If we can get managers and staff to provide these items from preparation directly to the line, it is more acceptable than when the dishes are held prior to serving. There's also a problem involved in the preparation of the pre-portioned, as I believe we've mentioned several times here today. This is a fried product. There is a recommendation in the new regulation that we should attempt to reduce the fat content of the menu. This would suggest that even though it is a fried product, perhaps we should not add fat to prepare it. This is a trend we would recommend.

We need each of you, as you go back, to be our masters because this is a teaching experience and the cafeteria is a laboratory. You're doing the teaching and the cafeteria will be the laboratory for putting into practice what the students have learned in the classroom. Along the way tasting parties or opportunities to taste seafood prepared in different ways could help expand student horizons concerning the variety of products available. Included in the new regulations is a mandate to involve students and parents more. This would provide an opportunity for teaching in schools where we have student organizations. We need to see more done in merchandising the food on the line. As we see more and more salad bars being offered and this is an excellent thing to offer a child, this would lend itself to providing a wider variety of seafood, rather than just the fried. Certainly the content of the product is very important. We looked at menus used in thirty divisions of the state last year. We found seafood served an average of twice a month. Usually the seafood was pre-portioned, batter dipped, fish sticks, fish sandwiches, or tuna salad. You can see we have a teaching job. In one division some of the nutritional education money was used this year to look at the acceptance of menus; they tried shrimp. They served the menus for a twenty day cycle and then they weighed the food that was returned from the menu served. They served a different twenty day cycle and then repeated the initial cycle menu plan. While all the food was accepted, they found that the second time around the shrimp was accepted as well if not better than the chicken or beef. They also found that the second time around there was less food waste. Following the first serving, they did a unit on seafood and they found that this really did pay off. This may be a clue as to what must be done in the areas of education and merchandising of seafood products. Unless the food is merchandised the children will not accept it, regardless of the food content.

SCHOOL FOOD SERVICE AND SEAFOODS

Carol Whitaker

I'd like to talk a little bit about why it is important to include seafood in the school lunch program, and serve it in the cafeteria. For one thing we know that the foods we learn to eat after about age five, we learn to eat away from home. Up to that time I think that in your early ages the parents get used to the fact that Sally won't eat hamburger and Tommy won't eat peas and so everyone is pretty well left alone and not forced to eat those foods. But when you get away from home and all they serve are peas, then you're stuck with eating peas or starving. It's a very good way to introduce people to new foods.

Judson Harper did a plate waste study, and he found that students enjoyed seafood and consumed higher percentages of seafood than some other foods. He did this on both fifth and tenth grade students. Fish came out higher in popularity than beef and poultry. It is well accepted in the schools. I think everyone is concerned that they serve food the students will eat.

One reason we eat is for nourishment. Seafood is high in protein, low in fat, good for B vitamins and sometimes A and D vitamins, and minerals essential to the diet, especially trace minerals that aren't often found in other foods.

Finally, how are we going to get people involved in eating seafood in the schools and serving seafood in the schools? I think one of the most important ways is going to be through nutrition education, not only for the students but also for the teachers, so the teachers are made aware of seafood and its benefits. Not just home economics teachers, but science teachers and English teachers also need to learn more about nutrition. Everyone in the school should be involved in nutrition education. Also if we're going to have seafood served in the school we should work closely with school lunch personnel if they're not aware of some of the forms available or not aware of some forms accepted by the students and easy to prepare. There are lots of different ways you can get involved in the seafood education program with the school lunch and with the teachers. You might have awards and games. A contest to give a new name to the fish portion served on the bun could be held and an award given to the best name. Posters could be put around the school. These could be secured from an in-school contest or a commercial source. The National Oceanic and Atmospheric Administration provides free films about seafoods so there might be a portion of the cafeteria where you could set up a projector and show films during lunch time. There are lots of different things that can be done to inform students and everyone else about seafood.

(Ms. Whitaker's presentation was accompanied by transparencies.)

SEAFOOD NUTRITION

Virginia D. Sidwell

Good nutrition and good health go hand-in-hand. We are very much aware that good nutritional eating habits are an integral part in the maintenance of good health. Today, we will become aware of the role seafood can play in maintaining this relationship.

Dr. D. Mark Hegsted, Director of Human Nutrition Center, USDA, aptly commented on this relationship in the testimony before the Senate.

> "...I wish to stress that there is a great deal of evidence and it continues to accumulate which strongly implicates and, in some instances proves that the major causes of death and disability in the United States are related to our diet. It includes coronary artery diseases which accounts for nearly half of the deaths in the United States, several of the most important forms of cancer, hypertension, diabetes and obesity, as well as other chronic diseases."

Although nutrition is not necessarily the cause of these diseases, the amount and kind of foods we eat are intimately related to these diseases. It must be understood that many such diseases may start in childhood and become manifested 20, 30 or 40 years later. The specific roles of the nutrients and interrelationship between nutrients in seafoods and other foods must be known in order to prevent or ameliorate these chronic diseases. The greater consumption of seafoods could play an important role in reducing the prevalence and severity of these chronic diseases.

School lunch program is an excellent media for teaching good nutritional eating habits, which will influence the rest of the student life. All the good nutritious food in the world will do no good, if it is not eaten; therefore it must have "eye appeal," that is, it must be attractively served. During the past year the TV program--60 minutes--featured the acceptance of school lunches by the students. The foods similar to the ones sold at the fast food outlets were more acceptable than the standard school lunch--frankfurter in a roll, baked beans and sauerkraut. I sympathized with the school children. I wouldn't like it either--no matter how nutritious. The serving plate was too small for the serving size. The juice from the beans and sauerkraut ran together, also it moistened the roll. There was no interesting combination of color. Compare this meal to a fish sandwich from McDonald's which certainly looks more appetizing. It is served on a plate by itself. The size of the serving does not overwhelm the average child. School lunch managers should take a lesson from the fast food interpreneurs. No reason why school lunches can't be attractive as well as nutritious.

Seafood can play an important role in school lunches. It is nutritious as well as easy to prepare. Don't serve gourmet type sauces on the fish. Make it simple and attractive.

Fish and shellfish are very nutritious, for example, an excellent source of high quality protein. They also contain generous amounts of amino acids that are needed to meet man's requirement. Moreover, fish protein is easily and completely digested.

Protein contains four elements; carbon, oxygen, hydrogen and nitrogen. By combining these elements in different ways, amino acids are formed. In turn the amino acids combine to form protein molecules which link together to form muscle fibers and other proteinaceous tissues. There are 22 different amino acids. Thriteen can be synthesized by the body, and termed to be non-essential. The other 9 must be supplied by the dietary intake. Seafoods contain ample amounts of these essential amino acids.

The results of the many feeding trials indicate that the protein quality of the seafood muscle remains approximately the same whether it is raw, cooked or processed. In fact, the quality of the protein is comparable to milk protein or casein. Another feature of this protein is that a small amount will supplement the proteins found in cereals and vegetables in the extent that the combined proteins will be comparable to the milk protein in quality. For example, 90 grams (about 3 ounces) of corn meal and 8-10 grams (about a third of an ounce) of dehydrated fish flesh will make a foodstuff with a protein equal to casein.

In general seafoods contain a high percentage of polyunsaturated fatty acids, also are low in cholesterol and calories.

These polyunsaturated fatty acids in seafoods are different than those found in vegetables or any other animal fat. Fish oils differ from vegetable oils in that they contain fatty acids with more than 18 carbons and up to 5 or 6 double bonds. Presently, it is assumed that the marine oils function in somewhat the same manner as the vegetable oils, overlooking the nutritional significance of the long-chained polyunsaturated fatty acids. We are not very knowledgable about the mechanism involved in the metabolism of these long-chained (C_{20}, C_{22}, C_{24}) polyunsaturated fatty acids in animals including man under normal conditions. In addition, what metabolic changes occur in the presence of an antioxidant, like vitamin E, selenium, etc? Do these long-chain and unsaturated fatty acids have any effect in pathophysiology of the heart or any other organ in the presence or absence of such factors as hyponoxia, stress, alcohol, etc.

So far, I've raised a number of questions concerning the nutritive value of the polyunsaturated fatty acids found in fish oils. I do not want to leave you with the impression we know nothing about the polyunsaturated fatty acids. We have scientific evidence that they are needed: (1) to prevent skin disorders; (2) to facilitate the absorption of the fat-

soluble vitamins A, D, E and K; (3) to reduce the accumulation of cholesterol in the liver and vascular system; and (4) to synthesize the fatty materials that coat the nerve fibers.

Dr. Borgman at Clemson University, observed in rabbits that were fed a high saturated fat diet (lard in this case) developed gallstones. When he included a relatively large amount of cod liver oil, he was able to prevent the accumulation of gallstones, also in cases where the animal had developed gallstones to obtain a remission when fed cod liver oil. Now, the question is what fraction of the cod liver oil was the active agent?

In population surveys it was noted that multiple sclerosis, which is more or less a disorder in the lipoid coating of the nerve fibers, is seldom found amoung fish eating populations.

Earlier I said seafood was low in cholesterol. It is. The educated generalization is--finfish has less cholesterol in the edible portion than the crustaceans or mollusks. In reviewing the data published in literature I learned that this generalization is based on relatively few species and very little amount of data. For example, in reviewing the data on oysters I learned that the amount of cholesterol in oysters varied from 40 to 400 milligrams (mg). There were 10 figures in all. Which is correct? In critically studying the data I found that the 400 mg was obtained from an early study, when the method for determining the amount of cholesterol was quite crude. The extraction was too short in the study where 40 mg were reported. What caused the variation in the other values? I did not know. Consequently, I conducted a small study to obtain some indication. Oysters were harvested each month from the Chesapeake Bay, Alabama Bay and Gulf of Mexico. Some of the variation is associated with the area of catch, season and/or spawning stage. In another study with Pacific oysters Dr. Gordon, Oregon State University, observed that all the cholesterol in the oyster is not in an available from to the consumer. If this is true for all the mollusks than the cholesterol content is no greater than it is in the finfish.

There is much controversy over the influence of dietary cholesterol in the serum blood cholesterol. True, high serum blood levels are associated with coronary artery diseases. It is due to a genetic trait whereby the individual synthesizes more cholesterol than the body needs to manufacture hormones and bile. Or, is it a faulty diet over many years before the disease is identified? I feel it is both plus stress, lack of exercise, living habits, and so on. Some scientists say that the unsaturated fatty acids found in fish and vegetable oil will reduce the serum levels. Others claim the fiber level of the diet interfere with the reabsorption of cholesterol from the large intestine.

To maintain a normal cholesterol level, my contention is: (1) eat a variety of foods; (2) decrease weight if you are overweight; (3) decrease intake of high caloric foods; (4) increase daily exercise; and, (5) don't consume all your calories in 1 or 2 meals--spread it out into 4 to 6 meals a day. This regime must start early in life, not at 40 or 50 years of age.

Millions of years ago life began at sea. During the process of evolution the terrestial animal, as well as man, has not lost the nutritional need for many of the elements present in sea water. Out of the 54 elements found in nature, 22 are nutritionally important to man. Seafoods contain many of these elements found in the sea, therefore they contribute significantly to the amounts needed for the nutritional requirements of man.

To demonstrate the importance of some elements in a 70 kilogram man (154 pounds), 3.2 percent of it (2.3 kilograms) consist of the following: calcium, phosphorus, sulphur, potassium, sodium, chlorine, magnesium and silicon. Eleven grams are made up of minute amounts of elements referred to as trace elements or microelements. The following are nutritionally important to man; vanadium, chromium, manganese, iron, cobalt, copper, zinc, molybdenum, selenium, iodine and fluorine. There are indications that nickel, strontium and tin may be beneficial to mammals. The lack of these elements contributes to several common chronic diseases of adults such as, atherosclerosis, slow wound healing, occlusive vascular diseases, delayed maturity, loss of the sense of smell and/or taste and general malnutrition.

Whole fish, such as canned sardines is an excellent source of calcium, phosphorus and fluorine. Fillet fish is low in calcium and fluorine, but contains an appreciable amount of phosphorus. Calcium and phosphorus are needed in relatively large amounts to build and maintain boney tissue. In addition, minute amounts of fluorine will assure children against dental caries and the elderly against brittle bones. Furthermore, phosphorus is involved in many biochemical reactions for the release of energy and for the building and maintaining of body tissues.

Fresh seafood--by that I mean fish or shellfish right out of the water--is low in sodium. It will contain 30-150 mg of sodium with an average of 60 mg per 100 grams of edible flesh. If the fish has been processed, frozen, canned or dried--the sodium content will vary. It all depends on the methods used in processing. Even the method used to handle fish on board ship affects the sodium content of the flesh; therefore only fresh seafood can be used in a low sodium diet.

Seafoods contain 240 to 400 mg of potassium. This element along with sodium plays an important role in cellular physiology. They are needed to maintain osmotic pressure and the acid-base balance.

Magnesium is another important dietary nutrient, since it activates the enzyme system which functions in the metabolism of carbohydrates to produce energy. Fish is a good source of this element. The amount found in the flesh is associated with the amount found in the environment and/or food chain. It is not known whether the animal accumulates this element in the muscle or reaches a saturation point at which the magnesium content levels off.

Zinc is present in the cell of all living organisms, especially plentiful in marine organisms. There is an appreciable amount in each serving 300 to 600 mg. The amounts found in the seafood flesh depends upon the amount of zinc in the environment. Zinc functions in the enzyme systems involved in the carbohydrate and protein metabolism. It is also involved in the mechanism that carries the carbon dioxide from the cell to the lungs to be exhaled. It is also necessary for the metabolism of alcohol, therefore a drinker will require more zinc.

Oysters will cure and prevent anemia since they contain significant amounts of iron, copper and vitamin B_{12}. These nutrients along with protein and vitamin C are needed for the synthesis of hemoglobin. The present composition tables indicate that seafoods are high in iron. How much of it is available is not clearly known. These determinations were done some years ago when the analytical technique was rather crude. There are indications that the iron present in fish is not readily available. In the oyster experiment the presence of vitamin B_{12} may have confounded the results.

Seafood is a rich and natural source of iodine. It is concentrated in the fat or the skin of the animal. As we all know this element is needed by the thyroid gland to manufacture thyrozine. In turn this hormone raises the oxidation rate in the cells, thus raising the metabolic rate.

Manganese is present in seafood in varying amounts. It depends how much is present in the food chain. It is believed that a serving or two of seafood per week will supply man's requirement. This element activates a number of enzyme systems: for example, it is involved; (1) in synthesis of cholesterol; (2) in the breakdown of large protein molecules, and (3) oxidation of carbohydrates.

For a long time the biological significance of selenium was confined to the toxic affect. About 1957, several scientists noted that they could prevent the deterioration of liver tissue by adding selenium to the diet of the experimental animal. They observed that it functioned along with vitamin E in the metabolism of fat. It definitely does not replace the vitamin. Recently, it was learned that selenium will reduce the toxic affect of methylmercury. Seafoods will supply adequate amounts of the element, about .4 to .9 mg per serving.

The amount of chromium found in flesh of aquatic animals will range from 10 to 40 micrograms per serving. This metal functions in the cholesterol metabolism. It is thought that the lack of this mineral will cause fatty material to accumulate in the aorta. This disease is called atherosclerosis. It also plays a role in glucose tolerance of man.

Not much is really know about the function of vanadium. There is evidence that it interferes in the synthesis of cholesterol.

There are indications that the vitamin content in fish muscle varies with species, age, season, sexual maturity and geographical areas. No extensive study has been published on vitamin content in various species of fish flesh.

Most of the vitamin A and D is found in the viscera, especially the liver, very little if any in the flesh. Cod, herring and ocean perch contain very little vitamin A in their flesh, even when the liver has a large amount. The eel, shark and lamprey contain more vitamin A in the flesh. There is more vitamin A in the dark flesh than in the white. In general there is no vitamin D in the flesh, a few species, sardines and mackeral, may have a little. Very little is known about the amounts of vitamins E and K in fish flesh.

Some important members of the water-soluble vitamins which exist in fish flesh includes thiamine, riboflavin, pyridoxine, niacin, folic acid, pantothenic acid, B_{12}, and vitamin C. The distribution of these vitamins in the body of the marine animal is evenly distributed throughout the muscles. The amounts of these vitamins vary with species, season and environment. The data on vitamin content of fresh fish is quite sporadic. Even less is known about the vitamin content of processed or cooked fish. Due to the lack of knowledge of the vitamin content of fish flesh it is difficult to make a conclusive statement whether it is a good reliable source of any of the water-soluble vitamins.

In a short time I tried to outline the nutritional benefits of including seafood several times a week in your diet. You will notice that I did not advocate the eating of fish exclusively, for it does not fit into my philosophy of good nutritious eating habits. Do you realize that 40 different nutrients are needed to meet the nutritional needs of man? No food, even the ones considered as the most perfect foods--milk or eggs--contains all these nutrients in adequate amounts therefore we must eat a variety of foods. This is true whether you are on a reduced caloric intake (reducing diet), a maintenance diet, or an increased dietary intake to gain weight. By eating a variety of foods you will not develop a deficiency of a nutrient, nor the detrimental effects of an excess of a nutrient. A variety also reduces your likelihood of being exposed to excessive amounts of contaminants in any single food item. For example, the formation of nitrosamine in the digestive tract from sodium nitrate which is used to reduce the undesirable organisms in smoked fish can be dramatically reduced by the presence of vitamin C from the fruits and vegetables in your diet.

SEAFOOD IS OUR SAL(I)VATION

A brief review of the fruits of the sea in literature and history

Hal and Libby Goodwin

What you are about to hear is a research report based on a hungry attack on the seafood Humanities literature, plus a single empirical observation. In a sense, this monumental research enterprise might be likened to a fishing expedition for the Great White Shark that ended up by catching Charlie the Tuna.

All research, of course, starts with a problem statement and our problem was pretty simple. We had given Sandi Howlett a title, but apart from our own experiences and prior studies, we had no clear idea of how to live up to the title. When I say "we" it is not editorial, or because we have royal blood, but because my wife Libby and I did the research together.

For inspiration, I took her back with me in memory to my youth in the great seafood state of Massachusetts. One fond taste memory was of going with my parents to get fish and chips. They were handed to us in a cone of newspaper, the Springfield Union, to be exact. Later, the newspaper gave way to a cone of light cardboard, about the consistency of a manila folder. I didn't realize the significance of this at the time, but the fish and chips place went out of business a short time later.

We decided to rediscover fish and chips as a way of getting both our digestive and mental juices flowing, and we went to an Arthur Treacher outlet. It was a letdown. We wondered. Was it that the nameless fish probably came from Iceland or Scandinavia in a frozen block to be cut into slabs, thawed in a limp blob, battered, and dunked in hot grease? Or, was it that memory is always more glorious than reality? Libby said it was just tasteless goop, but I didn't think so, and I went ahead and integrated the data. First, in my youth: after great success with newspaper cones, the fish and chips place switched to cardboard and soon went out of business. Second, the fast food fish and chips were handed to us on polyurethane platters. Third, I've had some experience in newspaper press rooms, and I know that printer's ink has a more positive aroma than most white fish, and more, certainly, than frozen and greasy white fish.

I made an intuitive leap to the real truth, which I think is of deep significance for this conference: the organoleptic qualities of fish and chips are, in substantial part, determined by the wrapper. (May be cited as Goodwin's Hypothesis.)

After getting into the literature, I was delighted to find that an English peer, Lord Champion, gave an interview in 1963 to the New York Times. His Lordship claimed that the English tradition of wrapping fish and chips in newspaper definitely determines the taste. I quote Lord Champion: "I am such a great connoisseur that I can tell the difference between the tang of the Beaverbrook Daily Express and the mellow flavor of The Times." So, there was the independent verification from unquestionable authority that my important conclusion needed.

This proves, naturally, that a sufficiently energetic literature search can turn up cooroboration for any hypothesis.

However, a literature search does not necessarily turn out to be productive in all ways. Knowing that the function of a dinner speaker is first to keep the audience awake, then amused and informed, we searched for seafood jokes and wit. It was a sterile search. Apparently seafood isn't funny. This was a surprise, because TV commercials had led us to believe that clams were pretty humorous and crabs downright hilarious. About all we found was the remark of a man who was going to Scotland to get some of the seafood cheese Jacques Cousteau talked about. Turned out he was referring to the Loch Ness Meunster.

Our studies took us into histories, anthropology texts, poetry collections, and even cookbooks. The cookbooks weren't very helpful, although most of them had stirring chapters. But we did get some helpful hints for you. It turns out that gourmet fish cookery around the world varies only according to the sauce, and in the Alice's Restaurant Cookbook, Alice Brock says this:

> "Don't be intimidated by foreign cookery. Tomato and oregano make it Italian. Wine and vinegar make it French. Sour cream makes it Russian. Lemon and cinnamon make it Greek."

To this, Libby Goodwin adds, "Soy and oyster sauce make it Oriental, and dill makes it Scandinavian." I would also have said Mayonnaise makes it French, keeping in mind Ambrose Bierce's definition of mayonnaise as "one of the sauces used by the French in place of a state religion."

We also found wisdom in the literature, like this adage: "Only a fool disagrees with a mule, a skunk, or the cook." And we came across basic information everyone ought to know, such as the fact that Kodiak, Alaska, once had a weekly publication called The Kodiak Fish Wrapper and Litter Box Liner.

In searching for the words of great men and women about seafoods, we began, naturally, with Epicurus, seafood being epicurean--sometimes. We found that his disciple, Lucretius Carus, was the one who said: "What is food to one man may be fierce poison to others." What could he have had in mind other than seafood allergies?

The poet Carolyn Wells parodied Lucretius this way: "One man's fish is another man's poisson."

A major discouraging discovery is that most historians are only vaguely aware of fisheries and seafood. It is a fact that the economy and fortunes and much of the culture of America originally were based on fish and fishing. But among the major American historians, only Samuel Eliot Morison makes this clear. Most of the history we cite came from a rather nice collection of books about food. Not cookbooks. Some are more than a century old, and a few are current. From all these sources we put together a sort of historical and literary bouillabaisse, starting with the fish of greatest importance to our colonial history: the codfish.

It's only in recent years that we have begun to appreciate the huge amount of Transatlantic travel before the arrival of Columbus, and it's seldom we're told that the reason was codfish. The Vikings same to start colonies, and perhaps the Irish did, too. But the Basques apparently were the first commuters. In the beginning, they chased whales, and as they chased them farther and farther from Iberia, they came across the Grand Banks. There they found such an overwhelming abundance of cod that they forgot about whales and concentrated on fishing, coming in the fall, wintering over to salt and smoke the catch, then returning home in the spring with a pause on the way for adding some fresh fish.

There is still a place in Newfoundland called Port aux Basques. When the explorer John Cabot reported on the vast quantities of fish in the New World, he said: "But especially there is a great abundance of that kind which the Indians call baccalaos." The Basques had come so regularly that the Indians had taken to calling codfish by their Basque name.

The Basques were joined on the Grand Banks by the Bretons, from that part of France we now call Brittany, and the Bretons still claim it was their fishermen who told Columbus about a continent in the Western Sea.

In the year 1602, the explorer Bartholomew Gosnold complained that his ships were "pestered with cod." Pestered how? It's a curious statement. Anyway, it was Gosnold who named Cape Cod.

The first real public relations man for the New World was Captain John Smith. His crew caught 60,000 cod in one month in 1614, and wrote to his backers: "Let not the meanness of the word 'fish' distaste you, for it will afford as good gold as the mines of Guiana or Potosi, with less hazard and charge and more certainty and facility." This report influenced financial support for some later colonizing voyages, including one of genuine fishermen to Marblehead. But it took time.

There was an abundance of edible seafood, over 200 readily available species including the green turtle, which ranged as far north as Cape Cod. Yet, despite sea and land abundance, the early colonists in Massachusetts

and Virginia came close to starvation. Our histories make much of their hardships, but very seldom point out why they nearly starved in the midst of plenty. It's because they were middle class tradesmen, clerics, and scholars with almost no farmers, fishermen, or even laborers. They didn't know how to work with their hands and considered it beneath them. In spite of legend, there weren't even many aristocrats with experience in hunting. The Indians tried in both colonies to teach the settlers how to plant, hunt, and fish, but with little success at first. To an incredible extent, the colonists were dependent on imports from England, including imported foodstuffs.

Civil war struck England and the flow of goods to the colonies was cut off. After nearly starving, the Puritans learned to fish from sheer necessity. In a single decade, from 1630 to 1640, codfish exports grew to 300,000 fish yearly. It took vessels to fish and to carry on trade, and the great American shipbuilding boom got underway, eventually opening the world to American trade. By the end of the century, exporting fish to Europe and the West Indies was the basic industry of the northern colonies. Fortunes were made and a new "codfish aristocracy" grew to rival the aristocracy of the ministry. A young man named Cabot grew rich as skipper and part owner of a codfishing schooner. Wealth separated the Cabots and others from the common folk and they grew snobbishly undemocratic, as this old rhyme tells us:

"I come from good old Boston,
The home of the bean and the cod
Where the Cabots speak only to Lowells
And the Lowells speak only to God."

Another less well-known rhyme was current, too:

"Of all the fish that swim or swish
In ocean's deep autocracy,
There's none posses such haughtiness
As the codfish aristocracy."

The codfish itself wasn't very aristocratic. The ways of preserving fish were limited, and the cod was prepared by turning it into dun cod, or simply dunfish. It was split, salted, and piled up in a dark place covered with salt hay or eelgrass for two or three months, then uncovered, stacked under pressure, and buried again. For cod caught in the spring, this treatment--if all went well--produced a properly mellow, dun-colored fish by fall. Dun color, my Merriam-Webster says, is a nearly neutral, slightly brownish gray.

In the end, Governor Winthrop of Massachusetts was moved to say: "It was adversity that made New England great. That and codfish." And, of course, the sacred cod, symbolized by a less than artistic wooden version,

still hangs in honored glory in the Massachusetts House of Representatives.

A footnote to history: In March, 1775, King George signed the New England Restraining Act forbidding the Yankees to fish on the Grand Banks and elsewhere. This law would have ruined the economy of New England if observed, and caused the simmering rebellion to break out into active revolt. But there was a bureaucratic delay in England, and the Act was sent by slow ship. While it was still enroute, General Gage sent his forces to Concord and Lexington where, in Emerson's words, the "embattled farmers stood and fired the shot heard 'round the world." When the Restraining Act arrived war was already in progress, dating from the 18th of April. And that's how close we came to having the American Revolution triggered by codfish.

Even during the Revolution, despite the British blockade, blockade runners continued to carry dunfish to market. The poorest grade went to the West Indies where it was fed to slaves. The middle grade was consumed in the colonies, and the best grade was sold to Catholic Europe. So, with this history, someone here may want to start a movement to make cod our national fish.

As the west opened up, dried salmon became another important fish export. The Hawaiian Islands, still called the Sandwich Islands in those days, accepted great quantities in trade for Sandalwood. We still see the relict of this in a Hawaiian luau when lomi lomi salmon is served. Lomi lomi means massage in Hawaiian, and the dried salmon was hand massaged into flakes. Today it's put into a kind of pickled salad, not a gourmet dish.

When cans came into being canned salmon became an important trade product, as it still is--even though only high income people can now afford it. I remember being sent by mother to buy a can of pink salmon for the cat. It cost ten cents. If you know anyone today who feeds salmon to the cat, let me know and I'll go meow under the window.

The first cannery opened in Alaska in 1878, and for several decades there wasn't much change in the technology. For instance, Duncan Law is a Chinese-American scientist who works at the Oregon State University Seafood laboratory at Astoria. Duncan told me how he and other Chinese worked in the cannery in Astoria for ten cents an hour. His job was hand-soldering the tops on the cans. To me, that epitomizes change in one man's adult lifetime. Many Americans have had fresh salmon, but very few have had the chance to eat fresh tuna. I think it's rather interesting that two of our most important commercial fish are still consumed primarily in canned form.

We find little mention of east coast salmon in the histories, because other fish were held in higher regard. One considered even more lowly than salmon was shad. It was so poorly thought of, in social status terms, that if company came while shad was on the table it was quickly hidden so the family wouldn't be embarrassed. In later years there was a change, partly caused by the technique of cooking planked shad, given status by the Fish

House Club of Pennsylvania. This is an exclusive club of 30 members that still exists and is said to be the oldest private club in America. The club is most famous for its Fish House Punch, a noble brew of great authority on which the framers of the Declaration of Independence forgot their differences in a haze of strong drink. George Washington became fond of planked or baked shad, and there came a time when members of Congress would take congenial and bibulous boat trips down the Potomac for shad feasts when the spring runs began.

The lowly shad was celebrated by one special author, Rex Stout, creator of the fat, gourmet private eye, Nero Wolfe. There are over 50 Nero Wolfe books, and quite often the fat genius and his Boswell, Archie Goodwin (no relation) sit down to shad or shad roe: shad broiled with sorrell sauce is a favorite, and so is shad roe mousse Pocahontas. The Nero Wolfe cookbook has about 40 superior seafood recipes, most of them tied directly to a meal described in one of the mystery books, which makes the combination rather different and interesting.

There is, believe it, a poem to the shad by Ogden Nash:

"I'm sure that Europe never had
A fish as tasty as the shad.
Some people greet the shad with groans,
Complaining of its countless bones.
I claim the bones teach table poise
And separate the men from boys.
The shad must be dissected subtle-y;
Besides, the roe is boneless, utterly."

I'm utterly sure the Fish House Club developed an appetite for planked shad after seeing the Indian way of planking salmon, pinning it to a plank or piece of driftwood, preferably alder, then putting it into the fire to blacken on the outside and cook deliciously on the inside. The better Indian way is to split the salmon and hold it in a mesh of green small branches, then place it before but not on a driftwood fire. Libby and I have had salmon cooked that way by Indians in Puget Sound, and it's about the best there is.

The Indians also taught our forebears how to make a fish soup, like the French clear soupe de poisson, and the Indians also are credited with fish chowder. We think that the Indians probably learned about chowder from the Bretons who came to fish for cod. The Bretons tossed a contribution of fish into a community pot called a chaudiere such as we eat at my house is fit for Epicurus himself. I remember a codfish chowder for lunch on a cold day in early March that echoed a comment by Clementine Paddleford, who used to be a food editor and columnist:

"The day has the color and sound of winter.
Thoughts turn to chowder. Chowder breathes
reassurance. It steams consolation."

Certainly good chowder or seafood soup is inspiring. Literature proves it. You all remember that Lewis Carroll celebrated turtle soup:

"Beautiful soup, so rich and green,
Waiting in a hot tureen!
Who to such dainties would not stoop?
Soup of the evening, beautiful soup..."

William Makepiece Thackeray was so overcome that he wrote a ballad of eleven stanzas to bouillabaisse. Here's one:

"This bouillabaisse a noble dish is--
A sort of soup or broth or stew,
A hotchpotch of all sorts of fishes
That Greenwich never could outdo;
Green herbs, red peppers, mussels, saffron,
Soles, onion, garlic, roach and dace:
All these you eat at Terre's Tavern
In that one dish of bouillabaisse."

Thackeray had his bouillabaisse at Terre's Inn in Paris, with the proper wine. He liked Burgundy. When we find seafoods in the literature we also find a counterpoint of wine. Jonathan Swift, who left us Gulliver's Travels, also left us this rule:

"Fish should swim thrice. First it should
swim in the sea, then it should swim in
butter, and last it should swim in good
claret."

Sometimes writers commented on a particular species, either pro or con. One of our favorite remarks is from Mark Twain, speaking about a meat he especially enjoyed. He said:

"The chief dish was the renowned fish
called pompano, delicious as the less
criminal forms of sin."

Ogden Nash, a seafood lover of strong opinions, kissed off one of Europe's favorite fish with a triolet:

"I don't mind eels
Except as meals--
And the way they feels."

He was kinder to the lowly smelt:

"Oh, why does man pursue the smelt?
It has no valuable pelt,

It boasts of no escutcheon royal,
It yields no ivory or oil,
It's life is dull, it's death is tame,
A fish as humble as it's name.
Yet--take this salmon somewhere else
And bring me half a dozen smelts."

Historians mention the cod, the salmon, the herring, but not the smelt. Nor do they give us many insights about the importance of fish to health or the local economy. There are a few exceptions. For example, we found references, though not in the usual history texts, to how the Virginia colonists survived a winter in the early 1600's. Keep in mind that they had neither the skills nor the equipment to be good fishermen. Captain John Smith conducted a fishing expedition to what is now Hampton, and reported: "...our fishing we could not affect by reason of the stormy weather...only of sturgeon we had great store, whereupon our men would so greedily surfeit, as it cost many their lives."

Imagine being done to death by an excess of sturgeon. We know they were plentiful; Governor Sir Thomas Dale of Virginia wrote of catching 5,000 sturgeon in one haul of a seine, most as large as cod, but some twelve feet long. Anyway, the early Virginians survived on sturgeon, and oysters gathered at low tide.

On another fishing try, Captain Smith noted: "We found that abundance of fish lying so thick with their heads above water, as for want of nets, our barge driving among them, we attempted to catch them with a frying pan, but we found it a bad instrument to catch fish with." The good captain had apparently hit upon a time of low dissolved oxygen, as still happens in Chesapeake Bay, when the dying fish were gulping air.

A different expedition found shoals at the mouth of the Rappahanock River and the men saw fish lying among the weeds. Captain Smith speared one with his sword, whereupon all hands turned to with whatever they had. Picture the colonists, repiers, cutlasses, and belt knives in hand, stabbing away at skates, slewives, perhaps spawning fish of other kinds. "By this device," says John Smith, "we took more in an hour than we all could eat."

As time went by, the Virginia colonists took fishing and fish very seriously. Their skill improved, and salt and pickled herring became a prime stock in trade. In the writings of George Washington, a letter dated in September, 1770, offers herring in trade for a hogshead of good rum, a barrel of good spirits, 200 pounds of coffee, 200 pounds of both coarse and fine sugar, and fresh oranges if any were to be had, the rest of the herring sale to be paid in cash. It's clear the Father of Our Country intended to wash his herring down properly.

Terrapin was another important aquatic food, but mostly for domestic consumption in Virginia and Maryland. In fact, Maryland had to pass an

ordinance forbidding the serving of terrapin to slaves more than three times a week.

Fish served as actual money in all the colonies. We have the record of a New Hampshire minister who was paid in salt cod which he could trade for his needs. Nowadays, of course, we have politicians who go to New Hampshire and pay for votes with fishy promises.

Fishery laws are also a clue to colonial values. In Massachusetts, which then included what is now Maine, fishermen were exempt from military service. The colony would pay the wages of field hands who replaced farmers who wanted to turn fisherman. Stealing fish was worse than not paying taxes. In Salem, a thief was paraded through the town holding the fish over his head and crying out, "I stole this and X quintals more," the amount depending on the theft. In 1786, the thief began by spending an hour standing on the public gallows, then receiving 36 lashes, and finally ending in jail for three years at hard labor.

Virginia was just about as harsh. A fisherman who didn't report his catches to the authorities had his ears cut off. That was in 1612. A second offense brought a year rowing in the galleys, man-powered fishing craft. A third offense meant three years.

As a final note on the importance of fish, now that the 1980 census is past, the first American census was in Virginia in 1624. Among other things, it enumerated the fish supplies on hand--mainly salt cod.

One would expect historians to swell on and poets to write sonnets about crustaceans, and especially the American lobster. Not so. We find brief, almost offhand comments about the plentitude of lobsters, but even more intriguing, we find a few mentions of giant lobsters five and six feet long.

New Amsterdam's first lawyer, Adriaen van der Donck, spoke of these six-footers and said, "those a foot long are better for serving at table." The Van der Doncks probably didn't have a six-food platter. In 1792, the writer Eddis, in "Letters From America," said the patriarchal lobsters were caught in New York waters until the Revolution, when "since the incessant cannonading they have entirely forsaken the coast, not one having been seen or taken since the commencement of hostilities." Thereby proving that lobsters, at least, have enough sense to get out of cannon fire.

Such giant lobsters need not seem incredible. Just a few years ago, when Electric Boat Company was making small research submersibles, the company got a contract to examine the crossover point of two undersea cables off New England at a depth of 2,000 feet. The little sub found the crossover easily, because a lobster had burrowed under it. The project director told me that the lobster was five feet long.

The Puritan minister Higginson wrote about lobsters at Salem and said, "the least boy in the plantation may catch and eat what he will of them," and that many weighed 25 pounds. There is also a report that heavy winter storms with high surf piled lobsters up on the shore in two-foot windrows.

As a lobster footnote: the Indians flavored the big lobsters with pine sap and steamed the smaller ones in oil pressed from sunflower seeds.

We've spoken of the unsung hero who first ate an oyster ever since Jonathan Swift first marvelled at him. But Gladys Tabor, writing in Stillmeadow Daybook, says "...think of the man who first ate a lobster. This staggers the imagination. I salute him every time I take a nutcracker in hand and move the melted butter pipkin closer." And so should we all.

Other crustaceans rate even less mention than lobsters. Fortunately, there is one superb volume on the blue crab, William Warner's prize-winning Beautiful Swimmers. If there be one among you who has not read it, hurry and get a copy. It's a joy to read if you care at all about our Chesapeake Bay and its watermen, and must reading for anyone related to seafood.

We found little or nothing about such succulent critters as the Dungeness and king crabs, or the rich stone crab of the Gulf. The poets and historians are quiet about shrimp.

We came across occasional passing mention of mussels and clams, including reports of colonists poisoned by them, so the so-called "red tide" clearly isn't a modern phenomenon. A few authors did point out that Indian wampum, which was money for the colonists as well as Indians for a short time, was made from the shells of the Venus clam Mercenaria mercenaria, which we know by its Indian name of quahaug in the north.

When it comes to the oyster: incredible change. The literature is chock full. No other foodstuff ever had so much praise, starting with the Greeks and Romans. Though Jonathan Swift spoke of the "bold man" who first ate one, we'll never know where or when. Wherever oysters occur we find huge middens of shell left by prehistoric peoples. It took the Romans to make the shift from natural harvest to simple culture and to begin documentation of the oyster. The place was an artificial brackish water harbor near Naples built by the Roman engineer Agrippa. The name of the harbor was Lake Lucrinus, after the Latin lucre, meaning money. Oysters planted in the lake were just that: money.

Pliny the Elder referred to oysters as "the palm and pleasure of the table." The Roman sage, Seneca, sang, "Oyster dear to the gourmet, beneficient oyster, exciting rather than sating, all stomachs digest you, all stomachs bless you." These comments anticipated others down through the centuries. We have time for only a brief sampling:

Cyrano de Bergerac: "You have never seen the sea but in an oyster on the shell."

The preacher, Henry Ward Beecher: "Oyster, that marvel of delicacy, that concentration of sapid excellence, that mouthful before all other mouthfuls..."

Saki, the writer: "There is nothing in Christianity or Buddhism that quite matches the sympathetic unselfishness of an oyster."

There are many books about oysters, but one is in a class with Warner's Beautiful Swimmers as a popularization, and was also a prize winner, of the National Book Award, just two decades ago: Eleanor Clark's The Oysters of Locmariaquer. Her language is the closest to real peotry we found about oysters. Here's just a bit, referring to the taste of the French plate oyster, Ostrea edulis, also called Belon oysters of Armoricaines:

> "Music or the color of the sea are easier to describe than the taste of one of these Armoricaines. It is briny, first of all...there is a shock of freshness to it. Intimations of the ages of man, some piercing intuition of the sea and its weeds and breezes shiver you a split second from that little stimulus on the palate. You are eating the sea, that's it."

There was an American period of oyster madness from about 1810 to 1870. Every town had oyster bars, cellars, saloons, parlors, and every host served oysters to guests. In 1842 Charles Dickens visited America, and writing of parties he attended, he wrote: "...at every supper at least two mighty bowls of stewed oysters, in any one of which a half-grown Duke of Clarence might be smothered easily." Dickens got the idea for the character of Dando the Oyster Eater in Sketches by Boz from watching the response to signs like "All you can eat for 6 cents" posted on American oyster houses.

In "Forty Years of American Life" Thomas Nichols said:

> "The American oyster, from New York to New Orleans, is large, bland, sweet, luscious, capable of being fed and fattened, and cooked in many styles, and is eaten for breakfast, dinner, supper and at all intermediate hours. Oysters are eaten raw, pure and simple, or with salt, pepper, oil, mustard, lemon juice, or vinegar. At breakfast they are stewed, boiled, or fried. At dinner you have oyster soup, oyster sauce for the fish, fried oysters, scalloped oysters, oyster pies, and when the turkey is cut into it is found stuffed with oysters."

The number of oysters a single person could consume stagger the imagination. Michel Montaigne reported on a doctor who died of apoplexy from eating pate de fois gras, although the doctor was able "to absorb thirty to forty dozen oysters with impunity." The great chef, Brillat-Savarin, wrote about trying to satisfy a friend who complained he had never had enough. After watching the friend consume 32 dozen oysters, Brillat-Savarin gave up and said: "My friend, it is not your fate to stuff on oysters today; let us dine. We dined, and he behaved with the vigor of a man only then starting to eat."

In contrast, the people of Maryland once listed among their grievances that they were forced to eat oysters. But that was in 1680 before the oyster craze.

The price of the craze was depletion of the East coast oyster beds from Maine to Virginia, and none of the beds ever fully recovered.

Oysters--and crabs--were the cause of the longest interstate feud in America's history, between Maryland and Virginia. Charles the First placed the boundary of the Potomac River at high water on the Virginia side, giving all the river's great oyster, crab, and fish resources to Maryland. You might recall a shooting skirmish, with casualties, just a couple of decades ago.

One more bit of oyster history: In 1660 Governor Hopkins of Connecticut ordered that the oyster beds set aside for income to pay for a college begin producing funds for that college. And that was the start of Yale University, founded on oysters "for the education of youth in good literature, and to fit them for public service."

There are poetic references to the oyster, but the light verse poets, instead of singing hymns to the taste, got their inspiration from the oyster's ability to change sex. Here's Ogden Nash:

"The oyster's a confusing suitor;
It's masc. or fem. or even neuter.
But whether husband, pal or wife,
It leads a painless sort of life.
I'd like to be an oyster, say,
In August, June, July or May."

Burton Braley confused his taxonomy a bit when he produced this limerick:

"According to experts, the oyster
In its shell or crustacean cloister,
May frequently be
A he or a she
Or both, if it should be its choice'ter."

And with this, farewell to the oyster, and to history and poesy about seafood, leaving us with a thought to provoke some speculation.

Geographer Carl Sauer suggests that, during pre-history when glaciers moved down to cover the northern land masses, our human ancestors may have been forced to the seashores to find subsistence at the water's edge. Sauer thinks that our present physiological need for iodine and salts, our need for high protein intake, and our greater tolerance for unsaturated than for saturated fats may trace back to our time as residents of the seas' edges.

So, when seafood makes us salivate, it may be because we have a genetic

response, that seafoods are good for us is built into our genes even more than into our palates.

And with that, let us conclude with a bit of nonsense by James Thom, a man who knows what to do with the names of our fruits of the sea:

This'll Gill You

What's life like under the sea? Is it a dog-fish-eat-dogfish world? Is everybody united for a common porpoise, or do they all split off into special groupers? One tragic story indicates it's pretty bad down there:

There was once a brilliant sturgeon on the staff of the community health fishility. He was, in fact, one of its flounders. Wiser than Salmon, a fin fellow who would never shrimp from his responsibilities, he was successful and happy; he always whistled a happy tuna. One day, one of his patients, a mere whipper snapper, told the sturgeon that his medical theories were full of abalone, and started trouting around telling everybody that the sturgeon's treatments had made him more eel than he had been, and then actually conched him with a malpractice suit!

Well, the sturgeon was in a real pickerel. The board demanded his oyster, and chased him off the staff. But the case smelt to high heaven, so the judge denied the plantiff's clam. The board tried to hire the sturgeon back, but by then he had hit the bottlenose pretty hard, and the end of our shad tail is that the sturgeon wound up on Squid Roe. Buoy! Isn't that a fine kettle of you-know-what?

UNDERUTILIZED SPECIES

Sally Patrenos

I am honored to be here today and to have the opportunity to talk to you about Florida seafood and seafood in general. What we're going to be addressing today is underutilized species. I'd like to explain to you what we call underutilized species. It's sort of the stepchild of the seafood industry. It includes those fish that have, for one reason or another, not enjoyed a lot of popularity. They are either not very pretty to look at, or people don't know how to prepare them, or people don't ever try them. For one reason or another they just don't become very popular. Because they aren't very popular, the price isn't right. Fishermen have to make a living just like you and I do, and fishermen are going to go out and bring in those species that can pay their own rate. Things like snapper, grouper, shrimp, lobster; these things that will turn a profit for them. So historically we have not had a lot of these non-traditional species harvested. There were other reasons why they have not been brought to the forefront. For example, for some of them there is no equipment available to process them. We're going to talk about rock shrimp a little bit later, and give you a prime example of a species that was out there in plentiful supply, yet we just didn't know what to do with them. Another reason that some types of fish are called underutilized is that there are no market outlets for them available. This is where we the marketing bureau come into play. I am with the Florida Department of Natural Resources, the Marketing and Extension Services Bureau, and I feel obligated to tell you a little bit about us and exactly how we come into play in the marketing program as a whole in the United States. We are now a force of nine home economists. We have four marketing specialists, and we travel not only in the United States and Canada, but also to Europe and to foreign countries, because we are now getting into export marketing. We have come a long way from the time when we were considered cooks. For some time, we were called upon when someone wanted us to cook seafood for the legislators. Now we are regarded more as educators, as people who have a knowledge or expertise in a certain area and can share that expertise with others. Florida enjoys the privilege of sitting at the top of the totem pole; we are the largest seafood marketing bureau in the United States. We have six offices in the state of Florida as well as one in Little Rock, Arkansas and Atlanta, Georgia.

We were originally established to promote and enhance the image of seafood, but down through the years lobster, shrimp, and crab have paid their own way. People already liked those things. Our job has evolved around utilized species. Our job is to share with you knowledge not only of how to handle, prepare, purchase seafood, but also to tell you about these species that may be new to you such as eel, shark, or squid. I can tell you what is underutilized in the Southeast, but that doesn't apply to all of you, so check the list in your material packet if you want to

know what is considered underutilized in your particular area. It could be eel or squid, or in the Southeast it could be grouper, it could be rock shrimp, it could be a number of things. We have tried to enhance some of these fish by calling them different things. But you know, a rose by another name is still the same, and so we finally learned it can be called anything, but it's still going to taste the same and people are still going to relate to it in the same way, so we had to go back to our old terms. An example of this is the sea mullet which has a nice nut flavor. It is the vegetarian of the sea. It is an excellent food fish.

All of you are interested in finding new food sources. We in the United States are eventually going to have to accept the fact that although we've assumed a superior attitude regarding food selection, we may have to re-evaluate our diet selection in terms of availability and cost. When you get right down to the bottom line, many people are locked in by waters all around and they have more or less been forced to look at the alternatives. They have such huge populations and the prices of red meats and proteins have been so high they have had to turn to the sea as a main stay for life. We need to re-examine our diets and look for food sources that can serve as alternate foods, high in protein and nutritional value. We are going to have to consider getting the most nutritional value for our food dollar. It's a real challenge to sit down and plan menus. We are going to have to lower the costs of food, and that's the nice thing about these products. Because the law of supply and demand is such that the cost has been kept down on these items, and we'll see in our example of rock shrimp how this mollusk has more or less evolved so that it can be a viable industry. Rock shrimp, for example; let's just talk about that as an industry in itself. Before 1970 rock shrimp was more or less enjoyed only by fishermen's families. They would catch rock shrimp, bring it in and nobody wanted to eat the little devils. The fisherman's family had to eat what was available. They would try to open it in the traditional way they had always opened shrimp and they found it would tear their hands; it has a very hard exo-skeleton. In the early '70's a piece of machinery was invented which revolutionized the shrimp business. That machine made it possible to process rock shrimp.

Another problem with promoting underutilized species is preparation information. Rock shrimp cook in about 30 seconds--not minutes, but seconds. The longer they're cooked the tougher they become. By combining product education with appropriate merchandising strategy, rock shrimp has established a market. This product can be shipped throughout the U.S. and exported with ease, and so it's now profitable for the fishermen to bring in the product.

We're slowly knocking down the barriers that have kept us away from these alternate food sources. The U.S. is becoming more interested and involved in the exportation of fishery products. People in other parts of the world have utilized species considered less desirable to Americans. Exporting these species seemed to be a good way for us to get rid of those things we really didn't want to market here. It's time for us to look at the fact that we have over a two billion dollar trade deficit, and to de-

termine how we can turn ourselves around so that we are utilizing those things and are not so dependent upon seafood from other nations. Try to look at the fact that many rock shrimp are brought in from Venezuela while Florida is the largest producer in the U.S. Why not purchase more from our own resources rather than send it to other place?

How exactly does this relate to you as a school food service person, as a home economics teacher? Well, for one thing all seafood is nutritious, usually low in calories (the way you add calories to seafood is by breading or using oil). It cooks in a very brief period of time making it particularly suitable for use in a time limited laboratory experience. Seafood has excellent holding properties, especially the very lean fish. Roger mentioned to you yesterday that unfortunately most of our Southern species are in the oily category, and most of the underutilized species fall into the oily category. That is if it has five percent or greater oil content we call it a fatty fish. So if you're going to have to buy your fish full-battered, chances are that ahead of time you might want to consider that fat fish can be kept three months or less, because of the oil content, whereas your leaner fish, that includes all shellfish, can be kept up to a year, with no problem. Short cooking time, easy preparation, nutrition, and the taste are all assets for selecting seafood for your menus. These are some factors that I think we're going to have to start at the bottom and integrate into our system and I think you are the ones that are going to have a big role in doing that because you are the ones who deal with the future generations and we want to improve their diets and give them nutritional information.

A question frequently asked is "Do I handle these species differently from regular or traditional species?" The answer is no. You handle them, with a few exceptions, basically as you would the more traditional species. The exception to that would be species such as shark, which requires some special care. They need to be handled immediately, or processed as soon as possible after the catch. Also in handling squid, eel, or some of the exotic species, there are some preparation differences. They must be cleaned and prepared for use in a manner appropriate to the particular specie. Shark is going to be one of the delicacies I want you to taste. We have not done a lot of work with shark in the past, but we are trying to come out with some new recipes and I think shark will be one of them. It is a fish which contains little or no bones, it is a cartilaginous fish, so therefore you are not having a lot of waste. It's a firm, white meat, and is an excellent fish to experiment with. It's something that has enough human interest attached to make it an interesting fish that your students would find intriguing.

ROLE OF THE FEDERAL GOVERNMENT IN SCHOOL FOOD SERVICES USING SEAFOODS

Beverly Barton

When Sandi asked me to title what I'd be talking about, it came down to that ominous title that you see here, The Role of the Federal Government in School Food Services Using Seafoods. When fisheries was with the Department of the Interior, National Marine Fisheries Service had a cooperative project with them on a school food service program for the fishery products. When we moved to the Department of Commerce that particular unit of our agency was dropped by the way side, so we really didn't have much interplay with the USDA. About every five years, the USDA goes through a revision of their publications they use with the school lunch program. They contacted the Secretary of Commerce and requested that personnel from the National Marine Fisheries Service assist in developing the buying guide for school food service. The food buying guide is more or less the Bible of the school lunch program because it gives information on the various foods used in the school lunch program to help the school lunch personnel meet the requirements of the National School Lunch Program. USDA administrates the National School Lunch Program and we are a cooperating agency. In the school lunch program, federal regulations are established by which a meal program is set for children of various ages. A few years ago some changes were suggested for the school lunch program. These changes will go into effect this next year where by different amounts of food will be served to different age/grade groups. In the meal pattern requirements for school lunch there are four meal components: meat or protein alternate, fruit and/or vegetable, bread and bread alternate, and milk. Dessert is not a required component. It is one of the other foods that is optional to serve. To have federal reimbursement for participation in the school lunch program, the schools do have to meet certain requirements for each of those meal pattern components. New regulations recommend serving sizes for different age groups. This should help cut down on tray waste. Before, there was a standard amount that had to be served to meet the meal pattern requirements and in many cases it was too much for younger children. As a result, we did have high tray waste, but now, for instance, with meat or meat alternate, which was the protein and main part of the meal, for pre-school and ages up to three and four, they will be served only one ounce of protein. For the next age group, they will be served 1½ ounces of protein, and for the older children it will be two to three ounces. Two is the absolute minimum that they can go--the highest is three ounces, to be part of the program.

The new buying guide has "average meals" of over 600 food items. As you might well imagine, seafood is a very minimal part of the 600 items. We have approximately 30 items included in it. What the average yield in the buying guide tells the storage manager is that when she purchases a certain amount of food she can expect to receive a specified amount of product from that full serving. For instance in the case of fish fillets, she will know that if she purchases a pound of raw fish fillets, it's cooked weight will provide a specific amount of the fish to be applied toward meeting those

meal pattern requirements. From that she can judge how much she will order and how she's going to set up her menu pattern to meet the meal pattern requirement. This is very important to the school food service because in order to have federal reimbursement for their participation it absolutely must meet the requirements. It's very important now because they are going to be conducting a meal program monitor system and are going to be looking at it very closely. The schools that do not fulfill the requirements will not be reimbursed.

What's involved in arriving at an average yield for fish fillet? Tests are conducted on various species of fish, fresh and frozen fillets and fillets that were cooked from the frozen and unfrozen stage. We use a number of brands to arrive at a representative cross-section. These are cooked in convention ovens. To arrive at a meal yield, you calculate the purchase weight, the before cooking weight and the drained cooked weight of the food product. This tells you what your actual loss or percentage yield for that particular item is. The breaded and battered portions have been a little problem in that they haven't fully met the requirements of the meal pattern. For instance, a 4 ounce portion when it was based on the 2 ounce serving may be only provided 1.8 ounces of protein which meant that the school, in order to meet their pattern requirement, had to supplement the serving of that breaded portion in order to meet the 2 ounce requirement. This requirement could be met by including cheese in a fish sandwich, or serving celery stuffed with peanut butter to bring the protein requirement up. There has been a problem as far as the breaded fishery items are concerned. In the test work that was done with the portion control items, we found that the yield we came up with on our current testing gave us better yield than USDA had been using to credit those fish portions. We used to use a 70 percent crediting for the fish portion and we found that actually we were coming up with a 78 percent yield. This was quite important to industry because it meant they were going to be getting more credit for the portions sold to the schools and perhaps because of this the sales of fishery products would increase in the schools. It also helps the school lunch person because it means she's going to more closely be able to meet the requirement of the meal she's serving to whatever age group.

The information in the buying guide for all of the breaded portions is based on graded products, products based on standards of grades of the United States Department of Commerce. This is important to the person purchasing the products for the fishery items because it tells them how much fish is actually in a portion of food, so they'll know how to use it for their crediting.

One of the problems we face with the schools as far as crediting is that many of the people did not fully understand how the crediting was done and they would buy that portion and they would think they would see the information 65 percent fish and would think that's how much fish they were getting in that portion to be used in their crediting. In addition to the fish flesh content of the portion, you have to take into consideration the cooking loss,

so that actually when you got it ready to serve, you had to figure in the cooking loss, so instead of ending up with 65 percent cooked fish flesh, you actually had a smaller amount. The buying guide does explain this in the latest edition and makes it quite clear.

INSPECTION AND GRADING OF SEAFOOD

Lu Kissel

I am with the National Marine Fisheries Service, which is a part of NOAA, National Oceanic and Atmospheric Administration, which is a part of the Department of Commerce, and we are the fish people. At times we get lost because everybody thinks that fish is a food product and it's housed in the Department of Agriculture. I wanted to call this to your attention and make it known to you that fish is housed in the Department of Commerce.

How many of you know that fish is not mandatorily inspected? Many people are not aware of that. They think the fish that they buy at the supermarket has some kind of approval of the federal government and it has been checked over just like meat, poultry, and eggs. Congress has never passed a law that says fish must be mandatorily inspected. Therefore only those processors who can afford it come to us and have us inspect their plants and their products, so they may bear the inspection mark or the Grade A mark. We have a very small staff. We don't have many inspectors out in the field who come to us and pay for our services on the service basis according to what their needs and desires are. That is why we are trying to publicize as much as we can the fact that certain products do have an inspection mark and a grading mark and do have federal inspection whereas others do not. This does not mean that the other fish in the marketplace are not safe or are of poor quality. It just means that most large fish processing firms do have food quality control systems operating in their plant. The FDA, Food and Drug Administration, is charged with the responsibility of inspecting those plants and giving their stamp of approval. The problem is the FDA is overloaded too, and they are overwhelmed with small staffs, small budgets, and they may get to these places only once every five years. The states are also charged, but they only look at sanitation, not at product. There is a bit of a problem there. That's why it is important that people like you are aware of the fact that there is some kind of inspection and grading available. You should make your students aware of it, or use it in whatever kind of work you do. We have three field offices, one in Downey, California, one in Boston, Massachusetts, and one in St. Petersburg, Florida. We also have a lab that does special testing and analysis for us for the inspection program in Pascagoula, Mississippi. Because we are a small outfit we have problems with distance. We have what we call a cross-license system going and we use a lot of USDA food inspectors to inspect fishery products. We also have five or six agreements with state food inspectors who will conduct these plant inspections. Suppose a processor calls and says he wants a particular lot of his product inspected or a school does it and they're in a far away place from where we have our nearest inspector. A USDA or a state inspector will go out and certify it.

One of the inspection services we have is plant inspection. We go in and look around and see what's going on. If they don't comply with our requirements specifically starting with sanitation, then we don't have a

contract with them. They have to comply to our specific requirements before we'll even go into contract with them. Then they have choices of what kind of agreement they want to go with. For instance, they can be under the SIFE program, which is Sanitary Inspection Fish Establishment; maybe that's all they want from us is to approve the sanitation of the plant. The step beyond that is the PUFI service, Plant Under Federal Inspection. That means the product is being inspected. First the plant must be approved for sanitation, then we will go in and inspect the product. It might not be every product that rund through every line. It may just be a certain kind of product, or so much of a product. For instance the military wants a contract on all military products for troop feeding. All products must be federally inspected. So maybe your processor wants to sell to the military and they just want a certain line or certain product inspected. Sometimes they request a product rating. That's a higher level that requires a lot more work on the inspector's part, a lot more sampling and testing, but no additional charge. We also do lot inspections, one shot deals, and it can be any place. They can't get a Grade A on that, because Grade A pre-requires plant sanitation. A Grade A product is only stamped in a plant which has been approved for sanitation inspection. You can't go out onto the dock and inspect a load of fish that has just come off the boat and give it a certificate. We have to see that product processed before it gets a Grade A. We do a lot of consulting services. For instance, if people want to learn an interpretation of government regulations, we'll help them with that. If somebody wants some help on writing specifications, any kind of an institution, veteran's hospital, school system, whatever, we'll help them write specifications for seafood. We also conduct a label review program. Any program that is under inspection has to have our mark on it; the label has to be approved by us to conform with the FDA regulations. Anybody who wants to deal with new product information can come to us for help. Some of the programs the particular office I work for deals with are import and export inspections. These are only done upon request, they are not mandatory. We also have a military program which I spoke of. The troops are fed only seafood that has been inspected and is Grade A. They have their own lines in the plant. They have very stringent requirements just for their products. They have their own breading, their own batter, their own rules regarding how many times they can touch the product, etc.; their own packaging, everything. They do have a federal inspector on the line. Some of the other fast food chains also partially have inspected products. We have one supermarket chain under federal inspection and that is a difficult thing to do, but we have one that did do it. They have a full time federal inspection program whereby the fresh fish that comes in are inspected at the distribution plant. The processors that process these fish are under inspection. They can still advertise at the point of sale that they have fresh, U.S. Grade A, federally inspected seafood. They charge a little bit more but it seems to have paid off with the marketing and the inspection. We've found that when the consumer gets to the counter he will pay a penny or two more or will relate to that marketing of the U.S. Grade A federally inspected product and pay for that extra little bit of quality in the seafood. We do have a consumer services branch. We provide as much consumer information, educational materials,

and services as we possibly can, with a very limited staff and budget. We have a teacher's kit that includes three cassettes, three filmstrips, student handouts, and the teacher's manual. We are going to have the kit ready for distribution very shortly. It's geared for high school. The first section deals with nutrition, the second with inspection, and the third with market quality or grading. Suggested projects and vocabulary are included in the teacher's manual. But we want you to know that we are there and if there's any way we can ever help, we are available to you.

SELECTION AND PURCHASING OF SEAFOOD

Laurie Dean

You've heard a great deal the past two days concerning Seafood - you've learned about its nutritive qualities, some of the underutilized species available, the role of the government in seafood industry. Now, we're going to look at some of the indicators of quality in seafoods.

Whether we live to eat or eat to live, all of us should have some idea of what to look for when we purchase food but, unfortunately, many of us are still trying to solve the mystery of how to get the most for our seafood dollars. We need to become versed in identifying the indices of quality for the variety of seafood products available to us.

First of all, as I'm sure you know, seafood is broadly categorized into finfish and shellfish. Let's begin with finfish. Finfish may be left whole or processed into one of several forms. Whole fish is simply that - the entire uneviscerated fish. Many people prefer to purchase their fish whole, gut it or have it gutted (or drawn as it is called) and either bake the fish with head on or fillet it out saving the bones and head for stock. This provides for very little waste and is probably the most economical way to buy. The fish can also be pan-dressed, but, once again, the trimmings should be saved and utilized for stock making. Stock made from the trimmings will last in the freezer for about 3 months and is an excellent base for soups and chowders, as well as, sauces for your baked, broiled or poached fish. A variation of the fillet is the butterfly fillet which consists of the 2 sides of the fish connected by the belly. If you have a very large fish, you may want to cut it or have it cut into steaks of approximately 1" - 1-1/2" thickness. Many people prefer to purchase a whole fish and have it filleted instead of buying precut fillets because they feel that the product is fresher.

Now that you know the market forms, how do you know if the fish is fresh? There are several check points on fish: (1) lustre, (2) eyes, (3) gills, (4) odor, (5) flesh, (6) cavity and (7) vent. No matter what form you purchase fish in, however, you must realize that it is highly perishable and that generally, quality decreases as number of days after harvest increases. So, it is very important that you know how to buy fish and also that you know how to properly store it - but that's another story.

Many people are lucky enough to be in areas that have access to high quality shellfish - one of the most popular is crab. There are many species of crab available. In this region, however, by far the most prevalent is the blue crab, that wonderfully succulent creature that is the subject of William Warner's book BEAUTIFUL SWIMMER. They characteristically have a blue-green shell and blue-green and white claws. The female crab can be

distinguished from the male by her red-tipped claws - almost as if she "painted her fingernails" and also the shape of her apron...the mature female having a rounded or dome-shaped apron, and the male a slender pointed apron. Raw crabs should be purchased live - a state indicated by movement. Cooked blue crabs should be red in color - the red pigment being the only pigment in the shell that is heat stable. Cooked crabs have a characteristic odor that is fresh, not sour. If you buy "picked" crab meat, it does come in several forms:

A. Lump meat - is a nice piece of muscle that is attached to the "swimming legs" of the crab - the blue crab is the only crab that is a swimmer. Because of this, the lump meat or backfin muscle is quite large by comparison with the muscles that operate the crabs other appendages. Lump is generally the most expensive variety of meat you can buy.

B. Flake - also called regular - is the white meat from the body of the crab - excluding the lump. You will generally find cartilage or shell in the white meat because of the structure of the crabs body.

C. Claw meat - is the brownish red meat from the claws of the crab. It is generally less expensive than the white meat; which brings up the point that you should buy crab meat according to the use that you have for it.

D. Mixed white - or special crab meat - is supposed to be all the meat of the core of the crab in normal proportions.

E. Cocktail Claws - are a popular hors d'oeuvre item. Cocktail claws are the claw muscles with a portion of the shell still attached.

F. Soft crabs - are generally sold whole. They are the result of the molting process of the crab. In order to grow, crabs must shed their hard exoskeleton; take in water which allows them to expand before the new exoskeleton hardens. In Virginia, this molting process occurs in the summertime. Soft crabs are purchased live or individually wrapped and quick-frozen.

G. Deluxe - no standard.

Staying with crustaceans, the next hard-shelled delicacy, and one that rivals crab meat in popularity, is the lobster. There are about 200 species of lobster, but two varieties are commonly available: The Northern or Maine lobster and the Spiny or Rock lobster. The most obvious difference in the two is the absence of large claws on the spiny lobster. This specie is actually a sea crawfish. The spiny lobster as its name indicates also has spines over its body and long slender antennae. Like crabs, if you

buy live lobsters, make sure they are alive. The test for this is that the tail of the lobster will curl under when held up. Lobster is sold live, whole cooked in the shells, frozen raw, boiled and frozen, frozen cooked meat, fresh cooked meat, and canned cooked meat. All should have a clean fresh odor when purchased.

The last crustacean I'm going to discuss is shrimp. There are several hundred species of shrimp. They range from less than an inch to nearly 12 inches in length. Like the other crustaceans we've talked about, shrimp shed their hard shells and replace them with larger ones in order to grow. The shrimp that are most commonly available on the East Coast come in a variety of pale colors; gray, tan, etc., but all will turn pink when cooked. Too often, consumers who do not come from the "shrimp belt," mistakenly purchase shrimp that is not fresh, because they confuse cooked color with raw color. Shrimp are generally sold by the count, or number of shrimp in a pound, with whole shrimp considered to be those with five or more intact segments of flesh. Anything less than that should be sold as pieces. The largest shrimp run about 15-20 to the pound - while some Alaskan shrimp are in excess of 200 to the pound. Fresh shrimp should have a mild odor and firm flesh. The shells should not be slippery or slimy, and, although some black spotting on the shell segments is not cause for alarm, a significant amount is frequently indicative of poor product handling. Other than fresh, shrimp can be purchased in a variety of forms including cooked, frozen-cooked, canned, frozen breaded or in a combination with other ingredients.

The second category of shellfish that we'll cover is mollusks - in this group are found oysters, clams, and scallops to name just a few of the most common ones in this area. There are three types of oysters available in the United States - by far the most important commercially is the Eastern oyster - Crassostrea virginica - which comprises the vast majority of total U.S. production. Oysters are sold in different sizes with the largest usually being the most expensive:

Counts not more than	160/gallon
Extra Selects	161-210
Selects	211-300
Standards	301-500
Very small Standards more than	500/gallon

You should purchase oysters according to their intended use.

Counts/Selects - Half shell
Standards - Soups/stews

Shell oysters should be alive when purchased as indicated by a tightly closed shell. Shucked oysters should be plump and creamy colored, have a

clear liquid and smell fresh. Oysters can be purchased in the shell, shucked and fresh packed or canned. Fresh oysters are available year round - there is no truth in the old saying - "R" rule.

Another bivalve mollusk of importance is the clam. There are many kinds of clams available, and, depending on the species, they may be round, oval, elongated, or almost rectangular. The quahog clam or hard clam is the variety most available in Virginia. The soft-shelled clam or "manninose" as we call it, grows as far south as Maryland and some few areas of Northern Virginia. It has an elongated brittle shell which it cannot close tightly because its long siphon extends beyond the shell. The quahog, like the oyster, is sold by size, but unlike oysters, the largest chowder size is the cheapest. Chowder clams are 3-3/4" and up. Sharps, the next size down, are 3 - 3-3/4". Cherrystone are 2-1/4 - 3", Littlenecks are the smallest, usually the most expensive at 1-1/2 - 2-1/4". The price increases with decreasing size because of toughness. Chowder clams are not intended to be eaten raw or baked on the half shell. They are, as their name implies, used in chowder, soups, stews or fritters - any method that requires a chopped or ground product.

The last of the bivalve mollusks that I will cover is the scallop. There are two types of scallops commonly available - although in Florida there is also a calico scallop. Bay scallops and Calico scallops are small scallops - 1/2 - 3/4" diamenter of the muscle meat. Sea scallops are much larger. The portion of the scallop that is eaten in America is the adductor muscle - the muscle that allows the shells to open and close. Scallops unlike oysters can swim and they propel themselves through the water by snapping their shells together. Because this adductor muscle is used for this, it is enlarged. Scallops are not marketed in the shell because they die very soon after harvest (cannot close shell tightly). Consequently, scallops are shucked on board the harvesting vessel. Scallop meats should be firm and white to pinkish in color. Packaged scallops should be practically free of liquid. I thing that it is important that you understand one thing about sea scallops. A process called "plumping" is used to increase apparent size of scallops. Plumping involves soaking the scallop in fresh water for several hours until the bulk has increased by approximately one third.

So, whether you intend to bake, broil, saute, etc. or cook fish by any other means, hopefully you have enough savvy now to make wise purchases and the results of your preparation labors will be the best quality available!

Information on freezing seafoods as well as how to select good quality seafood is included in the Seafood Products Lecture Guide as is much of the information I've shared with you today.

(Ms. Dean's presentation was accompanied by slides.)

Seafood Consumer Education in Texas

Annette Reddell

The Texas seafood marketing and consumer education project was initiated in 1968 in response to legislation initiated by the seafood producers of Texas because as small businesses, they did not have sufficient funds to individually support a market promotion program. By this legislation, Texas Parks and Wildlife Department was authorized to develop and support a program to foster and expand the sale and consumption of seafoods by the public. Our program functioned with a marketing specialist and home economist for several years whose emphasis was on industry and educational programs mainly to college and university classes.

In 1977 the staff which was now reduced by 50% was transferred to Texas A & M University where I have been a part of the Marine Advisory Program for nearly 3 years. Our support staff consists of specialists and marine agents who provide educational assistance for marine resource users by placing emphasis on current problems and wise use of Texas Gulf coast products. Marine Advisory Services is a unified effort conducted through the Texas Agricultural Extension Service. It is a consolidated program under which all advisory personnel related to Sea Grant at TAMU are under a single charter. Recently, we had a staff increase which gave us a marketing specialist and another seafood consumer education specialist. These two positions will provide for a much more effective effort in marketing and consumer education for Texas.

I would like to share some current Texas seafood consumer education activities with you. It is felt that unless we understand the consumer and her perception in shopping, we would not know how she views seafood as a food item in her home. We have found that generally she knows that seafood is nutritious; would purchase greater quantities if it were available; prefers fresh fish to frozen; prefers fillets to other forms; does not know how to handle seafood; does not identify canned seafood with other forms of seafood; believes fish to be a good value.

Over 300 seafood retailers in Texas receive special attention from us in an attempt to help them understand the fundamentals in merchandising in order that palatable product be presented to the consumer. Retailers are assisted in stocking, packaging and ordering and provides numerous brochures, recipe cards and other point-of-purchase materials to assist in consumer education of Texas fishery products. These are also distributed through the mail. The popular Seafood Retailing manual was developed and undergoes revision often to stay current on topics such as retail facility design, temperature control and sanitation, and merchandising tips. Distribution of this publication is to new and progressive retailers.

We have found that eye appeal and romancing the display cases in retail markets does much toward increasing seafood sales. Some retailers

are not as conscientious as others. Here is a before picture of a display case. After assisting the market manager with this new display technique, sales increased and overall clientel expanded. During in-store demonstrations, samples are provided of various products for consumer acceptance. This proves profitable for the retailer and serves to introduce a potential marketable item on the consumer market. Special displays are set up to promote a new item or to increase sales of regular items. In cooperation with the University Marketing Department, students are assigned managerial responsibilities for the seafood section in supermarkets. Suggestions are often made to consumers in making wise decisions in selection. In this market, cost per serving is being considered.

Being located in the seafood technology department enables our staff to combine research, teaching and extension efforts to fulfill project objectives. Recently, upon consumer request, the quality of shrimp from roadside vendors was tested. Samples were taken from 50 mobile units and 20 seafood markets to determine the level of freshness consumers could expect from these shrimp. Results were surprising and the quality of shrimp from the roadside markets proved to have lower bacterial count and an overall superior quality than the product tested at retail markets. Also tested in our labs are potential marketable items such as shark, mullet and swordfish. Recipes are developed and taste tests run to determine overall consumer acceptability.

One of our more important lines of communication lies with our food editors. Popular features include those which highlight seafood availability in the area and those items that are non-traditional and serve as inexpensive alternate sources of protein. We also tie in with fishery development. Occasionally a particular item is featured if industry has indicated a high inventory or if we feel education is needed to dispel misconceptions. The diet market continues to grow as more and more people join the ranks of health conscious consumers. Since seafood is naturally low in calories, it makes an excellent food item for health minded people. We provide seafood consumer information to over 200 daily newspapers and special promotions to 8 major newspapers in 5 major cities. All consumer tips in selection, storage, handling and preparation of Texas fishery products are used in these contacts which generate many mail requests for our consumer education materials. Special promotions are conducted through various retail outlets to aid in sales and promote the services of that establishment.

As Extension employees, specialists work with all age levels in conducting county programs on a particular subject matter. Youth groups are skilled in the processes of skinning, filleting and steaking fish and often this subject becomes part of a 4-H project. Workshops or short courses in which agents have hands on experience are conducted in individual counties upon the request of agents in that county. We have also found that seafood cookery demonstrations for large audiences do much toward encouraging consumption of seafood products and acquainting people with local species that they may not be familiar with.

Cooperative work with other trade organizations is an integral part of our work. Fish does indeed combine well with other food groups and it just makes food sense for us to support all Texas products. Exhibits at conventions of other commodity groups builds good working relations which enhances mutual publications and knowledge of each others' capabilities. For the first time this year, during Seafood Month, we participated in the Texas State Fair. The food and fiber pavilion is sponsored by the Texas Department of Agriculture and all Texas food commodities are represented. Over 1 million visitors go through the fair.

An important factor in determining project priorities is our association with fishing industry organizations. For instance, Shrimp Association of the Americas sponsored a special shrimp and microwave project in which we determined the optimal cooking time and temperature of Texas shrimp so recommendations could be made to fast food chains. A consumer publication was also written to contain 40 recipes especially designed for shrimp cookery in the ever popular microwave oven. Distribution is through consumer requests, county agents and possibly microwave oven distributors.

Catfish Farmers of America is another special interest group which requests assistance from our division at annual conferences and fishery interpretation activities. We have recently become involved in the crawfish industry. Although in Texas, as in other states, there is some disagreement between sport fishermen and commercial fishermen objectives, as a public servant it is important to impartially assist both groups. Many sportfishermen are surprised that their technique of storing the day's catch contributes to deterioration and effects the overall good quality of fresh caught fish. For any length of time, their procedure is not recommended, of course. The product should be eviscerated and iced as soon as possible to maintain the original good quality. The continuous washing of the fish by the ice reduces bacterial count and keeps the product fresh until time for preparation. Occasionally, we are asked to assist with sportfishing tournaments and provide an advisory service to those first-time participants who are new to saltwater fishing.

Another effective way to inform Texans about what is new and not so new in Texas fisheries is through television presentations which number about 70 a year. Guest spots are available on shows of consumer interest. Free consumer education materials are offered to the pbulic and often questions are taken right on the air. Monthly, magazine articles are published in two popular sport magazines. Consumer tips and recipe ideas on fish are featured in the consumer section and the other contributing editors write on various aspects of the same species.

I suppose the most exciting and worthwhile project this year must be the work done with the state vocational home economics educators. In the past, the seafood concept has also been sadly neglected in the homemaking curriculum in our state. An introduction was made at the teachers' annual state conference in the summer through an exhibit which provided teaching suggestions and packets of materials for both teachers and students.

Teachers were able to select recipes, fact sheets, and learn of the opportunities in expanding their teaching units to include seafood education. As a result, some teachers have asked for individual assistance to perfect their skills and become more adept at handling seafood. In coastal counties, our marine agents are on hand to provide expert advice to homemaking teachers. During the last 3 months, seafood education seminars have been conducted at the teachers' area meetings. Seven hundred and eighty teachers representing 63,000 students were supplied with seafood consumer education materials including lesson plans, order blanks and samples of fact sheets available in quantity for distribution to their students. A spinoff of these workshops has been requests for assistance from food service administrators, CVAE, HECE and VEH coordinators. They are being schooled in teaching techniques useful for their particular teaching situation and then enjoy the fruits of their labors through a seafood buffet. More seminars are planned for the fall.

Thanks to the valuable curriculum materials the VPI-Sea Grant program has shared, our program with the teachers has been well received and has done much to upgrade seafood education standards in Texas.

As public awareness toward more carefully selected diets continues to grow, knowledge of fishery products becomes increasingly significant. We feel that full units devoted to all aspects of seafood will add a much needed dimension to excellent on-going programs in home economics education.

(Ms. Reddell's presentation was accompanied by slides.)

CONCLUDING REMARKS

Sandi Howlett

The past two days have been very full and fast paced. You may feel as though you have been barraged with more information on seafood than you were aware even existed. I've learned much and only wish I'd had this information available to me two years ago when I started on this project. The materials and information that you've received are the cumulative efforts of many people. Much of what you've been exposed to has been the result of the project tying together information needed by and available to food service people, to home economics people, and to occupational foods people. I hope you feel that a large part of that gap has been filled. Since you've been here you've had an opportunity to meet other people who can serve as good sources for you. Now I feel that with the project nearing the end, the responsibility of sharing this information with others can be transferred to you as you reach out to the many students you teach each year. You have the information and the tools. It's quite a challenge and a mission to you to take what you've received and integrate it into your own situation. I wish you much success. Thank you for your participation and interest in attending this conference and a special thank you to George, to Anita, and to Joanne. I appreciate all the help they have given me, as well as the input and feed-back from this group. Thank you again.

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