

the **LODE STAR**

Charting the course of fisheries development today.

Alaska Fisheries

Development Foundation, Inc.

Volume V, No. 1 Winter 1986/87

News to Use

It may be Spring where you are, but here the ground is still frozen hard as a ship's plank, and so we call this the Winter issue. (In Alaska, everyone but the pussy willows knows better than to be optimistic in March.)

New executive director joins AFDF April 1

Mel Monsen, former consultant to the Bering Sea Fishermen's Association and legislative specialist on fisheries issues, was named executive director of AFDF at the board of directors meeting March 23 in Anchorage.

Monsen brings to AFDF broad experience in the natural resource industries in Alaska, and has worked with many segments of Alaska's seafood industry.

Monsen begins his duties on April 1. The AFDF board, staff and membership welcome Monsen to his post.

AFDF welcomed five new associate members this year. They are:

Fletcher Fishing, Ltd.

Bellevue, WA

Roquette Corporation

Gurnee, Ill.

Nobel Insurance, Ltd.

Dallas, Texas

Pacific Rim Fishery Projects

Danville, CA

Specialty Foods, Inc.

Richmond, CA

New surimi product contest

AFDF will sponsor a Prototype Development Contest this spring as part of our effort to diversify the market for Alaska's surimi. The foundation will invite proposals to create a prototype surimi product that is a non-analogue, non-substitute, stand-alone item that demonstrates the unique advantages of surimi.

AFDF will seek proposals from food technologists, engineers, and surimi consultants who can provide a development plan and product concept that will significantly enhance consumption of surimi-based foods beyond current market niches. To the selected applicants, AFDF will provide cooperation and limited financial assistance for product development and market evaluation.

AFDF will issue a request for proposals in April. If you are interested, please contact AFDF.

Kodiak is on top of bottomfish

By Krys Holmes

Probably several metric tons of paperwork have been generated to explore and explain fisheries development in Alaska, but no one has explained it better than Al Burch, when he told the Kodiak Daily Mirror in November, "Last year at this time I had boats looking for markets. This year the markets are crying for boats."

Al Burch is executive director of the Alaska Dragger's Association, a groundfish harvesters' group whose boats suddenly are in hot demand after several years of slow going since the decline of shrimp and crab resources in the late 1970s.

Burch's statement illustrates what fisheries development really means: a lively boat harbor, a string of active shoreside plants, reliable markets for fish. Employment, commerce, jobs. The groundfish industry has come alive in Alaska, and Kodiak is the state's shining example. In a town virtually still during the winter months even two years ago, now ten processors are handling groundfish, three of them processing more than 400,000 pounds per day.

"All the plants in Kodiak were virtually idle between September and April before this year," said Chris Blackburn, director of Kodiak's Groundfish Data Bank. "In 1987, three plants will operate year-round, processing surimi September till March, and pollock fillets year-round. Next year, it's expected that all eight plants will operate year-round."

A number of factors have converged to improve the seafood scene in Kodiak:

- Cod prices vaulted 75% in one year, as high as \$3.50/lb. for fresh and \$2.50/lb. for frozen fillets FOB Boston. The Seafood Leader 1987 Buyer's Guide said higher prices were "more a function of de-

mand than a lack of production." They predicted prices would not drop below \$2/lb. in the future.

- Pollock prices stretched from \$1.45/lb. to \$1.85/lb. for shatterpack, and pollock nuggets entered the fast-food business for the first time in 1986. Pollock has become increasingly acceptable on the world market as a high-quality substitute for cod, and pollock supplies are expected to remain tight.

- Alaska Pacific Seafoods, Kodiak's only surimi plant, doubled its surimi production capacity in late 1986, signalling that shore-based surimi processing in Alaska can be an extremely profitable venture.

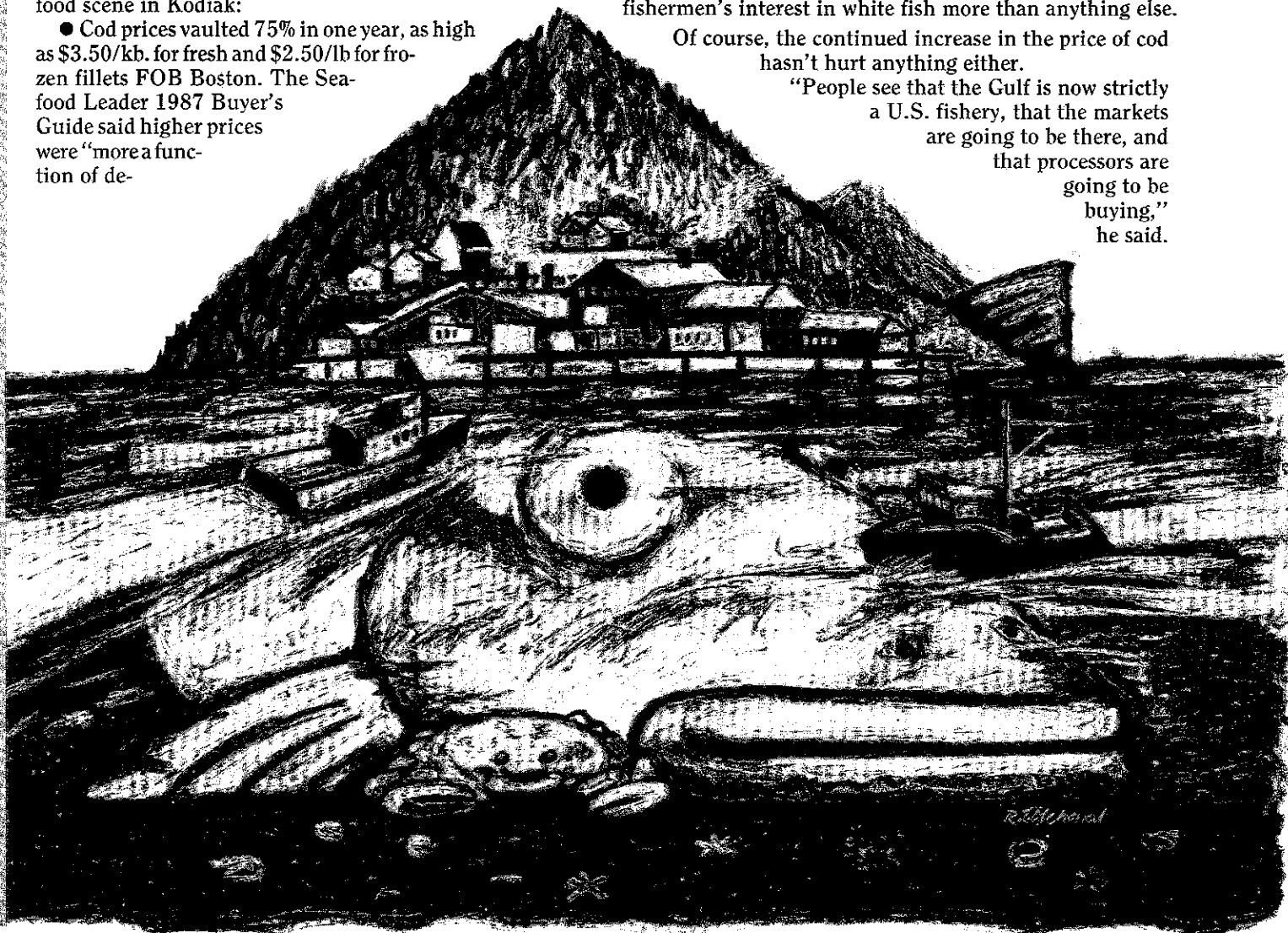
- National Marine Fisheries Service issued a report in late 1986 following a survey of Alaskan processors which predicted that Kodiak could process 45,000 metric tons of groundfish in 1987. The Kodiak Borough countered with 82,000 metric tons. Either way, it became clear by late 1986 that foreign and joint venture fishing were over in the Gulf of Alaska.

- Equally convinced was the North Pacific Fishery Management Council (NPFMC), which in December ended all foreign fishing and severely limited joint venture fishing in the Gulf of Alaska for 1987, reserving 190,000 metric tons of groundfish for domestic processing.

Kodiak fishermen and processors may have been lined up at the starting gate before this year's white fish season, but many say it was the NPFMC that pulled the trigger on the starting gun. Chris Bublitz of the Kodiak Marine Advisory Program said, "Their decision to reserve the Gulf for the domestic industry, I think, sparked the fishermen's interest in white fish more than anything else.

Of course, the continued increase in the price of cod hasn't hurt anything either.

"People see that the Gulf is now strictly a U.S. fishery, that the markets are going to be there, and that processors are going to be buying," he said.



Kodiak, continued

Pollock and cod aren't the only things that raise Kodiak's jib: The plentiful flatfish is still "underutilized," which means its potential hasn't begun to be tapped. "Flatfish, like pollock, has found a place in the world market as a reasonably acceptable replacement for cod," Bublitz said. "This is a world where there are plenty of species, and we will have to carve a niche for these products, or else produce a product that's higher in demand than any other. That takes time, but the flatfish fishery holds tremendous promise."

Few people thought any fishery in Kodiak held promise in 1978, after the downturn of crab and shrimp stocks. Today, Kodiak's population of 8,000 people boasts the lowest unemployment rate of any Alaskan community — in a year when low oil prices have gutted other areas of the economy. The Groundfish Data Bank's Blackburn said \$6 million were invested in 1986 in cod and pollock processing equipment. This figure does not include investments in purchasing plants. "Even last year, there was almost no cannery employment to be had in Kodiak between September and May," Blackburn said. "Now the groundfish processors employ 600 people." International Seafoods of Alaska, a cod and pollock processor, operates two 50-person shifts daily and sometimes still is short of workers.

Burch said the current white fish activity replaces the former shrimp fishery more than crab. "A number of us see bottomfish as replacing the shrimp, which was the backbone of the fishing industry," Burch said. "Crab was a romantic, high-value fishery, which was extremely valuable for a short period of time. Shrimp was less valuable to the boat owners, but more valuable to the town. Bottomfish will be the same. We have a long-term, high volume low value fishery that's been at our doorstep for years. We're finally taking advantage of it."

A study by the Kodiak borough estimated that, assuming Kodiak processors handle 120,000-150,000 metric tons of pollock in 1988, the ex-vessel value to fishermen will be \$13.5-\$18 million. Assuming each surimi line requires an average of 960 man-hours per day, at \$5.50 per hour, operating 250 days per year, processors' employees will earn \$4 million to \$5 million.

But what happens if the pollock resource fails, as did the crab resource in 1980? What happens if, after a host of small boat owners have converted to cod gear, cod prices drop? Blackburn offers one consideration: "Look at it this way," she said. "The biomass has to be viewed as a total mix of species. On the East Coast, the low-value fisheries were fished out first, leaving the high-value fisheries like lobster and shrimp. But here, our high-value fisheries, like crab, were fished out first, leaving us with low-value resources like pollock and cod. So where a species shift might be detrimental on the East Coast, here it would just mean a shift from low-value to high-value fisheries, which would be great for the economy."

Burch said, "Stability is geared to the world prices of white fish, so if something happens there, it could put us out of business. We have no control over that. We can regulate our take, regulate our seasons, and promote product quality, but the world prices are the driving force."

Right now, however, there is no shortage of resource in Kodiak; just a shortage of trawlers. Small boat fishermen

are investigating conversions to trawl gear, several joint venture companies are seeking new boats to increase their fleets, and along both U.S. coasts, boatyards are abuzz with trawler construction activity. Ted Evans, executive director of the Alaska Factory Trawlers Association, said 30 new vessels will enter the Alaskan trawl fleet this year. Is overcapitalization in the offing?

Bob Morgan, president of Oceantrawl, Inc. and former executive director of Pacific Seafood Processors Association, believes that overcapitalization, while not an immediate danger, is a concern the industry should be wary of. "I'm not ready to say it's happening yet," he said. "But it's something we need to be sensitive to. The two major potential problems we need to guard against are overcapitalization and not protecting the resource."

Burch said the current influx of conversions and new trawlers could result in too many boats delivering too much product to shore at one time—a problem in the king crab fishery. But, he said, limited entry on pollock or cod would not be the answer. "I can't support any single-species limited entry system, because all you do is push your troubles over onto another person's fishery. There might be more favor for a total, across-the-board limited entry system for all fisheries," he said.

For now, Kodiak is thriving, an oasis of economic vivacity in a state that has been kneecapped by falling oil prices. Kodiak's three auto dealerships broke sales records in the first two months of 1987. Fuel suppliers, net makers, equipment suppliers, grocery stores and dockside coffee shops are their busiest in years. Kodiak was the only community in Alaska to register increases in residential housing construction in 1986.

Some fishermen and processors are reluctant to say how well they're doing for fear that Kodiak's success might become an open invitation for big boat fishermen from the Lower 48. "You'll probably have some trouble getting information out of most of the folks here about how well they're doing, because Kodiak's industry could get eaten up in one day by some of the huge trawlers out of Seattle," said one Kodiak borough official who himself asked not to be identified. "We're trying to provide a stable economy here in the Kodiak community to support the bottomfish industry, but the truth is that the majority of the resource is fished and processed by non-Alaskans," he said.

But grow the community has, and, according to most people interviewed, so will the Alaskan bottomfish industry. Kodiak Borough Mayor Jerome Selby said in a speech to the NPFMC in December, "In 1988, there will be a bigger and better quality pollock harvest than in 1987. The total catch will be greater, the fillet recovery rate will improve, and the roe recovery percentage will be higher because the average pollock will be more mature than in 1987. This improvement should continue in 1989, and it is my understanding (the Gulf groundfish catch) should increase to an annual sustained yield of 800,000 metric tons."

If fisheries development can be defined as the construction of a stable, profitable industry based on a variety of product forms and markets and employing a broad sector of the community, Kodiak may be on its way to becoming a model of fisheries development in Alaska.

AFDF, APS renew commitments to surimi

AFDF and Alaska Pacific Seafoods (APS) of Kodiak have agreed to see the USDA approval of a voluntary inspection program through till the end.

AFDF and APS in February signed a contract that would make APS the first surimi producer in the U.S. to establish an in-plant inspection program approved by the USDA. Under the agreement, AFDF will provide all technical assistance necessary to implement a Hazard Analysis and Critical Control Point (HACCP) program, which is now being designed by AFDF, a group of surimi producers, and the USDA. After the HACCP program is in place, AFDF has reserved an option for purchase of up to 20,000 lbs. of surimi produced at APS under the program.

The new agreement is the latest in a series of cooperative projects between AFDF and APS which began in 1984, when APS submitted a successful bid to become the first U.S. shore-based surimi processor under AFDF's surimi industry development project.

Sharon Gwinn, acting executive director for AFDF, said the 18-month HACCP project agreement demonstrates "a strong commitment by APS to help the U.S. surimi industry reach its potential."

AFDF, Eagle Fisheries to study pollock liver oil value

Can Alaskan pollock processors take advantage of consumers' infatuation with fish oils? AFDF and Eagle Fisheries of Kodiak have begun to study the feasibility of producing pollock liver oil for use in pharmaceuticals, health foods, and other applications. AFDF hopes to produce a commercial, food-grade oil to enhance the profitability of pollock plants and better use the pollock resource.

AFDF and Eagle have engaged T C Swafford of Pacific Rim Fishery Projects to apply centrifuge technology to pollock oil processing. The project will include studies of pollock oil recovery, production alternatives for processors, the chemical and vitamin composition of pollock liver oil, and its market potential in pharmaceuticals and health foods.

After sample production is completed, AFDF will survey potential users for the product. Interested companies should contact AFDF.

New York shippers open Kodiak pollock plant

Startup was "graceful," in the words of Eagle Fisheries plant manager Gary Taylor after Kodiak's newest shore-based pollock processing plant started operations in March. "It was very graceful, compared to any other plant I've been involved with," Taylor said.

Eagle Fisheries is located in the old Whitney Fidalgo facility on Marine Way. Eagle's 60-plus employees now are processing pollock roe and fillets (management hasn't ruled out surimi, but has no plans to process it this year.)

A Ryan wet pump on the Eagle dock transfers pollock from boat holds to a series of fish tanks on the dock, where the fish are hand sorted by size and species, and each batch of like fish is weighed on a Pro-log computerized scale.

From the scale, the fish are pumped via another Ryan pump to one of two

different automatic lines. Small fish are sent through a filleting line equipped with a Baader 182 filleting line, followed by a Baader 51 skinner and candling table. A second filleting line, equipped with a Baader 189, is for larger pollock and cod, and likewise is followed by a Baader 51 and a candling table. Large cod and flatfish are hand filleted.

From either of the fillet lines, the product is moved to a packing table where it is packaged into freezer containers and transported into one of four Jackstone plate freezers.

During roe season, the pollock will be hand slit before filleting. Roe is checked and graded according to size and quality, then frozen for shipment to Japan.

The plant can process 200,000 lbs. round weight per day and is currently operating one daily shift. Eagle's Reed

Wasson, president of Eagle's parent company, Falcon Shipping Group, said the plant would process pollock and cod up until May, then process halibut until mid-summer. "We will be trying to keep the plant going 12 months a year, though our major automated lines will only be running 9-10 months a year," Wasson said.

Much of Eagle's labor force came from Kodiak, with a few line workers from outside, Wasson said. "We have a bunkhouse for 70-plus people, so we have the capacity to bring in a whole line of personnel from Outside, if we need to. But we have received far more applications for employment than we can use at this point. There seem to be quite a lot of people in this town who still want to work in the plants. Or maybe it's because we're new, and everyone wants to come down and have a look."

Eagle's shatterpack fillets and blocks will be distributed by Pennon Seafoods, Inc. of Seattle, and will be aimed primarily at U.S. institutional markets and secondary producers of value-added products for foodservice. Roe and black cod will be exported to the Far East, Wasson said.

Most of Eagle Fisheries' neighbors in Kodiak entered the bottomfish industry by way of other fisheries; most of them look hopefully toward pollock and cod to help create stability in a historically volatile industry. Eagle Fisheries, however, was created last year when the Falcon Shipping Group, trawling for new investment opportunities in a domestic growth industry, targeted on Alaskan pollock. "We think the bottomfish industry in Alaska is a very promising area for potential investment and expansion in the next few years," Wasson said.

Pink Salmon Studies

New products find favor

By Paul Peyton
Alaska Office of Commercial
Fisheries Development

Alaskan salmon producers may look forward to a solid U.S. market for value-added pink salmon products. The Alaska Office of Commercial Fisheries Development (OCFD) is publishing the final report of its three-year pink salmon product development project, which reveals that consumers, especially in the Midwest, are receptive to eating pink salmon outside of the can.

When the OCFD began its pink salmon project in November 1984, inventories of traditional canned salmon were large and growing, with more large runs forecast. Alaska has produced more than 60 million pink salmon (about 100,000 metric tons round weight) every year since 1979 (compared to the lowest recent production year of 9 million fish in 1974.) Long-range forecasts predict pink production to stay near 60-80 million fish per year—possibly increasing as more hatchery production is added.

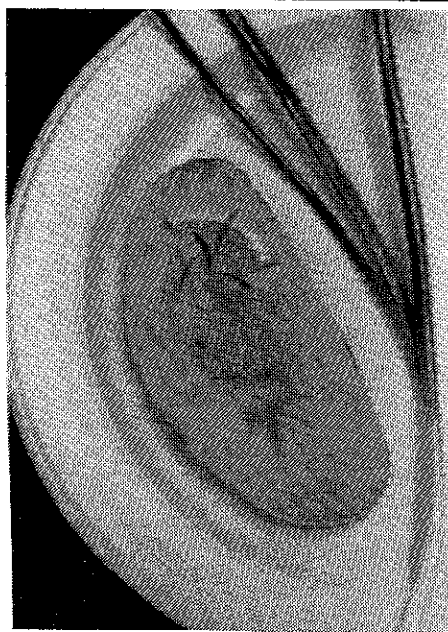
Market research told us the average American canned pink salmon consumer is over 50, low to middle income, and probably lives in the Southeast or Midwest. While it's possible to get those people to buy more fish when the price is low, it is a struggle to convince new consumers to try canned salmon. Canned pinks faced two major obstacles: Overall canned foods are losing consumer appeal in favor of fresh and frozen products; and research conducted by Hormel indicated that 83% of canned salmon eaters dislike the skin and bones.

The OCFD applied bottomfish technology and marketing channels toward making pink salmon more attractive. Recent advances in fillet technology have made filleting faster and more efficient. Boneless fillet technology, now being developed for pollock and cod by Baader North America Corp., is expected to be applicable to salmon within several years. The average filleting machine produces approximately 3,000 lbs. of fillets per hour, while a skilled trimmer can only produce about 50 lbs. per hour. Removing the pin bone by hand is a time- and cost-consuming effort, and adds 15¢/lb. to finished product costs. Clearly, automatic boneless filleting is a crucial hurdle to be cleared.

Other obstacles arose during this project: the fatty salmon tends to become rancid when exposed to oxygen, which makes providing a year-round product a challenge. Finding suitable product forms was also a challenge. OCFD's solution was a vacuum-extruded fillet product encased in an oxygen-impermeable sausage casing. A weighed portion of the product is pumped void free into the casing by a vacuum extruder (sausage stuffer). By using the proper diameter casing, it is possible to produce consistent logs,

from which portion-controlled patties or steaks can be cut.

OCFD also processed some pink salmon logs in a series of other extruders including a Betcher press, Formax former, or a Koppens former. These machines applied considerable pressure and required tempering the log before reforming, which produced a chewier product. The advantages were that the meat was formed rather than cut from a log, so there was no waste from sawdust.



The log form presented several advantages over traditional blocks:

- vacuum packaging eliminates the need for anti-oxidants;
- minimal handling was required;
- logs can be portioned directly without tempering;
- logs can be blast or brine frozen if leakers are avoided.

Some disadvantages of logs were identified:

- the product can't be used by food companies set up for cutting portions from blocks;
- product freezes slower in blast than in plate freezers, resulting in higher drip loss and tougher product texture.

OCFD also considered several cost factors:

- casings are expensive;
- the vacuum extruder is expensive, but not as expensive as a plate freezer;
- to a processor geared up for blocks, the only added cost of producing pink blocks is for anti-oxidants.

The OCFD now is test marketing its pink salmon products in Minneapolis, Portland, Austin and San Diego. Results from the early market tests were encouraging for fillets. Mince has had poorer acceptance because of a slightly mealy texture, which was attributed to slow freezing, which causes toughness and adds to drip loss.

A summary of the project to date, with test market data and estimated market prices, are available from Paul Peyton, Office of Commercial Fisheries Development, Box D, Juneau, AK 99811, or by calling (907) 465-2504.

New processing options show potential

What's in Chuck Crapo's freezer might hold some secrets for increasing the value of pink salmon to Alaskan processors.

AFDF and Crapo, of the Fishery Industrial and Technology Center, are investigating ways pink salmon processors can maximize their income by producing different product forms, and by storing their fish right after catch for processing later in the season. "We found that it is feasible for a processor to freeze pink salmon mid-season, either as fresh-frozen fillets or as whole dressed fish, and bring it out for re-processing later," Crapo said. "It doesn't appear that quality changes as severely as previously thought."

"The idea is that during the pink run, a processor can't spend the time to make fillets or other value-added products. They don't have time enough to do much besides canning," Crapo said. The AFDF-sponsored project will outline alternatives that will help processors get out of the big-delivery, quick-process, low-price cycle that now dominates the industry.

Two thousand lbs. of pink salmon caught during the 1986 season were purchased last fall. All the fish were dressed and 275 were immediately frozen, glazed, wrapped in a two-mil polyethylene sleeve and packed in a master carton. The salmon were plate frozen at -40°F for six to twelve hours, or air-blast frozen for 16 hours at -5°F.

The remaining salmon were belly-iced and held in insulated totes overnight at 32°F. The next day the fish were removed from the ice, rinsed, "planked" (to remove the backbone), skinned on a Baader 50, and filleted. The boneless fillets were held at 32°F overnight. The third day, the trimmings were minced in a Baader 694,

approximately 90% of the trimmings was recovered as minced flesh.

A separate batch of ten pinks were processed at a separate plant to compare recovery data. The various treatments being evaluated were blocks packaged with or without vacuum and containing either 1) no additives; 2) 0.05% citric acid plus 0.45% ascorbic acid; or 3) sodium erythrobate (an anti-oxidant) at 0.25%, 0.5%, and 1% levels.

A third batch of dressed pinks were processed into blocks of "shallow-skinned" fillets with 25% mince.

All batches were frozen for three months and were recently evaluated for microbiological and aesthetic quality. A taste panel preferred the 100% fillet and the 75% fillet/25% mince product over the 50/50 fillet/mince and the 100% mince for flavor and desirability. However, there was some textural preference for the products with higher mince ratios. Tasters were unable to differentiate between product with erythrobate at 0.25-0.5% levels, but were able to taste its presence at 1% levels.

Chemical tests on the product revealed low rancidity, but some microbiological concerns arose from a high aerobic plate count in some of the products.

"Basically we're trying to investigate a number of product forms, and test their shelf life, with the hopes of expanding the alternatives for pink salmon producers," Crapo said.

Copies of the project's interim report, which details recovery data and production methods, are available from AFDF. Further shelf-life studies will be conducted six months and a year from production date; a final report will be published in 1988.

— AFDF Sampler —

Product development is AFDF's middle name. If your company is interested in investigating product development possibilities with pink salmon, pollock or pollock surimi, you're reading the right paragraph.

AFDF offers limited amounts of product as free samples for product development purposes. Following are samples now available:

Product	Form	Sample size	Cost
Surimi	frozen block	in 10-kilo blocks (2 blocks per carton)	no charge
Surimi	dried	1/2 lb.	by arrangement
Pink salmon	fillets	13 lb. logs	no charge
	mince	13 lb. logs	no charge

For more information about the samples available, or to order your sample, contact Barbara Culver at AFDF.

WHAT'S NEXT?

AFDF's 1988 push: make room for pink salmon

By Loretta Lure
AFDF market researcher

For the first time in four years, AFDF will shift its efforts in 1988 to focus on development of other underutilized species besides Alaska pollock. Priorities for the foundation's FY 88 program were outlined in March from an AFDF membership survey. A draft program proposal will be presented to the board of directors in April.

AFDF staff generated an outline of program priorities from the membership via a questionnaire which listed a number of development categories. A preliminary meeting of the Foundation's Program Development Committee was held in late January, and the membership was surveyed again for comment by mail February 17. In March, each member was canvassed by phone, and from the resulting responses (AFDF received a remarkable 75% response rate) the list of priorities was drafted.

Most members consider pink and chum salmon process and product development a high priority. Former AFDF Director and current owner of Koru-North America, Chris Mitchell said, "AFDF *must* begin to move away from surimi...My number one priority rests with progress to date and the likelihood that something tangible will result in the next year, such as a pink salmon processing project."

"The foundation should work on pink and chum salmon with as much money and energy as with surimi," said one seafood processor.

Another strong suggestion was that AFDF should give serious thought to the development of secondary processing technology for the production of value-added products in Alaska. T C Swafford, a new member from Pacific Rim Fishery Projects, points out: "Value-added aspects on secondary products are where the revenue bases become very worthwhile...Unless the operator is geared up and motivated to put out good stuff, he won't make the effort to join the value-added club."

Some members, however, are concerned about consumer reaction to salmon that has traditionally been regarded as "cheap." Pink and chum salmon are grossly undervalued species, but the success of salmon products in U.S. markets depends heavily on the enhancement of landed fish quality. "Our role at the primary level is getting fish out of Alaska at reasonable cost and quality," said Konrad

Uri of Trans-Pacific International Industries. The National Fisheries Institute, an AFDF member, emphasized the importance of improving the quality of salmon products to increase nationwide consumption.

Opportunities for underutilized species such as flatfish and alternatives for small boats and processors were ranked second by members. The foundation had suggested a seining and on-board handling demonstration project, stock and market assessment, ergonomic analysis and the implementation of the computer-assisted manufacturing system (CAM). Henry Mitchell, executive director of Bering Sea Fishermen's Association, said, "There is really an opportunity for the industry in flatfish, but market assessment is necessary for other underutilized 'shovelled overboard' species (such as grenadier and thornyhead)."

Many members favored a demonstration of proper handling techniques to educate fishermen about enhancing fish quality, and thus increasing catch value. However, others were concerned that a number of such projects have already been attempted by other agencies.

Rae McFarland, a meat processor, preached AFDF's "moral obligation to touch on worker safety and productivity and to make recommendations." Others did not see ergonomic research in line with Foundation objectives.

It is widely agreed that the applications of the CAM system are beneficial to the industry, though some had reservations about an AFDF project involving the evaluation of fillet quality using this computer-aided method. One processor felt it would be expensive, sophisticated and involve additional costs. Generally, quality appeared to be the industry's big priority, and the CAM system was seen as a step in this direction.

"In order to deliver the best quality product to the consumer, we need the best raw material. This system, if perfected, should help meet this objective," said William Diederich of Van de Camps Frozen Foods.

Clearly, the membership agreed that AFDF's role in surimi development should be much more limited than in the past. Most feel that surimi R&D should be industry driven at this point, and that the foundation should keep an eye on the "big picture." Surimi product refinement and market penetration were included in next year's program priorities. However, a casing

company representative said, "The Foundation should be aware that other opportunities for surimi exist. Its binding capability means that the possibilities for surimi-based products go far beyond crab analogues and sausage products."

Most members support AFDF's work in developing a voluntary inspection/HACCP program for surimi processing. "A standardized, non-complicated system will make everyone's job easier," says a crab analogue producer. More importantly, new member Harold Wolfmeyer of Roquette Corp. said, "surimi production should be uniform to meet U.S. standards, and AFDF should be sure plants are monitored properly."

Some members feel that domestic market analysis of surimi is still needed. "The domestic supply must be known and raw material guaranteed," according to Walter Keller of Haarmann and Reimer, a flavoring company. "If the Japanese are supplying it all, they could develop an OPEC in raw surimi." Ronald Galyean of Griffith Laboratories, a major ingredient supplier, agreed. "The Japanese want to retain their market position in seasonings and flavorings for surimi products. Domestic market penetration is important, and the foundation has a role in continuing communications in the industry," he said.

Frank Kawana, president of JAC Creative Foods, worries that the foundation would jeopardize the future of surimi by toning down its role in the industry. "There are a lot more things that the foundation could do for the industry, like standardizing the quality of raw product, as well as monitoring

production in Alaskan plants," Kawana said. He noted that analogue producers would prefer to get consistent-quality raw surimi with specifications than simply a grade attached to the product.

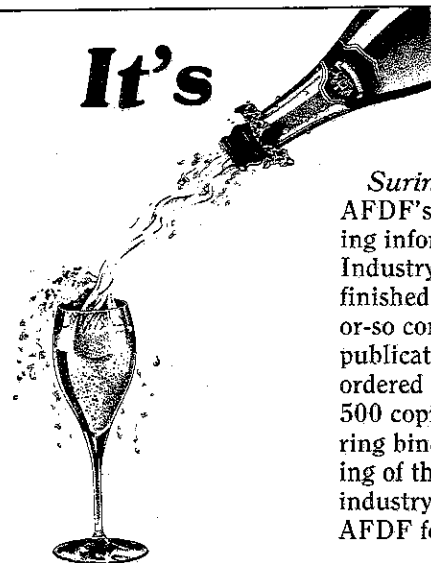
Most members, however, said that AFDF has done all it can do for the surimi industry and that it should concentrate on other areas in fisheries development. George Pigott of Sea Resources Engineering feels that Alaska's destiny as a fishing state is pre-determined. "The same thing that happened to agriculture is happening to the Alaska fishing industry: the small fisherman is being phased out." Pigott recommended that AFDF continue work in by-product utilization, upgrading the quality of fish meal, and developing new meal products.

Only a few members expressed opinions on a suggested project involving phosphate-additive research on frozen and smoked products, saying they felt that this is an opportune time for the foundation to do such studies. There was also little response to the proposed primary and secondary processing projects in Norton Sound (western Alaska). Those that did mention it agreed that it would be a tough process to prevent market domination of that fishery by the Japanese.

The question of whether or not stock assessment was the responsibility of the Foundation also arose, and many felt that it would be appropriate for AFDF's program to focus on the abundance of fish resources, as well as processing capacity, and market forms.

AFDF's final proposal must be submitted to the National Marine Fisheries Service in May.

It's finished!



Surimi: It's American Now, AFDF's comprehensive book compiling information from the Surimi Industry Development Project, is now finished and is on its way to the 100-or-so companies who made pre-publication orders. If you haven't ordered yours, you may want to: only 500 copies were published. The three-ring binder format allows easy updating of the book's 14 chapters as the industry grows. Get yours now from AFDF for only \$50.00 plus postage.

ONE STEP CLOSER

Surimi zeroes in on USDA acceptance

The U.S. Department of Agriculture (USDA) has approved a sketch label for a surimi/pork nugget, accelerated its schedule for dealing with surimi regulatory issues, and given the nod to test production of a surimi/pork product in a federally-inspected plant.

Barbara Batson of Manning, Batson & Associates, on contract with AFDF to oversee the USDA regulatory project, said that at a February meeting with the USDA, officials encouraged AFDF to begin working with a USDA-inspected meat plant to further develop manufacturing procedures and safety standards for a surimi/meat product.

In November 1986, AFDF submitted a series of surimi/meat prototype products to USDA for preliminary approval as a way of opening the doors for the use of surimi in meats. Batson said that such encouraging instructions from USDA in such a short time indicate that the approval process for surimi in meats might happen more quickly than originally thought.

Significant obstacles remain between the surimi industry and full USDA approval:

- Development of a voluntary inspection protocol for surimi producers selling surimi to meat processors;
- Further microbiological studies;
- Establish production standards for plants producing surimi/meat products;
- Establish a system of specifications for surimi being used in processed meats.

AFDF has initiated development of a voluntary inspection program for surimi processors. A group of surimi producers has been organized to help design a workable Hazard Analysis and Critical Control Point (HACCP) program for surimi, with support from USDA, National Marine Fisheries Service, Food & Drug Administration, and the Fishery Industrial Technology Center (FITC) of Kodiak, Alaska, where microbiological studies on surimi have been conducted over the past two years.

Unlike most other inspection programs, the HACCP program is self-policing. "The biggest advantage of the surimi HACCP program will be that the producers themselves have an opportunity to design it for their industry, rather than reacting to a program imposed upon them by the USDA," Batson said. "That's why most of the surimi producers have gotten involved."

USDA has raised some specific concerns about the microbiological safety of surimi introduced into a meat system, particularly the growth of *Vibrio parahaemolyticus* and whether or not surimi would introduce land pathogens into a meat product. AFDF now is conducting several series of microbiological studies at the Alaska Pacific Seafoods (APS) surimi plant to address these concerns. Samples were drawn from ten different places in the processing line to be tested for aerobic plate counts, *V. parahaemolyticus*, and other microorganisms. Samples will continue to be drawn for a year to detect any seasonal changes in the microbiology of the product.

At the same time the microbiological studies are going on, AFDF hopes to address potential problems at the secondary processing level. The foundation now is surveying the processed meat industry to find a company interested in pioneering the surimi/meat protein blend in a non-standardized commercial product.

"Any company that plans to commercially produce and market surimi/meat products will have to go through the same process with the USDA that we are in right now," Batson said. "We're looking for someone who is ready to enter the fray, and wants some technical assistance in getting through the regulatory approval process."

AFDF will offer free surimi samples or low-cost surimi shipments, along with exhaustive data on the functionality of surimi in meat systems, to a processor cooperating in the USDA approval project. Batson and food scientist Patricia Manning also will assist in product formulation and development of production methods as needed.

What is a HACCP program?

The most important thing to know about the HACCP program is that it is not mandatory for any surimi processing plant.

A Hazard Analysis and Critical Control Point (HACCP) program is a system of identifying microbiological problems in a production line, and setting process controls to ensure product safety. HACCP programs are usually designed for a specific industry. They are relatively new (the concept was introduced in 1971), but are beginning to be used in many food industries. HACCP programs generally are designed by regulatory agencies; however, the surimi industry is so new in the U.S. that USDA officials have encouraged the industry to design its own HACCP program, which would be submitted for USDA approval.

According to a paper by Dr. Jong Lee of the Fishery Industrial Technol-

ogy Center (FITC), the HACCP system estimates microbiological hazard by estimating the degree of risk and identifying the extent of controls necessary to control any microbiological problem. Since the HACCP is designed to provide basic health protection, Lee said, it outlines only the minimum efforts required from a processor.

What will a HACCP program tell us?

First, in developing a HACCP program, the industry will learn where the critical points in a production line are. Some critical points already have been identified. Studies have shown that Alaska pollock held on-board in refrigerated sea water have a slightly higher microbial load than fish held in ice. Microbial loads in surimi increase significantly at various stages of the surimi process, but the most notable

increase was during the refining and dehydrating stages.

After the critical points have been identified, those developing the HACCP program will design methods of controlling bacterial growth. These methods could take several forms. Some of the surimi-making equipment could be refrigerated, which may significantly inhibit bacterial growth. Some equipment may be modified for easier cleaning, or the HACCP program may call for shut-downs for cleaning at regular intervals.

Participants helping design the HACCP program may also be the first to recommend microbiological standards for surimi, and establish standard production practices for U.S. plants.

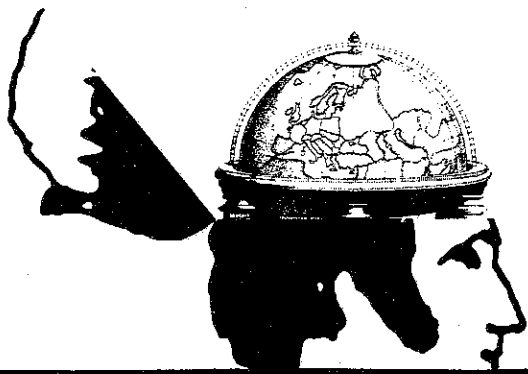
What then?

After the in-line "problem points" have been identified and procedures for ensuring high microbiological

quality of the raw surimi have been established, a draft HACCP program will be submitted to the USDA for approval. When the program is approved, surimi producers who adopt the HACCP program in their plants will be allowed to market their surimi to other USDA-inspected food processing plants, including meat processors.

As complex as the initial program design process will be, the final HACCP program will be a simple procedure for surimi producers. As Lee concluded in his paper: "Development of a HACCP system initially would require considerable microbiological sampling and testing, but once in place the good HACCP system would require only simple and inexpensive monitoring steps. A thermometer, watch, pen and paper may be all you need to implement the surimi HACCP."

ideas



THE VIEW FROM HERE

By Sharon Gwinn
Acting Executive Director

I'll wager everyone can remember enduring a job situation where "you never know what the boss wants until you've already done it wrong." You get multitudes of praise for a spectacular coup, so you prepare in a similar fashion to attack the next target of opportunity. You feel confident the encore will be more efficiently executed and less risky, since you've learned what tactics don't work and where the traps are. Then *Boom*, a memo from the chief shows up on your desk: "Effective immediately, the company will no longer reimburse employee expenses related to spectacular coups or feats of daring. Please go back to doing something less disruptive."

If this situation is familiar then you can relate to what is happening now in all of the fishery development foundations. Under new management in Washington, D.C., the National Marine Fisheries Service (NMFS) appears to be undergoing an identity crisis. This has triggered a crisis of confidence in the Foundations, since their major source of revenue, the Saltonstall-Kennedy (S-K) program, is controlled by that agency. The mysterious term "marketing" is in the middle of this debilitating maelstrom.

NMFS has decided that federal fishery development funds should not be used to assist the marketing, promotion or product development efforts of private industry. The only reasoning given is that these activities ought to be financed entirely from private sources.

In all the fishery development foundations except ours in Alaska, the marketing of underutilized or undervalued species has been a major emphasis, and has helped them build very strong, supportive memberships. Every year when the Boards of Directors and members gather to review and set priorities, these groups of fishermen and processors have reaffirmed their belief that support of marketing activities by S-K funds is both appropriate and effective.

Even in Alaska, where the nuts and bolts of our program are related to production technology, we've learned that our projects cannot succeed unless technology development is focused on a clearly identified market opportunity. Identifying that opportunity takes market research, and taking advantage of the opportunity requires market development work. NMFS has not yet

said whether this type of activity is considered "marketing."

Those of us who choose the fish business as a way of life don't do so for its security or stability. We tolerate, maybe even appreciate, more than our fair share of uncertainty regarding external influences on our business. We're accustomed to the unpredictable nature of fishing seasons, market trends, and politically-driven resource allocations. But the capricious, elusive moves made by the NMFS administration toward abandoning the original purpose of the S-K program are more than we should have to bear.

In deciding how federal fishery development funds should be spent, we are fortunate to have several sources of guidance. First, there is the original S-K Act, which aimed in 1954 "to promote the free flow in commerce of domestically produced fishery products." Even

Even when federal agency leaders do think they know how to design an effective industry development program, they ought to keep their opinions to themselves, or at least refrain from articulating them as federal policy.

more instructive is the experience of six full years of program design and management by the regional foundations. Although the specific problems and opportunities of the industry vary greatly from region to region, taking advantage of those opportunities always involves some aspect of marketing.

In Alaska, our Pollock Industry Development Program has been touted as an admirable example of what can be accomplished by an industry-government partnership. It has been acknowledged by both sides of the partnership that fishery development priorities and strategies need to be market-driven and industry-directed. Our experience has proven that indeed, our development projects are successful *only* under those conditions. Reinforcing that experience is the American Fisheries Promotion Act, which prescribes implementation procedures for the S-K grants program. To have a federal agency establish development priorities is not only inconsistent with the intent of the law, but is also an impractical, counterproductive waste of time.

I am not arguing about whether S-K money should be spent on marketing, and I am not suggesting that individual bureaucrats do not understand industry needs. I am asserting that even when federal agency leaders do think they know how to design an

effective industry development program, they ought to keep their opinions to themselves, or at least refrain from articulating them as federal policy. My assertion is based on the theory that unless a sizeable nucleus of real private businesspeople is behind the purpose and structure of a development program, it simply will not work.

On the surface, there appears to be a federal commitment to support seafood marketing, exemplified by the recently-signed American Seafood Promotion Act. Sponsored by our own Sen. Ted Stevens, the new law provides for the creation of a National Seafood Marketing Council, and enables industry groups to form regional marketing councils. However, there is no provision for either type of council to sponsor market development. By market development I mean the mar-

keting of ideas (like ways of using surimi), or the marketing of product concepts (like blended surimi/meat products), or the commercialization of new products.

It will be at least a year before the councils are established and organized enough to sponsor projects. Meanwhile, the money to pay for the formation of the national council is being taken from this year's appropriation for S-K industry grants. So, the effectiveness of this year's S-K program will be reduced so that NMFS can set up a marketing council to make it look like we don't need all that S-K money anyway, while making it impossible to get federal financial assistance for the most essential part of fisheries development projects.

By the way, the tariff money on imported fishery products keeps coming in, but since the pool of industry S-K projects that qualify under the new criteria is likely to be smaller, that will leave more money to help NMFS through its restructuring process. I am trying hard to make sense of all this, but I have a sinking feeling that we're dealing with a web of internal contradictions. I seriously doubt that this is what Senator Stevens had in mind.

NMFS does solicit industry opinion on development priorities at least annually, but there are often areas of contention, and the new NMFS policy that prompted this editorial cannot

have been based on industry advice. Those of you who are members of AFDF know that there is a large amount of time and energy put into compiling and synthesizing your opinions and presenting them to NMFS in the form of our annual S-K proposal. It is hard to justify this kind of effort year after year if our collective wisdom is going to be ignored in favor of the modern version of the Golden Rule: "He who has the gold makes the rules."

In my opinion, if we permit the government to assume full responsibility for establishing and defining development priorities and strategies, the S-K program will be completely ineffectual. Such an impotent fisheries development program is a greater evil, to both industry and government, than no program at all. The structure and the experience is available to conduct a very effective, efficient, cooperative program. But it will only work if the National Marine Fisheries Service acts as the servant of industry, rather than the reverse.



The Lodestar

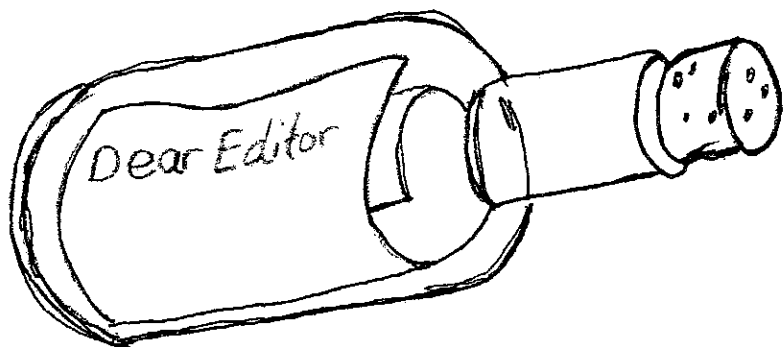
The Lodestar and its smaller companion newsletter, The Lodestar Update, are each published four times annually by The Alaska Writers Group for the Alaska Fisheries Development Foundation, Inc., 508 West Second Ave., Suite 212, Anchorage, Alaska 99501. (907) 276-7315.

Subscriptions: \$20 within the U.S., \$30 Canada, Mexico and overseas. Subscriptions are free to AFDF members. All subscriptions are on a calendar year basis.

Krys Holmes, Editor
Sharon Gwinn, Acting Executive Director



LETTER TO THE EDITOR:

**Dear Editor:**

I was appalled to see your article entitled, "A New Twist on Surimi Testing," in which you reported that the NFI Surimi Technical Committee agreed to select torsion tests as a standard method.

As I correctly understood at the meeting, the Committee agreed to re-examine three methods, namely: punch, torsion and compression tests, for their appropriateness as a standard technique in evaluating the quality of surimi. Currently, data are being compiled to assess the performance of each method at various research laboratories. However, without having a sample preparation procedure standardized, I don't see how accurately the comparison can be made. It was a general consensus that the standardization of the testing method should be done in conjunction with the sample preparation procedure.

In searching for the most appropriate method, one must define what is the most important quality index to be

measured in evaluating surimi. The binding property of the surimi gel, specifically cohesiveness, has been used as a primary quality index. It can be measured only by breaking a gel, either twisting (torsion), bending/folding (no procedure reported for bending/folding test is done manually), compression, or punch test. The first three allow the entire sample to undergo a breaking process, while in punching only the local portion is subjected to breakage. Both torsion and bending tests would require extra care in getting a specimen of precise geometry as well as in setting and handling during testing. As for a punch test, because of its local breakage with a probe point having a 5mm-diameter head, the result may not correctly reflect the property of the whole sample body unless the sample is uniform in structure.

Breaking force and extent of deformation are used in measuring the gel cohesiveness, where stress is force/area and strain is deformation/sample

length. Strain is generally not as sensitive as stress when the gel sample is highly elastic and firm as in the case of a surimi gel according to our results as well as others from both compression and torsion tests.

Rigidity, on the other hand, is a ratio of stress to strain and remains relatively unchanged if strain changes proportionally with stress, even if substantial changes occurred in gel properties as a result of treatment. Therefore, this can be best used when comparison of surimi made from different species or different types of protein gel is made, but generally not for the quality changes due to freshness, handling, formulation, etc.

Another important factor in selecting a testing method is how sensitive, simple and reproducible the method is. Torsion test generates stress and strain; compression test yields stress, strain, non-failure stress (firmness) and expressible moisture; and punch test results in punch force and deformation (not strain). Regarding the sample preparation and testing procedure, torsion requires laborious sample preparation and an imprecise preparation will result in erroneous results.

It does not appear to be an absolute necessity for the test to generate stress and strain data unless these values have to be plugged into some type of formula to be used in evaluating the gel quality. Of more importance is whether that particular method is able to provide sensitive and discriminative results in a consistent manner.

What disappointed me and many other members of the meeting was that these facts were never made clear to the committee members. The impression the committee had was that the torsion test is the only testing method which can perform all necessary analysis, as reported in *The Lodestar*. It is a matter of principle that prior to selection of any official method, the proposed method should be opened to the scientific community for their review and careful examination until a uniform consensus is reached. Regrettably, this did not happen even after it was repeatedly suggested. Otherwise, I am sure, this whole confusion would not have occurred in the first place.

At this point in time, the choice should be left up to the individuals. In view of our relative unfamiliarity with the surimi testing methodology, we should take the necessary time to obtain sufficient information and results for each method so that a discernible decision can be made.

Chong M. Lee
Associate Professor
University of Rhode Island

Editor's note: Roy Martin, head of the Surimi Technical Committee at National Fisheries Institute, said the committee is still considering the surimi testing issue. Martin preferred not to respond to Dr. Lee's letter until the committee meets again. At press time, no meeting had been scheduled, though one was expected in late April.

The editor's turn

Off the  Cuff

By Krys Holmes
Lodestar Editor

About a year ago, Chris Mitchell leaned up against my door post and asked a question I've been thinking about ever since. "What's everybody going to do when this is all over?" he asked. "Surimi has been a big, fun, exciting job—and hard work, too—but what will capture our interest as much after this?"

Now AFDF is heading into a new year, and a new roster of projects, and our former director's question is still with me. Sure, there's much to do in the Alaskan seafood industry. But what will capture our creativity? What will pop our corks, the way the surimi project did?

For the foundation there are many things ahead, some of them exciting, some of them tedious, all of them equally important. But AFDF only does what industry can't. It's your creativity—the industry's—that directs us.

What's next for the industry? We think it's mariculture. AFDF is restrained by funding limitations from addressing mariculture. But the industry is restrained only by the limits of its creativity, and mariculture certainly seems to have ignited the industry's collective imagination.

Farmed salmon will comprise 14% of the Pacific salmon catch and 92% of the Atlantic salmon catch in 1990, and will dominate world trading in fresh and frozen premium products, according to Quick Frozen Foods International. One seafood processor has said mariculture is no longer promising, but is rapidly becoming a necessity.

Norway, Japan, Canada, Chile and New Zealand now lead in world production of farmed seafood. But in the Pacific, eyes are turning toward Alaska. The Alaska legislature now is considering a bill that would establish regulations for an Alaskan mariculture industry. The bill was spawned by the Alaska Mariculture Association (AMA), a newly-formed group of advocates for salmon, mussel, oyster, kelp and scallop farming, who say that Alaska's salmon industry will see fierce competition from salmon farming operations in the future, whether Alaska gets involved in mariculture or not. AMA advocates opening legal barriers to salmon farming—barriers which are not explicitly outlined but rather are implied in current Alaska Department of Fish & Game statutes. (According to an aquaculture report by the House Research Agency, the Attorney General of Alaska has stated that, since fish farming is not explicitly allowed in current statutes, "you cannot do it.") Other laws more specifically prohibit the collection of fish fry for scientific or propagative purposes. Hatchery owners are also prohibited from selling eggs or fry except to other hatcheries or to Fish & Game.

The House Research Agency report illustrated the economic benefits to producing premium farmed salmon by quoting Norway's \$180 million earnings in 1985 for 5% of the world's salmon production. By comparison, Alaska earned just more than twice that—\$370 million—for 45% of the world's salmon catch.

Curt Kerns, author of "World Sal-

mon Farming," a Marine Advisory bulletin, compared the benefits of salmon farming to poultry farming. "When reliable mass-production techniques for chickens, turkeys, and ducks were developed in the 1940s and 1950s, consumers responded by buying poultry in vast quantities," the booklet said.

Still, there is much debate over what role mariculture will play in Alaska's future. Some fear the entry of Alaskan farmed salmon onto the market would bring wild salmon prices down. John Enge of the Commercial Fishing and Agriculture Bank said that the investment capital to build an infrastructure would more than likely come from overseas. "No little fisherman is going to be able to shell out the millions of dollars it will take to build the infrastructure," he said.

Enge predicted that by the time Alaskan farmed salmon come onto the market, there will be a glut of farmed salmon anyway. "The biggest problem is that Norwegian salmon is being sold in the same markets with our wild salmon. It's even being called Alaska salmon," he said.

Still, some small fishermen are apprehensive. One seiner from Southeast Alaska said the advent of mariculture would turn small boat fishermen like him into anachronisms.

There doesn't seem to be much question that mariculture will play a powerful role in Alaska's seafood future. If Alaskans take the lead, it could become an important limb of the state's seafood economy. If not, farmed products will become formidable com-

petitors to Alaska's products on the world market.

Since we at AFDF probably won't be involved, this is our opportunity to encourage the industry to apply its pluck and passion to an idea whose time has come.

For more information:

● *Aquaculture in Alaska*, a 103-page report, House Research Agency, P.O. Box Y, Juneau, 99811.

● *World Salmon Farming: An Overview with Emphasis on Possibilities and Problems in Alaska*, by Curt Kerns, Alaska Sea Grant College Program, Univ. of Alaska, 590 University Ave., Suite 102, Fairbanks, AK 99809.

● *The Marketing Relationship Between Pacific and Pen-Raised Salmon: A Survey of U.S. Seafood Wholesalers*, by Ronald V. Rogness, and B.H. Lin, Alaska Sea Grant College Program, Univ. of Alaska, 590 University Ave., Suite 102, Fairbanks, AK 99809.

● *Mariculture in Alaska, and Straight Talk About Mariculture Development in Alaska*, Alaska Mariculture Association, Rodger Painter, executive director, P.O. Box 020704, Juneau, AK 99802. (907) 463-3600.

"For any product to be successful it has to pass the 'I'll be damned!' test. Potential buyers must say, 'Well, I'll be damned!' when they see it for the first time."

—Wilson Harrell
Inc. January 1987

Bulletin Board

New protein symposium

Brigham Young University will host a New Protein Technology Symposium March 30-31. Program includes Dr. Tyre Lanier from North Carolina State University, speaking about fish surimi, and Dr. Hershell Ball, also of NCSU, talking about surimi technology applied to chicken. Other speakers and topics will be featured at this popular seminar. For more information, call Dr. Clayton Huber, (901)378-4903.

AFDF alumni report

From one success to another: Chris Mitchell, former executive director of AFDF, now is running his own company, Koru North America, in Seattle, WA. Koru is exclusive North American agent for New Zealand's Fletcher Fishing, and Mitchell is now working to develop new markets for New Zealand's burgeoning surimi industry.

Onward and upward for Michael Broili, former AFDF marketing director, who left to re-vitalize his sole proprietorship, Oceans Development. Now in a 3-company consortium with Arthur Young & Co. and Graff Martin Co. of Anchorage, Broili is developing a groundfish data network to conduct fisheries development projects for the private sector. The consortium is called Arctic Seas Development Group, and is based in Anchorage.

New surimi factory trawler

Oceanrawl, Inc. of Seattle, now headed by Robert Morgan, announced that the 340-foot *Northern Eagle* is soon to be converted into a \$30 million surimi factory trawler for operation in the Bering Sea. Oceanrawl expects to begin operation in 1988, and will produce 50 tons of Alaska pollock surimi per day, as well as meal, oil and fillets.

Thought for food

"No country in the world is independent of the global food supply. We have to think internationally," said a *Meat Plant Magazine* review of the USDA/FDA 1986 Journalists' Conference held this winter in Los Angeles. Other notes: Make sure technical information is presented so consumers can understand it; stress the importance of a balanced diet, not just a single nutrient present in your product; and give food a chance! Eat a wide variety, as much as 30 different kinds of food a day, say the Japanese.

Eatie gourmet

Gourmet foods are now available in 24,000 specialty shops, 30,000 supermarkets, 1,200 department stores and 9,000 mail order outlets across the U.S., with total sales of US\$8.5 billion a year, according to *Gourmet Foods*

in the U.S., by Frost & Sullivan. The report says specialty meats such as pates and sausages will be among the fastest-growing products, and may increase in sales by 40% a year through 1990. Copies are yours for \$1,650: Customer Service, Frost & Sullivan, Inc., 106 Fulton St. New York, NY 10038. (Ask for Report #1513.)

International market news

Fishnet, a televised view-data system broadcasting up-to-the-minute seafood market news from Europe, has changed operators and is now available from AGB Heighway Ltd., a London seafood publisher. Contact: AGB Heighway, Cloister Court, 22-26 Farringdon Lane, London EC1R 3AU, UK.

Food processing reference

Ever wonder how blue cheese is made? Or co-extruded sausage? Or surimi? Read *Food Factories*, a new 280-page book covering food processing plants worldwide. AFDF contributed the surimi chapter; the other forty are interesting, too. Copies are \$100, from Alfred Bartholomai, Editor, 570 Stanhope Road, Sparta, N.J. 07871.

You may want to read...

...new info about surimi, as was presented at the Feb. 15-18 Pacific Fisheries Technologists meeting in Monterey, Calif. Of note:

- "Processing Surimi from Pacific Whiting," by Lucina Lampila, Oregon State University Seafoods Laboratory, Astoria, Ore.

- "Cross-linking Reaction of Myosin Molecules in Surimi Gel," by Messrs. Kumora, Toyoda and Fujita, Nippon Suisan, Tokyo, Japan

- "Product Recovery From Surimi Process Water," by Leo D. Pedersen, Western Research Laboratory, National Food Processors Association, 6363 Clark Ave., Dublin, Calif. 94568

- "Separation or Concentration of Undesirable Fractions from Surimi Mince Washwater Process Staging," by T C Swafford, Pacific Rim Fishery Projects, 524 Silver Lake Dr., Danville, Calif. 94583

- "Microbiology of Analogue Products," by Jack R. Matches, Institute for Food Science & Technology, Univ. of Wash., Seattle, Wash., 98195

My mistake!

The last issue of *The Lodestar* featured an article on the microbiology of surimi-based seafood analogues by Dr. Mel Eklund of the Northwest & Alaska Fishery Center, NMFS, Seattle. The article incorrectly recommended cooking analogues at 185°F for three minutes to ensure against bacterial growth. *Please note:* the recommended cooking time is 20 minutes at 185°F for complete safety in your analogue products. For more information call Dr. Eklund, (206) 442-7728.

the ODESTAR

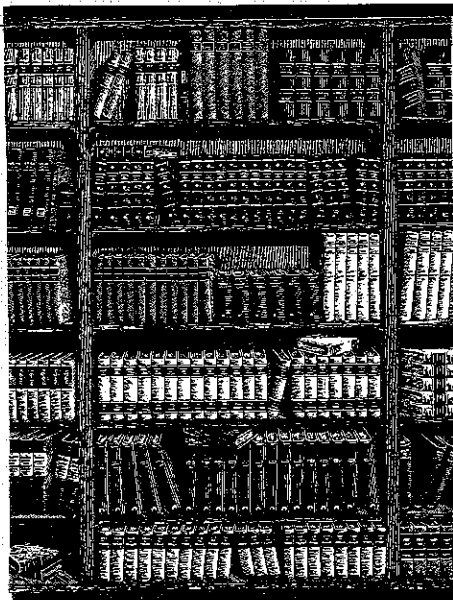
Charting the course of fisheries development today

Volume V, No. 1 Winter 1986/87

Alaska Fisheries Development Foundation

The vitality of thought is in adventure. Ideas won't keep. When the idea is new, its custodians have fervor, live for it, and, if need be, die for it.

— Alfred North Whitehead



Every person who knows how to read has it in his power to magnify himself, to multiply the ways in which he exists, to make his life full, significant and interesting.

—Aldous Huxley

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