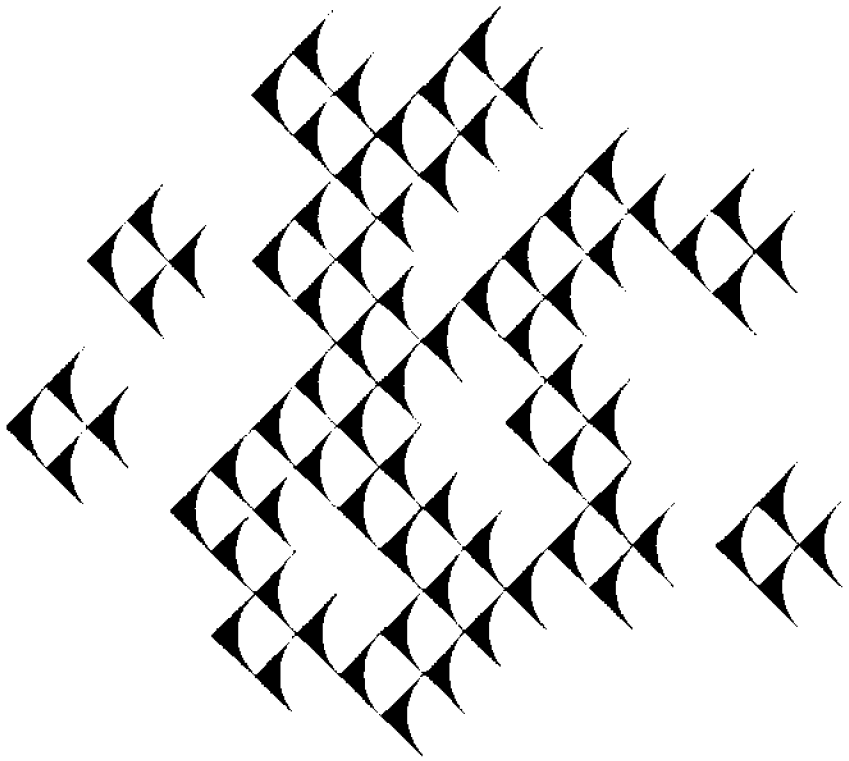

Seafood Quality and Product Form

Proceedings of a Workshop
November 7-8, 1985
Newport, Oregon

Joe Yuska and Sandy Ridlington, Editors

Oregon Sea Grant
ORESU-W-85-004

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Sponsored by

U.S. Department of Education
Department of Agricultural and Resource Economics, Oregon State University
International Institute of Fisheries Economics and Trade
U.S. and Foreign Commercial Service, International Trade Administration
A consortium of Oregon seafood firms
Oregon Sea Grant

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Contents

Preface

This workshop was an arena for the candid discussion of seafood quality and the problems associated with attaining and maintaining it in the Northwest fishing industry.

A recent Alaskan study, which interviewed over 100 industry leaders and experts, concluded that quality appeared to be the major hurdle facing the seafood industry in the next twenty years. With rapidly increasing sales in seafood due to health concerns over cholesterol, some people in the industry feel it's now or never for tackling the huge issue of quality control.

This workshop offered a forum in which all segments of the seafood industry could meet, examine different perspectives on the quality issue, and explore possible routes by which to proceed.

Presentations

WELCOME

Dick Johnston

I am with the Department of Agricultural and Resource Economics at Oregon State University, and on behalf of that department and the International Institute of Fisheries Economics and Trade, the U.S. and Foreign Commercial Service, a consortium of Oregon seafood firms, and the OSU Sea Grant Program, I would like to welcome you to the Marine Science Center and to this workshop. This is the last workshop in a series of four workshops sponsored by a grant from the U.S. Department of Education. The purpose of the workshops is to facilitate dialogue between individuals on university campuses, especially at Oregon State University, and persons in the seafood community, the private sector and the public sector.

COMMENTS ON THE NORTH PACIFIC FISHERIES DELPHI PROJECT

Bill McNeil

Bill McNeil has worked with fisheries resources, particularly Pacific salmon, for at least three decades. He has served on research assigrments with Oregon State University, the University of Washington, and the National Marine Fisheries Service in Alaska. He has taught courses in fishery science and aquaculture at OSU and at the University of Alaska. He recently left a position with private industry at Oregon Aqua Foods of Weyerhaeuser to become director of the Cooperative Institute for Marine Resource Studies at the Hatfield Marine Science Center.

The North Pacific Fisheries Delphi Project was conducted by the Alaska Department of Commerce. The term "Delphi" comes from a town in ancient Greece which was recognized for its oracles and prophets, and the term "Delphian" means prophetic. The Delphi method involves a large group of experts who are brought together by correspondence. In this particular study, 101 individuals were chosen for their expertise in the fisheries field. They were asked to respond to a series of assertions and questions put together by a research team. Questions were structured to stimulate their thinking on the future outlook for the North Pacific fisheries. The process involved three rounds of questionnaires. The first round was exploratory and was structured by the research group. The second round of questions and assertions was developed from responses to the first round. Responses to the first round were collated and provided as feedback through the second questionnaire in an attempt to identify areas of consensus. The process was continued in the third round to further establish areas of consensus.

The final report, dated September 1985, summarizes areas of consensus and points out areas of disagreement. To give you some idea of the scale

of the effort, the first questionnaire consisted of 28 pages. The second questionnaire was 76 pages, and the third was 33 pages. Those who participated devoted hours of effort going through these documents and responding to them.

The panel of experts was structured around two criteria: (1) expertise in five seafood areas (supply, demand, trade, price, and marketing) and (2) broad representation from industry, government, and academia.

The first round of questions focused on an overview of major issues which are likely to affect the seafood industry in the next twenty years. Questions in the first round were developed by the research team with the help of a group of advisors. It could be argued that the structure of that first questionnaire might help set the tone and direction and possibly bias the conclusions. This is a risk in the Delphi process. However, the participants responded with many of their own questions and assertions which were incorporated in the second and third questionnaires. I doubt that the original questionnaire biased the outcome of the study.

One area of interest was to define impediments to and advantages for the U.S. industry. Rounds two and three focused on the evaluation of the responses to see whether or not a consensus could be obtained.

With regard to impediments to the U.S. industry, there was strong agreement that there would be continued strong competition from foreign products. There was also a perception that in our society we have a tendency to structure our industry based on perceived social demands rather than around sound economic strategies. Financing is generally conceived to be inadequate, particularly long-term financing. A general lack of government support that would provide an infrastructure for a viable seafood industry was also considered to be an impediment along with inadequate research and development.

There was a consensus that the U.S. seafood industry has some advantages. Probably the biggest advantage is access to an abundance of seafoods in our continental shelf waters. Another advantage is easy access to U.S. markets which have considerable potential for growth. Furthermore, the outlook for utilization of our groundfish resources through blended seafood and other value-added products appears to be good. There was considerable agreement that our domestic industry has good potential to become competitive.

The panel developed a long list of important issues which the U.S. fishing industry will face over the next 20 years. I chose some examples for today's presentation. If each of you were to go through the report you might choose a different set of issues. The report is very complex. One almost has to sort through it issue by issue and make value judgments on how one personally feels about the level of consensus that was reached by the panel.

One overriding issue which fits into the theme of this workshop is that quality to the consumer is a major problem. The panelists agreed

that we need more coordination with product development, harvesting, quality assurance, and marketing and promotion. Seafood promotion is an area that we have tended not to pursue adequately in this country. The cost-competitiveness of our industry will also require continuing attention.

Questions related to salmon aquaculture received considerable attention by the panel. There was a recognition that competition from foreign salmon aquaculture will increasingly affect the ability of our industry to remain competitive in world markets.

I would like to digress to indicate to you that as the study progressed and consensus viewpoints surfaced, it soon became apparent that the panel focused on two areas for significant future upside economic potential. One area is salmon aquaculture, where a high-value species offers considerable potential for expanding the supply by applied technology. The other area is groundfish, particularly with the reallocation of stocks from foreign to U.S. industries. Though other forms of seafoods weren't ignored, I think there was this general attitude: crustacean and other fisheries are fairly mature--mature in the sense that the resources are fully exploited in most instances. Future upside opportunities were not clearly evident with fisheries other than salmon aquaculture and groundfish. As we continue with this review, we will focus primarily on salmon aquaculture and the groundfisheries.

The panel recognized that there are many institutional impediments to the development of an effective, competitive U.S. fisheries industry. There needs to be (1) better coordination between our biological management and economic utilization and policy development; (2) entrepreneurship and foresight in developing competitive products and effective marketing strategies; and (3) maximization of our stocks of salmon, groundfish, and shellfish for economic return. There was a general feeling that we need to focus far more attention on the health aspects of seafoods to try to expand per capita consumption, particularly in the U.S. Issues related to property rights and overcapitalization, particularly in the capture fisheries, will continue to plague us.

There was a general attitude among many panel members that much of the thinking within our industry is production oriented. We need to get a better balance between production and marketing. Some of the arguments reflect geographic and political concerns over the cost competitiveness of vessel-based processing with shore-based processing. We make it difficult for our processing operations to become efficient and competitive by creating regulatory impediments which make it difficult for floating processors to operate. Furthermore, the U.S. has fallen behind many other countries in the development of facilities such as the Hatfield Marine Science Center for effective education and research.

We are also behind other countries in long-term financing for the industry. The adequacy of our coastal ports and the infrastructure required to support a dynamic fishing industry are behind that of other nations.

The allocation issue of transferring harvest opportunities from the foreign fisheries to the domestic fisheries is a major concern throughout coastal areas of the U.S. There may be a continuing problem with currency exchange rates. The strength of the dollar has caused great difficulty for the competitiveness of our industry. The management of our trans-boundary stocks will continue to be a problem.

The panel identified a series of probable developments within the next twenty years. I will discuss them briefly.

One key development is the likelihood that natural stocks (exclusive of aquaculture) will soon reach maximum sustainable yields. There is even some suggestion that we may already have approached this condition on a world basis. This will stimulate more interest in applying technology to farm seafoods as opposed to hunting.

A parallel conclusion was that the capacity of the North Pacific to grow salmon could well be reached within twenty years. This projection is based partly on initiatives currently under way for ranching salmon. We are putting more and more fish into the North Pacific pasture, which of course could lead to some political initiatives on allocation of grazing rights. With regard to cage culture of salmon, the panel predicted that industry would continue to grow internationally and would probably supply much of the European market.

There was a consensus that domestic fisheries will largely displace the foreign fisheries within our conservation zone. The panel felt export trading companies would become much more aggressive and competitive on the world scene. The Third World countries could become significant markets, particularly for our groundfish. Alaska would become the major supplier of groundfish to the U.S. market.

Let's focus more specifically on salmon aquaculture in the next twenty years. Again, the capacity of the North Pacific to grow salmon is expected to be reached. The panel expects a long-term increase in the salmon supply to continue. This will be especially true for species like pinks and chums, which probably once again will become a staple item in our diet. The major salmon-producing nations will probably be involved in a dialogue on grazing rights in the North Pacific. The USSR will become a major supplier of salmon, primarily to the European markets. The Japanese will become exporters, particularly of chum salmon, although they will probably continue to import the red-fleshed salmon, primarily sockeye salmon from Alaska. The European markets will largely be supplied by the North Atlantic fish culture industry and ranching from the Soviet far east. Perhaps the North American troll industry will find it difficult to compete. Competition will be fierce with the increase in supply of cage-cultured salmonoids, including Atlantic salmon. There will also be a continuing trend to integrate the ranching programs with the capture fisheries. I suspect Alaska is probably the model, with the private nonprofit hatchery corporations which are largely operated by fishermen's associations. The salmon aquaculture industry is expected to become self

supporting in terms of financing. The economic benefit from the salmon resource is expected to continue to rise at a rate a little higher than the increased supply. In other words, panelists don't expect to see such depressed prices on salmon that incentives for increased production will disappear. It will be economically feasible to continue to expand salmon aquaculture.

With regard to groundfish in the next 20 years, the expectation is that the U.S. industry will grow at the expense of the foreigners within the 200-mile zone. The trend toward blended seafoods will continue, and U.S. processors will participate much more actively in the production of surimi and related products. There was a general consensus that the U.S. would reduce foreign harvest in our fishery conservation zone by at least 50 percent. There would be a continued trend toward investing in floaters as opposed to shore-based processing. The markets for groundfish will be most active with fast food restaurants and convenience foods. There will be a continued growth in demand for blended products, fresh and frozen fillets, and breaded products (mostly convenience foods). Price will be a major factor affecting market demand, along with product quality and dietary issues. Price, quality, and health issues were all identified as major considerations for the future of our groundfisheries. The panel predicts that we will pay more attention to the development of standards for product quality.

These are some of the major conclusions that I obtained from the study. I would encourage those of you who have an interest in this study to contact the Alaskan Department of Commerce for a copy of the report.

DISCUSSION

Question: What stimulated the state of Alaska to undertake this study?

Bill McNeil: The Department of Commerce in Alaska initiated a study to help the Governor's Office with its policy planning for the future of the Alaskan fisheries. The Governor's office was very concerned about the future of the salmon programs in Alaska because considerable amounts of state money had been spent on hatchery programs. I think this triggered the interest in undertaking the study. Once a group had been assigned to plan the study, the objectives became much more broadly based than just salmon. Salmon were an important component from the beginning, but it is interesting that as the results surfaced, salmon became one of the key elements in terms of identifying upside opportunity for Alaska's economy in the future. There is more to this study than just Alaska's economy. We are looking at the fishery resources that are shared around the North Pacific Rim.

Question: Were you aware of the two Norwegian developments that have taken place in the Puget Sound area, fish farming as we call it?

Bill McNeil: The interest for investment in Puget Sound is largely on the part of European cage culture groups. But there is far more interest in British Columbia. I have talked to some administrators in B.C. and as of about three weeks ago, they had approved about 60 projects in British Columbia. They literally have a "water rush" for people speculating on permits for cage culture of salmonoids. Most of the financing is coming from Europe: Norway, Scotland, and other European countries.

Comment: We are in the airline business and we see a lot of European cage culture salmon coming into Seattle. In fact, we had our first shipment this last week. The unfortunate thing for that imported fish was that Washington State had a late- season bonanza in the Hood Canal and it broke the price. As of yesterday, we still had it in our storage because they had to get $4.50 to $5.00 a pound. It is a beautiful fish, and that is a major issue.

Bill McNeil: European growers certainly do have excellent quality control. I would suggest that their best opportunity is to put fresh fish on the market during the season in which hunting fisheries don't operate. This, of course, represents the bulk of the year. During the season in which salmon are available from our traditional fisheries, the farming industry will have more difficulty in selling their product for the price they really need. There is a very strong world trend now toward cage culture of salmonoids. It is not just Norway; it is happening in Chile, New Zealand, Japan, and Scotland, along with some minor production in Puget Sound and on the east coast of the U.S. and Canada. Canada may develop into a major producer. The Atlantic salmon is the prime target species. I would say the chinook and then the coho salmon are second and third. The Japanese have a fairly aggressive pen culture program with coho salmon.

PANEL: IDENTIFYING THE WEAK LINKS IN THE CHAIN OF QUALITY

Jon Rowley

Jon Rowley was born in Astoria and attended Reed College in Portland and the Institute of European Studies in Paris, France. He is a lifelong scholar of the seafood industry and has traveled widely throughout the United States and Europe gaining hands-on experience at every level of the business. He also knows the culinary applications of fish and shellfish in different cultures. Through his company, Fish Works, he provides consulting services to restaurants, retailers, and seafood companies. His unique expertise has been used by transportation companies, advertising agencies, public relations firms, cook book authors, food editors, TV producers, and photographers. Prompting better seafood quality to the seafood industry and consumers alike has led to his national recognition as an innovator in our industry. The Alaska Fishermen's Journal has said, "In the last five years Jon Rowley has helped establish standards by which freshness and quality are measured." He contributes to various trade and consumer publications.

If, from the standpoint of quality, the system functioned better than it does, I would not have a business. Our clients are primarily restaurants and retailers, although we also have clients that are primary producers.

Our clients pay us to make their businesses more profitable. We promote better quality seafood. Good fish sells very well and the margins are attractive. The problem is getting good fish in places that are at the end of the distribution chain.

Generally, from the standpoint of quality, the seafood distribution system in this country simply does not function. It is very encouraging to see that there are now a few exceptions to this statement. If I really know what fish is supposed to be, and I am a restaurant fish buyer or retail fish buyer and put in a fish order through traditional channels, there is probably not going to be much in the delivery that I can use. I am going to have to return much of the order.

In trying to pinpoint weak links in this system, I would like to deal with some things I perceive in general. In this country there are no quality standards under which the industry operates. Neither the government nor industry has standards. Now I see cases of individuals and individual companies that are setting high standards, and that is very encouraging. But in general, there are no industry-wide standards in this country. As a result, the general level of quality tends to be fairly low in many regions.

There is no relationship between price and the quality of seafood products that go across most of the docks in this country.

I see some weak points in fisheries management.

The previous speaker, Bill McNeil, pointed out that the management of the fishery is production oriented and not market oriented. Rarely is the management decision evaluated from the standpoint of how that decision is going to affect the quality of the fish. A good example: last year there was some discussion about rockfish quotas and the quotas got very low. The boats from Washington lobbied for two-week trip limits instead of one-week trip limits so that they wouldn't have to come in so often and incur more fuel and other costs. From a biological standpoint, there were no dissenting arguments. It is not going to effect the quota adversely one way or another if the fish are caught in one-week or two-week trips. But from a consumer's standpoint, fish that have been on a boat over a week are not interesting.

Generally there is no significant grading in the industry. A fisherman that takes very good care of his fish, has impeccable handling practices, ices his fish well, makes short trips, and unloads his fish with a great deal of pride gets a certain price when he unloads his fish. A fisherman comes in behind him who has been out 10 days, with fish poorly iced. These fish are in very marginal condition. That fisherman unloads and gets the same price as the fisherman with the quality fish. The fish

are subsequently mixed at the dock and are sent out into the system. The good fish goes through the system without its own market identity.

Nomenclature policy at the wholesale and retail levels of the industry is a detriment to all of us and seems to be extremely confusing to the consumer. An example of this is the use of the term "butter fish" to make small black cod fillets sound more attractive in the market place. Use of the word "red snapper" to sell various species of rockfish is another example, as is the use of the term "bay scallops" to sell calico scallops. "Up-scalisms" I call them. This is making fish sound better than they might otherwise be.

In the freezing part of the business, I see a lot of variants in the quality of frozen seafood products produced in Alaska and the West Coast. In France they have two separate terms, "congelé" and "surgelé." One of these terms designates fish that are frozen at the peak of flavor and in a correct manner. That fish, when properly stored and thawed, is very close to the best fresh fish in quality. The other word designates fish that is frozen because there is a glut of fresh fish on the market. The fish has been sitting around awhile and there is no longer an opportunity to move it into the fresh market, so it is frozen. Those are two completely different levels of frozen fish quality. In this country, the two types are mixed. It is just pounds of a commodity sold at a price with no real look at the quality.

Furthermore, the way fish is frozen varies greatly from plant to plant and situation to situation. Often the fish is not frozen fast enough. Often the storage temperature, especially the temperature at which frozen fish is transported, is not adequate to maintain the quality of the fish if it was excellent at the start.

Another basic problem is the way fish is bought and sold over the phone. It is pounds of fish, sold at a price. Often the buyer and the seller do not even visually inspect the product that is being bought and sold. Once again, there is no price-quality relationship and no real opportunity to look at the product.

This is different in countries where the eye comes into play. In such cases, where the eye is very important in the whole purchasing process, the price for good fish is good and the price for poor quality is not so good. There are very strong incentives to fishermen to produce good fish in auctions where price-quality relationships are very strong.

From the research I have done in trying to determine how the handling on boats affects the merits of the fish, I've found that the first three hours after the fish comes out of the water is critical. The handling that the fish gets immediately after it comes out of the water determines how that fish is actually going to taste and determines the shelf life of that fish, providing that everybody else in the chain does his or her job correctly.

There is room for improvement in the trawl fleet. Many of the fish coming out of the fishery show evidence of severe bruising. This could be a result of tows that are longer than they should be. Or it could be the result of dumping a large volume of live fish into a fish hold while their hearts are still beating. This breaks capillaries in the circulatory system and the blood then goes out into the flesh. Tons of weight lies on top of the fish that are on the bottom of the hold. Fishermen should either shorten tows or find ways to get fish out of the nets that minimize the opportunity for bruising. The manner of laying fish into fish holds (when they are alive it is not a good practice to let large numbers of fish drop long distances) and the practice of storing live fish with lots of bearing weight on top create poor quality. Fish holds could be separated by lateral bin boards. Some form of containerization could be used, as well as improvements in the method of boxing. Depending on the vessel, there are probably a number of different measures that could be incorporated to address this bruising problem.

In the trawl fleet, I also noticed that it is not the practice on this coast to dress fish such as true cod, black cod, and ling cod. If that fish is more than four or five hours in an uncleaned condition, it changes through enzymatic action. I see and smell the result of it. The enzymatic action sours the flesh. It no longer has that clean, fresh, moist quality that we expect when we eat fish. If it is possible to bleed and dress more fish on the vessel, then to wash and chill them before rigor sets in, that would greatly improve the quality of those species.

At the unloading dock, I do not see the introduction of fish pumps as an improvement in maintaining the quality of the fish. At the processing level, standards need to be set for the quality of the fish that is unloaded at the docks and that fish needs to be graded. Good quality should be rewarded. With troll salmon, a very simple quality indicator could be used as a grading criterion on the dock: scale loss. I find this is almost foolproof as long as there has been temperature control. If salmon have minimal scale loss, their quality is usually excellent. The scale loss is caused by mishandling.

I would like to see species of rockfish that come to the docks in significant volumes identified and segregated. The practice of packing fillets in bags should be discouraged. If the fillets were nice to start with, by the time they get to where they are going, they are not. When you take them out of the bags, you unfold them; there are creases, they are twisted, and they are not at all appealing to the eye. It is very frustrating to get a bagful of fillets and to have several species of rockfish that are different sizes. The shelf life is vastly different and the species are different. They look different, they taste different, and they appear different to the eye. By mixing them you are not raising the value of the lowest desirable species. You are lowering the value of the most desirable species. For instance, if you have a combination of widow rockfish and yellowtail rockfish, you are lowering the value that you could be receiving for yellowtail rockfish. Yellowtail has much better texture and a much longer shelf life.

I would also like to see more high-quality dressed fish available in the marketplace so that at the retail level, the people that I work with could do more cutting on site. Icing down the whole fish and cutting it as it is needed would improve quality. As soon as fish have been cut, as soon as they have been exposed to the air, they are subject to bacterial growth. This would not happen if the fish were kept in whole dressed form.

Les Greening

Les Greening is chairman of the board for Airport Drayage Company, located at Sea-Tac International Airport. Les has spent 45 years in the air transport industry: 20 years with the direct airlines and 25 years with his own company. That entire time he has dealt in air cargo, specializing in perishable goods. Mr. Greening talked about weak links in the transportation of the product.

I represent a facet of the air transport industry. We are a service organization and are not involved, of course, in the direct airline operation. I was asked to identify the weak links in air shipments. Many weaknesses have been due to inexperience, and these have been overcome. There are still a number of problems that have yet to be worked out. We are working hard on those.

I would like to preface my "weak links" list by making a few statements as to what you people are probably fully aware of. Fish and seafood are becoming an increasing factor in the American diet. Most of us are aware of the factors that are contributing to the changes taking place in the eating habits of the American people. In the last few years, people have learned more about the effects of cholesterol and saturated fat in our diet. This is prompting a change to protein sources that are low in cholesterol and saturated fats. Two of the best sources of this protein are poultry and fish.

This diet change has resulted in an increasing demand for the movement of fresh seafood by air to points in the U.S. further than 24 hours trucking time from the source. Fishermen know their product. Nobody knows it better, but once it leaves their hands they have to have intimate knowledge of the distribution chain or complete confidence in the people they are dealing with.

The distribution chain has to be viewed as part of the product itself. We are not selling only fish; we are selling fish at a certain destination point. This is where we as a service organization enter the air transportation chain. Our link is a function that strengthens the chain and eliminates most of the weak points.

There are several potential weak points:

(1) Delivery from the producer to the airport in non-refrigerated trucks. We insure that refrigerated trucks are used at all times.

(2) No airport control when awaiting flight. The product should be kept under refrigeration at all times at a temperature conducive to the maximum protection of the product. At many airports fish are put in refrigerators that are designed more for flowers and produce than for fish. We probably have one of the largest facilities of any airport in the U.S. We just built a $2 million building at SeaTac International Airport. There, we have a fish cooler and a large cooler for imported tropical fruits. The fish cooler is kept at 31 to 32 degrees. The tropical fruits are kept around 50 degrees. In addition, we have a freezer. The freezer is used primarily to subject some fish products to a good, sharp chill for an hour or two before we tender it to the airline. It goes across an electronic scale in our facility where it is weighed. Then we can deliver it to plane side, which eliminates the lead time necessary to get it aboard the airplane.

(3) Not notifying the consignee of the flight number and arrival time at destination to enable prompt pick up. Notification is very important, especially going into the major markets in the East. As soon as a shipment is on the airplane, we call the consignee and let him know it is on board. Preferably it is on a nonstop flight, which he can monitor. It is his responsibility to pick up that shipment as soon after arrival time as possible. This again cuts down on the time. Don't let the airline put it in their refrigerator. Many airlines don't have refrigerators, and those that do may not keep fish at the right temperature. It is up to the consignee to be on top of it all the time if he wants prime product.

(4) Not selecting the most direct and expeditious route or failing to monitor the shipment to be sure the product is on its way and arrives as routed. There are four choices in airline movement as far as we are concerned. The first and most desirable, of course, is to use the same airline to ship your fish nonstop from point A to point B. The second is to use the same airline on a direct flight, even though it stops en route to the final destination of your shipment. The third is to use the same airline with your cargo transferred from one flight to another. And wherever possible, stay away from the fourth choice, interline (transferred from one airline to another), because this is where we run into problems. Quite frequently, it's tough to pinpoint who is responsible, why the shipment didn't get on the connecting flight, and so on.

(5) Delayed or cancelled flights. In these cases, retrieval of the shipment and proper storage in a refrigerated fish room is necessary. This is very important because you can't control the weather. There are times, especially around Christmas, when mail takes priority over air freight. Although the airlines do try to show a preference, if they can, to perishable products, this is not always possible.

(6) One weak point that we cannot fully overcome is the fact that we cannot ship by air using wet ice. Wet ice is the ideal way, as you people

know, for shipping fresh fish. We are in the process of working on packaging that will eliminate any possibility of leakage in the fresh shipments while in transit. Although wet ice is an ideal way to ship, it is presently prohibited by U.S. air carriers because of leakage which has a brine content.

I would like to read from a recent bulletin concerning what is necessary to minimize this problem. Right now Norwegian farmed salmon has started to arrive in this country. We had our first shipment here last week. The Scandinavians have solved the leakage problem. They allow wet ice on their airplanes in a Norwegian-built, leakproof, styrofoam container. It is 1 1/4 to 1 1/2 inch thick and encased by an impregnated carton similar to our wet locks. However, it's folded and constructed a little differently so that you don't pop the corners.

You are all aware of our wet locks. We do have a problem when you put a hundred pounds of fish in there. When two people pick it up, they torque the box and pop the corners; then there is leakage. However, the Norwegian version has reinforced corners and is very well designed. Because of the possible fish farming and shipping which we have in the Pacific Northwest, we want that type of packaging over here. We are going to try to find an American manufacturer to make those boxes.

I recently distributed a letter accompanied by letters from Frontier Airlines, United, and Northwest. It describes some of the problems we are facing. I've enclosed two recent memos from airlines outlining the new packaging regulations for seafood. From recent media articles, we are all aware of the importance of maintaining airline equipment. Tragedies can occur when these standards are lowered. To quote Greg Chen, district cargo sales manager of Northwest Airlines: "Brine presents a safety hazard to the air trap and its critical components."

United Airlines was required to take two airplanes out of service for several days because of leakage corrosion in the belly. One of these was due to leakage of seafood outbound from Seattle. UAL's estimated cost per day for an airplane out of service is $35,000. This estimate is based on maintenance and lost revenue.

I have had experience with this leakage. We started out in Alaska in 1940 with Pan American. After World War II we tried to encourage a southbound movement of seafood. The only thing that Alaska produces in quantity that lends itself to air is fresh fish. Of course at that time, most of the salmon was being canned, and what wasn't being canned was frozen. There wasn't much of a fresh market at that time, so after I joined Pacific Northern Airlines, we zeroed in on king crab when it came into the American diet right after the War. Prior to that, Americans did not know about king crab. With the first few shipments we weren't aware of the significance of leakage, and we had quite a bit of leakage in the DC4s. I was interested in the southbound load because that enhanced our revenue figures. We had full loads of cargo going north but nothing going south. I then learned of the corrosive properties of brine and salt on aluminum. The belly on one of our DC4s had to be relined at a cost of

about $6,000, which at that time was a lot of money. Mr. Woodly, the president of Pacific Northern Airlines, had a little strip cut out which had a hole in it. Every time I started talking about moving fish, he would pull this out as his exhibit of corrosion. Today, damage due to corrosion is even more important.

Since a substantial part of our business is in the handling of seafood air shipments, we are very concerned when there is a problem with packaging. It is in the interest of all of us to make certain that we prevent any leakage from shipments before it starts. The airlines are now requiring us to use heavy-duty plastic liners. This liner is not to take the place of liners in the wet lock boxes or smaller shipments consisting of loose individual boxes or E and EH containers. We make certain they are properly packaged before tending to the airline.

This is probably the most current problem we have. If we get that solved then we will improve the product transportation by including wet ice in the container. As I said, the Norwegians have already done this. The product is coming from Norway in wet ice and it arrives in beautiful shape. As you know, there is a certain amount of dehydration in seafood when it is not kept in a very moist condition.

One of the most positive factors for the future of fresh fish is that the product lends itself to air transport. I am thinking of aquaculture as it is being developed in the Puget Sound area as a potentially large customer for air freight services. As we resolve these weak points in the distribution chain we will enhance the development of new markets for fresh fish. I don't know if you are aware that the Norwegians have invested in two aqua farms in Puget Sound. I understand next March will be the first harvest from Cyprus Island. The other farm is at Port Angeles. We are very excited about that. I don't think that is going to cut into the harvested salmon. What it is going to do is fill in the void left when harvested salmon is not available. It is going to augment the ocean harvest and will enable the product to be in the market for 12 months out of the year.

Here is a final story to show you we are ahead of some other countries. Our first farm salmon shipment from New Zealand was in horrible shape as far as packaging was concerned. When the container came in on Pan American, it was full of water from leakage. A lot of the fish had to be transhipped out of Seattle, so it was necessary to repackage it. The New Zealanders were doing two things that we learned not to do a number of years ago. They had a styrofoam container that was not leakproof; it was of the loosely compacted styrofoam type. They thought they would make sure that it didn't leak by encasing it in a very thin plastic. In handling, the workers are not always careful. By the time the salmon arrived, the ice had melted. Now Pan American has refused to ship New Zealand salmon until the problem is solved.

Peter Troy

Peter Troy, of Troy Seafoods in Portland, has been active in the seafood industry for a long time and is quality conscious.

I have five retail stores and one small restaurant in Portland and have been in the business for 18 years. We do about three million in sales. Two years ago I bought into a processing company in Sitka, Alaska, called Quality Seafood. We processed about four million pounds of fish at the plant last year. I am pretty involved in trying to get quality fish to our stores. One of the reasons we bought into the processing plant in Sitka was to try to solve some of the problems of getting good-quality fresh fish.

I will tell you a little bit more about the processing end of it later. We didn't succeed in getting quality by buying a processing plant that does four million pounds. One of the things we need in our retail stores is at least five days of shelf life for our fish. This is reasonably difficult to have in lots of instances, because everybody in the distribution chain tends to use up the shelf life before the fish get distributed. Many times it is not their fault. They have a glut of fish all at once and the logistics of getting this fish to the end user is difficult. We buy from brokers also. But it is difficult to buy from a broker because he doesn't see the fish that he sells. We have to take a chance on what we get when we buy from a broker.

For example, take a frozen fish from a broker. We thaw it out and don't know whether it was frozen when it was 2 days old or when it was 10 days old.

Jon Rowley described very accurately the situation that occurs when fishermen bring the fish in. No matter how hard you try to keep good-quality fish separated from older ones, it is almost impossible. You have tons of fish on the floor and you have logistics that are very taxing: working 24 hours a day with fish coming in and fish going out.

On top of that, we have an agency that is setting very short seasons. The fishermen have to go out further and stay out longer to get their fish. We had a season that lasted 10 days. The fishermen ran out and instead of coming in every 3 or 5 days to deliver their fish, they just stayed out there the whole time. When they came in, they had more fish than they should have stacked up in their holds and the fish were older than they should have been.

In our retailing stores, we have a problem with price versus quality. The consumer looks in the newspaper at the ad prices. Consumers are very price conscious. We have maintained quality from the beginning in our business; that is how we developed it. We can't sell for the same price that the grocery store can. The grocery store buys from the processor.

They buy the stuff that is thrown in the bag and folded up. The age of it is sometimes questionable.

What we buy is what some of the processors call a quality pack. The processor takes the better grade of fish, packing it with plastic in between the layers. It costs a little bit more to do. We have to compete with the grocery store, which is very difficult. Fortunately, our customers are still coming back to us, and they seem to be appreciating quality.

An example is the housewife who goes into the grocery store and buys an avocado for 50 cents, takes it home, and finds out that it isn't all that good. Maybe she eats a little bit of it and throws away the rest. But when she goes in, buys a pink salmon, pays $20.00, comes home, and it isn't very good and has to be thrown away, she is considerably irate.

I am afraid the seafood industry hurts itself an awful lot by merchandizing a product of inferior quality. The housewife goes into the grocery store and buys a piece of fish. Maybe this is the first time she has purchased fish in a year or two, because she may have had a previous bad experience. She bakes the fish or cooks it. It smells and the house stinks. Her husband and children then ask, "Do we have to eat that stuff? It stinks!"

It is a bad experience for her and for the family. Her attitude is, "I am not going to buy any more of that fish." Maybe she picks one kind of fish that she doesn't ever prepare again or maybe she just takes it as fish in general. I truly believe that if in the very beginning we had made sure that every piece of fish which came across the counter to the customer was of good quality, we would have a lot more fish eaters out there today. Take a good-quality fish and it will smell pleasant. It has a good sea breeze odor.

We have a terrible time in our stores trying to maintain quality. We have picked certain suppliers up and down the coast that we trust and have confidence in. They have generally done a good job for us. They know that if they send us something that isn't good, we are going to call them up and say, "What would you like for us to do with this?" "Do you want us to send it back to you, freeze it, or throw it away?" After a few instances like that, they find out that we do mean business and that we really must have quality. Thus, we have developed a few suppliers that are doing a very good job for us. There are not very many of them out there.

I will tell you a story about our processing plant in Alaska and some of the problems we have up there. The plant is located in Sitka. Seiners were working close by, and there some very good-quality pinks in the area. A seiner came to our buyer and said, "We would like to go out and fish for you; will you buy our fish?" Our buyer went down to the processing plant and said to the operations manager, "I have these boats that want to fish for me; they want to deliver the fish tonight at 6:00 p.m. Will you be able to take the fish and process them?" The plant manager said, "I won't

be able to do them tonight but I will do them the first thing in the morning."

We decided that would be adequate. We could buy the fish and get them processed in the morning. They would be less than 12 hours old from the time they were caught until the time they were processed. We told our fishermen to go ahead and go fishing. They caught 10,000 pounds of pinks and came back to dock, where we put more ice on them to make sure they were very cold.

The next morning the plant manager said, "I've gotten a lot more fish in than I thought and some of it is older than your fish. We always have to process the oldest fish first so they won't spoil. That evening as well as the next morning, it was the same story. Finally, on Monday morning he got around to processing those fish. The fish coming down the line were of very poor quality, very smelly, and there was only one option: grind them up.

We bought those fish from the fishermen, then we had to grind them up and throw them away. You would like to say, "Whose fault is this?" The plant manager had good intentions because he meant well. He thought he could do it. He also had 800,000 other fish on the floor he had to take care of. The processing plant gets so busy with so many fish that it is very difficult for it to do a good job with quality.

I'm getting out of processing in Alaska. Three million dollars worth of sales doesn't say much for 4 million pounds of fish if most of it is going to Europe, Japan, and places such as that.

Sitka is a small town. It has four flights a day to the States and we want to bring out a few thousand pounds of fresh fish in to the continental U.S. on a daily basis. The airlines tell us, "We will allow you, as a processor in Sitka, to bring out two thousand pounds a day." We tell them, "We will have two thousand pounds there tomorrow morning."

When we take it to the airport, they say, "We can only get a thousand pounds out on the flight today. We will send the other thousand out tomorrow." "What about my two thousand pounds for the next day?" we respond.

"Well, we will have to put that off."

Processing is not too exciting. Something in retailing that is very exciting is advertising. The newspapers like to have their ad copy in their hands on a Friday for their Wednesday advertisements. The consumer is going to read this ad on Wednesday and buy this fish the next Friday. In most instances the fisherman hasn't caught this fish on Friday when you are supposed to submit the ad, especially if it is going to be fresh. We have to do a lot of praying and a lot of hoping. When we have a fresh season coming up we call the processor and say, "Now, we want to run an ad next Wednesday for all these salmon that your fishermen haven't caught yet. How much are you going to charge us for this catch?"

The processor says, "Well, the fishermen and I haven't even come to an agreement yet as to what I am going to pay for the fish." So, I have to put this ad in the paper, put a price in there, and think, "I hope this is going to work out."

We have to work around those logistics all the time, and we are still succeeding in doing it.

George Berkompas

George Berkompas is quality assurance manager for Chugach Alaska Fisheries. He has a B.S. in biological science and spent 15 years with the National Marine Fisheries Service in seafood inspection. He spent two years as a consultant in product inspection and seafood handling. He has also been the director of quality assurance for whiting at Faldalgo Seafoods.

Processors have some logistic problems in receiving fish from fishermen, and also in getting the fish out of the processing plant. Our firm handles shellfish as well.

I will have to say the processor is literally caught in the middle. We can't improve the quality of the fish we get. The only way to maintain the status quo is by putting it in a can. Jon Rowley referred earlier to ideal handling. However, the fishing methods today don't lend themselves to individual handling of the fish.

One of the weak links in the process is scheduling deliveries. When you have 100 fishermen, how do you schedule your deliveries so everybody is happy and everybody can get into the dock and out fishing again before the season closes?

In receiving the product, we set standards. We won't take any fish that is warmer than a certain temperature, say 50 degrees Fahrenheit. But this can cause problems. For example, what if one of your fishermen makes a set out at the end of the dock and drags his seine over to your unloading point? The water is about 50 degrees so the fish is already warmer than your receiving standards. But the fish are alive.

We presently use a wet pump for unloading. We have found that it actually maintains the status quo as well as any other of our unloading methods such as elevators. If the fish is really fresh when it comes to the dock, we won't have any difficulties there.

Another weak link is sorting the fish for your market. You have to decide whether to send them to a fresh market. If you want to send it to a fresh market, are the fish of high enough quality?

Another weak link is the holding. If you have hundreds of thousands of pounds of fish coming in all at once, you have a problem of sorting and handling in the proper order. At present we use champagne ice in our plants for holding the round fish. I am a firm believer in ice for cooling. You can't use too much ice as far as I am concerned.

Scheduling for processing on an individual basis is also a problem. Maybe one boat will deliver excellent fish and you start processing those fish. Then another boat comes in that has fish which are near marginal. Do you interrupt your processing and go to the poorer fish or do you keep on doing what you have been doing so that you have excellent quality from the first boat?

Scheduling shipments (which Peter Troy touched on) is a very sore point (getting fish out of the remote locations, especially for the fresh markets). The airlines will promise us cargo space for so many thousand pounds but when the flight comes down from Anchorage, someone else has bumped that space and we have to take our fish back to the plant. Sometimes the airline doesn't notify us. The fish will be sitting at the airport, with the next flight not due for another 8 or 10 hours.

Again, every step in handling the fish, from the catch to the consumer, lowers the quality.

I would like to say something about marketing frozen fish versus fresh. I have a hangup about this, because people are so oriented toward buying fresh fish. I think they will sacrifice quality just to get "fresh fish." Which is better: a fish that has been frozen after it is only a few hours out of the water or a fish that has been in the market for six or seven days and hasn't been frozen yet? In these days of microwaves and refrigerators, it is a simple matter to thaw frozen fish for almost immediate consumption.

In summation, I say we definitely all have to work together to put out a better product.

Scott Boley

Scott Boley has been a fisherman since 1976, fishing primarily for salmon and secondarily for albacore. His fishing season goes from May through October with weather and season permitting. Scott has become involved in various panels and projects during the winter. Currently, he is a member of the southern panel on the U.S./Canada Salmon Commission, a member of the user group panel of the Klamath River Task Force, a member of the Sea Grant Advisory Council, a director of the International Trollers Coalition, and a coordinator of Fishermen Solidarity.

I would like to address some of the weak links that I perceive in bringing high-quality fish to consumers. I want you to realize that my perspective is entirely from my experience with troll-caught fish. I

don't presume to have any knowledge or expertise in any other area. I think that many of the comments that have been stated are accurate.

From the fishermen's point of view, I think one of the major weaknesses is the lack of a quality control program. Perhaps the primary problem is a lack of incentive for quality control. There is no incentive for me as a fisherman to deliver high-quality fish to a processor, because at the plant my high-quality fish are mixed with low-quality fish and then all goes out through the mill. They are delivered to the consumer at day twelve, or somewhere around there, as the same mediocre-to-poor product. I am paid exactly the same amount for my good-quality fish as the rest of the fishermen are paid for poor quality fish.

I'd say another weak point in the system is the lack of refrigeration and a lack of ice facilities up and down the coast. It is difficult, particularly in California, to get adequate ice for your vessel when you need it. And if you can get it, it is usually very expensive. Therefore, people tend not to buy enough ice. The lack of ice facilities is one reason we've gone to a refrigeration system on our boat. If we had had fish ice facilities in the shore-based plants, we would not have installed this.

Another thing that degrades the quality of salmon, and I think this may be true of groundfish along the West Coast, is the dockside practices when the fish are unloaded. Generally the fish are unloaded in the sun and placed in totes. The workers have almost no training as to what constitutes good or poor handling techniques. It is very common to drop the fish from great heights on the grading tables. It is very common to let the fish sit in the sun for hours.

When a trip fish has been delivered, it is three to five days old. To warm that fish up to a 40 or 50 degree temperature is a sin and it will markedly decrease the quality. That fish needs to be maintained at 32 degrees Fahrenheit or close to that in order to maintain its quality. The problem is that the buyer for those fish doesn't have any incentive to demand quality, either. He is paid only 25 to 30 cents a pound to handle those fish for someone else in the system. The whole system is not geared toward quality. The whole system is geared toward getting out a uniformly poor quality at the other end of the chain.

At the annual meeting of the International Trollers Coalition, which we just had in Seattle, we felt that quality, coupled with identity, is the number one problem we are facing as trollers. We are instituting a program which we feel will address some of these problems. It is the system overall that does not encourage or give incentive for quality. As a fisherman, I see this as the weakest link in the chain.

Any extra care taken by the fisherman must be rewarded with an incentive. It can't put him at a competitive disadvantage because fishing is very competitive. It is just as competitive as the processing industry or the retailing industry. If I, as an individual fisherman, put myself

at a competitive disadvantage by taking extra care of my fish that I don't get paid for, there is no way to make it up.

DISCUSSION

Question: What are the problems facing fishermen who'd like to negotiate a higher price for quality fish brought in to the processors?

Scott Boley: I think one of the primary problems has been that top-grade fish loses its identity as it goes through the distribution chain. It can be recognized by experts as a top-quality fish at the other end, but it is not kept separate and it is not easy to keep separate. The logistics are not easy, and most processors haven't been interested in quality control up to this point. I hope things will change in the future. We have a proposal which would create an identity for the high-quality product, coupled with an orientation and training program for both fishermen and processors. If we create an identity for a high-quality product, then I think we can negotiate a base price and quality bonus for fishermen.

Question: I would like to ask George if he perceives some opportunities now for the processors in terms of better quality, with the rise of fish ranching facilities.

George Berkompas: I can't speak for the other processors in Prince William Sound, but the way we are set up at Chugach is that we have fishermen deliver to tenders, who are on a 24-hour rotation. In other words, they are not allowed to stay out longer than 24 hours on the grounds. They don't purchase fish that is any older than 6 hours. Technically, the oldest fish we would get into the plant would be 24 hours from catch to receipt at the plant. Aquaculture-raised fish are put out on bid to the individual processors, and the prices go quite high. I don't think the high price which is paid to farmed fish is offset by the quality of that fish because its quality isn't that much better than the fish that we get from the fishermen.

Question: We have trouble getting anyone to take high-quality fish at a higher price. Can you respond to this problem?

Peter Troy: I think I can help you a little bit on that. I will give you an example using salmon. Consider a processor who pays a fisherman a nickel more a pound for a high-quality fish, then has to sell that fish for more money. He has to find a willing buyer. His main buyers of large quantities of salmon (which he is processing) are going to be the large grocery chains (assuming he is going to the domestic market). Those people are all competing against one another and they are buying large quantities. Their buyer is concerned about price because price is profit. You offer them some stuff that is worth a nickel more. What is the difference? It is still the same; it is salmon.

The other little problem which we can throw in is getting that salmon, which you paid a nickel more for, to its destination before it becomes the same age as the rest of the salmon that is going out.

Here's another factor. If the processing plant is in Alaska, 90 percent of all the salmon are going to be in gross and sold to the Japanese or Europeans. Ten percent is going to go to the domestic market. The domestic marketplace consists of chain stores and small private companies like ours. We can afford to pay a little bit more and do pay more for a better quality fish. But there are not enough companies like ours to take care of the number of fishermen who want to bring in that quality product if they could get a nickel more for it.

Jon Rowley: Rockfish is one high-quality fish I've been trying very hard to find a source for. If you are a fisherman or a processor and you have a desire to upgrade the quality of your rockfish, I would very much like to talk to you.

Question: Ever since I have been involved in the fishing industry, I have been hearing about the same problems. Is anything really changing? Are the retailers and consumers really demanding better quality?

Scott Boley: My perception, from reading the trade journals and in my direct sales to the public, is that people are becoming more quality conscious at a very rapid rate. I think there will be profit potential for high-quality fish. The challenges are that there has to be a structure that will allow this profit potential to occur. We are trying to set this up for a very limited species (salmon--troll salmon, particularly) and only on a pilot basis for this coming year. If you want a solution to the overall problem you are going to have to come up with an overall system that allows the higher-quality product to be effectively marketed and thus reward the people who engage in this all through the whole chain. I think there is profit potential.

Jon Rowley: I think changes are occurring and a lot of major fast-breaking developments are taking place. These result in much better fish reaching the market in most regions and at every level. For the most part, these positive changes are not coming out of the industry. The changes are consumer driven; in fact, there is an explosion in the consumption of seafood. You don't have to sell fish. Consumers are looking to buy fish, but they want it to taste good. Once consumers have the opportunity to be exposed to excellent seafood, they never will buy anything less. At that point, the industry, I predict, will change extremely rapidly. This will occur once a critical mass of consumers knows quality.

I think the food editors and food writers in the consumer publications are now beginning to play a very important role in increasing consumer awareness about quality. I do think that things are changing.

Comment: There has been some emphasis on how old the fish are. It is not how old a fish is that determines quality; it is how a fish is taken care of when it is first caught. You have to take care of it immediately, and put it in a refrigerated hold or on ice. There is a big difference. I would much rather eat a 10-day-old fish that is kept in ice than a fish that is caught, left in the sun, and marketed the next day. There is less shelf life on that fish than on a 10-day-old fish that is taken care of.

Les Greening: I am not an expert on fish but I think that is right. I was interested in what George Berkompas had to say about fresh versus frozen fish. I love fish and eat a lot of it. I have a selfish interest in the fresh product. The test really is this: how does it taste and how is it perceived when it is consumed? I would like to bring up a point with the experts. We are becoming involved with the Norwegian salmon. As I understand, when this farm salmon is harvested and ready for market, handlers put them in killing pens and then cut the gills and let them bleed. This removes all the blood from the fish. When that salmon arrives here it is beautiful. It is exceptional. The fish is delightful and has no fish smell. When we first started flying in the orange roughy as a fresh product, I really liked it. Now they are bringing it in as frozen product and I really can't tell the difference between the frozen and fresh. Either orange roughy freezes well, or the processors do an exceptional job of freezing it properly and keeping it at a low temperature consistently until it arrives at the market. As a consumer I can tell the difference between salmon which is fresh and salmon which has been frozen.

Comment: Les, with your remarks about Norwegian salmon, you've eliminated several of the processor's weak links. Fish farmers can harvest just exactly what they need to market. They don't get a whole boatload of fish coming in all at once and they handle the fish individually, not in mass.

Les Greening: Well, am I justified in being excited about the development of the fish-farming industry in the U.S.?

Question: I would like to direct this to Jon Rowley. There seems to be an underlying assumption here that if quality seafood is delivered to the markets, that will automatically lead to higher prices. We're assuming the consumer is going to accept it. There are limited markets where you will be able to get that kind of acceptance. I think most of the business is going to be in the grocery store chains. I question if demand is automatically translated.

Jon Rowley: No, not automatically. What you just described is the status quo. It is the way things are currently being done. If you look at the actual percentage of fish sales in some of these chains as opposed to meat sales or the percentage of fish sales as a function of the overall store sales, they are not selling very much fish. This is because it doesn't taste and smell good. In many supermarkets, you walk by the fish counter and you turn away from it. You don't want to be near the thing because you start to perceive what it is all about before you even get there.

Consumers want fish that taste good. They are not that price sensitive. I know if I go into the store and I am buying a piece of fish to take home to eat, especially if I happen to be entertaining, I worry less about the price. People love to entertain with seafood if they can get really good seafood. I want something that is very, very good. If I have to pay even another dollar a pound for it, it is not a concern to me. My concern is that I entertain well, or that my family eats well. In the environments that I have been working in, I see a very direct relationship between quality and increased fish consumption. I think it can happen across the board if quality becomes consistently and dependably better. But you are right: higher-quality fish does not automatically translate into better prices, but it can if there is a process that takes place.

Comment: In 1984, Better Homes and Gardens did a consumer survey and found that most of the quality concerns were rated as being more important than price considerations. The survey revealed that the most important factors influencing the consumer are the food's appearance, freshness, and nutritional value. Following those concerns was cost. I think that is an important provision.

VOLUNTARY INSPECTION PROGRAM

Carl Grant

Carl Grant received his bachelor's degree in agriculture from the University of Missouri. He has spent 21 years in the seafood inspection business, 16 of them as a supervisor. He has been in the Pacific Northwest for ten years, and at present works out of the National Marine Fisheries Service office in Bellingham, Washington.

I would like to start by giving a short history of voluntary seafood inspection. It came into existence with the Agricultural Marketing Act of 1946. This act was designed to promote a scientific approach to the problems of marketing, transportation, and distribution of agricultural products. Fish and shellfish of all types were included in the act as agricultural products. It was meant to promote better quality through development of voluntary grade standards, and it was to provide voluntary inspection and certification on a fee-for-service basis.

Inspection actually got under way in 1948 under the USDA. One of the first needs seemed to be for a U.S. grade standard for fish sticks and portions. Processors were being tempted to use less than the best fish in these products and to use less and less fish and more batter and breading, since batter and breading were inexpensive in comparison with the fish. With no standards and with the cost of producing these products directly related to the percentage of fish they contain, it is not too hard to understand why products were being overbreaded.

Standards were developed for fried fish sticks, raw breaded fish sticks, and eventually a number of other products.

The minimum fish flesh percentage was set at 60 percent for fried fish sticks, 65 percent for fried portions, 72 percent for raw breaded sticks and 75 percent for raw breaded portions. These still remain in effect today. In addition to the flesh percentage, it was determined that grade A must have good flavor and odor--not just fair or reasonably good, but really good. And to be grade A the product must score a minimum of 85 points using the grade standard which has point deductions for the different defects. Factors that can be scored under this standard are such things as damaged sticks, uniformity of size, distortion when cooked, and blemishes such as blood spots, bones, and texture.

The provision of the agricultural marketing act that related to fish and shellfish was transported from USDA to the Department of Interior in 1956. The program continued gradually to expand into breaded shrimp, fish steaks, fish fillets, canned products, and so on. Although it was the same program with the same inspectors, it was a different department. In 1970, the program was transferred to the U.S. Department of Commerce, where it remains today.

How does the program work? All of our inspections are by request. Our inspectors are not authorized to inspect any product or any facility without a request to do so. This request can come from any party with an interest in the product and commonly comes from the processor.

You might ask, "Why would a processor invite the government in, pay an inspector a lot of money, and possibly have the government give the processor a hard time about the conditions of his plant and maybe the quality of his product?"

There are several reasons. Products that are packed under federal inspection (i.e., the plant, the product, and the label are approved) can carry the U.S. grade A mark or the "packed under federal inspection" mark. The product can be advertised as being federally inspected. In some cases, buyers have specifications that require U.S. grade A or the PUFI (packed under federal inspection) mark, depending on the product. On exported products, the importing country may require the inspection or the seller may request inspection for his protection. The seller may know that he has a high-quality product, but feels that the buyer might try to claim otherwise. In that case, the inspection certificate would protect the seller.

Since we must pay our way, there is a charge for all of our services. This differs from mandatory programs, such as USDA meat and poultry inspection. There, taxpayers' money pays for the inspection, except for overtime.

We have basically three types of inspections: contract inspection, lot inspection, and miscellaneous services. Under contract inspection, the handling practices and sanitary conditions must be approved. A

sanitation standard is used to rate the plant to check such items as construction of the building, lighting, water supply, waste disposal, laboratories, ventilation, cleaning, and personnel practices. Points are deducted for some defects and others are considered critical. To be approved, the plant must score a minimum of 90 percent with no critical defects.

I would like to mention some of the common problems we find in West Coast plants. Some of what I am going to say here may not make me very popular with some of you processors, but I think it needs to be said. Unfortunately, in some towns one can look for the worst areas and the worst looking buildings and in that area one finds the fish processors. Many of these buildings were not designed for food processing. Some are very old with broken up floors, doors that can't be rodent proofed, wood in direct contact with products, and wooden walls that go all the way to the floor in wet processing areas. These wooden areas cannot be properly cleaned and sanitized. There is questionable water quality in some places (especially Alaska) and poor septic systems or no system at all in some cases. General handling of sewage in some areas is a very real problem. There is sometimes a lack of concern for good personnel practices. We have actually failed newer, well-constructed plants because of a lack of concern for personnel practices, such as employees' smoking, chewing over the product, and not washing their hands. We have some problems with plants that barely pass the sanitation survey after two or three tries. Later, the inspector may have problems getting the plant to upgrade or even maintain the level present at the time of approval.

The second step under contract inspection, after the survey, is a contract which has to be signed by our agency and the processor for the inspection services. This may be for four hours per week or more. A security bond must be posted or money paid up front to protect our agency from possible losses due to bankruptcies and so on. Once all this is done, an inspector is assigned to the plant and must be present for all phases of the processing except under approved quality assurance systems. For an approved system, the company submits a written plan using our guidelines. Once this written plan is evaluated and approved by USDC, we make an on-site visit to evaluate the plan in action. We want to see that the written plan is actually being followed. If everything is approved at this point, USDC will monitor the company's work and inspect a portion of the lots, thus making it possible to reduce the USDC inspection hours. This lowers the cost of inspection.

The US grade A mark can be used on packages where a grade standard exists for the product and where the USDC inspector has certified that the product meets the standard for US grade A.

PUFI, the "packed under federal inspection" mark, can be used when a standard does not exist. The inspector determines if the product meets a USDC-approved processor specification. The processor can submit his own specifications in this case. Once it is approved by our department, that is what the inspector will use to inspect the product.

Contract inspection involves inspecting plant sanitation, inspecting the product, and also the labeling. It is the lowest cost per hour of all our services, at present $23.85 per hour. The second type of inspection, lot inspection, may be for domestic or export orders. It is an "end item" inspection, meaning that the inspection is on the finished product, not during processing. Statistical sampling plans are used to inspect the product, and the sample units represent the lot or shipment. Certificates are used spelling out the findings.

A big drawback to this type of inspection is that the inspector has little or no knowledge of how the product was handled prior to and during packing. With this type of inspection, a portion of the cases are stamped with an "officially sampled" stamp or in some cases "accepted for specification" stamp. Lot-inspected products cannot carry the U.S. grade A mark or the "packed under federal inspection" mark. Sampling is usually done at a cold storage or a warehouse. Probably the biggest problem we find with the product is a lack of freshness. For some products, decomposition is far too common a problem. Lot inspection is the most expensive of our services, currently $33.40 per hour plus any expenses. This could involve cost for airline tickets, per diem, and mileage.

The third type of inspection is miscellaneous services. These are consultative services and usually have to do with working with companies regarding their plant structure, product specifications, quality control plans, and related items. This service is sometimes used by processing plants that cannot meet the requirements for approval, but want inspectors to point out areas where they need to make improvements. The cost is $29.85 per hour plus any expenses.

What's ahead for seafood inspection in the near future? Our agency is revising our present sanitation standard. This is about a two-year project. We are making plans to update several product standards as well. There will be a few new product standards coming out.

As most of you know there is talk of mandatory seafood inspection. There is a bill now in Congress for mandatory inspection under the U.S. Department of Agriculture, designed along the lines of the present red meat program.

What's ahead in the long term for the seafood industry and for seafood inspection? It is anyone's guess, but I do know that when properly handled, seafood is an outstanding food. It has so much going for it nutritionally, let's all work to see it is handled with the care it deserves.

NFI QUALITY ASSURANCE PROGRAM

A. D. Chandler

A. D. Chandler is a government relations representative for the National Fisheries Institute. His involvement with the fisheries industry, at least since 1980, has been mostly through the National Fisherman Magazine, on whose staff he has been associate Pacific editor, Pacific editor, and office manager. He has also been the consulting editor for Seafood Business Report.

We are really talking about three different areas when we talk about seafood quality. In certain instances it's important to specify which of the three areas you are referring to.

The first area is wholesomeness. Is this piece of fish or shellfish wholesome to eat? Will it make you sick? The second is integrity. Integrity deals with issues like short weighing, overbreading, and overglazing. The third area is the senses. Does it smell good? Does it taste better than another fish which may be as wholesome?

I think it is worthwhile to keep in mind that we are dealing with three separate areas when we deal with quality; however, I get the feeling that most of us here are talking more about the sensory issue than wholesomeness or integrity. That is not to say that we shouldn't be concerned about those two, especially as we look at the inspection issue. While seafood is generally extremely safe, the incidence of seafood-related diseases and illnesses is considerably higher than for red meat or poultry. Just to give you a rough idea, there is an incident of seafood poisoning or seafood ill health for every 61 million pounds of seafood consumed, whereas in red meat and poultry, that incidence is only one in roughly 865 million pounds.

Of course, to put this incident into perspective, one must ask how many of the seafood incidents are related simply to the consumer mishandling the product.

Where does quality begin? There are two answers to that question. The first is that it begins on the boat; the second is that it begins with the restaurant and retailer. NFI (National Fisheries Institute) essentially takes the position that the final responsibility for quality rests with the retailer and the restaurateur. They ultimately are the messengers, and the directors. As messengers, they send the message to the industry which will eventually get back to the boat. If they demand quality, they will learn how to tell quality and how to purchase quality. That is all they will buy. The reason this message will be heeded by the fisherman and processor is partially because the buyer of seafood is in the driver's seat: we are a free-trade economy. The buyer isn't forced to buy from a U.S. producer. Maybe he should be and maybe he shouldn't; that is a different issue. If Mexican shrimp is in better shape and is better

handled than U.S.-caught shrimp, the buyer has the opportunity to buy that product from Mexico.

I once took three Congressmen to a supermarket in Seattle. One of them was from New England. He was amazed to find out that the supermarket owner bought sole from Europe rather than from the Congressman's district in New England. He was also amazed that this supermarket owner sold the product at the price that he was selling it at. The supermarket owner said, "I can't get the quality I want from New England. I can get what I want from the U.K., and my customer will bear the burden of the price."

In that sense, the restaurateur or the retailer is crucial in the development of quality in seafood markets. This is what I would call a trickle-down theory. It is an organic approach. I would like to see it changed from a trickle to a fast-flowing torrent.

The National Fisheries Institute began work on a new seafood quality improvement program in 1983. That was not a good year for seafood. The same year, the Cable News Network did a fairly significant piece on species substitution at the retail level. Also that year the GAO (General Accounting Office) issued a report very critical of the quality of U.S.-produced seafood. GAO was investigating why the U.S. was having a difficult time exporting its product. There were many comments from foreign nations pertaining to the quality of U.S. seafood. Also, that year New York health officials told consumers not to eat raw clams. This didn't do much good for the shellfish industry. The same year the Public Voice for Food and Health Policy, a consumer-oriented group, came out with a report generally stressing the problems in the seafood industry and once again calling for some type of improved inspection.

NFI decided to form a special quality committee. Invited to sit on it were the institute's heavy hitters. Just as they were getting ready to meet, yet another issue hit which had ramifications. It was discovered that the bluefish off New England were impregnated with fairly significant levels of PCB. The press played up that story to the concern of many people in the industry.

A new policy was established which I will read:

> Whereas consumer acceptance of seafood is dependent on consumer confidence in seafood, and whereas consumer confidence in seafood requires an industry commitment to product quality, wholesomeness, and integrity, and whereas the NFI is committed to increasing consumer acceptance of seafood, therefore be it resolved, that the NFI establish a comprehensive industry code of quality and product integrity and encourage industry members' adherence to the same. And that the NFI participate in the development of nomenclature regulations and their dissemination to assure consumer confidence and fair play within the industry and that the NFI develop a total education program network aimed at all levels of the seafood industry: boats, packers, processors, importers, wholesalers, brokers, distributors, retailers,

food service operators, consumers and regulatory agencies on all aspects of seafood quality, wholesomeness, and integrity and that the NFI expedite and otherwise encourage the implementation of this resolution.

The NFI staff had come out with concrete proposals by the time of its convention in 1984, and by the board meeting in October 1984, final drafts of the new quality assurance program were out. By the regional meetings in January 1985, the program was essentially released, though not altogether loved.

As I said, the key was to educate the consumer, the consumer not being the housewife but the restaurant owner or the retailer. One of the things distributed by NFI were back-of-the-house posters. For example, if you are a seafood receiver, what do you look for? Make sure products are delivered in a properly refrigerated truck, even for short hauls. Products should be well iced or solidly frozen. Use your nose to detect foul odors. Check live shellfish to make sure acceptable numbers are still alive. Use any code information the supplier may have provided to make sure you are receiving new products. Keep seafood cold and clean, and keep it moving. Those are seafood-handler reminders.

Our poster also covers seafood marks of quality. What to look for in a fish if you are buying fish. For example, bright, clear, and full eyes with black pupils, and translucent corneas; firm, elastic flesh; shiny, bright, metallic-colored skin; bright red gills; translucent mucus and no slime; and firmly attached organs in gut. If the fish are gutted, evisceration should be complete.

I don't know if many of you have seen fish like that. I have seen a few. But not too many. We had a number of members who were very upset and in a sense were saying, "Why should you be telling the buyer what a perfect fish is? He might just start demanding it."

Not very many said that. Most of them realized that it was a crucial program and one that really needed to be carried out because as I said earlier, that is where quality begins.

I know a processor in New England who stopped buying Pacific salmon. It is one of the top quality houses. The company started spending a dollar a pound more to buy Norwegian. I saw some of the Pacific salmon it had stopped buying. I know some other people who have also seen it and can verify what I am saying. It was crap. I don't know whether it was the shipper, the processor, the fisherman, or any combination thereof. But whatever it was, it forced this traditional buyer of Pacific salmon to start buying Norwegian salmon.

If that buyer would take the time to start insisting that the Pacific supplier supply the quality which he wants, then he would perhaps be able to buy that product. However, again, we go back to the trade laws and back to the free market economy under which this nation runs. At this point he doesn't need to do that. If someone else comes knocking on his

door and says, "Here is a great product that I have," this person is going to buy that product and simply dismiss the Pacific problem. He is still willing to look at Pacific salmon, but now he is going to be very skeptical. It is up to you to prove that you are better just as it was up to the Norwegian producer to prove that he was better.

NFI has taken a number of other steps to try to educate people about seafood quality. We have newsletters which have gone out to a lot of different people. I have a whole program of quality-related material. For example, I have a seafood quality flip chart. Anyone who is interested in these items can look at them. They are for sale. We have this poster that says the first thing in increasing seafood sales is increasing your own knowledge and that of your employees. The second thing is inspiration. The third thing is promotion.

Thus, the essential part of our education program on quality is to increase the knowledge of buyers of seafood so that they can put pressure on the suppliers. The other component is the "commitment to quality," which is essentially an effort to get our members to sign their names to an oath of quality. It doesn't necessarily mean anything except that they are willing to put there names on it. However, if people know they are producing poor-quality products, and they have signed this oath, it could make life embarrassing. The oath has no force. They are not going to be kicked out of NFI if they don't follow up. Out of 850 full company members, 170 have signed the commitment to quality.

The problem of nomenclature was also dealt with, particularly in reference to blended seafood products. What should these be called? Surimi production started in the Northwest when there was very little crab available. Therefore, making imitation crab was not a big threat to crab producers and suppliers. However, as imitation seafood products hit the Gulf and New England, there was a little more concern. There are plenty of shrimp about, without having to worry about shrimp look-alikes. This is an area in which NFI is currently working with the industry. At this point we are petitioning the FDA to allow it to be called either surimi seafood or blended surimi seafood, rather than "imitation." The problem of calling it imitation is that it is not imitation; it is seafood. If you call it imitation seafood, people will think it is made of soybeans.

The other area I would like to talk a little about is inspection. This was another area of concern for our members. It is clear that there are problems in product integrity. There was, within the industry, some concern that members aren't selling products at full weight. The vast majority of the industry may be penalized because of the actions of a few bad apples. There are existing laws and regulations enough to ensure product integrity, but the FDA (as the current regulator) simply is not able, especially with the budget cuts, to enforce them.

Many people in our industry feel that mandatory inspection is not necessary. By the trickle-down approach, the bad apples will be weeded out naturally. There are enough regulations now; we don't need more. The industry will survive if left alone.

There is the concern that if some consumer dies from bad seafood we could have a very real problem on our hands. We would have the consumer groups coming out of the woodwork and pushing very hard. If it happened during an election year, we would need God's help. Half of Capitol Hill would be saying that there must be an inspection program. It would be a good vote winner. If the industry members are not prepared for it, they could find a program like that used in meat and poultry foisted upon them. There is no question in anyone's mind that continuous mandatory inspection is irrelevant to the seafood industry. The U.S. Department of Agriculture (USDA) will admit that inspection is irrelevant to the vast majority of the meat and poultry industry. We don't need to inspect every individual piece of fish. NFI as an institute has come out and endorsed a mandatory seafood inspection program. The program has basically three points:

1) It would be one-stop shopping. That is, instead of having agents from the Department of Commerce, the Food and Drug Administration, the USDA, states, counties and cities all dealing in plants and in the process of inspection, you would have one agency. The agency that has been selected by the board is the Department of Agriculture. We have had discussions with the Department of Commerce (DOC) and they are essentially very pleased with this decision. They think inspection probably belongs in the USDA not in DOC.

2) The other key issue is that there is universal treatment of U.S. and foreign products. Many U.S. processors are legitimately concerned that they are going to be the easy target for any inspection program. While they get hammered upon, the producer of a product in India would get away with a plant that would not pass U.S. inspection laws. The program would basically call for certification followed by surveillance. We are still open for suggestions. We are going to many people throughout the industry to get their input.

3) Control would be through hazard analysis rather than by constant inspection. This takes into account the key points from the time the seafood is caught to the time that it gets into consumers' refrigerators or onto their plates. It focuses attention on key areas, letting the rest of the industry be. Our program uses the industry to make sure that at those key points the industry has enough interest in its own survival and growth to take responsibility.

Those are the basic areas we are looking at. I could go into far more detail, but I would like to go back to where I started and ask, "Where does quality begin?" As I said, in one sense, it begins with the ultimate buyer. It also begins with the vessel. Vessel inspection is in the NFI program, as in other legislation on mandatory inspection which has in the past gotten to the Senate and House floors but ultimately has not passed. Our members ultimately feel that boats should be inspected, that they should somehow be put under a certification program. This obviously would be very difficult. I would like to get feedback from people. We have 32,000 fishing vessels over five net tons. We have over 100,000 fishing vessels that are simply registered but not licensed. The cost of

certifying would be immense. The cost of achieving any code would be immense. The cost of enforcement would be immense. We know all that, but we also know that somehow we need to get back to the boat.

Take an example of two boats. One is fairly old, made of wood, and not very clean to the eye, but the fisherman who owns it is very quality conscious and brings in a top-grade product. The other boat is a state of the art with the best equipment, but if the fisherman operating it doesn't really understand or care about the product, he can bring in a very poor product.

We know that simply by having certification, we are not going to guarantee any sort of good product. We also know that to a certain extent it could be achieved under the existing system. At present processors don't pay for quality. If they would pay more for quality, then the fish would be better taken care of by the fishermen. There have been reasons for that. The processor has a very legitimate concern. I have talked to shrimp processors on the Gulf. One of their concerns is that if one processor doesn't buy the shrimp, someone else will.

Maybe we should look at systems in New Zealand, Canada, or Norway, the fish exporting nations. In the U.S. we have a bit of a problem; there are only three seafood markets in the world that really count. The smallest is Japan, the next one is the European Community, and the largest one is the United States. Those are the three world markets for quality, high-value fish. The European Community and Japan are very protectionist whereas the U.S. is fairly open. We are our own market.

Countries like New Zealand, Canada, Norway, or Iceland don't have big internal markets. It is much easier for them to really gear for export markets, and, in fact, they have very strict export regulations, far stricter, often, than the regulations for internal sales.

As far as vessels go, let me read this New Zealand regulation to you as an example:

> If a fisheries officer is of the opinion that any fishing vessel or any equipment on that vessel used for taking, storing or processing of fish is by reason of unsanitary defects or other conditions unsuitable for the taking, storing, or processing of fish for human consumption, he may prohibit the use of the vessel or equipment either absolutely or until the condition has been remedied. A fishery officer shall condemn any fish intended for human consumption found on that vessel.

The New Zealand law is fairly lax compared to recently enacted laws in Canada or Norway. New Zealand leaves it up to the discretion of the officer. In Canada they have gone to further extremes. They demand core temperatures in fish, core temperatures all the way through. They regulate how you construct your vessel. The Norwegians do much the same thing. These sorts of regulations make it clear to a lot of fishermen that the government does take the issue of quality seriously. The laws

are on the book if they need to be enforced. Using this approach, the fish buyer might conceivably have the power to detain a product which the buyer feels is not up to grade. Maybe he could detain it until a circuit inspector could come by and take a look. You could have some sort of arrangement by which if the circuit inspector says the fish is passable, the processor has some responsibility (if the product has deteriorated) to compensate the fisherman. I would be happy to listen to your ideas on the subject.

Fish quality starts with all of us. We must take care of the fish. Unlike other fish-exporting nations where the export income from seafood is very important to the nation's balance of trade, the United States has managed fish traditionally: as a common resource property and on a production basis. We have managed it for those in the industry. We have managed it for fishermen and, to a lesser extent, for processors. We have managed it for the status quo. We have managed it on an ad hoc crisis basis. We have managed it as far as maintaining production, maintaining jobs, and keeping conflict down to a minimum. We have not managed it for the consumer. We have never taken the consumer into our discussions when deciding what to do. It is certainly arguable that in the United States the taxpayers own the fisheries since they are a public common property resource. All of us own the fish and it may be time to consider how we get ultimate benefit from that fish. Conceivably, if we start looking at that question, we can change our attitudes toward seafood and start getting in the same mental position as one finds in places like New Zealand, Norway, and Iceland.

DISCUSSION: SHOULD THERE BE A MANDATORY INSPECTION PROGRAM IN THE SEAFOOD INDUSTRY?

Question: What is the current status of the national legislative effort, and what is your prognosis for both the House and the Senate?

A.D. Chandler: There is a bill by Byron Dorgan from North Dakota, which is not terribly legitimate. He essentially put it in at the bequest of his beef-raising constituents who thought that if seafood had to go under inspection it would lower the consumption of seafood and help the beef producers. The bill really isn't going anywhere, though it will be reintroduced every year. The only concern is that because it is reintroduced, because it is there, it is a vehicle. Should there be a crisis, there would be a bill ready at hand for someone to use. There has been some thought that if the industry does proceed with an inspection bill, we could tie into the Dorgan bill as a vehicle.

We really haven't gotten to that point. NFI has not officially started contacting members of Congress. We have some people in mind who have expressed great interest, but we are concerned about giving anyone in Congress a bill that is going to hurt them. Politicians are just as concerned about taking on a bill that would hurt them.

At this time we are trying to design legislation which both the industry and the consumer can support. When I talk about industry, I mean processors, fishermen, importers, and so on. Basically, we are in the very early stages. We have talked to the FDA; we will be talking shortly to the Secretary of Agriculture. He has made it clear to us that should the industry decide it wants mandatory seafood inspection and decides it wants that inspection within the Department of Agriculture, he would work absolutely flat out to help get a bill which we wanted. He would go to the President and work with the Administration to try to help us get our bill enacted.

Bruce Gore: It is somewhat of mystery to me what the inspection program will be inspecting for, what the criteria would be, and how they would actually affect seafood quality. Sanitation practices are common sense and are pretty much being practiced now, the way I see it.

Jon Rowley said something significant this morning: the first three hours out of water are critical to the quality of seafood, say six months from now (if frozen) or if it is going to be used fresh. "Fresh" is a term I don't like to use because it doesn't mean anything. You have three hours to do something with the catch and what you decide to do is important. You have a period of days when it is held at a controlled temperature where you are controlling the biological decomposition of that product. When the product is landed at a plant, there is a small amount of time when it is taken out of that refrigerated environment and put in a tote. At some point it is frozen or shipped "fresh."

What is happening here is that most of the time the product is under some kind of a temperature-controlled environment. The quality of that product is being affected by people that don't harvest the product, don't own the product, and aren't going to buy the product. These people are the shippers and the processors.

Comment: Processors own the product.

Bruce Gore: Not always. There are independent processing plants up and down the coast.

A.D. Chandler: Bruce, can I interject? We are dealing with three levels of quality: integrity, wholesomeness, and sensory perceptions. I think what we are talking now about is simply the wholesomeness level. Any plant that is certified to sell to the military, that is under the NMFS voluntary program, or that wants to sell to a school program would be more than qualified to pass any certifications of basic wholesomeness. Such a plant has running water, screens, etc. It may be that the plant is not certified now because its managers don't want to go through the hassle and don't feel the markets are there, but most legitimate plants would pass. Wholesomeness is a concern with the fly-by-night operations that come in. There is a lot of concern in California now about the Vietnamese fleet which is going in, packing fish, shipping it around in uninsulated pickup

trucks, and selling it throughout L.A. They are selling a very dangerous product. Yes, we need to insure the wholesomeness level.

Then there is product integrity. There are laws which say that if you are selling 16 ounces you must, in fact, be selling 16 ounces. We know that if you are ordering an 8-ounce portion of something at the restaurant, you might be getting 6 ounces. Few consumers are going to know the difference or care. You are being cheated. The restaurant owner may not even know that when he buys the frozen product it is, in fact, 16 ounces frozen weight, not 16 ounces thawed weight. Additionally, there is species identification. These are areas of integrity.

When we get down to the sensory area, NFI does not feel that the government has any position in mandating quality. We want to encourage the buyer to do that. It is not really the government's role.

Bruce Gore: Let me get to the point of my comment. If there is a point at which government regulations would have some effect in getting a high-quality product to the marketplace, it is the time during which fish is either in storage or under controlled temperature in transit. The shippers are the most ignorant as far as what is required and what the minimum standards of performance are.

I am involved in a situation right now where a product that was in perfect condition was put into a van and was received in a condition that was still frozen. The shipper didn't perceive any problem. The people at cold storage didn't perceive any problem. But we had +20 and +25 degree Fahrenheit core temperatures on our frozen products. I perceive that as a problem and so do my markets. I pulled that salmon out of my market and refused to sell it because the product was altered. The edibility of that product is not nearly what it was when it left my hands. During the period where it is in cold storage and in transit, 32 degrees is 32 degrees. Quality frozen salmon must be kept at a temperature well below freezing and should be written as a regulation. We are not talking quality; we are talking about eliminating the largest source of anonymity in the seafood business, through which most shippers escape. The number one problem here is to stop the ticking of the biological clock by keeping the fish at -20 degrees Fahrenheit or so.

Scott Boley: From the standpoint of the vessel operator, I don't know of any variable that will absolutely determine the quality of the product other than temperature. If there is any sort of inspection program, it should be some sort of mandatory record of the temperature history of the product. It should be product oriented and not vessel oriented. Any sort of guidelines should be aimed toward reducing bacteria count and should be on a voluntary basis. If you make it worthwhile to the fisherman, he will do those things because it is making money. That has to be the bottom line.

Question: As an a nonexpert and consumer, I thought you made a very important point when you said that acceptance or rejection by the retailer and restaurateur is really the place at which the quality is determined.

They are the ones who are most affected. If their product doesn't have quality, it won't sell. Would it make sense to really concentrate on that final link in the chain to educate those people to recognize the quality?

A.D. Chandler: We know that both the fisherman and the processor, if they're going to be turning out a better handled product, need to get a better price for that product. Any increase in sensory quality demands an increase in handling and in cost. We are now entering the real window of opportunity because of the links between seafood and health. This link is worth millions and millions in paid advertising. This could and I hope will be used to latch on to the consumer. The problem could, in fact, be maintaining a supply if we do a good job in marketing. But, I think if you can get the consumer to say, "I want the good fish," then the retailer and the restaurateur will respond to the consumer, the processor will respond to the retailer, and so on.

The only other way you can improve quality is to get people like Bruce Gore. You get a few of the super-quality houses that spend a lot of time and effort in direct marketing. These super-quality houses bypass the cold storage, bypass the wholesaler, and go right to their ultimate market, trying to convince the buyer that this exceptional quality, expensive, frozen product is in the buyer's best interest. The buyer (usually a restaurateur) can increase bottom line profits by spending a little more for a quality product. It all comes down to dollars.

Question: I'd like to pose a hypothetical problem here about the grade A program. We are a producer of grade A. Take, for example, a bag of grade A fish and a bag of regular fish. They go to the same place--to the buyers who buy both fish. Granted, you have to get a little more money for your grade A fish. Which product is the guy going to hold onto longer, grade A or the regular fish? Which is better, regular fish that is held for a day or two, or grade A fish that is held for a week?

Comment from the Audience: I can speak only as a small clam grower, but I do know that the airlines can change, any time, their shipping regulations on what kind of boxes we use, which changes our total manpower requirement and a whole lot of other things. I'm not faulting them, but they have quite a bit of arbitrary control. Also, for example, Northwest Airlines rerouted some of our clams all the way to Tucson. They were supposed to go to San Francisco and this was in the middle of the summer. By the time they got to San Francisco, half the clams were spawned out and no good. The airline couldn't understand this. The clams were only two days old. Then we applied for insurance. We couldn't collect from the airline on the claim because they didn't ruin our product. However, the product was no good by the time it arrived at its destination. The clams were all spawned out. In addition, the airline didn't maintain our product at the proper temperatures. When the clams left our plant, the fecal coliform count was just great. We got an incredible 3,000-fold increase in the fecal coliform count of some clams which we sent to California. What happened then was that the state of California threatened to put us on a

conditional shipping list and wipe out our entire market because one shipper didn't keep our clams cold. There has to be some kind of education directed at these shippers.

A.D Chandler: I agree, and again I'll put in a little plug for NFI. As a national organization, we have spent a lot of time working with the airlines. We work very closely with Delta and quite closely with United and other airlines dealing with the issues of air shipping and air freight. We know our members are the ones who have problems. If they come to us we go to the airlines, and we can speak from a broad spectrum. It gives us added insistence because we also represent a large potential market for them. They don't want the hassle of shipping, but if they feel they can be assured that the product is not going to infect the rest of their baggage, then they obviously want the business.

Clam Grower: Well, for example, Northwest Airlines told Greg Chen, who represents us, that it was no longer going to ship any seafood. Greg said to them, "Do you want to lose thousands and thousands of dollars of air freight business?" Northwest reconsidered and they gave him 72 hours to come up with seafood shipping regulations in order for him to even be allowed to ship seafood at all. If our market is the United States, we better be able to get our product to our market.

A.D. Chandler: I agree. It's a legitimate concern, and not one that is limited to the Northwest. I think an even worse problem than air shippers is overland shipping.

Bruce Gore: I agree with Appy's comments on overland shipping. I have talked to overland shippers and I ask, "What kind of temperatures do you maintain in your van?" They say, "We keep the product frozen." And I ask, "What temperatures do you maintain?" The trucker says, "We try to keep them at zero degrees Fahrenheit, but we are in and out of the trucks quite a bit with loading and unloading. When we open the door we turn them off; when we load them they are off. Our vans are usually reliable between zero and 10 degrees above."

Well, in my opinion, that's a fib. Then I ask them one more thing, "Do you have thermographs on your van?" They respond, "Oh, no. We don't have thermographs." The trucker says, "If you have produce or something you need thermographs; that is real critical, but with frozen products, no. You know you have a problem with frozen products if the boxes are wet."

This is true; I hear that all the time from truckers. I don't know what to do about this. Because I catch and freeze my fish, I know exactly what the quality of my product is before it leaves my hands. I have the ability to follow that product to where it is going which no one else in the industry does. I can see a cost-effective relationship between what goes into the van and what comes out.

Once you incur some temperature abuse, what is the effect on that product over time? After a week or two it is not too apparent. After six

months, it can wipe out the product's quality. This has happened to me more than once. If there is government intervention, what I advocate is temperature regulation.

A.D. Chandler: I understand that. However, in talking about getting action, you don't want to rely on getting a new government regulation, because even if you get it, someone is probably going to screw it up. Far more effective in the end, is working through groups, whether they're like NFI, or regional trade associations, or whatever. These groups represent large segments of the industry, and they talk to people at the senior level or to the trucking council and say, "We've got a problem. All of us. We need to sit down and come to a solution." That is what was done with airfreight and it probably needs to be done in other modes of shipping.

Bruce Gore: What happens here is that the product has a certain value based on the consumers' acceptance of the product. A person who sits down to eat a plate of fish and thinks it is absolutely wonderful and sees it is a good value will eat it again. The person may be paying $18.00 a plate. That's the person who is paying the bill for the entire industry. If you, as a skipper, can't get something to a consumer in a restaurant that is worth $18.00 a plate or even $15 or $12 or $10 or whatever the price, what you are doing, in essence, is eroding the "tax base." We are allowing the transport industry to erode the tax base. If it is not worth $18.00 a plate because of the decrease in quality, then what has essentially happened is the shipping industry (by degrading the quality) has destroyed that amount of revenue coming back to the fishing and seafood industry.

A.D. Chandler: Well, the shipper's doing something worse. Because we are a free market or free trade nation, the shipper is allowing New Zealand, Norway, and Iceland to come in with a little higher quality product, one which they have made incredible efforts to control. They may also be subsidized. It's very difficult to trace some of the subsidization. We do have trade laws that theoretically help our industry if foreign producers are being subsidized. But still, because we have free trade, an alternative product is available. Not only do we hurt ourselves, we are also pushing restaurants to buy from overseas.

Bruce Gore: That's right. We're losing our own market.

A.D. Chandler: I agree, Bruce, but I think basically the vast majority of U.S. processors and fishermen put up a damned good product. The real problem comes in the ignorance down the line throughout the system. It is right in the consumer's house. It ends with the person who has a self-defrosting refrigerator, puts the fish in the freezer, and can't understand why it doesn't taste good after a month. The consumer assumes somehow it is going to be kept cold when in fact the freezer's temperature is going up and down. It's a problem that isn't solved by mandatory inspection of any sort.

When you go to a restaurant or a supermarket, buy a piece of beef, take it home, and don't like it, the chances are good that sometime in the next six months you might consider buying hamburger again. Somehow there is a feeling that, "Well, it was a bad piece." However, with seafood, there's still the feeling that if you buy a bad piece of seafood, it's a bad industry. That's the attitude we've got to change. Conceivably we could alter that attitude with some sort of a stamp like "USDA inspected." It may begin to break down consumers so they say, "It's not all fish that are bad; it was just that piece." We've got a long way to go to get there. But that is an example of one area where inspection would absolve us. We know that won't do the whole trick.

PRODUCT PACKAGING--INNOVATIONS

David Anderson

David Anderson is Cryovac's research and development representative on the West Coast, located at the packaging lab in San Francisco, California. His education includes a master's in food science and technology and a bachelor of science in microbiology from Louisiana State University. He's been with Cryovac for six years. For five years he's been coordinating all technical research and development activities on seafood packaging within Cryovac, USA. His efforts center on fresh and frozen seafood in all forms. He's involved in the evaluation and development of new flexible plastic films for fresh seafood and is continually investigating new, competitive packaging methods. He's worked with seafood harvested and processed in the northeast United States, the Gulf of Mexico, the West Coast, Alaska, and Canada's northeast provinces. His present activity on the West Coast involves introducing Cryovac's flexible packaging technology to the research, development, and engineering centers of major food and nonfood companies.

Some of you may not have heard of Cryovac. What is Cryovac? Who is Cryovac?

Cryovac was formed in 1947 and today is a major division of W.R. Grace. W.R. Grace is a $6 billion international marketing company. Cryovac sales of flexible films and equipment, worldwide, exceed $650 million with Cryovac North America accounting for $375 million. In North America alone, Cryovac maintains 7 regional and 17 district sales offices with 5 centrally located manufacturing plants, employing over 3,500 people. Our world headquarters are located in South Carolina, which also serves as our major facility for research and development and for engineering.

You've heard a great deal in this workshop about the market demand for quality and the pressures being placed on the industry to obtain a quality product. From a packaging perspective, we at Cryovac fit right in the middle of these two areas. The marketplace wants and deserves a

packaging material that is functional while maintaining product quality. Too often, the expectation is for packaging to improve a product of poor or marginal quality. Cryovac strives to solve the handling and distribution problems associated with perishable products by matching the right flexible films to the right equipment, backed by technical and support services. We call this the total systems approach.

In the time allotted, I would like to briefly discuss how past and present Cryovac flexible products and innovations can enhance seafood quality and the benefits of their use. The four major areas of discussion will be (1) Cryovac's traditional product line, (2) salmon packaging, frozen salmon specifically, (3) the packaging system for fresh seafood, including packaging for retail products, bulk, or institutional items, and (4) new packaging options and techniques, including retail packaging, cook-in vacuum technology, and applications in aquaculture where we have made some strides in the last couple of years.

In the traditional product line, I'd like to discuss some of the existing accomplishments. The first major breakthrough for Cryovac was in the fresh red meat industry. We developed a very tough oxygen barrier bag, which revolutionized the beef industry with a concept called boxed beef. Eighty-five percent of the beef now processed in the United States is distributed in this form. It's a high-barrier structure against oxygen. It uses high-vacuum technology with the shrinking of the bag around the product. The product actually ages or tenderizes in the bag. It's more economical for supermarkets and hotel/restaurant users to handle and portion. From this original concept, it moved to the whole and half ham industry. Smoked and processed meats are also vacuum packed in the barrier bag. The second area where we were able to make tremendous strides was in whole turkeys, fresh and frozen. We developed a material called "Super L," which is basically the barrier bag without the oxygen barrier layer. It's very tough. The industry is able to offer turkeys year-round to supermarkets in either the fresh or frozen form.

Another area in the last 7 to 10 years where we've made some tremendous strides is in the hot fill packaging of foods. A Cryovac Kettle Cook System is now in major commercial usage at various food service companies. Typical foods that use this technology are soups, chilies, sauces, chowders, Mexican entree items, and gravies. If you eat at a Mexican restaurant chain today (for example, El Torito) you'll be eating beans, chilies, whatever, which are usually handled in this manner. The food is transferred directly from the kettle into Cryovac C-300 casings, still at pasteurization temperatures of 180 degrees Fahrenheit. The casings are chilled to arrest cooking, stored in the cooler at less than 40 degrees Fahrenheit. for distribution, and then reheated in hot water at the retail or hotel outlet. One casing does it all. Even after weeks in storage, foods taste freshly cooked. Foods handled in this manner can have a shelf life of over 30 days and still be of very good quality.

We've also done this for the egg program, or Eggs-in-a-Bag system. This is a successful program for institutional food service. Raw broken

eggs are packaged in the casing, then refrigerated or frozen. They are taken from storage, reheated at 180 degrees Fahrenheit, and agitated, and in a few minutes, one has hot scrambled eggs. This process is used in several of the major food service establishments across the country.

We also supply equipment and film for such things as wieners, bacon, luncheon meat, and cheese; these are some of the more traditional systems that we've been involved with over the last 30 years.

With this background in vacuum packaging technology and proven barrier bag technology, Cryovac's first venture into packaging seafood was in the salmon industry. Fresh, whole, dressed No. 1 or No. 2 grade salmon are placed in a modified barrier bag that has an increased abuse resistance and puncture resistance due to the requirements of packaging salmon. The bag is vacuumized and either clip closed or heat sealed. The product can either be brine frozen or placed in an air blast. There are three benefits of this packaging over traditional ice glazing and polyethylene bagging.

(1) There is longer quality shelf life. We've conducted taste tests where trained panels could not tell the difference between 18-month-old frozen salmon and fresh salmon less than a week old.
(2) There is no freezer burn or dehydration due to being vacuum packed and having an oxygen barrier around the product. No air is left in the belly cavity after vacuum packing.
(3) No off flavors or rancidity develops due to the oxidation of fats and oil in the salmon.

Savings in cost are one of the benefits associated without reglazing the product. There is no weight loss or product loss and fewer customer product claims. In my opinion, it is also a more attractive and appealing product. At present, there are five locations in the Northwest and Alaska using this approach. In 1985 we realized sales of 4.3 million bags. Roughly 10 percent of the fish caught are now vacuum packed in this way. Other fish being packaged in this manner include halibut, swordfish, tuna, and snow crab.

Packaging systems for fresh fish: I'd like to discuss our efforts on fresh seafood as they relate to both retail and bulk packaging. I want to point out that we do not pretend to be all knowing about seafood quality. That's the reason for panels such as this. However, we have researched the critical factors that affect seafood quality. These include raw material quality, as we've heard today. Very important is the sanitation and the control over microbial contamination in the plant itself and constant temperatures. We believe between 28 to 32 degrees Fahrenheit for fresh fish is desirable.

With these factors in mind, Cryovac researched several packaging techniques and methods and then developed the following concept: We tested products at different times when they were caught--in other words, 1 day from time of catch, 2 days, 3 days, on up through about 10 days. We determined that under the present commercial situations found in the

industry, if the product is handled well on board and is well iced, then one could use fish no older that 5 days from time of catch. Much of this work was done in the northeast U.S. Anything older than 5 days really doesn't hold up well. We have a saying at Cryovac: you put garbage in, you're going to get garbage out. No packaging method is going to improve quality. However, if you do put top quality in, you will extend the life significantly--not weeks, but long enough that it can get through the retail distribution or institutional distribution systems.

Point number two: we scrub our seafood. On a laboratory scale, we'll go through a fish washing method to reduce the microbial load on the fish. Once the fish is filleted to the point where it can be put on a foam tray, it's inserted into a bag, which is evacuated, sealed, and shrunk, using hot water. In many respects the package appears quite similar to a conventional tray overwrapped product you find in supermarkets. The material used and developed by Cryovac is a unique shrinkable bag with an oxygen permeability of 4000 cc's. I know that doesn't mean much to you but compare that to the polyethylene cover or the PVCs you would find in the stores. They are basically dust covers. (We'll talk about sophisticated films where you control the microbial growth on the product later.) This particular concept solves the wants of the processor, consumer, and retailer. These Cryovac criteria, which were developed by Cryovac, had the input of the National Fisheries Institute (NFI) and the US Department of Commerce (USDC) standards. The package maintains the quality of the product to a point where it is consumer acceptable for 12 to 14 days.

It is also cost effective. The package has a familiar appearance so as not to alarm or disrupt the eye or confidence of the consumer in a retail case. She or he is very reluctant to pick up a package that doesn't look like it was made or wrapped in the back room of the supermarket.

A key point is that the package is leakproof. One of the things a consumer hates to do is to pick up a fish package that leaks on the back of his or her hand. And then, of course, the consumer has to continue shopping and smelling fish on his or her hand throughout the supermarket. That's one of the major benefits of this concept. The package smells good, not fishy, when the consumer picks it up. One of the key points we've found in our market research is that if a consumer doesn't use the package the day it's bought, or within two days, the buyer freezes it. This package can be frozen for a maximum of three months. This package offers consistency through quality and package integrity. For the retailer, there is no more in-store rewrapping. One retailer we talked to during the implementation of this program said he rewraps every other day. He throws away the tray, the pad, and the film. That does run into some money when you start putting a pencil to it.

Second, if the package is leakproof, it reduces the daily cleaning of the seafood case. This is an economical savings for retailers. They don't necessarily recognize it; we basically have to point it out.

This system is a convenience for the retailers in handling fresh seafood. Where we have had some difficulty is putting a price on that convenience, or I should say, the processors have had difficulty. In other words, what price per pound is the retailer willing to pay for it? It's fluctuating anywhere from 25 cents to 45 cents a pound.

The last point I want to make about this packaging is it satisfies the retail supermarkets' need for five to seven days of shelf life once the product arrives at their warehouse.

Cryovac recognizes the concern for safety when discussing vacuum packaging fresh seafood. Being a responsible supplier, we conducted several in-depth, botulism-inoculated pack studies comparing our recommended system with commercially accepted stretch PVC film packaging. These studies were conducted with the input of the National Marine Fisheries Service and the National Fisheries Institute. We worked very closely with the USDC and NFI in obtaining approval to use federally inspected seafood in this packaging system. At present, Cryovac has the only USDC approved system and method for vacuum packaging federally inspected prepackaged fresh seafood for the retail market. This includes labeling the product under the "packaged under federal inspection" (PUFI) label and the grade A label and coding with a 10-day grade A shelf life. At present there are four companies in the U.S. and Canada using this concept.

On the institutional side, we took the same principles in sanitation, raw material quality, etc., and used them in the development of a bulk fresh seafood package. Cryovac developed a tough, injection molded plastic tray and combined it with our new Super L bag, which is also breathable, similar to the E bag. This packaging concept is cost competitive with other packaging systems. You have to determine what packaging systems are used and what region of the country you are talking about. We are cost competitive with systems used on the East Coast because they use a lot of containerization. The West Coast seems more like "dump some filets in a polyethylene bag and ship." And, of course, at seven cents a pound for a 10-pound unit it's not going to compete with a polyethylene bag. However, for an extension in shelf life of anywhere from five to seven days using the tray and bag, we feel that it's in the same ball park. On the East Coast they're paying eight cents for a 10-pound poly tub unit. The package is leakproof and can be distributed on refrigerated trucks with other meat and poultry products without the use of ice. This is the distribution method of one of the users on the East Coast.

The bag is printable. That is one of the key factors in brand identification using a plastic material like that. This system also satisfies the end users' desire to have a 10-pound unit they can use without worrying about the remaining product spoiling before use. At present, six companies in the U.S. and Canada use this concept.

Now, I'd like to discuss new packaging options and technologies. Cryovac continues to develop packaging systems for many markets and transfer their application to other areas. I'd like to present recent

packaging techniques that we feel have application to the seafood industry.

For the retail area, there is a new concept in film called stretch-shrink. This is a high-performance shrink film with the accompanying packaging equipment originally developed for the cut-up poultry market. The film resembles the E bag in that it has a high degree of permeability to prevent odor buildup. It has excellent sealability, produces hermetic seals, can be liquid chilled, and is leakproof. The film has excellent memory. You can press the film and then it bounces back. If you press PVC, it will stay in that position. It also takes a high degree of abuse. If you look at a lot of prepackaged seafood in the supermarkets today, the film will tear in the corners and is thus not a leakproof package. Our film has crystal clear optics and is printable. It is competitively priced with PVC, but outperforms PVC. Our goal in 1986 is to have at least two processors in the seafood industry using this concept. That could be in the aquaculture area of catfish, trout, possibly shrimp. We feel it is an excellent application, especially in sealing in the fish juices within the package.

The second area of Cryovac technology that we feel is applicable to the seafood industry is a concept called cook-in-vacuum packaging materials. We developed a family of structures. The first structure is called a cook-and-ship bag. It is a high-barrier material. You place meat into the bag, vacuumize it, and clip seal it. The material adheres tightly to the product. There are no internal voids or moisture separation. The product is ready to ship in the same bag.

The second structure is called a cook and strip. The material has no oxygen barrier to it. It is used just for cooking. It has the same tight adhesion as the first material I described. It improves the yield without moisture separation. After cooking, the bag is removed and the product is sliced. Much of the product is smoked before it is repackaged.

A third area in which we are making some tremendous strides in the meat and poultry industry is a cook-and-ship, post pasteurizeable bag. It is a new high-barrier shrink bag. After the food is vacuum packed, it can be pasteurized in 200 degree Fahrenheit water. This dramatically extends the shelf life. Such items that I see applicable to this in the seafood industry include salmon fish roasts, fish emulsions, pastes, and the post pasteurization of seafood products such as picked crab meat and peeled shrimp.

Another area in which we have been involved is the aquaculture industry. Our own company, Grace, owns shrimp farms in Hawaii. We have worked with them for over a year on the development of shrinkable material that they could use to vacuum pack 2.5-pound units of aquacultured shrimp. They did not want to use any sulfites to prevent oxidation or black spot. We used high-barrier packaging, and this is contrary to everything I have been telling you about using breathable films. In our wildest dreams, we never thought a barrier material would be applicable to a seafood product that was fresh. However, an oxygen barrier material was applicable and it

prevents the formation of black spots on the product. They are marketing the product now at temperatures around 40 degrees with a shelf life of 21 days. We are actively involved in both the trout aquaculture industry and the catfish industry in Mississippi, Alabama, and Arkansas.

As discussions in this workshop have shown, the industry is moving slowly towards adopting a lot of packaging. One of the attendees asked this question: "We have been talking about seafood quality for 10 years. When is something going to be done about it?"

Cryovac has been involved for about six years. I guess we are in the same boat. We want to know if some measures are going to be taken to adopt some controls, like in the aquaculture industry.

SEAFOOD QUALITY AT THE RETAIL LEVEL

Jon Rowley

See introduction, page 8.

I said earlier this morning that there weren't really any quality standards in the industry. The only real standard is an FDA ruling that fish must be wholesome, that is, nontoxic. What I'd like to do in teaching seafood quality to people is to give them a seafood quality scale of 1 to 10.

Americans eat 13.5 pounds of fish per person per year. About half of our consumption is canned tuna fish. Americans are not really eating a whole lot of fish.

There has been in very recent years a phenomenon in the food service community. There has suddenly been a little explosion in certain areas of the country in the consumption of seafood in restaurants. McCormick's in Seattle has a fresh list, printed every day. The restaurant lists about two dozen separate fresh seafood items on its menu. Triples restaurant in Seattle is doing some very effective merchandising on its menu--"It's not just the best time to enjoy Copper River king salmon, it's the only time." The restaurant is in tune with the seasonality of this particular product. Fish consumption has gone up in restaurants to the extent that steak houses have had to completely alter what they are offering on their menus. You've probably heard the recent Black Angus ads about their new fish menu. Many steak houses in the Seattle area have even shut down, been remodeled, and are opening as seafood grills.

At the retail level, red meat consumption has gone down and poultry sales have gone up, but retail sales of seafood have been rather flat. I would estimate that currently we're looking at less than 20 percent of market penetration at retail level on seafood.

Traditionally, seafood has been part of the meat department, a lowly stepchild at that. Most meat people don't care to handle fish and you can often see that by the way fish is merchandised. For example, take a chum salmon roast which has a "boneless" sticker on it. Just a little thing, but what happens when the customer sees that is an immediate loss of confidence in the ability of the market to deal with seafood. Also, in supermarkets you can see "red snapper" of very poor quality showing a lot of the gaping flesh that is caused by packing fish in bags.

I have found a smoked product that has actually gone below that line between wholesome and unwholesome. It was a seriously decomposed product which should not have been for sale. Julia Childs has said a few times, "Something has got to be done about supermarket fish. It seems that supermarkets are the dumping ground." I think that is indeed the case.

There is currently a lot of interest in eating fish and shellfish for reasons of nutrition and fitness. There is going to be a lot more interest. One thing that you are going to hear a lot about are omega 3 fatty acids and the discoveries that have been made about the oils in fish fat--how they will actually reduce cholesterol levels. That is a very important finding. Fish like chinook salmon, black cod, and albacore are probably going to become very fashionable.

Retailers, as well as restaurant people, are at the end of a distribution chain and they can sell only what they receive. It helps, I've learned, when the people who are retailing have an understanding of what goes into producing quality. They become better buyers and then better merchandisers.

A lot of things can happen to fish before they reach a retail environment. What happens to fish during the first three hours on the boat determines what the ultimate quality of that fish is going to be. If there is an opportunity, given the harvesting method, the fish should be chilled pre-rigor.

What you do if you chill fish pre-rigor, providing they've been dressed and other essential steps have taken place, is control how long fish are in rigor. As long as a fish is in rigor mortis, there is no bacterial action on that fish. This is something the scientific community has practically no understanding of, but there seems to be a consensus among the people that have looked at rigor mortis that this is indeed the case. So, if you can control rigor, and extend rigor mortis a long time, you improve quality. I've seen ling cod in rigor mortis for up to a week, which means those week-old ling cod were like fish only hours out of the water, from the standpoint of bacterial decomposition.

In some other countries fish reaches the market in far better shape than it does in the United States. In a typical French port fish are unloaded off the vessels in boxes that hold about 80 pounds of fish. They are unloaded by vessel and displayed in large halls along the pier. Before the auction starts, the buyers go down and visually inspect the

product. They find what fits their particular market and they prepare to buy as soon as the auction starts. There are all types of fish that come from all sizes of boats and represent all kinds of quality. What you see is a very close quality-price relationship.

In a typical retail fish environment in Europe the whole fish or the dressed fish is put on the counter. Most of the products are sold in a whole dressed form so that the quality can be maintained much longer in distribution.

In the West Coast we receive products through the system in fillet bags. This practice of packing fillets in bags is horrible. It has no redeeming social value, and it's the accepted way of doing things on the West Coast. It just destroys fish.

If you are going to fillet fish, there are ways of getting it to the market and maintaining the basic integrity of the product. One way is to ship in round or rectangular containers; the idea is to put fish skin side to skin side and meat side to meat side so the pigment along the skin side doesn't transfer to the meat side and discolor it. If you have extremely fresh fish, that pigment is very active and you get unsightly looking fish if the skin touches the meat side of the fish. If fish could be layered flat and put into containers and well iced through the chain, that would greatly improve the quality of what's done on the West Coast.

"Fresh." This is a word that gets a lot of play in advertising in restaurants. In Seattle we've got about 12 restaurants that are advertising the freshest fish in town. It's the most commonly asked question of restaurant waiters--"Is your fish fresh?" If it's fresh, even if it doesn't taste quite right, somehow, it's okay.

Let's examine this word. What does fresh really mean? Here is a typical distribution system that we work with locally. There can be variances in this scenario, but this is not atypical. Fish can be on the vessel from 1 to 10 days, and there are cases where fish is on the vessel for longer than 10 days. It's in the processing plant for 1 to 2 days. Now as we know, it's often at this level for much longer than this. It can be in transport from 1 to 3 days. There are wholesalers who specialize in one species of fish, like salmon. If it comes to a large wholesaler, it may be there for a day or two before it is then sent to a distributor, where it may be for a day or two. Then it is at the retail shop for a day or two, and as we know, it is often sitting at that point for much longer. Fish that has that age on it is still considered "fresh," as you can see on some supermarket packages. What you see are stickers that say "fresh" in very big bright blue and red letters, letting the people know that they are buying "fresh" fish.

Is fresh fish delivered daily? Well, that sounds good. It looks good to the customer, but keep in mind that we're dealing with the system that I just described. A joke on the phone with people in the fish business is "Sure it's good; it just came in today. Fresh." That is not a piece of fish that I would be interested in taking home.

If fish is handled correctly on the vessel, it won't sustain bruising. Red snapper, perch, and yelloweye rockfish belong to the same family. However, I suspect the reason the industry likes to call this fish red snapper is because it is always red (from being bruised), which gives the customer a very positive association, when actually it is a negative quality. There is one species of rockfish that has the legally accepted name of Pacific ocean perch. Too often, however, just for the sake of obtaining some variety in the fish case, you'll see one species of rockfish or another called red snapper, perch, sea bass, and whatnot. When you look at it you can see that it came out of the same bag of fish.

The retail price of similar fish may vary widely. The red snapper fillet may be $2.59, the perch fillet may be $2.69, and yelloweye rockfish may be $4.49. There's another story to that. The yelloweye is air freighted down from Sitka and it's caught by a very inefficient fishing method which is costly, but it sells well at that price.

Customers want to see a lot of variety. You can achieve variety in lots of clever ways. A store might sell ling cod fillets, ling cod steaks, and ling cod roast--all of those forms sell well.

Seafood additives. There is a lot of interest now in eating fish, and the word "fresh" is market magic. So instead of responding with higher-quality fresher fish, segments of the industry, unfortunately, are responding with chemicals to maintain the fish in not too good a condition longer. Unfortunately, there's a fair amount of this dipping going on. It's something that you can see and feel on the fish, and you can also taste it.

Fresh vs. frozen. The difficulty is selling the public good frozen fish. We get a very high level of market acceptance when the product is excellent every time. Surprisingly, you can even sell it at price levels higher than fresh fish, if it is consistently excellent.

Which is better, fresh or frozen fish? Fresh or frozen I don't think is really the issue. I think that quality, ultimately, is the issue. If frozen fish of excellent quality can be put on the market consistently, customers are going to buy it.

Quality standards. This is something that I have been trying to establish, using a scale of 1 to 10. If we are able to develop standards that retailers can work with and understand, then they'll be able to say, "This is something we accept and below this we can't sell it." Peter Troy mentioned that he needed fish with five-day shelf life in a store. What I encourage people to strive for is to get fish with no less than five-day shelf life in the store, and then sell that fish in two days. That way, the customers are going to have a very good dining experience with that fish. Even if they don't get to it in a few days, it's going to be fine. So quality standards, I feel, are very important.

If the fish is seven or above on my scale it has no fishy odor whatsoever. The odors are clean and pleasant, and we're looking at three to more than seven days shelf life in that condition. In the middle of the scale you're starting to pick up a perceptible fishy odor and when you cook it, it will taste slightly fishy. The shelf life is much reduced and we're generous in giving it four days. Down at the bottom of the scale, you get fish with a very strong fishy odor and very strong fishy taste. There's a lot of it around, unfortunately. But we try not to deal with it.

Nomenclature. One needs to be as accurate as possible with nomenclature. Sometimes it takes a fair amount of research to settle on the correct name. What are we going to call this fish and why are we going to call it this?

Labels like "fillet of sole" don't inspire a lot of confidence. They cause a lot of confusion for the customer who one day will buy a "fillet of sole." After it has been cooked, it tastes good but the next day when the customer gets "fillet of sole," it was another kind of sole. It might be the mushy Dover sole and when it's cooked the customer doesn't enjoy it. The customer ends up being very confused. The same thing happens with salmon.

Truth and accuracy in labelling is important. Uses of names like "butterfish" and "red snapper" are technically illegal. If these names have a historic use in another part of the country then it is technically illegal to take those names and put them on our local fish just for marketing reasons.

In another situation, we might have black cod in the bottom tray. In the tray above is the same fish in filleted form, but named "butterfish." The customers get very confused.

Let's look at salmon and the range of retail prices. King salmon's price ranges from $4.00 to $9.00 per pound. Chum salmon is from $2.00 to $3.50 per pound; recently it has been much cheaper. Pink salmon ranges from $1.00 to $2.50 per pound, sockeye from $3.00 to $7.00 per pound. "Salmon" on the label does not tell the consumer enough. If customers are paying over $5.00 per pound for a piece of fish, they deserve to know what they are getting.

In terms of the product form, some customers are smarter than others. Some are purchasing fish for the first time. They try salmon for $.99 per pound, salmon fillet for $6.99, salmon fillet for $7.99. From month to month and store to store, you will see all kinds of different numbers under the price for "salmon." That is very confusing for the customer who doesn't know a lot.

It is important to put the form of the salmon on that label. What is it that the consumers are buying? Don't just put "salmon," put "silver salmon steaks," "silver salmon fillet," so that they know exactly what they are getting. You will be surprised how many people don't know the

difference between the steak and the fillet in the package. If they are told, they walk out of there and have learned something.

At this time, the store owner needs to be committed in order to be successful at retailing seafood. This is true whether we are talking about the supermarkets or the retail fish markets. We are dealing, right now, with a system which from the standpoint of quality, doesn't function. There are many obstacles which we are going to have to overcome to correct this.

An ice machine is a major expense and it is something that you can't do without. A meat department has no use for an ice machine. If it were a fish department, one of the first things that would be needed would be an ice machine.

Once you make a commitment, tell people that you are in the fish business. An outside reader board used to advertise seafood tells the public in no uncertain terms that you are in the fish business.

A commitment to educating and training personnel is necessary. This is essential. What is drastically needed is a school. In many other countries, there are schools where people can go for varying lengths of time, up to several years, to learn the retail fish business. There is nothing like that in this country except for the school that the New England Fisheries Development Foundation puts on. That is a very brief course. I haven't been to it but I understand that it is quite good. It is going to be necessary to spend some money on your people because there are not many good retail fish people around.

Advertising and promotions are exciting arenas that have a lot of potential. Very little has been done on a retail level where a lot of exciting things could happen.

Usually supermarket fish ads are placed in the little blue area of the ad and are tucked in between the roasts and hams. That is usually where fish are advertised, a very poor stepchild to the meat department. At some point in the near future, I hope we will see advertising of a better quality, promoting all kinds of fish.

Another area that I would like to talk about is merchandising. I constantly stress that the quality of the products you buy are your most important merchandizing tool. Excellent quality sells itself. Seafood has excellent display characteristics. Displaying seafood is like putting together a fine jewelry case in which you are displaying fine gems. The case has lots of colors and forms to show off.

If you have a service fish case you can lay it all out. People will talk about it, and you can show it off. I have learned, to my astonishment, that you don't need that environment to sell fish. I used to be skeptical that you could successfully sell fish in plastic tray packs. However, I worked with one store recently that was successful at it and the experience made a believer out of me. I discovered that as long as

you can get high-quality fish into those tray packs and you can repeat it where the customer can trust you to get the best product, you can be extremely successful. Once again, the quality of the fish is the most essential merchandising tool.

When the fish are uniform, of excellent quality, free of blood and bruising, and extremely fresh, they will obviously be fine if you have to wait a few days to cook them.

Let's look at service fish cases that have been traditionally used to retail fish. There is a coil on top which is a gravity feed coil. You fill it up with ice and that is how it works. This is a fine situation except it doesn't allow the fish to be displayed extremely well. They are very hard to set up; you have to come in from behind and lay the fish in. The cases are very hard to clean. It is important to keep that glass impeccably clean if you have very high quality. Actually you must have a mania for keeping the glass clean. With a clean glass, that fish will jump out at you.

There are more supermarkets on the drawing boards now and there seems to be a great deal of remodeling in supermarkets already in existence. People who are remodeling and building new stores are looking at a new type of fish area that is a special environment. An attempt to create a whole new seafood area is something that is being planned in new stores.

Some European style fish cases are "ice only" cases. They don't have the coil on the bottom, and the ice is the only refrigeration that you have. Some of the more expensive ones are equipped with ice-holding coils. Another model has the coil behind the ice and there is additional refrigeration which is circulated over the top of the fish. From the standpoint of temperature, this is a better situation but tends to dry out the product.

Live tanks are something that you may see more and more of. It is not necessarily the best thing to do with a lot of live shellfish. In some cases, they deteriorate faster in the live tanks than they do if you have them in a walk-in cooler at the right temperature. A live product is not always the best product.

I like to use flowers with retail fish because it takes that fishy perception away from the fish. It makes it seem like something different when there are a few flowers around. The customers who are trying to find good fish to buy are upscale, thin, and health conscious, and they can afford to pay. They don't want fish that smells like fish and they don't want fish that tastes fishy. The challenge for all of us is to get fish to this point in the system with no smell.

DISCUSSION

Question: Has anybody investigated the sushi bar furnishings, like you find in the salad bars?

Answer: I have seen retail fish markets that are starting to put sashimi quality fish in tray packs. They are doing a nice job of it and are selling it for very high prices. The only sushi bar that I know of in a fish market is in a Japanese supermarket in Seattle.

Sashimi quality fish is an excellent retail opportunity. A store just needs to have a section of the seafood case devoted to extremely high quality fish that can be eaten raw. I have played around with a little of that with good success in certain neighborhoods. Caucasians are eating a lot in sushi bars. They have had exposure to it and would pick it up and take it home. They would eat it that way if they had confidence that it was sushi bar quality.

PANEL: DIRECT MARKETING FOR FISHERMEN: A MEANS TO MAINTAIN PRODUCT QUALITY

Scott Boley

Scott Boley has been a full-time fisherman since 1976 with his wife Dixie. He fishes a 55-year-old troller along the coasts of Oregon and California, seeking primarily salmon and albacore. The fishing season is usually May through October, weather and seasons permitting. During the winter he gets involved in workshops like this. He is currently a member of the southern panel on the U.S./Canada Salmon Commission, on the user group panel for the Klamath River Task Force, a member of the Sea Grant Advisory Council, a director of the International Trollers Coalition, and a coordinator of Fishermen Solidarity.

I am just a fisherman who tries to get along, but I have definite thoughts about what makes high-quality fish and have pursued these thoughts over the years and tried to turn them into more dollars.

The subject of my talk is quality, direct marketing, and signature salmon. I am going to look at three main areas. I am a salmon fisherman so I will focus on salmon and try to define what is a fresh, troll-caught salmon. One might ask the question, "How can the consumer identify such a fish?" Often we are asked by our neighbor, "Is that fish at Safeway your fish?" I always tell them "No, it is not." We will look at what kind of incentive a fisherman has to have to bring in a better product. That is very crucial. In our country, in our free enterprise system, you have to have incentive. You have to make a living. There are reasons why things work in an economic sense. We have to keep that in mind all the time in devising a structure.

The consumer is becoming more quality conscious. People are looking for better fish. We heard this yesterday, time and again. I think it is the wave of the future. It is an explosion, in fact, that is happening right now. I am excited about trolling and about fishing in general. I think there are tremendous opportunities right now to do very well

financially. You can have a rewarding lifestyle in fishing just because people are going to be moving to seafood and quality seafood. An entrepreneur who takes advantage of this consumer demand is going to do well. It is not going to happen automatically; you are going to have to work at it.

When trolling for salmon or any species, whether it be rockfish, albacore, or whatever, you have to realize that you are catching fish on a one-by-one basis. We catch our fish one at a time. Individual care and handling can be lavished on each fish. This can't be done in other fisheries such as the trawl fishery. Salmon are caught while actively feeding before the hormonal changes occur which will cause them to stop feeding, return to the rivers, spawn, and die. This diet of shrimp, squid, krill, and herring, and other delicacies they eat imparts a flavor to the fish which is captured in the troll-caught fish. It's a very delicate flavor. I think you can tell the difference between fish caught in the bloom of life, so to speak, and one that is caught later in its life cycle, if properly handled.

Each fish that we catch is stunned before it comes out of the water. It is landed very gently onto a piece of conveyor belting on the deck, which is rubberized on the surface to prevent bruises. We take extraordinary care to make sure we don't have sharp edges around our landing area on the boat so we don't get bruises or scale our fish. We bleed the fish immediately. The main artery is cut so the blood pumps out. The fish is then set for ten minutes with water running over it. Then it is cleaned and washed well. At that time we put the fish into a proper size plastic container so it doesn't slosh back and forth in the boat. It soaks in cool sea water for 15 to 30 minutes to let remaining blood come out of the veins and the belly cavity. Then the fish is washed again. The veins are milked, and we try to remove all the blood on the second washing. After this the fish is immediately put into a chilled water system.

I will explain later why we use this system. Basically it is a compromise between what will work and produce high-quality fish and what is economical for us to do and still remain competitive in our business.

This is very important: within an hour after the fish comes out of the water and after it has been properly washed, bled, and carefully handled, it is immediately chilled. I think this is the advantage that we get on our quality. The heat is removed from that fish immediately. We maintain our water at 32 degrees. We may go down as low as 31 but never below 31. We may go up as high as 34. I would rather have my water a little bit too warm than a little bit too cold.

Our water is a mixture of two-thirds fresh water and one-third sea water. Sea water is used for two reasons: one, to produce a little bit better color in the fish; second, to increase the heat transfer from my cooling coils in the tank to the water, for engineering reasons. It does, according to studies performed by Sea Grant, result in a very good product that does not have any significant salt uptake. You do not want to keep

fish in pure salt water that has been dressed because they will take up salt and you will get a briny product. The longer you keep it in that water, the brinier it will be.

We fish short trips. We fish five-day trips. We deliver on the morning of the sixth day. This is a compromise that keeps us competitive. There are people who fish longer and there are people who don't fish that long. This is what we feel is a good balance between delivery and quality and making a living in the business. We still feel that gives our fish a seven-day shelf life perhaps longer, after we deliver our oldest product.

We do something special to our fish. When particular markets desire it and will pay extra, we mark our fish. I have a waterproof plastic tag that we attach to the tail or the head on the gill flap with a clothing tagging gun. We write on the tag when the fish is delivered so that the customer has an idea of the remaining shelf life of that fish. One can write other things. One can write where it was taken or caught. We even experimented with actually tagging each fish as we caught it with the date caught.

We found that with five-day trips there was no significant quality difference between the first fish and the last fish of the trip. We had high quality in everything except the shelf life. However, by the time it got to consumers, they still had a high-quality product, irregardless. We did have some tag loss with this type of tag, but by this tag we were able to trace our fish through different customer markets and received nothing but glowing reports, in the smoked market, in the mild cure market, and through restaurant use. People who have gotten our fish would like to have them again. When we are in the area, when the salmon are near those particular locales where we can deliver to those markets, we have a demand for our fish. That makes me feel good and it also makes my pocketbook feel good.

There are some handling problems on board that cause bad fish in a fisherman's catch. One of these is mis-striking a flopping fish on the deck. (This happens to people that do not stun their fish in the water.) You cannot flail around with your kill club or gaff hook and hit that fish six or seven times and hope that one of those is going to stun that fish. The fish should be struck once, sharply between the eyes. Make sure that it is only hit between the eyes. Don't hit him on the back or the nape of the neck or the body. If you do, that causes a massive bruise and you are going to get blood migrations into the cell structure of the fish.

Unfortunately, there are quite a number of fishermen these days who don't gaff their fish. They net their fish for reasons of economics and it makes it difficult to properly stun the fish. Bruce and I also think that it may contribute to lactic acid buildup and buildup of wastes that are caused by the fish fighting as it struggles before you stun it. This may degrade the quality of the flesh.

Another don't do for fish is don't warm up the fish. The fish should be kept cold. Always. Yesterday I mentioned some of the abuses that occur on the dock. A lot of abuses by trip boats and day boats occur by leaving the fish in the sun. They are busy and are catching more fish, but this practice is a no-no. You can't let that fish lie in the sun. Two hours on the deck in the sun is equal to having that fish stored in a fish hold for several days, in terms of quality loss.

Our fish-unloading procedures up and down the coast are outdated. It is almost all done in the sun, and people are not trained. They don't have any idea of what they are doing as far as how it affects the quality of the fish. All they know is that they are getting paid $.25 per pound or $.35 per pound to unload those fish. That is what the buyer is getting. It doesn't make any difference how that fish was treated in between. It might as well be a rubber ball in some instances. The abuses are tremendous.

I make it a policy that if buyers abuse my fish, we generally do not do business with them. This policy has to be somewhat flexible, because we deal with a fresh product. I have to sell that product; otherwise it rots in my boat. Generally we encourage the buyer to take good care of our fish because we are proud of what we catch. We feel it should be the best product possible to the consumer. Too many times it will be dropped onto a grading table from a great height. Half the fish will miss the grading table, and fall 6 or 7 feet onto the concrete. I cringe when this happens. That fish is going to suffer bruises and scale loss and it is not going to be the same fish. Or, the fish will be thrown from 8 or 10 feet away into the weighing carts and hit the edge of the cart. A sharp edge and a sharp blow like that does as much damage as banging on it with a gaff hook on deck. I took care not to do that and expect the buyers to take care.

Each boat is different. Our system is a compromise of what will work, provide high quality, and still keep us competitive in the business. Basically, if you stun fish quickly, handle them carefully and gently, prevent scale loss, bleed them promptly, clean and wash them very well, and chill them promptly, you are going to get high-quality fish off the boat.

On Rowley's scale, I would say you are going to get an 8 1/2 to 10 fish on a consistent basis, all the time, if you can do these things. You may net your fish and stun them on deck. I think this probably degrades quality by one or two percent. However, take care of the big factors, which are keeping that fish cold and chilled, bled, and properly cleaned.

One of the things happening this year that may solve some of the problems with quality fish is accountability through the system for quality fish. Where does the buck stop? How can the consumer identify a fish that has received extraordinary care?

The troll industry (the various troller associations up and down the coast) meets once a year to hash out mutual problems that we might attack

on a regional basis. We felt quality was a regional problem that was affecting our market and the amount of money we were getting for our fish. We think our fish is worth more. The consumer was not able to recognize a troll-caught fish. Consumers heard a lot about troll-caught fish, but they never could really see one of the critters in the store that they knew for sure was a troll-caught fish. We are going to try to identify troll- caught fish. We are investigating plastic tags which would be cheaper than the one I now use and could be color coded. Our goal is to make a quality troll-caught fish an identifiable product in the marketplace by tagging each individual fish. These tags will give the fish an identity and make the fish traceable to the vessel. We feel that the buck has to stop some place. It is entirely possible that fish may be ruined because of factors on down the distribution chain beyond the control of the individual fisherman but somebody has to be accountable. We feel that somewhere along the line if abuse occurs, whoever did that abuse is going to receive heat in the form of complaints, kicking and screaming, and bodily abuse by the fishermen. In fact, complaints come back to the fishermen.

This is what we call our signature salmon program. We hope to have this in place in a pilot structure for this coming year. Not all trollers would be putting tags on their fish. We would have a quality training program for trollers. These trained fishermen, once they were identified and educated as to what causes poor quality and how to maintain good quality, would be issued tags for their fish. We would also have an educational program for fish buyers and wholesalers and we would have an education program for the end consumer, the restaurateur, and the public. They would be aware that they could now identify premium quality troll-caught fish. We think that this is a step that will give our product an identity in the market. It is pretty exciting.

One advantage is the consumer can readily identify premium troll-caught fish. He can also have pertinent information, such as the date landed. Where the fish was caught can be included for each individual fish. The consumer is interested in this kind of information for an eating experience. He is not buying dinner. He is after an eating experience and he wishes to absorb the karma of that fish. This is a wild thing that he is eating that has been feeding in the wild, briny deep. He is willing to pay money for this. I know this from our direct marketing sales off the boat. People are very interested in what we do and how we do it and what the fish was eating.

We feel the value of these troll-caught salmon will be enhanced because they are identifiable. We feel that pride, quality, and workmanship in maintaining quality will be fostered throughout the whole distribution chain. If everyone knows those fish can be traced through the system, they are going to be more careful with them. If somebody is responsible for quality, then that person is going to make efforts to educate others and to make changes in the whole system.

The point I would like to make is that there has to be incentive for this. Fishermen should get more money for producing high-quality fish.

The wholesalers should get more money for taking care of high-quality fish. Retailers should get more money for selling high quality fish. We think the consumer demand is there and everyone can make a profit throughout the system on this.

I would like to talk a little about direct marketing because direct marketing is one area in which we can capitalize on our quality. We deal in a fresh product, and selling a fresh product directly to the public is a tricky business. You have very good fish the first day and somewhat lower quality fish the second day. After a week the fish are garbage. Time is of the essence and the logistics involved--making sure those fish get off the boat and get sold--is why we have fish wholesalers and the rest of the distribution chain. It's difficult to short circuit that with a fresh product. But it is possible if you are close to a market. We often fish in front of San Francisco with seven million people just over the hill. Direct marketing will work in that kind of an environment. To some extent it works with albacore along the coast. We sell albacore in the San Francisco area. It's a fresh item that is going to be consumed fresh. Almost none of our fish that we sell are canned.

Along the Oregon coast canning is usually the end result. Most of the fish are going to be placed into cans because the people have found that canned albacore is a far sight above what they can buy in the store. In any event, when you start dealing directly with the public, you realize that the public is after quality. When we sell albacore to people, we have to take extraordinary care of our albacore. It is a tough fish to take care of. It is soft and bruises easily. It is tougher to take care of than salmon, by far. Yet those people expect those fish to look like they just came out of the ocean. If the fish are not perfect, consumers are not as willing to buy them. People are very quality conscious.

I would like to cover some of the things used in my operation. I use a salmon sleeve. It is used in the freezing business for salmon. We use it to protect our fish. With our salmon, the first 15 to 20 fish that we place in each aluminum tank are placed in these bags so that slight movement of our fish in the bottom of the tank won't take any scales off. The rest of the fish will kind of nestle in among these first few fish and all the fish are protected. Our tanks are about 300 gallons each and have a 12-inch opening on the top--a situation similar to a full catsup bottle. You can twist and turn that bottle a lot and you get hardly any movement inside the tanks. There is some. Enough to keep the water stirred up, which is about right. This is what we use to protect the fish. It is also good for marketing the fish.

When we sell a customer a fish off the boat, he puts it in a bag and it looks good. It looks like he just picked it up out of the water. He carries it up to his car and along the way he sells us two or three or more fish because it is a visible product. If it is an albacore, it is gleaming in the sun and all the colors are coming out. If it is a salmon, it is the same. If you are selling to the public, you have to be a salesman to a certain extent. We don't offer our fish; we sell them. Because if we don't sell them they are going to rot. To that extent,

Bruce and I are completely different. That is the difference between a fresh product and having a product that has an almost indefinite shelf life.

The gun we use to affix our tags is very reliable. It is used throughout the clothing industry. Our gun is somewhat different in that it is manufactured with stainless steel parts instead of ordinary steel, but most of it is plastic. The needle is stainless steel. Fish biologists use them for attaching tags for marking fish. It is not very expensive. The clothing clips are reliable. They never come out of the fish. The only problems we have had is that sometimes in handling, these waterproof paper tags would rip. I think this can be remedied by going to an all plastic, tougher tag.

In direct marketing you have to satisfy state regulations; you have to pay county assessments. It is $.065 per pound in California and $.07 in Oregon for salmon, I believe. There are certain amounts you have to pay for rockfish or albacore. In California it is quite easy for the fisherman to market his catch directly. You go to the nearest Fish and Game office and they give you a book like this which has forms in triplicate. You fill this out for each sale. If you are selling to a restaurant, you record how many pounds, how many fish, all the necessary information. If you are selling fish to the public, all you have to do is keep a record of each individual sale and at the end of the day you can fill out this tag and attach your record to it. At the end of the month you mail them into the California Department of Fish and Game along with a form like this, where you list all your totals and pay your state assessment. That is all there is in California. If you don't do any business in a month, they don't bother you. I think it is a very good system. Unfortunately, the rest of the Northwest hasn't caught on, or else they are in the business of hiring government employees. In Oregon, if you want to sell fish off the boat, you have to have a wholesale license and you have to pay poundage every month. If you don't do any business that month, you still have to send in a statement saying you don't have anything. They send you back three or four computer-generated reports each month to say that you haven't done any business. I understand the most recent session of our state legislature did pass a simplification of rules for selling albacore and rockfish and other species other than salmon off the boat. You still have to go through the old process for salmon. I don't understand why this is so.

In closing, what we do is not that special. We just try to do a good job. We have to remain competitive with the rest of the fishermen. When regulations become very tight and we get very short seasons, it degrades quality because the fisherman has to make a living and he has only one way to do it. He has to fish harder or fish longer trips. In 1982 we had a twelve-day coho season. That is terrible. When you have small quotas like that, management should be geared towards getting a product of high quality to the consumer. The whole season shouldn't run consecutively. It should be broken up so that you get fish of decent age. Force boats to deliver to the dock by closing the season for a day or two. Halibut in

Alaska was an example of how not to do it. I think this past year was an improvement.

The comment was made yesterday that our whole system of fisheries in the United States is geared towards production. I think that is true, but it shouldn't be geared towards production. It should be geared toward the consumer: producing the highest quality fish for the consumer and the greatest social benefits from the fishery. To that extent, I am a strong advocate of trolling and a strong advocate of small operations that employ lots of people, offer a good life-style, and provide high-quality products. We may not be as efficient in a pure limited economic sense, but I think we are more efficient when you consider all the social and other relevant factors.

Bruce Gore

Bruce Gore has fished all of his life. He started fishing with his dad when he was about 10 and did that all through junior high school. He trolled from a small boat out of Illwaco. He crewed on purse seine boats in Alaska during summer in high school and college, then bought his own boat and has been running his own operation for the last 16 years. He has very strong ideas about the way things should be done and is uncompromising in his standards of quality. He has created a strong market identity. His customers include such luminaries as Julia Childs, who has used his frozen salmon on national T.V. Others who wish to base their reputations on the highest standards of quality are also his customers.

Scott has done an excellent job of hitting all the high points. He and I are definitely on the same path. A smart seafood buyer would be using his product during the fresh season and mine during the off season. That way the consumer could be assured of having the highest possible quality year round.

I'd like to discuss what I do to design a fish to be frozen. As we know, a lot of fish are frozen out of default, to prevent them from going to the dumpster. I do it a different way.

I fish in Alaska. Troll fish, of course. The fish are caught one at a time on hook and line as everyone probably knows. That gives you the opportunity to have an intimate encounter with every fish. You can handle them in such a way that you can maximize the individual potential of each fish. Each fish is played to the stern as quickly as possible and stunned in the water. I was surprised to hear that there were quite a few people on the Oregon coast who net fish. They are losing some market identity at that point by scale loss. The integrity of the scales on a fish is an indication of quality. You are losing some of that identity by putting a fish in a net and landing it that way. On my boat, every fish is gaffed in the head and swung aboard.

When the fish hits the deck, the first thing we do is sever the main artery between the heart and the gill raker. It is very important to bleed the fish immediately. If you hit the right spot, the blood will pump out very rapidly.

We allow the fish to bleed like this for 10 to 15 minutes, depending on the condition of the fish. You can tell when it stops pumping. We like to maximize that bleed time and try not to sever the heart. If you miss the cut, the pump looses its prime and you don't get maximum bleeding.

As soon as the fish stops bleeding on the deck, we dress the fish. I am designing these fish for freezing so I do a little different dressing than Scott does. I dress most of the fish with the head off.

Eviscerate the fish totally. It is very important to get all the visceral material out of the fish as quickly as possible, whether you are icing or freezing. You need to get all the blood out, but you also need to get any blood around the collar, kidney, or the backbone. All the membranes must be taken out of the belly cavities. No esophagus should remain around the throat latch. The fish needs to be totally clean. Those are the areas where bacterial bloom will start. Those will be the first areas of decomposition, discoloration, and off flavor.

I happen to use a "hook-out," which sport fishermen use to take the hooks out of a catfish. I can grab those little pieces of membranes with the tool. It is a lot faster than trying to grab it with your fingers.

On every fish, we split the knuckles at the anterior end of the backbone. This is something a lot of people don't do and I am promoting as much as possible. What that does is open up the main blood line down the backbone of the fish and the heavy loin part of the tail.

I bleed the veins in the belly flap down. Rapidly, I run over it with my hand to get the blood started in the right direction. I do this very rapidly in the original cleaning of the fish. Upon completion, I do a few strokes down the back to get the blood headed toward the area in the anterior area of the backbone, which I severed. Most of the blood in the back and the heavy part of the tail will be worked towards that point. I lay the fish forward on the deck and from there, my wife Kathy will pick the fish up, and take it to the hatch. She will repeat the whole process, but she will do it much more thoroughly. She uses a rubber spatula to bleed the veins down and she also uses a slimming knife.

Blood in the belly flaps will appear as black lines. We will actually back flush the circulatory system. Scott doesn't need to do this because he is dealing in fresh fish. With frozen fish it is very important to get the blood out before the fish is frozen. If fish are frozen with blood in them, there are chemicals in the blood that will affect the appearance and the taste of the fish over time. If the fish is not going to be frozen, if it has time to be on ice for a few days or in a tank as Scott does it, the blood will come out by itself. We are working these

fish as rapidly as possible so that we can get the fish into the freezer prior to rigor mortis. Beating rigor mortis is very important. The only way you can freeze a fish before it enters rigor is by freezing it on the vessel. That separates our frozen fish from all other frozen fish. It gives a higher degree of quality and it gives extended storage time.

We tested the length of storage time for our fish. The longest time one was held was for 16 months. That fish was chosen as a fresh fish in a tasting.

We actually pressurize the fish by pumping sea water into the veins. You have to be careful with this procedure, because if the deck hose has too much pressure, you can explode the fish. We have a by-pass with a Y valve that will adjust depending on our trolling speed. Pumps will put out different amounts of water so you have to be careful that you don't damage the fish.

We turn the fish belly down in the cleaning trough and then lightly stroke the back of the fish and run a hand flat down the lateral line from head to tail. A little bit of pressure will get the blood moving toward the point that has been opened up. We will repeat the process until the fish runs clean, until there is no more of the blood puddling on the belly flap.

We like to take the slime off the belly on the king salmon because sometimes you will get yellowing. We also tag our fish. That is a very important program. I have a tagging program which I have been doing for several years. Like Scott, I am proud of what I do. I put my name on my product. I think it is important that people know where the fish come from. It is crucial that fishermen be accountable for the product they produce, particularly in direct marketing. If you don't do that, you aren't separated in any way from the rest of the industry. That is a very important thing to pursue. Quality is what is going to give you your market.

I use the same Swift-tach tagging gun that Scott uses. Instead of a paper tag, I use a plastic tag with my name, the vessel name, and the company name on the tag.

We lay the fish on the hatch like sardines. They are carried everywhere they go. We don't slide them or throw them. Every fish is carried around on a velvet pillow, so to speak. When they are on the hatch, we keep them covered with wet burlap. We don't let the hose run on them, because the temperature of the sea water will generally exceed the temperature of the air in Alaska where we are fishing. Even on a sunny day, if you have a wet burlap, soak it down, and allow the water to evaporate, the temperature under that burlap will be colder than the air temperature and the water temperature. That fish is cooling the whole time it is on deck. We try to get the fish totally worked up, bled out, tagged, and into the fish hold within two hours of coming out of the water. Often, depending upon our level of production, it is faster than that. We try to get them down as rapidly as possible.

My fish hold is 30 degrees below zero. I have thermometer bulbs all through the fish hold. I can monitor the temperature in the fish hold from about six places and that is very important. You need to maintain consistent temperatures in your fish hold when you are doing this. I am freezing in the hold as well as storing in the hold, so I need to know what is going on down there.

Temperature is crucial to quality; I can't stress enough the initial chilling--getting that fish cold as rapidly as possible. You need to know what your temperatures are at every point in your fish hold.

In freezing, those fish will be handed down into the hold one at a time. On either side of the slaughter pen, I have dole plates. It is 30 below zero and windy in the fish hold. It is an air blast system with contact plates. I lay the fish individually on contact plates in moving air. They freeze very rapidly. The tissue damage that is done with the rapid freeze is minimal, in fact, imperceptible. I believe that you can't tell it has been frozen. Freeze rate is critical. You need to freeze a fish very rapidly or you get ice crystal build up within the cells. As the ice crystals form, if the freeze rate is too slow, rupturing of the cell walls occurs.

I am sure everyone has taken a fish home that they've caught, put it in the freezer, thawed it a month later, and found that it was mushy and not very good. It froze so slowly that the cells ruptured. When you thaw it out, you get a lot of drip. You have a soft fish, and the flavor is lost. That is a lot of people's idea of frozen fish. It doesn't have to be that way.

You don't want to glaze a fish too soon. If you glaze a fish before the temperatures equalize all the way through the body of the fish, you are putting an insulating barrier on that fish. It will retard the freeze rate and you will run into texture problems on the backbone. You will get mushiness along the backbone. It's the same principle: you slow the freezing process down and the cells will rupture.

I hand dip every fish twice in a solution of sea water and Frudex (corn sugar). That puts a protective glaze on the fish. The fish is then protected against dehydration and oxidation of the fats. It is important to get the glaze on adequately and completely. By hand dipping every one, we get total coverage. Commercially, when processors glaze fish, they often dip them in a basket. They have a large basket with a thousand pounds of salmon lying in it. They dip the whole basket. The salmon are in contact with each other. When the basket is set down, the processor will crack it on the cold storage floor and the fish will rattle loose. Then the fish are boxed. They don't get total coverage with their glaze. They get adequate coverage, but the fish is vulnerable to some oxidation. If oxidation occurs, it usually occurs on the fattest part of the fish. Along the belly is one of the most noticeable places. If there is some freezer burn there, just trimming that off doesn't necessarily get rid of the problem. The oxidation will travel up the fat line of the fish. One

can trim it off the belly but the consumer will still taste it in the flesh. It creates an off flavor that is undesirable.

We unload the fish from the boat into plastic totes. Aluminum is too heat conductive; it will melt off little patches of glaze where the fish are in contact with the bucket. We unload under cover. Each fish is sleeved and boxed in a plastic-lined box. An export box will protect the fish in cold storage, given adequate temperature control, for periods up to 18 months.

That is what I do and I think all the reasons for it were pretty well focused on yesterday during the "Weak Link" session. The weak links were pretty well identified. It became apparent to me several years ago that in order to overcome the weak links we had to take responsibility for our own product. We had to be careful who we sold it to.

DISCUSSION

Question: Bruce, what is your goal as far as how quickly you freeze a 15-pound salmon?

Bruce Gore: Freeze time down to 20 below at the backbone? I haven't actually drilled a fish and stuck in a thermometer to check the rate of freeze. My rule of thumb is I will not glaze a coho within 24 hours or a king salmon within 48 hours. That doesn't mean that the fish takes that long to get that cold to the backbone, because it doesn't. A friend of mine has a Freon 12 system. I have a 502, which is much more efficient freon. I run hold temperatures about 10 to 15 degrees colder than he does. He is not freezing on contact plates. He has put a dial thermometer on a 10-pound coho and laid it in his freezer. His fish was at zero degrees in seven hours. I would say that is minimal performance. His fish also are very high quality. I am freezing at a faster rate. He does an adequate job with a 20 below zero Freon 12 system, just laying them on aluminum plates with no freon going through.

Question: How much horsepower do you use for your system?

Response: My system is a Carrier transicold system. I direct drive a 5F30 carrier compressor off a four-cylinder Mercedes. That is a little 50-horsepower diesel and it probably doesn't take more than 20 or 30 horsepower to operate the 5F30, the electricity, and the condenser water to run the system. I can also run it off of a variable volume pump that is driven off the accessory drive on the main engine. I run a smaller compressor with that. I do that primarily when I am already down to temperature. That is probably taking 8 or 10 horsepower off the main engine. The horsepower requirement varies with the number of BTUs you need to remove. If you put 100 fish down in the freezer, it takes a lot more horsepower than if you are just holding them already frozen at 30 degrees below.

Question: I would like to ask Scott about the signature salmon program. How do you feel the restaurant industry is responding in respect to changes in the way salmon are described in restaurant menus?

Scott Boley: I hope they are responding. I would hope that the restaurant person would try to market a local troll-caught fish. Throughout the industry, we feel we received a lot of favorable press over the last two years due to El Nino, the regulation crunch, and the fact that fishermen have been in very hard economic times. This has created an identity for our industry in the minds of many consumers, which we have not taken advantage of with a product. I hope the restaurant people will take advantage of that identity. Market their product as a high quality dinner, taking advantage of this perception. With our signature salmon, the restaurant person has the date on each of those salmon. He knows which fish to pull out of the cooler and use next. He is going to have a better quality product and he is going to be able to maintain a more consistent quality dinner menu because of that.

Question: I have been trying to direct market to the restaurants. The first thing they ask is, "How many scallops do you have, how many prawns?" They want to be able to buy all their seafood from one supplier. That is exactly what happens.

Say that I am able to get one restaurant to buy salmon from me. The restaurant has to buy the rest of its seafood items from someone else. A large supplier comes along and says "If you aren't going to buy your salmon from us, then we don't have any prawns for you this week." It is very difficult.

Direct marketing frozen fish may be easier but fresh fish is very hard to sell. The only place you can unload your fish is at the dock. The processor already has the hoist tied up. He won't let you use the hoist. You can't use a boat basin because there is a regulation prohibiting what you want to do. So, you wait around and bribe a night watchman. The next thing you know, there are police all around, because they think you're trying to unload drugs.

Scott Boley: What he is saying is correct. Certainly the major wholesalers that sell to the restaurants try to protect their market. They offer a full spectrum of seafood to the restaurant and they certainly don't encourage the restaurateur to make deals with the fishermen or go outside their wholesale chain. That is not to say that the restaurant will not do that on the sly or that you can't direct market. You can to certain restaurants but to market to the restaurant industry in general, I think you will have to go through the wholesale chain and convince that wholesaler he is going to make money on your high-quality product.

What you all say about the established seafood wholesalers trying to protect their turf by having certain regulations to prevent direct sales

is exactly correct. We run into this all the time. Two of the reasons we did not fish albacore this year were (1) we didn't need to because there were plentiful supplies of salmon around and we were doing better on that than we would have on albacore, and (2) there was a new regulation which was going to cost us a lot of money to get around.

The regulation had been passed exclusively to prevent direct marketing, to protect the wholesalers who were already established on the dock. Those are problems. The only way to get around them is consumer demand for high-quality fish.

Bruce Gore: The logistical problems are even worse in Alaska. Here, in the lower 48, you are closer to the population and the market. In Alaska, there are only a handful of towns. Maybe the one you are dealing with is 100 miles from where you are fishing and there is one dock in town. One person controls the whole thing. He likes to peer over the edge of his dock and do you a favor by taking your fish off your boat for a pittance. In Alaska, you have very few options. Up there, it would be almost impossible for me to do what Scott Boley is doing with fresh fish in California. With frozen, I have more options because I can run my own fish to, say, Seattle. Finding some place where you can unload your product in a timely manner is a big problem. The commitment of restaurateurs is also something that has to evolve. Sometimes, it is difficult for restaurateurs to make a commitment to buy from you because the large wholesaler is putting pressure on the restaurateur not to buy from small wholesalers like yourself. Their large supplier will start withholding things when the supplier finds out the restaurant is buying from you. What it takes is a philosophical commitment on the part of the person that is buying the fish. You can waste a lot of time by trying to sell fish to the wrong restaurant.

Comment: I would like to comment about the placement of the fish support services that are a problem for fishermen. Buyers have done something at the Santa Barbara Harbor that is very good. The dock there had coin operated hoists for unloading fish. Anyone could use them. Even more interesting was the coin operated ice machine.

Bruce Gore: The fisherman needs to make a total commitment to this if it is going to work. You can get frozen out, especially if you need ice. You can't depend on ice, and you have to be ice independent if you are going to direct market. If you are not putting your fish through the normal channel, the guy who is selling you ice could withhold ice from you and shut down your whole operation. When I started breaking my fish out of the system and freezing on board, I froze everything.

I have two boats in Alaska. I also have a gill net boat and I give those fish the same handling treatment that I do the troll fish. It is just that the catch method is different. When this was evolving several years ago, I could see that I was going to run into problems with my gill net fish. I was breaking out my trawl fish with a fairly high profile, direct marketing those fish, and still needing ice for my gill net fish.

The owner of the dock would say, "You don't land your troll fish here so I won't give you ice for your gill net fish."

What I had to do was to become completely ice independent. I have a blast freeze system on the boat and I also have a chiller so I can have refrigerated sea water for chilling round fish. In the hold I have a partition of watertight board that allows me to high grade fish and blast freeze the forward section of the boat and chill fish that I want to unload to the buyer in the aft section of the boat. At any point, nobody has any lever on me. You have to make that kind of a commitment.

Scott Boley: That is true in the fresh market also. The ice scenario is accurate. We are bait fishermen and predominately fish for bait throughout the season to catch our chinook salmon. One usually would get bait from the buyers. If I direct my fish or if I have one particular wholesaler that I am dealing with who is willing to pay me extra for my tagged fish, I have to make sure either that the wholesaler can provide me with bait or that I can get my own bait.

My solution has been to I partition off my fish hold and convert part of it to a frozen storage area so that I could carry up to 10 cases of bait. That would be enough for almost a month's worth of fishing. This, to some extent, makes me completely independent of the plants. I do not have to go to any particular plant for anything. The only thing I need to continue my operations is fuel. Fuel is usually an independent concession in each of the ports that they can't freeze me out of. For small quantities of fish, I can hand carry them up the dock and they cannot freeze me out of that, either. Not being allowed to use a hoist is certainly a hassle if you are trying to off-load several thousand pounds of fish.

LESSONS FROM THE POULTRY INDUSTRY: CONSISTENCY IN QUALITY PAYS OFF

Charles Fischer

Charles Fischer is the extension poultry specialist with the Department of Poultry Science at Oregon State University. He has extensive experience in the poultry industry and is here to share with us his perspective on quality control.

I came to Oregon State University in 1947. The inspection of poultry and animal products was just beginning. We've gone through it, and it now is totally accepted. I think if you were to ask the industry today what they thought about it, they would say it has been very worthwhile. I will point out some of the advantages.

When life ceases, decomposition begins. How soon the skin of a product will break down depends on how much of a bacterial load there is in the system or on the skin. We use different methods of preservation. You have heard some of them today: lowering the temperature, freezing,

heating, cooking, canning, and preserving with salt and brine. Until the time of Napoleon, the only way a product could be preserved was to soak it in a salt brine or dry it, with salt being applied to keep it from spoiling. The only way the people long ago could preserve their meat was by salting it down.

During the Civil War, the armies had herds of cattle which followed along behind. When the army stopped, they slaughtered cattle and served fresh beef, or they raided chicken houses.

The latest in preserving is radiation. That will be used in the poultry industry soon. There are some very definite advantages to it. Radiation may also have advantages for the fishing industry.

Do you remember, some years ago, seeing turkeys in the grocery stores at Thanksgiving hanging with their legs and heads, undrawn at room temperature? They were called New York dressed turkeys.

When I was growing up in South Dakota we would dress and ship poultry to California and all over the U.S. There was some refrigeration. But what you got was called "green struck poultry." The insides were starting to decompose, the coloration started coming through the outside, and it looked green. Some of the merchandisers that got stuck with this poultry had all kinds of ways of taking care of it. They would quickly draw the birds and then soak them in soda water. There would still be quite a flavor to it. People got used to that flavor.

Before we started a fresh egg program, people were used to the eggs that the old setting hen had been setting on. Farmers would pick them up on Saturday before they went into town and sell them. People were accustomed to that taste of an egg. So when we started the fresh egg program, we got complaints because the eggs didn't have any flavor to them. At times, we run into problems when people are used to an inferior product.

When I was at Iowa State University in 1946, and we wanted a chicken, the butchers were still drawing chickens in the retail stores. We would ask if the chicken was fresh and the response would be, "Yes, it came in yesterday and we drew it this morning." That chicken had been cooled with the innards in it and it had some off flavor. When we wanted a really fresh chicken, my wife had to buy a live one and kill it herself.

That is the freshest way. In freezing poultry we do it much like the fisherman from Alaska, Bruce Gore. The chickens come from the processing line, go into the bag and into a blast freezer at 50 degrees below zero. They are crusted an inch deep within an hour. That is the way you get quality control.

The New York dressing method referred to earlier went out in the fifties. The industry went to eviscerated poultry, which was a tremendous step forward. Our poultry inspection was very minimal. I remember walking through a poultry processing plant. Before I got to the killing

room floor, the stairs and all areas leading there were very unsanitary. That is no longer the case. Poultry inspectors make you keep the premises clean.

A couple of things brought on poultry inspection.

(1) Many of the large retail chains wanted to be able to tell their consumers that their poultry had been processed in a plant that had been inspected. This forced some of the processors to go under a voluntary inspection program.

I don't understand how the fish industry has managed to escape the attention of the consumer groups and the labor unions as long as it has. We were in Salem at a legislative session in the 1950s. One person from a consumer group related that people could get many different diseases from eating an uninspected chicken. It was that type of pressure, plus the interest on the part of the retail chains, that brought the poultry industry into mandatory inspection.

The poultry industry has been very market oriented. This is the reason it's where it is today. If the market expressed a need poultry raisers did their best to meet that need. The industries which are successful over a period of 25 to 50 years are the ones which are market oriented. It sounds to me like some of you people are really getting market oriented. That is the wave of the future as far as I am concerned. It has been the case in poultry for the last 20 to 30 years.

(2) The retailers demanded a product that they knew was wholesome. As production continued to increase, the plants became more competitive. They were looking for a slight edge over their competitors and voluntary inspection became an advantage. With inspection, the plant managers discovered something that they had never suspected: with more emphasis on sanitation, they were getting a longer shelf life. In many cases with the bacterial load that some of the poultry had, the shelf life may be three days. They found that the better the sanitation practices among their employees and their plant, the longer the shelf life for the product.

In the early 1960s, the federal government passed a law that said that all poultry crossing interstate lines must be inspected by the USDA. The poultry industry didn't vigorously oppose the law because they were divided. Some of those who had been under voluntary inspection saw advantages to it. They felt that they were paying for inspection and that plants not under the voluntary program had a competitive edge. They could sell their product a cent or two cheaper.

It worked out that everyone was under the federal inspection law except some of the state plants. Today, every poultry processing plant in the Pacific Northwest is under federal inspection.

I would like to discuss some of the procedures the poultry industry follows in order to develop this wholesome product that I keep telling you about. First of all, let me talk about monitoring the flocks before

processing. If you have been reading the newspaper, you have read quite a bit about drug-resistant bacteria and possible residues. I just finished a project on residue avoidance in poultry production, particularly in turkeys. When you have a turkey flock with 20,000 toms weighing 20 pounds, you can't take any chances that they have a drug residue. Every week the field man for the Oregon Turkey Growers plants goes out in the field and samples six birds from that flock. He takes tissue samples, fat samples, kidney, and blood samples. The samples go to the lab and by Friday noon he knows if there are any drugs in those birds. If there are drugs, then the flock has to be held until the tests are clean.

If you have a flock of toms, they are eating a pound of feed a day at $.10 per pound. If you have to hold them one week, that is $.70 more to your cost. If you sell them right now, you might make $1.00. It really encourages you to watch your withdrawal times and the drugs that you are feeding to the birds.

At the university, we found that you don't have to slaughter the turkeys to test for sulfonamides. We prick the tip of the wing for one drop of blood and put it on a small disc on a culture plate. We incubate the plate for 12 hours and then read it. If there is any sulfa in the blood, it will inhibit the growth of the bacteria around that the disk. If there isn't any, the bacteria will grow right up next to it. This is an inexpensive way of testing.

The broilers go off feed for 12 hours before processing. The processors do not want any feed in the intestine. If the intestine should be ruptured in processing, any tissue the intestinal contents touch must be trimmed. It can't just be washed or sanitized. It has to be cut off.

We have very rapid processing of poultry. From the time that the chicken or turkey is hung on the rail until it is in the spin chiller is probably not over 20 minutes. Their throats are slashed, they are bled for so many seconds, and then they go into the scalder, into two or three automatic pickers, and through inspection. The processing room is separate from the evisceration room. The birds go through a wall into a separate evisceration room. At the end of that process, they go into rocker or spin chillers. In the spin chiller, the poultry is cooled to 33 to 35 degrees within a period of one hour.

I would like to stress that at every stage in this process, they are washed with high-pressure water and, in many cases, a sanitizing agent. One has to be careful with sanitizing agents. Most of the time they are using chlorine, up to 20 parts/million in water, in order to kill the bacteria. When you are washing the poultry, you wash off the bacteria. By washing your fish you get rid of a lot of bacteria in that process.

The birds are kept cold in the plant during transit and in the store. There is a place in the state of Washington which will either rent or sell you a temperature recording device. Many of the large chain buyers are using these. If they are ordering a load of chickens from Arkansas, they will send the device to the processor and tell him to put it in the truck.

It records the temperature for the whole route. They can tell if the temperature ever went above a certain point. If it did, then the buyer will not want the chicken. The chickens are bought with the understanding that they are transported en route at a temperature of not over, say, 33 degrees Fahrenheit. This may be something that you may want to think about if you are shipping fish any distance.

The bacteria counts on our poultry are low. A number of years ago the city of Portland's inspector was curious about the bacteria count on chicken. He would be the first one to open the boxes when they arrived at a retailer. He would take a swab from the chicken. After about a month of doing this, he came back to the plant manager and said, "You know, I am really amazed. I haven't been able to get a bacterial count on your poultry over 10,000."

That sounds like a lot but compared to the fact that the average sample of hamburger has a bacterial count from 500,000 to 1,000,000, it's not bad. Keeping the count down is one of the reasons we now are able to get the shelf life that we have.

In the 1960s, Arkansas producers started shipping out here. They dipped the poultry in an antibiotic dip. That was pretty expensive, but they did it to kill the bacteria on the birds so they could arrive here and still have some shelf life. Through years of close attention to sanitation in the plants, they are now shipping the poultry out West without a dip and without any problems. Generally they put them in a deep chill and get a seven-day shelf life. Sanitation pays off in the long run.

We have some newer processing methods. One, as I mentioned, is deep chill. The bird is taken down to 28 degrees Fahrenheit, where a crust forms on the surface of it. When the industry first started selling those, it had some problems. Sellers explained that they were deep chilled and were fresh. Buyers would tap the bird and say that it sure sounded frozen. The sellers couldn't move deep-chilled birds at first. Now many of the large plants in the south are deep chilling their product.

Looking back on poultry inspection, I think that everyone in the industry would say that there have been some disadvantages. Sometimes the processors have been prevented by the inspector from starting up because of a piece of dirty equipment, so work is delayed. That type of thing really harasses the poultry foreman and the processing plants, but they have gotten use to the idea that these things need to be done and that their cleanup people had better pay attention. As result, they are selling a more wholesome product. When you look at what has happened in consumption, you can see the difference. Poultry consumption used to be about 5 to 10 pounds per year. Last year, we surpassed pork in per capita consumption. The poultry industry feels that by 1990 or 1991 it will be selling more poultry than beef. Next year, the broiler industry expects to raise five percent more broilers, and red meat consumption is likely to be down about that much.

One of the reasons the poultry industry has made such gains is that the consumers are confident they are buying a wholesome product. When consumers lose confidence, they act like a flock of sheep. Remember the watermelon fiasco this year [1985]? That didn't hurt just the sale of watermelons in California. That hurt the Hermiston melons as well, even though every article in the paper said they were inspected, and they had stamps on them. People weren't buying watermelons. I was at a meeting in the Midwest and I was in a bus with some people from North Carolina and some from California. The North Carolinian was telling the Californian, "The mess you had with the watermelons has cut our watermelon sales in North Carolina." A friend from Arkansas commented last week that he is in the watermelon business and he didn't sell any watermelons this year. All this from one little incident.

In the poultry industry we feel that just one discovery of an unwholesome product or of drug residue will cost a million dollars in the lack of sales, in recalling the product, in destroying the product, and so on. It is a very expensive process and something that I hope the fish industry never has to deal with.

It amazes me that the fishing industry has avoided the attention of consumer groups and unions. We got that attention 30 years ago. I predict that you are going to have inspection in the fish industry. You have two options: you can continue as you are and end up with mandatory inspection, or you can develop a set of standards of your own. When mandatory inspection comes in, it is going to be something of a trauma. It was for the poultry industry.

The federal poultry inspection program requires you to have a separate room for the inspector with file cabinet, desk, etc. You have to go through a certain amount of bothersome bureaucracy. My suggestion is that if you are going to have inspection, try to work out your program so that when it does come, it won't be so much of a shock.

If I were a fish processor, I would do many of the things that were covered this morning. Fish should be cleaned and iced, and flushed with clean water under high pressure. I recognize you have a problem carrying fresh water out into the ocean. You have to use salt water. Are there any organisms in salt water? I recognize the salinity of the water is such that not many organisms can survive.

One of the things that we have found is that bacteria are very adaptive. Once a processor had a problem with the shelf life of his chicken. His people made a rigid inspection of everything. They found that they had a cold-tolerant bacteria growing in the outlets of the tubs used to cool down the chicken. They had disinfected the tubs, but they hadn't cleaned the drains. That was ruining the shelf life of the chicken. Bacteria are very adaptive. Some can withstand very cold temperatures. There are also some strains of bacteria that adapt to very high temperatures. The same is true of fresh water or salt water. You have a wide range of bacteria. You could have a problem, but Bruce Gore says he has never had any problem. There may be a problem when you are

pumping water into the arteries of the fish. If you use sterile water or semisterile water, it may prevent bacterial problems.

I am market oriented. If I am starting a program, I make sure the market knows about the product. You should take the buyers out on a fish run sometime. You should let them see the care that you take with your fish. They would be impressed and you would be making customers. Sometimes these buyers and some of the division managers need to be shown what is being done.

Julia Childs wrote an article in which she points out that it took years for the poultry industry to come under nationwide poultry regulation. Now it is high time for the fishing industry. At present fishermen who take proper care of their catch get no better price in public auctions than crews who puncture ungutted fish.

I feel the fishing industry has a great future. You are harvesting a product that is delicious and at the same is good for people. Someone has said, "Everything I like is illegal, immoral, or fattening." Fish is none of these but you must strive continually for an improved quality product. In the October 1985 issue of Science News is an article, "Fish, Fatty Acids and Physiology," by Jennie Dusheck. A lot of people are bothered with high cholesterol and those who are should be careful. In the egg industry we simply say that 98 percent of the people need not be concerned. The 2 percent who have high cholesterol should do something about it, and one of the things they should do is lower their intake.

A friend was telling me how someone he knew had been put on a fish diet by his doctor and how it had reduced his cholesterol level. I thought, "Here is another one of those fad diets that you hear about which is terrific until you try it and it never seems to do any good."

However, this Science News article begins by saying,

> Eskimos have a lower incidence of heart disease than do other populations, even though their high-fat, high-cholesterol diet ought to make them a high-risk group for heart disease. How do the Eskimos get away with it?
>
> The answer lies in the kind of fat they eat. The Eskimo diet consists mostly of fish, seal and whale. Fat from these animals contains "Omega 3 fatty acids," which are structurally distinct from the "Omega 6 fatty acids," that most Westerners get from domestic meats. Epidemiologic studies of populations, such as Eskimos and Japanese, that consume a lot of fish suggest that the omega 3 fatty acids in fish reduce the likelihood of getting heart disease, rheumatoid arthritis and other inflammatory diseases.

I would suggest you use this information in your promotional program. There is a saying: "He who has a product to sell and goes and whispers

down a well is not as likely to collar the dollars as he who climbs a tree and hollers."

The prevention and control of salmonella in poultry processing plants demands the careful attention of everyone in the plant. This includes supervisors, line workers, truck drivers, and cleanup personnel. People can be one of the worst spreaders of salmonella in the processing plant. Contamination can be carried on shoes, clothes, equipment, or tools. Keep visitors out of the eviscerating, packing, and shipping areas unless they wear plastic boots, a cap, and a long washable coat.

Workers using knives, scissors, and other hand tools should have running water nearby to wash them off regularly. Knives and other tools should not be placed on shelves, ledges, or stools when not in use but in a container of disinfectant which is placed at each station. You would be surprised where you will find these knives sometimes. Whenever a knife or a pair of scissors becomes contaminated with fecal matter from the fish, it should be washed immediately and placed in disinfectant. A thorough washing of the carcasses both inside and out is one of the best methods of reducing bacteria counts. Many of the bacteria are on the surface and can be washed away quite easily by using a high-pressure spray.

Other bacteria are in the folds of the skin and cannot be washed off completely. These have to be destroyed by other means. One method is to increase the concentration of chlorine in the chill water. Most water systems in cities have a certain amount of chlorine in them. A processor may increase the amount of chlorine up to 20 parts/million without any damage or harmful effect on the product. Sometimes it is a little corrosive on certain types of equipment.

A continuous chiller allows the product to go in one end and come out the other. In a continuous chiller, quantities of chlorine need to be added at regular intervals since organic matter, such as blood, soon inactivate the chlorine.

As the birds are removed from the chill tank or continuous chiller, contamination of the birds can occur in a number of ways. The same is true for fish. Contaminated working surfaces or equipment, contaminated shipping containers or trays, and contaminated ice are some of the culprits. Everything that has been done to this point to produce a clean, wholesome product can be undone in the packing and shipping operation. If the product is cut up on a table, the table surface should be flushed with water at regular intervals and thoroughly disinfected at every break. If cutting boards are used, they should be plastic boards with smooth surfaces. Wooden cutting boards should be replaced as soon as they become chipped and nicked. Bacteria can easily hide in the nicks and it is difficult to thoroughly clean and disinfect such boards.

Many plants use band saws to cut up chickens. This equipment might be used in your industry. If one chicken cut on this saw was contaminated with salmonella, every chicken which was cut up following it would become

contaminated. Ice shovels should be kept off the floor at all times. They should be left in the ice or hung up.

To control bacteria numbers, keep the product cold. Most bacteria multiply very slowly at temperatures between 32 and 40 degrees. Poultry is cooled down rapidly and held between 30 and 33 degrees. This practice would be a good one to follow for fish. When you freeze the product, you don't kill the bacteria; they are just dormant. As soon as the temperature rises, they start multiplying again.

Keep the boxes of product off the floor. This not only helps prevent contamination but also facilitates cleaning the cooler. Hose down the coolers and disinfect them at least once a day to keep the bacteria numbers in check. While bacteria growth will be slow at the temperature normally maintained in the cooler, there nevertheless will be some multiplication. A thorough cleaning of the plant is an absolute necessity. This involves not only hosing the equipment with water at high pressure, but also the use of a powerful disinfectant. You want to be careful about this. Check to make sure you use one that is approved. Your cleaning person is one of the most important persons in your plant. You can get into a lot of trouble if you don't have a cleaning person who knows what he or she is doing.

The trucks used for delivery should be thoroughly hosed out and disinfected at the end of each day. They should be closed after cleaning to prevent contamination by flies. This brings us to the final point, employee hygiene. It has already been pointed out that a person can have a mild case of salmonella and be unaware of it. Such a person can shed salmonella for weeks and in some cases as long as six weeks. Therefore, thorough washing of the hands with a germicidal soap must be accomplished each time an employee visits a rest room. Management has the responsibility of providing hot and cold running water with foot valves, plenty of soap, and individual hand towels. A separate set of rest rooms for the slaughter room personnel and the eviscerating and packing personnel should be provided. This may not be necessary in the fish plant.

Sanitation is the key to clean, wholesome food products. Feed manufacturers, producers, plant managers, and workers in food processing plants must exercise the utmost in sanitation at every stage of production and processing. Cooking the chicken to a temperature of 165 degrees will kill any surviving bacteria. Stamping out salmonella in poultry processing plants requires the combined efforts of the plant managers, the workers, and the cleanup crew. It can be done. Start now to critically examine processing practices that may result in contaminated food leaving your plant. Remember, you are handling food for human consumption, not just poultry or fish.

DISCUSSION

Comment: I would like to reiterate a point that you made which I feel is very important. I am in the sanitation end of the processing business. What we are talking about is presenting a product that has the maximum amount of shelf life. That can be equated with bacteria count. The kinds of sanitation procedures on board the vessel as well as in the processing plant are crucial. We do the exact thing you do in your plant. We disinfect all working areas, disinfect all the tools, and burlap and totally scrub the boat down before fishing.

The other point that you made which I think is very important and which we didn't talk about is this: when it comes to marketing this product, education is the key. When you go to the market with a frozen product that is superior to a fresh product in terms of shelf life and bacteria count, often the customer doesn't understand what it is you are talking about. The easiest way to sell something is by educating the person you are trying to sell it to. Education can't be emphasized enough. Once the customer understands and appreciates what you do, the choice is easy.

Charles Fischer: Absolutely, and one of the ways of educating them is by taking them down to your vessel, even if it is docked, so you can show them the first step. That would certainly get the point across.

Comment: That is something that I do and it is very effective. A lot of people don't understand anything about the fishing industry, what it really entails, and why they can't buy a good fish.

Question: I have a question about temperature control that you talked about. How is the shipper held responsible for this?

Charles Fischer: If you are a truck driver, you should make sure you know the temperature of the product when it comes into your hands. You are going to be held responsible for that product while it is en route. Trucks have coolers and they are required to maintain a constant temperature. The reason temperature-recording instruments are used is that some of the truckers were turning down the refrigeration system until they were close to their destination point. They would then turn the refrigeration unit back up before delivery. This was creating problems, so the recorder helps solve that problem.

Comment: I deal with a lot of produce. If you have something that is not handled properly in transit, you charge the damages to the transportation company, and they will be deducted from your freight bill. That is the protection you have. It is essential that you purchase a number of those recorders. They are essential for your protection. Ryan Instruments make one that is inexpensive and it gives a good reading of what has happened to your product en route.

Question: Is the temperature of poultry in transit subject to regulation?

Charles Fischer: "Refrigerated products" are defined as those at 45 degrees Fahrenheit or less. For poultry, that is too high. It should be held below 40 degrees Fahrenheit. If I were transporting I would want them shipped at not over 35 degrees. When we are talking about shelf life, we are talking about making certain it is a good product when the consumer gets it. What do consumers do when they get it? They probably put it in a warm car and make several stops on the way home. If you have any bacteria on the product, it will start multiplying. You can imagine what is going to happen. Sanitation and temperature are the two things for maintaining a good product.

COMPARING U.S. TO FOREIGN SEAFOOD QUALITY AND PRODUCT FORM

European vs. U.S. Seafood Quality

Matthy Welling

Matthy Welling is a native of The Netherlands. He came to the U.S. in 1974. He attended The Netherlands School of Business and the University of Georgia where he majored in agricultural economics and received his MBA. He worked for AJC International in Atlanta, Georgia, and for the Pasco Trading Company in La Jolla, California, and is now the export manager of Sea-Cal Trading in Seattle. In his current position, he is primarily involved in international seafood trade with particular emphasis on frozen salmon.

Having spent most of my life in Europe, I've grown a bit familiar with European seafoods. I have spent the last eight years in the United States seafood business, but I still don't know all the species that are available or how people handle all seafood. It is confusing to me being from the outside.

The resource here in the United States is huge, while in Europe the seafood resource is declining because of increased demand and because the population is increasing. In Europe, the most densely populated areas are in close proximity to the ocean; therefore, most seafoods can be moved very fast through inland transportation.

I will restrict myself to looking at the North Sea and Baltic Sea products because those are handled mostly fresh. Those seas are the most significant because they are resource areas for this food staple for Europe. The south Atlantic production from Portuguese trawlers is mostly frozen on board and processed into blocks for further processing on land. The Mediterranean countries' seafoods are used locally and don't travel

north at all. Fish are concentrated locally and are not flown or trucked out.

The Europeans know seafood better than the Americans because Europe has fewer species. There are only about 12 species that the people have to know about. To make it easier to maintain quality, most fishing ports are within a few hours boat ride from the North Sea and the Baltic area. So when a fisherman comes in, he has been out 12 hours or less. Ninety percent of his fish will be auctioned, which serves as a big incentive to the fisherman to maintain good quality and to handle the fish well. The fish are placed in baskets on the floor with the vessel number on them. Every potential licensed buyer can inspect fish and then it goes up for auction. There are wide variations in price due to quality. One advantage which the fisherman has is that the government will guarantee a minimum price for him so he won't go out of business due to an oversupply.

After the fish are auctioned, the wholesalers bring the product into their plants and either repackage it, fillet it, or ice it and ship it out to the markets. Each market in Europe demands a different presentation. The majority of the markets will ask for as much untouched fish as possible. There is not much demand for filleted fish. Filleting is done at the retail level.

The fish is shipped about 5 to 6 hours after the auction, and it is in Paris, Madrid, or Berlin within 24 hours. Most of the fish ends up on the table no longer than three days after being caught. This, of course, preserves quality. I should add that no processor in Europe is allowed to use any type of preservative such as sodium or other additives which are used here in fillets. It is strictly forbidden there.

Depending on the destination, Europeans see seafood differently also. It goes to an open buying market of which the majority are street markets or open markets like the Rungis Market in Paris. All the producers use styrofoam cartons with ice. The reason they do this is because it is very popular. You can print your name on the carton, and because the styrofoam is white it will keep the product cooler. The extra cost of the styrofoam carton is generally offset by a better looking product, and because everybody does it, it sets the market price.

Very few fish are going through the supermarkets. If they do, they are generally sold through the smaller stores because those are very trustworthy businesses. People will ask to look at the fish. They trust the store person to have good fish because the shopkeepers go to the fish market every day to buy fish. At this level the people can look at the fish's eyes and can judge the freshness of the fish. After this inspection, fish can be filleted there or the customer can take it home whole.

Because of the higher price of fish in Europe, people have grown accustomed to eating a pan-ready flounder where you don't have a lot of waste when you start filleting it. In terms of price per pound, it is not so expensive. They cook it with the skin on, skin the fish after cooking,

and eat the meat off the bones to obtain a better yield. In the restaurant, it is a little different. The restaurant buyers go to the market or get the seafood from the local wholesaler, inspect the fish the same way, and can have it prepared.

In Europe, it is not unusual to get a head-on flat or bottom fish on your plate because the plate coverage is much better with the head on. People do not object to being served fish with the head on.

Again, the general statement which I make is that Europeans know their fish a little better than Americans do. First of all, there are very few species to get to know, while in America there are species from all over the world and many types of presentations with different names. Names are very strictly regulated in Europe. You can't call a product anything else than it really is. The French take it further. If French customs doesn't have it in their book, it doesn't "exist." Kamoboko is illegal in France because it doesn't "exist" for them.

The problem which I have noticed in the United States is that U.S. customers have too much variety, which confuses them. They have to rely on the restaurant where they are eating, then they will buy the product which they know. Also the quality differences are very great. One example which I noticed was the Chilean sea bass which has a very limited shelf life. It is being handled fresh in the United States, which is unbelievable. Its quality doesn't stand up, although the fish is very good in quality to start with. This should not be handled as fresh fish. People in the United States tend to ask for fresh fish because it is in fashion. I hope people will eventually learn that good frozen fish is as good as fresh.

Europeans generally know that good fish is expensive. Not always so in the United States. People expect to find it sold cheaper. Therefore it is an open invitation to a processor to manipulate, to make it cheaper. If the customer demands it, they will make it for them. Again, in Europe you cannot change species on anybody. The Europeans do spend more money on food and in America it is not the tradition to do so. Here people tend to spend as little as possible on food.

Of the processed seafood items in Europe versus the United States, there is one item which I have personally been involved in, which is pickled herring. That is a dying item in the U.S. but is enjoying a rejuvenation in Europe. The older generation was eating pickled herring in jars. The new generation, of course, was not too keen on that. Thus, European processors have come up with new presentations and flashy packaging, not the old type of jars. They have put the herring in a vacuum pack, wrapped a nice label around it, and made it stand out. They even added some new flavors. It has been proven in Europe. I have introduced this item to several chain stores here, but it is too big of a hurdle for them at this time. The recent drop in the dollar has not helped. Americans have been able to package it cheaper so far.

In Europe nationalistic feelings are pretty strong. Each country has a certain pride in putting up its product. To assure that people realize the product is Norwegian, "Norwegian" is printed on the label. The people will ask for Norwegian, Danish, and so on. The governments became involved in Norway and Denmark where people in fisheries form a very large percentage of the labor force. The government generally starts contacting industry if it wants to set up a good program for promotion, export, or setting standards.

Another activity in which I am involved is bringing expensive fresh Norwegian salmon into the U.S. I have noticed the way in which Norwegians have set up the process. I think we can learn something from them. The government initiated this program. It began doing the research on how to farm raise salmon. Most of you have probably read how they do it over there. The marketing aspect is the most interesting part. As soon as Norway found out that there is a huge market for the salmon, in order to avoid any tampering with the market or changing species, or becoming involved with sizes, etc., they issued licenses to people who have a good reputation. They don't have to be producers necessarily; they can be exporters or traders. The government issues licenses which are strictly controlled. If a distributor in the U.S. says that the Norwegian fish have been tampered with, the supplier's license will be pulled. Therefore, it is such a big risk that the licensed person will not do anything like that.

The licenses are limited. There are only a certain number. The government will not increase them. They cannot be traded or sold. The system does have some shortcomings, but I think that for the protection on the other buying side, it is a very good system. You can pretty much blindly buy these fish.

Because of the very favorable dollar rates last year, some other products were being exported from Europe into the U.S. I got involved in fresh flounders and scallops besides Norwegian salmon. At a certain point in the dollar situation, American products couldn't even compete with the European ones, even with the dollars per pound in air freight figured in. That was not a very desirable situation for local U.S. producers. We found out that the national feeling still holds as U.S. buyers prefer U.S. products. However, U.S. prices had to adjust down to the level of imported products. Now that the dollar is retreating from its all-time high, those situations will be pretty much in the past, from a competitive point of view. We will continue to buy flounder, sole, and scallops when there is too little or no domestic production.

Government involvement worked in Norway. They have done a good job. They are very dependent on fisheries. In my travels over there I noticed they pay attention to fish. They spend extra money on their plants. The fishery is not subsidized at all, but well supported. Sellers know how to market seafood because the government is helping them a lot in marketing products. I have seen the requests for information. The government has lists which tell who is looking for what and how to get in touch with them. If you don't speak the language they will help. The referral

service from the government makes Norwegian seafood products very successful all over the world.

In Holland, my native country, the picture is not as rosy. The government is not involved at all. You are allowed to do what you want with seafood. You can change species or anything you like. The domestic market is a little more strict. What happened on the East Coast of the U.S.A. last year was that people were bringing in sole, flounder, and almost anything from Holland. This causes the reputation of the Dutch product to be pretty bad. It becomes a cheap item again as buyers cannot rely on a certain quality. The Dutch are learning from this and are talking about establishing a marketing group to export certain items to the U.S. with quality standards. They need to protect themselves from the other person who can do it cheaper. It doesn't always have to be more expensive to set up a marketing interest group.

I have restricted myself to fish and haven't touch on shellfish. Shrimp and crab are usually handled locally. It is done differently than in the U.S.. People can identify the product immediately. When I look at oysters here, I don't understand why someone hasn't put up an oyster bag (as oysters are often shipped in onion bags).

Norwegian shrimp are very popular here. In Europe, cooked and peeled shrimp from Norway are not as popular. Europeans use mostly the Far East cooled and peeled shrimp. If it is not very good, they will irradiate it in Holland and ship it out again. There are many kinds of tricks. The whole cooked shrimp is a very popular item in France. I have had some Alaskans ask me what could be done with their shrimp in Europe. It is almost impossible to export them because of high duty and competition from Greenland.

Furthermore, they are not able to package them the way Europeans want it, meaning individually quick frozen in 10-pound, illustrated cartons. On the West Coast I have found that producers cannot accommodate markets as easily as I would like. It is all a matter of time, I am sure. I have done this for eight years and have seen much progress in production on both coasts. Quality has increased significantly over the last couple of years.

RIGHT PRODUCT QUALITY FOR THE RIGHT MARKET

Larz Malony

Larz Malony is a member of the consortium of seafood firms which have been so instrumental in putting on these workshops. He has been a very productive member of that group. Since 1976 he has been a salmon buyer in Bristol Bay. He organized a buying program for the set net fishermen, whereby they would fly small planes onto certain designated beach areas, buy fish, ice them down, transport the king salmon by small plane to DC3 transports, and finally take them to market. In 1980 he became involved in research on surimi-based seafoods, and in 1982 he made new product introductions at the World's Fair in Knoxville, Tennessee. He is employed by Viking International, involved with export and import sales of seafoods, and is, in fact, the director of marine products for Viking.

I believe that the quality issue is the most important issue facing us in the U.S. seafood industry. Frankly, without keeping up our quality in this industry, we are going to lose our share of the markets. We have seen this happen in other industries already.

First, I would like to draw some analogies to the seafood industry. They are ones we are familiar with and have been driven home to us several different times. For many years, the U. S. led the world in producing products that were of the highest quality. This was the main reason the U.S. became such a strong player in the domestic as well as the international market in all types of products. These ranged from semiconductors to cars to different types of foods and packaging. Unfortunately, in the 1960s and 70s our friends in the automobile industry learned a bitter lesson about what happens to one's markets when one becomes cocky, overconfident, and lazy in paying attention to quality and what the consumer is asking for.

Let me point to a simple example quickly. The U.S. auto industry, when trying to make an entry into the Japanese market many years ago, firmly said it had no interest at all in switching the steering wheel to the right side of the car. Switching would, of course, accommodate the way the Japanese drive and the way the road systems are set up in Japan. Australia is also set up that way. We are going over there and telling them "Our cars are built this way. You are going to have to change the way you do things."

We don't expect the Japanese or Europeans to come over here and tell us, "You have to buy our products and you have to change the way you do things." That just doesn't happen.

The Japanese could not understand why the Americans were trying to get them to buy their product when the Americans were not willing to produce their product to make it work in the Japanese market. That reality inspired the Japanese to place more emphasis on the development of their own cars and place the steering wheel to the correct side of the car

for Americans. You know as well as I do what has happened since that time.

Let me add one quick point. Lee Iaccoca, regarding the big issue of import restriction into the Asian market, was heard to say at a recent press conference, "Here Chrysler has finally developed the finest and highest quality minivan in the world. Why can't I sell this car in the Japanese market?" The answer is, "Lee, change the steering wheel over to the right side." It is as simple as that.

You can't force a product, no matter what quality it is, if that is not what the end user wants in his marketplace. This a pretty simple example, but I believe that it illustrates the main point. That is, you have to listen to what your customers are saying. They will tell you what they need in your product to successfully sell in their market.

We all want to make entries with our products into new markets. Granted, sometimes we scratch our heads about some of the requests which we hear from our end users. Some are seemingly unusual requests, but we have to realize that they are experts in their market. They are the ones that know well what their market needs. They are the ones who have put the time and energy into their market, so we must listen.

In turn, we must take the time to explain what we and experts in our field can and cannot do. We have to have patience, we have to listen to each other. We have to learn to give and take. If the end result can be a high quality, or a higher quality product tailored to that specific market, then we have made progress. We have reached another plateau on product development.

Another example, tailored more specifically to the seafood industry, will bring us around to the Japanese market. With the Magnuson Fisheries Conservation Act and with the different recent regulations restricting the Japanese harvest of black cod in our waters, the U.S. fishing industry has finally been able to get its due control of the black cod industry. The U.S. and Canada have learned, over the past few years, how to produce extremely high-quality black cod. We have gained a lot of respect, not only in the Japanese market, but now in the Taiwan and Korean markets for black cod. We in the seafood industry wonder why the Japanese will not (on the whole) accept a Western-dressed black cod. Western dressed is head off, collar on, and belly cut. Sometimes we leave the collar intact, sometimes not intact. Instead, the Japanese require what we have all come to know as Japanese or Eastern dressed. What Eastern dressed does is cut off the head along with the collar and cut behind the pectoral fin. The belly is not cut but the guts are pulled out or sucked out by a machine. When we think about it logically, the Western dress is the better of the two. It is the better way to do it. If you leave the collar on you are protecting the flesh. If you take the collar off, all of a sudden you not only wasted that good portion of meat from the collar to the back side of the pectoral fin but have now exposed all of that meat to air and other elements. Inevitably, it may have to be cut off once again. When the belly is not cut, it makes cleaning out the gut area that much harder.

Inevitably there are problems getting all of the blood line out. This potentially leaves chances for bacterial contamination. But that is not how the Japanese buy it. They want Japanese cut. They expect you to do it correctly and they expect you to correctly clean out the belly, glaze the fish, and wash it out. We can argue all day long and it won't do any good.

Cod is dressed that way in Japan for a traditional reason. That is the way the people are familiar with buying it both at the restaurant level and at the household level. If you are going to force a product down their throat, then they won't buy it. You thus lose a substantial market for the black cod.

I would like to take the opportunity to point out a few more examples. Matthy Welling mentioned the Norwegian shrimp. It has made a great entry into the U.S. market. One of the reasons the Norwegian shrimp has done better on the whole in the U.S. market than has our small Pacific shrimp, which is an excellent shrimp also, is that the Norwegians have spent a lot more time and money in developing the individually quick-frozen (IQF) machine that will handle these small shrimp. That is just a guess on my part. The majority of shrimp producers on this coast tend to want to freeze their product in a block form. That produces a fine product, but the Norwegians have shown why IQF is better in their perspective. The consumer has said, "I note that, and I will begin to use it in that way."

When you try to market block frozen Pacific shrimp, the consumer will say, "That is good but we have to take more time to thaw the product. It takes time and time is money."

Listen and learn. Granted, an IQF machine is $15,000 to $20,000, but maybe it will pay for itself.

Let me also point out the ocean perch industry. The Japanese used to fish up and down our coast and into Alaskan waters. They harvested many types of red- and orange-skinned rockfish. Ocean perch, Sebastes alutus, was one of the main fish they would harvest for this particular market. Since the Magnuson Act has gone into effect, there has been more emphasis on West Coast and Canadian production of ocean perch.

The most important aspect of this fish is not necessarily the freshness, and not necessarily the way it is frozen (although both of those are very important). The value of this fish is determined by the intensity of its color. This fish happens to have a fairly good red-colored skin. That skin tends to fade quickly if it is not treated correctly. We in the seafood industry have to use a sodium-based treatment called Nanoxyan which is illegal for domestic sales in the U.S. and Canada. The exporter is faced with trying to sell the fish and is confused about what to do. So we have to weigh all the factors related to both the fresh market and the export market. We have to continue to weigh what the customer is saying to us and what we can do well to make the program. It has become fairly successful now, with the Canadians,

specifically, deciding to go ahead and push the program. They catch the fish and treat it quickly, block freeze it, and jet it over to Japan. They have had very good luck with it. The Norwegians, Nova Scotians, Newfoundlanders, and Icelanders are doing the same thing with the Sebastes marinus. It is a little lighter-colored fish, but if it is treated correctly it will have a huge market in Japan.

At the same time, to point out a deal, I just sent a fairly substantial amount of Sebastes marinus out of Nova Scotia and Newfoundland. The packer that I worked with very closely was running out of chemicals. Before he told me, he decided to lessen the amount of chemical that he used on four loads of this product. When it arrived in Japan, all of a sudden instead of having a very nice red-colored fish, there was an orange-colored fish, a light yellow- or white-colored fish. We have a $40,000 claim.

We had a chance to make some money and continue our market over there. Now, because there wasn't enough attention paid to quality and listening to what the customer had said very clearly, we have a big claim and the potential of losing a market. That was a rather painful lesson, especially because of the many trips which I have taken to the plant and the many inspectors I have had located at the plant. Finally, I thought, the packer understood the requirements for that fish and what the end user needs. That plant should have let me know that it was running out of chemical so we could have moved the product to the fresh market. We cannot take the chance of shipping out a poor-quality product in the future.

Quickly, I will talk about some of the Asian efforts which have done well in the United States and some which haven't because of a lack of paying attention. Two or three years ago, the U.S. scallop industry was not doing very well. Our production was off and that allowed a big opportunity for other countries such as Peru, South America, Chile, and Japan to make some entries with their scallops. These foreign scallops had not a chance before because our production was good and of high quality. The American production of large, white scallops had been unsurpassed. The Japanese produce a wide range of different colored scallops, from tan to gray to white. The majority of Japan's product is cultured. A cultured scallop will have a little higher moisture content. It will look very nice and large, but once you cook it, it will shrink some. That is okay as long as you tell everyone that it will happen. Japan made some very good entries into the U.S. market in 1982 and 1983 with an untreated scallop. They eliminated the tan and gray color because it wouldn't work in our market. They stuck with the white scallops. Then they wanted to increase their scallops' weight so they treated them with tripolyphosphate. That is a good chemical if it is used correctly. It was overused by the Japanese. At the same time, they were trying to take additional advantage of the market by increasing the price. The scallops were selling well but then the people realized they were shrinking too much. You will find now that the majority of Japanese scallops which do come to the U.S. are untreated.

The same thing has happened to turbot fillets. Japan buys a lot of Greenland turbot on factory vessels. They move it to Japan, process it, and sell it to the U.S. When the product is frozen whole or headed and gutted in Greenland, thawed, make into fillets, and then moved back to the U.S., it gains a lot of water. It tends to get mushy when you cook it. It is not the same product. The U.S. continues to want to buy its own product, which is excellent.

The same problem exists with the fillet blocks now coming out of joint ventures between Alaska and Korea on Alaskan cod. They have a long way to go to get the quality of cod fillets done by processors in the U.S.

The Japanese have been successful in the "freezing at sea" program they are involved in. They produce frozen-at-sea swordfish, mako shark, and products like that. The frozen-at-sea boats are larger and much more expensive than the smaller vessels that bring the product to shore and freeze it, but a product such as swordfish, whose good, white flesh is so important, must be frozen at sea. It must be brought on board without banging it up, then bled, gutted, and frozen quickly. The Japanese process all of it into steaks. It is an excellent product. Here is a time when they have paid attention to the U.S. buyer.

In closing I would like to make one comment. That is, the most important thing for us in the American seafood industry is to continue to pay attention to the end users, both domestically and internationally. If we do that, if we listen and learn, we will continue to remain on top of the world in the production of high-quality seafoods.

DISCUSSION

Question: I have a question about the North Sea fishery. I've heard that 90 percent of that fish is bought under options. Could you explain?

Matthy Welling: North Sea fishermen do fish under contract at a predetermined price on certain company-owned boats. But 90 percent seems much too high.

Question: Do you feel that the European Economic Community is going to become increasingly protectionist as the years go by?

Matthy Welling: Based on the experience of the last several weeks with the citrus and walnut war they have over there with the U.S., I don't think they will because they are mostly self sufficient like the United States. In the United States, if we become protectionist about shrimp imports, it will be ridiculous because it would be inflationary. If the EEC would do the same thing to salmon, it would be inflationary and it would not benefit their own fishermen at all. That is the way they argue it. They do become protectionist where they can replace the goods themselves by local fisheries. They couldn't replace the imports because

we don't compete with their fisheries. For instance, a couple of weeks ago I shipped spiny lobster over there. There was a 20 percent to 25 percent duty on them because they catch them themselves, too. They do not have enough in their fishery but they want to keep the prices artificially high. All the levies and duties are in place. One duty rate which I would like to see eliminated is that on further processed items like salmon fillets. We could make a better product to send over there if the duties weren't so high.

Question: I know the meat producers to a certain extent in places like Australia, New Zealand, and the U.S. work together very closely to try to make an entry into the European market. Do you think there would be any reason for the U.S. and Canada and other fish exporting nations to work together to accomplish the same?

Matthy Welling: It is always good to join forces; however, the meat situation is different. The way the EEC has set up the quotas is very complicated. Fish is pretty loose. In the United States and Europe seafood quotas are in their infancy. People don't know how to handle that vast array of seafood items because there are all different kinds of species and they come from all over the world. Then, there are the underdeveloped countries which you don't want to hurt, so it is a very touchy subject. It often becomes a political issue in Europe.

Comment: The Europeans are trying to put the fish into separate categories, as they have done with agricultural products.

Matthy Welling: That is right. They have their own projects as a way of developing the fisheries. For example, there is not enough demand in Europe for EEC mackerel. The government has fishermen fish for it for a certain contract price and the government freezes it. Then they try to ship the product into a certain country like Nigeria or Egypt which they know will eat the mackerel. It becomes a form of development aid while it serves the local fishery. It does seem to work very well there because they have done it for many years now. I don't think they will become more protective of their markets. At least, not for seafood.

Question: Is quality used as a barrier extensively for seafoods in the European and the Asian markets? How important are fish grading restrictions?

Matthy Welling: For meat, quality is used as a barrier. Seafood just has to be edible. The French are the strictest about it. They require that it be good for human consumption and free of chemicals. Again, it is pretty loose over there because none of us has any standards. None of us knows how to set quality standards in seafood except for the very basic requirements. It is very difficult if you really look at the nature of business. It is almost impossible to set standards. That is why you have to look at a very confined area. You can't make a worldwide standard for

sole fillets. That would be impossible. That is how the Europeans look at it. They judge quality on a per country basis.

Dick Johnston: Is that an issue in Asian markets, Larz?

Larz Malony: In Japan, they have the highest developed market for seafood. They are very particular, and at the same time they are the largest market. If you want a part of that market, there are certain things that you have to listen to and either change or improve your product.

Question: Are the species that are harvested along our Pacific coast in the wrong product form for export? Suppose we could take rockfish and other fish to the Asian market. Are there any product forms that we could export?

Larz Malony: That is a question I ask myself often. With the rockfish issue, four years ago the only rockfish of the Sebastes species the Japanese would accept was Sebastes alutus. Now they accept Sabastes marinus from the Atlantic because they have red skin. Recently, they began accepting orange-skinned fish. The color variance which goes from orange to bright red includes a larger number of fish, at least eight different species. At this time, they are going slow with the transition. Orange rockfish has been selling there only during the last six months to a year. Once we start selling the yellow, maybe we will have an opportunity to get into our darker-skinned species. One of the problems with the Pacific coast fishery is the different catch limits which we have to deal with. We need to think about how to tighten the fishery regulations more logically. But some day there will be a market for the good rockfish off our coast in Japan and other Asian markets. It will simply take time.