ering this risk is based upon experience. If one has a claim one year the insurance rate will be higher for the following five years. Needless to say, anything that helps to reduce the risk is most welcome.

Most of Hot Shoppes' experience with seafood has been very good. However, several years ago the company bought a shipment of 38,000 pounds of shrimp and the usual quality control methods were applied. A composite sample was drawn and proved to be satisfactory. All but 10,000 pounds of these shrimp were consumed before any difficulty arose, but the rest of these shrimp the company had to sell through a broker at a loss and purchase replacements at an additional cost of 4c per pound to us. This is another example of those hidden costs which adequate inspection services could eliminate.

Uniformity is an essential requirement and grading for size is an important factor to the industry. It is realized that this presents a problem because the catch does not consist of uniform sized shrimp or fish. When the fisherman drops his net he may get a great range of sizes and the producer has to find a market for all of the fish. It was believed that the grocery stores could serve as outlets for the odd sizes, but actually the large grocery firms, too, are interested in a uniform size, particularly in shrimp. Recently the shrimp producers have done much to improve the size grading and it is hoped that the fish segment of the industry will soon find a way out.

In summary, the public feeding industry offers a great marketing potential for seafood. Increased sales to this market depend, however, on the availability of adequate controls that would safeguard the quality of the product. It is believed that under ideal conditions the feeding industry can absorb as much as $600,000,000 worth of seafood products.

DISCUSSION

Technology Session

Discussion Leader: FRANCIS W. TAYLOR

Discussion Panel: HAROLD ALCOTT, JOSEPH STERN, JOHN D. KAYLOR, MAX MEYER

Fishing Industries Attitudes Towards Official Voluntary Quality Standards

HARRIS MAGNUSSON

Q. Kaylor: Has the Food and Drug Administration expressed any interest in the standards being developed for fishery products?

A. Magnusson: The Food and Drug Administration is interested in developing minimum standards of identity for fishery products. This, of course, is different from the standards which we are trying to promote.

A. Whiteleather: F.D.A. is interested in the fitness of food for human consumption. The voluntary grade standards which we are trying to develop are of a type which F.D.A. is not concerned

with, and go far beyond these minimum standards. Of course, there can be no conflict with F.D.A. mandatory standards.

Q. Stern: Will the army accept the voluntary standards in lieu of "specifications"?

A. Whiteleather: The army and other federal purchasers buy under federal specifications. If there were federal standards they would probably be incorporated into the federal specifications.

Q. Duggan: I would like clarification on how these voluntary standards are developed. In the case of fish stick standards, the first move was by packers, who jointly developed preliminary standards and turned them over to the Fish and Wildlife Service for further work. This is where we are now, and what is the next move?

A. Whiteleather: In the production of voluntary standards the following steps are involved: (1) The development of the standards—the technical research necessary to produce an acceptable practical standard for both the producers and consumer; (2) The promulgation of standards—meaning that they are published in the Federal Register and are thus accorded official status as a U.S. standard; (3) The certification or inspection stage —where inspection is made, on the request of industry, on the basis of the official standards. The fish stick standards are about ready for public hearings and promulgation. There are some legal aspects to be worked out by our lawyers.

Q. Fieger: What per cent of the industry will have to accept the standards before they will work?

A. Magnusson: In the case of other food standards, sometimes the per cent of producers openly using standards is very small, below 10 per cent, and yet the standards are successful because a much larger per cent of the industry is using the standards on a private basis. In meat grading less than 50 per cent of beef is graded, despite the wide acceptance of grading in this product. With butter, again less than 50 per cent is graded. In cases of frozen vegetables and other products you will seldom find grades on the package and yet a grading standard has been used, and the effect has been to raise the quality of the product. Many believe that the main value of standards is not in their effect on the final consumer, who buys by brand or store, but in raising the quality in the industry as a whole.

Duggan (Comment): As a packer it seems to me that a major advantage of standards would be to define clearly the characteristics of various grades, as a guide to the processors. Then "Grade A" has some universal meaning, instead of every packer being able to claim his product was Grade A. The buyer could check the claims of packers against a real standard.

Q. Kaylor: In the National Fisheries Institute tests of fish sticks, how many of the 27 brands met Grade A standards, according to the tentative standards?

A. Magnusson: About half the samples were "Substandard," primarily because of flavor. Three or four of these were "Substandard" because of errors in preparation. Only six or seven were A (or AA, according to the older classification).

Voluntary Standards for Fishery Products—an Industry-Government Cooperative Job

R. T. WHITELEATHER

Q. Stern: Who will do the inspection in the application of the seafood standards? Will it be the Fish and Wildlife Service, or the Agriculture Marketing Service of the Department of Agriculture?

A. Whiteleather: We want to avoid duplication of function and will make as much use as possible of existing organizations. In the inspection and certification of fishery products we hope to come to some agreement with the Department of Agriculture to use their inspectors, after training them in the inspection of fishery products. If they don't have enough inspectors in a particular location, additional men can perhaps be hired. If this does not work, then Fish and Wildlife Service would have to seek authority to handle the job ourselves.

Q. Stern: If these voluntary seafood standards become a reality, will in-plant inspection be a part of the system, as it is with some fruits and vegetables?

A. Whiteleather: If it is planned to say on a label that all packages of a product are of a certain grade, then continuous plant inspection is necessary. However, if certification of certain lots or codes is contemplated then continuous inspection is not required and the lot can be given a grade by an adequate sampling procedure any place along the distribution chain. This latter is what is now contemplated for our fishery products. The labelling of all packages of a product as, say, "Grade A" is another step ahead, which is not planned for right now.

Magnusson (Comment): Perhaps one thing has not been made clear. It is possible to put on a label many things, provided it is not claimed that the product is government inspected and approved. If the agriculture system is followed, in-plant inspection is necessary if *government* standards of quality are claimed. If, however, industry standards can be used, the grades can be industry definitions of quality. Here, of course, the packer must be certain he is meeting this definition, and be willing to defend this in court. In the early stages of fish stick standard development it was thought that there would not be government inspection, but that industry standards would be used.

Q. Duggan: With voluntary industry standards, a yardstick is provided for a packer's guidance. Then, if I understand correctly, if a packer puts "Grade A" on his package he is not only obliged to prove, if challenged by a buyer, that his product *is* Grade A, according to the voluntary code, but he is also liable to prosecution by the Food and Drug Administration under the charge of mislabelling, if the product is *not* Grade A. Is this correct?

A. Magnusson: Yes, I believe this is correct. Agriculture grading groups do not favor voluntary industry grading because of the chance of laxness on the part of the producers. Producers may not be capable of ensuring packs are actually Grade A, as he claims. This might reflect on other packs, which do live up to the standards.

Q. Kaylor: There is a packer of fish sticks who has on his package, now, the statement that his product is "Grade A". What happens to his standard if government standards are promulgated and his do not come up to the government standards?

A. Whiteleather: It is possible for anyone to claim "Grade A", according to his own standards. There is a great deal of difference between "Grade A" and "U.S. Grade A" and if the former implied the latter, it would be mislabelling.

Magnusson (Comment): I don't know the answer to this problem of packers having their grades before official standards are adopted, but if, after standards are adopted officially, a packer labels his product "Grade A" he is open to prosecution for mislabelling, although it is not as clear a case as it is if he put "U.S. Grade A" and fails to meet the standards. Furthermore, he could be sued for labelling "U.S. Grade A" without permission, so he can be prosecuted two ways.

Q. F. Taylor: Suppose a package is graded as "U.S. Grade A" and later ceases to be "U.S. Grade A". For example a case arose in the west where a trout farm shipped a load of frozen trout to a customer. The latter bought more trout than he needed, and a year and a half later the customer wanted to return part of the shipment. Now the package was Grade A when it was shipped, but of course was not after a year and a half. What can you do when a pack ceases to be Grade A somewhere along the line?

A. Whiteleather: I think this is exactly where standards serve best. In a situation where there is any question of quality, an inspection can be requested. If a transportation company accepts a shipment of Grade A fish sticks and they are found not to be Grade A when they arrive at their destination, then the blame can be placed clearly. This avoids the endless arguments that now take place as to whether the fish were good when they left the producer.

A. Olcott: All grades are dated, and they only say that the lot was Grade A at the time of grading. If a question arises later, then a new inspection must be made and a *new* grade assigned.

Q. F. Taylor: It seems to me that the packer should put the date of production on his package so the housewife could tell how old a product she was getting. This would encourage the merchant to keep the package only for a reasonable time.

A. Duggan: I can answer that with an actual experience. The type of handling a frozen product gets is much more important than the time element. We have dated our packages of fish and recently we had a pack dated October, 1954, almost a year ago. A broker called us from Salt Lake City, very excited, and asked us if we couldn't please leave the date off the package. The customers were complaining about the age of the fish. The quality was good, but the date scared them.

Olcott (Comment): I have sat in on many meetings where frozen food processors have argued about how to keep up the quality during storage. One suggestion has been to devise a frozen food indicator to put on the package to show whether it had been mistreated. At the Western Regional Laboratory, Dr. Anderson devised one, which consisted of a red chemical on a piece of filter paper. With a rise in temperature this red area would spread along the filter paper, and if the food had been mistreated, red would begin to show through a transparent plastic window on the package. This idea has been rejected by the industry, since it would actually not be possible to pin the blame. Some one along the chain does a *little* mishandling of the package, the next fellow does a *little* mishandling and the third does a *little* mishandling, then the red area shows and the fourth man has to pay for the lost product. In some cases a frozen product can be kept for two or three years and still be good, while others, badly handled, will be poor quality in six weeks.

Q. Gilbert: A large proportion of the fish sticks made in the United States are made from imported fish, and Canada is one of the biggest exporters of fish blocks or slabs to the United States. Is there any move to make standards for fish blocks?

A. Piskur: We are working on standards for fish blocks right now and we expect to have the first draft out in about a month.

Q. Gilbert: Is there now any inspection—federal or state—of imported fish blocks?

A. Kaylor: Only the inspection of the Food and Drug Administration. They are concerned, of course, not with whether the blocks are Grade A or B, but whether they are fit for consumption. Food and Drug Administration is strictly regulatory.

Q. Fieger: Have the voluntary standards and grade developed for the Maine sardine industry improved the quality of that product?

A. Piskur The standards as drafted for the sardines are quite workable, according to the state laboratory men, and the members of the industry. Samples of the pack are taken by state inspectors and tested in the laboratory in Orono. The packer is informed of the grades given his product as well as the

grades of competing packers in Maine. The packers are enthusiastic and they believe the system shows up the weak spots, which can be corrected with the help of the state technologists, so that sub-standard grades, which hurt the whole industry, can be brought up in quality. They haven't had time, really, to show improvement in the pack, but they exect to see some by next season.

Sanitary Standards for Crab Plants

GEORGE GEHRES

Q. Olcott: You said the ideal method of preserving crab meat would be in a hermetically sealed can, which would be heated to dispose of the pathogenic organisms. Unless you heat enough so that you actually have a regular canned product, does this not lead to a public health problem? I refer specifically to possible residual spores of *C. botulinus*.

A. Gehres: Crabmeat is the only cooked food product that I know of that is not sealed hermetically in a package, and it seems desirable to use this method with crabmeat. Of course, the added heat treatment would not destroy all pathogens or spores, but would be another protection for the consumer. Some sort of heat treatment like the pasteurization given to milk, might have prevented outbreaks of illness in the past which were due to crabmeat.

Q. Olcott: But that still does not remove the threat of toxins produced by botulinus, which thrives in the absence of air, and in the absence of spoilage organisms, whose production of lactic acid tends to keep botulinus from developing. In California, there has been hesitation about allowing the sale of sealed foods other than foods treated enough to kill all organisms and spores. They finally have permitted the sale of foods in hermetically sealed cans provided the cans are clearly labelled, top and bottom and in large red letters on the side, instructing handlers "Keep Frozen—Do Not Thaw."

A. Gehres: The growth of pathogenic bacteria stops at about 50° F., so if foods are kept below this temperature trouble can be avoided as far as production of toxins are concerned.

Olcott (Comment): Of course, there is no assurance that the housewife or other handlers of the crabmeat will keep them below 50° F.

Strasburger (Comment): I don't believe you will find any record of a case of botulinus caused by ingestion of fishery products. Nearly all cases were derived from vegetable products—products which had been in contact with soil, since botulinus is essentially a soil organism. Even in hermetically sealed containers I doubt that much is to be feared from botulinus from seafood products.

Q. Strasburger: What control has the state over packers to ensure that they cook only live crabs?

A. Gehres: Some dead crabs are probably cooked in nearly every batch. I imagine some unscrupulous operators frequently cook a lot of dead crabs. Not every batch can be inspected, but observations indicate that most operators try to keep the cooking of dead crabs to a minimum.

Q. Strasburger: If the crabmeat is picked directly into the can, how can the amount of shell be controlled? This is a factor of great importance in quality.

A. Gehres: Only spot checks can be made of the amount of shell. In some plants the pack of individual shuckers is identified by numbers so that careless packers can be checked on. In some cases fluorescent light is played over the top of the can, and the shell on top can be picked up. The less the handling of the crabmeat, the less is the bacterial load. The amount of shell is not a health hazard, while bacterial load is. We are trying to reduce the latter, and are not concerned about the shell.

Latest Progress in Establishing Fish Stick Standards

FRANK PISKUR

Q. Strasburger: It seems to me that the standards being developed for fishery products are based entirely on an examination of the product, with no attention being paid to the conditions under which they were manufactured. Do you not feel that some weight should be given to the sanitary conditions and the general character of the plant?

A. Piskur: This goes back to the question of how the inspection is to be made, whether it is to be a spot inspection of the product or a continuous plant inspection, or some other type. It is up to the industry now to decide what type they want. I agree with you that inspection of the plant and of processing methods is a necessary part of completely satisfactory standards. In Maine only product inspection is so far being conducted.

A. Whiteleather: The criteria being suggested now for standards are a beginning. If they are successful we can go on to other steps, and just as fast as the industry wants to go.

Q. Ingle: I was interested to learn that oily fish, when made into fish sticks, have a storage life of about six months. In relation to the questions of mullet, are any oily fish now being successfully made into fish sticks commercially?

A. Kaylor: We can pack ocean perch as fish sticks. These are six to seven percent oil, not nearly as oily as salmon. These perch sticks are acceptable, but experimental mackerel sticks were not. Two things are involved: the amount of oil and the nature of oil, and only actual experience will determine whether mullet can be made into successful fish sticks.

Q. Fieger: Why are flavor and odor not rated on the fish sticks standards? Are these not after all the important criteria as far as the buyer is concerned?

A. Piskur: We rate flavor and odor, but we don't give them the numerical scores. This is because it is difficult to grade these subjective criteria. We have a project underway in our Boston Laboratory to determine the flavor component of fish and when this is finished we may have some way of scoring flavor and odor objectively.

Standards for Breaded Shrimp

ARTHUR NOLTE

Q. Kaylor: What has been the biggest obstacle in developing standards for breaded shrimp?

A. Nolte: So far it has been in getting agreement on the percentage of breading.

Q. Olcott: Are there problems of rancidity with breaded shrimp?

A. Nolte: Not with uncooked shrimp, but there are some with cooked shrimp.

Q. Strasburger: Is any consideration being given in the shrimp standards to the different species of shrimp?

A. Nolte: Not so far. This again is something for the industry to decide whether they want it.

Q. Idyll: Mr. Wood, as a wholesale buyer, do you believe it is desirable to specify the species as part of the grade?

A. Wood: I do not think so. We regard that as similar to some area preferences for brown eggs and another for white eggs. After the shells are removed the eggs are the same. There are certain regional preferences for certain species of shrimp, but I believe that that is due to differences in handling methods or marketing methods, for example, lack of size grading or freshness, rather than to real differences in the taste of the shrimp.

Whiteleather: (Comment) I agree that species of shrimp might in some areas be an important thing to show as part of grade standards, but I believe we are a long way from such refinements yet. This is the first year we have even had statistics on the amounts of various kinds of shrimp caught. What you are talking about, Mr. Strasburger, is an objective to shoot for in the future.

Strasburger: (Comment) You are right, and I am thinking in terms of the future. I believe there will be increased imports of shrimp into the United States, because the demand will not be supplied by our own fishermen. These imported shrimp are of different species from locally produced shrimp, and have different tastes and odors. I believe it is not difficult to differentiate between species, even after breading, and some of these species will undoubtedly be found to be much more desirable than others.

Standards for Fishery Products from the Point of View of the Wholesale Buyer

WILLIAM H. WOOD

Q. Kaylor: Would you be interested in the development of standards designed specifically for the institutional trade, rather than for the individual consumer, which is what we have been concerned with up to now?

A. Wood: I am sure we would. We have had very little trouble with fishery product quality, but we are using a fair amount of imported fish. With standards it is probable that we would use more domestic products. It would be a help to know that what we buy is under supervision in its manufacture and that we would not run into the occasional bad lot.

Q. Hoover: Would you pay a premium for graded fishery products?

A. Wood: We are paying a premium anyway, by buying the best quality. If a graded product was of higher quality than one that was not graded, we would buy it, and pay more for it.

Q. Piskur: Do you develop your own buying specification or do you use federal standards?

A. Wood: Our standards are higher than federal specifications for some seafoods, but are similar for others.

Q. Gehres: What are your criteria in buying crabmeat?

A. Wood: It has to have a "clear," clean taste, and it should be free of shell. Of course, we realize it is impossible to get every bit of shell out, but that is the ideal. If regulations are going to insist that crabmeat be packed directly into containers, I'm afraid the amount of shell will increase.