

The LODE STAR

Charting the course of fisheries development.

Alaska Fisheries

Development Foundation

Volume IV, No. 2 Spring 1986

News to Use

Francis Moore Lappe said it first. It's not what proteins you eat that's important, it's the combination of proteins. Now the surimi industry embarks on a new trend: toward protein blends, custom-mix products combining surimi with poultry, red meat, salmon or shellfish. Seafood analogues are but one example. Surimi sausage, surimi/salmon jerky, surimi/poultry blends, these point the way toward the future of the seafood industry in the U.S.

Seafood processors of the 1990's may find a strong market for custom blends of salmon and surimi, or other foods, for secondary processing into nutritious, convenient foods for the health-minded, gourmet market.

News inside: 13 imitation crab producers now are in business in the U.S. (see pg. 2). Some studies of surimi's water-holding capacity and on RSW holding of pollock are completed (see pg. 4). Beehive Machinery and Norbest are cooperating to study poultry/surimi blend products (see pg. 5). AFDF's S-K proposal for 1986/87 is outlined in brief (see pg. 5).

Hendricks resigns

Jeff Hendricks, president of the board of directors of AFDF, resigned from the board May 7, citing personal, business and health reasons.

"I am very proud of AFDF's accomplishments... The AFDF surimi project gave our crippled industry the answers and confidence it needed."

Hendricks said in a telex to AFDF announcing his resignation.

The AFDF staff and board wish Hendricks well in the future, and offer sincere thanks for his dedication and commitment in the past. At press time, no one had yet been selected to replace Hendricks.

Secret from the Sea



Heads up, Max Factor.

Surimi has taken its first step outside the food world and may soon enter the multi-billion-dollar cosmetics industry.

The newest surimi-based product is a moisturizing cream combining the water-holding capacity of surimi with the restorative properties of PABA, aloe vera gel and vitamin E. The "protein package" in the formulation, of which surimi is a primary ingredient, constitutes about 10 percent of the formula. Surimi acts as a humectant in the cream to hold in the skin's natural moisture. Surimi also binds with the other restorative ingredients in the formula and helps hold them to the skin.

The moisturizing cream was developed by food engineer Lynda Nestelle working with a cosmetic chemist who, because she works for another company, asked not to be identified.

Nestelle said the moisturizing cream hasn't a name or a label yet. The two inventors now are approaching cosmetic companies hoping to sell the formula. She expects the product to retail for \$30 for 6 ounces.

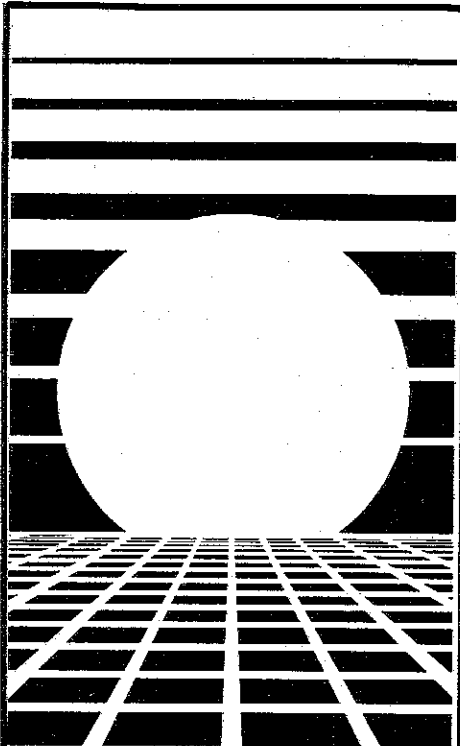
The cream is fragrance-free, white in color, and highly absorbent. Nestelle said the surimi compares favorably with animal proteins, which are commonly used in cosmetics. "The objective is to hold moisture into the tiny folds and pockets in the skin," she said. "Moisture helps 'plump up' the skin, giving it a younger, less lined appearance," she said.

"I've always known surimi would be an ideal ingredient in cosmetics, because of its protein content and the way it holds moisture." Nestelle now is testing the cream in relation to various skin problems, to compare it with other creams on the market.

AFDF executive director Chris Mitchell took a sample of the cream to Washington, D.C., in May to share with Congressional representatives and NMFS officials who have been influential in the U.S. surimi industry.

"This is a good example of our belief that the potential for surimi goes far beyond imitation crab," Mitchell said. "This is a reminder to all of us that we shouldn't say no to anything."

industry news



First surimi sale to Japan

AFDF completed in May the first sale of U.S.-produced surimi to Japan. The Zenkama All-Japan Surimi Users Group, an organization of surimi secondary processors in Japan, purchased a containerload — about 44,000 lbs. — of surimi from AFDF on May 12, taking the first step toward opening Japanese markets to American surimi.

The surimi was produced at Alaska Pacific Seafoods in Kodiak. Its selling price was consistent with the current market, but the addition of transportation costs to Japan and a 6 percent import tariff increased the price to nearly \$2 per pound.

"I don't think the price is important," said Chris Mitchell, AFDF director. "What's important is that a significant sale has been made, and the import quota in Japan has been tried."

The sale marks a milestone in the U.S. surimi-producing industry because many in the industry believe economic success depends on selling surimi to Japanese secondary processors. A large purchase of U.S.-made surimi indicates satisfaction with the quality and consistency of the product, Mitchell said.

The sale also represents a breakthrough to the Japanese market, never before penetrated by a U.S. surimi producer. Though Japan instituted an import quota for pollock last year, no sales of U.S. pollock products have been made until now.

Japan is the biggest user of surimi in the world, processing about 400,000 metric tons of surimi into a variety of food products every year.

Three new analogue plants:

Icicle, Peter Pan, Calista bet big on surimi

When Icicle Seafoods opened its new 35,000 square-foot, \$3 million seafood analogue plant in Bellingham, Wash., on May 15, the U.S. production level of seafood analogues rose to more than 9 metric tons (MT) per hour.

At that rate, 7 MT per hour of surimi are going into analogue production in the U.S., and that figure will rise before year's end.

Among those responsible for the increase are Peter Pan Seafoods of Seattle and Calista Sea Foods, Inc., a subsidiary of Calista Corp. Both plan to begin production of crab analogue products in the Puget Sound area in the next few months.

The six analogue plants that opened last year brought the estimated U.S. production to about 8,000 MT. In addition, last year the U.S. imported 41,400 MT of seafood analogue products from Japan, and 1,000 MT from Korea.

Strong growth in analogue production levels represents good news for U.S. surimi producers looking for markets. Alaska Pacific Seafoods of Kodiak, and Greatland Seafoods and Alyeska Seafoods, both of Dutch Harbor, estimate that by year's end total annual U.S. surimi production capacity will be nearly 13,000 MT. In addition, at least three companies, neither of which wanted to be identified yet, are building or converting ships to handle at-sea production of surimi.

In addition to the record number of analogue plants in operation, there are a handful of ethnic foods producers—most of them on the West Coast—who use surimi in traditional Oriental products.

Following is a list of U.S. plants now producing seafood analogues (two are scheduled to start up in the next few months), with pertinent information about each plant:

Peter Pan Seafoods

1000 Denny Building
6th & Blanchard
Seattle, WA 98121
(206) 728-6000
Contact: Steve Chartier
Label: SeaBlends
Products: crab stick, flakes, chunks
Marketing area: Nationwide
(Scheduled to start up this summer.)

Icicle Seafoods

401921st Ave. West
Seattle, WA 98199
(206) 281-0300
Contact: Ken Franck
Label: Icicle
Products: crab sticks, flakes, chunks
Marketing area: U.S., Europe, Canada
Startup: May 15

Calista Sea Foods, Inc.

317 East 4th Ave., Suite 303
Olympia, WA 98501
(206) 786-5797
Contact: Michael Gamble
Food Service Trade Ctr.
(415) 991-0767 (San Francisco)
Label: Not yet identified Products:
Also not yet identified (probably crab sticks and flakes, according to Mike Everett)
Marketing area: Western states, food service
Startup: Sept. 1
Fishing Processors, Inc.
1324 East 15th St.
Los Angeles, CA 90021
(213) 746-1307
Contact: Al Nigorizawa
or N. Kawaguchi, Chairman of the Board
Label: Mrs. Friday's
Products: crab chunks; plan to begin crab stick production soon
Marketing area: Nationwide Startup: December 1985

Shining Ocean

2440 W. Commodore Way
Seattle, WA 98199
(206) 284-2810
Contact: Scott Howard
Label: Kani Mi
Products: crab sticks, flakes; plan production of chunk-style salad pack soon; also custom pack for private labels
Marketing area: Food service, grocery outlets on West Coast
Startup: February 1986

International Multifoods

4994 Science Center Dr.
New Hope, MN 55428
(612) 340-3852 or
1-800-325-4732
Contact: Bill Mitchell
Label: SeaFest Products
Products: crab sticks, flakes, chunks and salad pack
Marketing area: Midwest
(Startup November 1985)

JAC Creative Foods

3050 E. 11th Street
Los Angeles, CA 90023
(213) 263-3344
1-800-354-3746
Contact: Terri Kishimoto
Label: King Krab
Products: crab sticks, flakes, Tasty Tails shrimp, Sea Scoops scallops (lobster analogue "immediate next step.")
Marketing area: Nationwide
Startup 1981

Kemp Pacific Seafoods

4832 West Superior
Duluth, MN 55807
(218) 624-3636
Contact: Roland Chambers
Or: Fred Gatzke
Label: Crab Delights
Products: imitation crab legs, flakes, chunks
Marketing area: Food service, all products; retail, legs and flakes
Startup: January 1986

Kibun Corporation Redmond, WA and Raleigh, N.C.

Contact: Kibun Products, Int'l
709 E. Colorado Blvd. Ste. 210
Pasadena, CA 91101
(213) 681-0726
Label: Delicaseas
Products: imitation crab leg and salad pack, Seafood Medlee shrimp or crab with vegetables, low-cal Seafood Pastas.
Marketing area: Nationwide
Startup: February 1984 (WA)
April 1984 (N.C.)

Trans-Ocean Products

(Taiyo/Steuart Fisheries)
Marketed by:
Commodity Sales
Fishermen's Terminal Bldg. C-3
Suite 201
Seattle, WA 98119
(206) 282-3737
Label: Jana Brand
Products: 3 kinds of crab sticks, 7 salad packs; newest product Seafood Medley (Norwegian shrimp-/imitation crab combination)
Marketing area: Retail and food service nationwide
Startup: October 1985

UniSea

15110 N.E. 90th St.
P.O. Box 97019
Redmond, WA 98073-9719
(206) 881-8181
Contact: John Seman
Label: UniSea
Products: crab stick, chunk-style, scallop analogues; new product: Pride of Alaska imitation crab leg and chunk style, to be introduced this summer.
Marketing area: Nationwide.

Menhaden surimi starts this fall

The foundation has been poured for a plant which East Coasters hope will be the base of a new industry capitalizing on the plentiful menhaden resource.

Zapata Haynie Corporation, with Congressional funding and technical support from National Marine Fisheries Service, has begun construction on a 4,000 square-foot demonstration plant adjacent to their existing Reedville, Va. plant to produce 40 tons of menhaden surimi over a period of two years. Equipment will be delivered in June, and production is scheduled to begin with the fall menhaden season, according to project manager William Stevenson. The product will be made available to companies interested in testing or using the surimi.

Zapata Haynie hopes to prove menhaden can produce high-quality surimi for use in seafood analogues and other products. Recent experiments have

shown fairly high quality surimi can be made from the small, oily fish, but it is not as white as pollock surimi.

Menhaden is an abundant, low-value fish for which there is little market in the U.S. The purpose of the menhaden surimi project is to increase the value of the 2.5 billion pounds-per-year fishery by using developing new products for human consumption. The new plant will produce a ton of surimi per day.

This spring, Zapata Haynie is conducting preliminary evaluation of harvesting methods aimed at maximizing the quality of fish at delivery.

The menhaden surimi project is being managed by Stevenson. For more information, contact Zapata Haynie Corp., Surimi Project, P.O. Box 198, Reedville, VA. 22539; (804) 453-4211.

Sign up for surimi training

About 25 Alaskan seafood industry workers will attend a surimi-making training workshop this summer through a program sponsored by the state of Alaska and the Japanese seafood industry.

Trainees will attend a five-day classroom session and will hear lectures from Japanese surimi experts Dr. Okada and Dr. Tamoto, according to Bill Paulich of the Alaska Office of Commercial Fisheries Development. The classes will be held at Kodiak Community College. Following these sessions, the class will break into groups of four or five students for hands-on training at Greatland Seafoods in Dutch Harbor, Alaska.

The training program is the result of an agreement forged last October between Gov. Bill Sheffield of Alaska, the Japan Fisheries Association, and

the Overseas Fishery Cooperation Foundation. The agreement provided for the state to help sponsor the surimi training program, which is part of the Japanese effort to assist in the development of the Alaskan seafood industry.

Also included in the agreement were projects for developing an aquaculture industry in Kodiak, and other development projects. Alaska will contribute \$300,000 over a three-year period to the projects, while Japan will contribute \$1 million. However, at press time the Alaska legislature had vetoed the first-year allocation of \$112,000 for the project. Alaska has trimmed its state budget in the face of falling oil revenues.

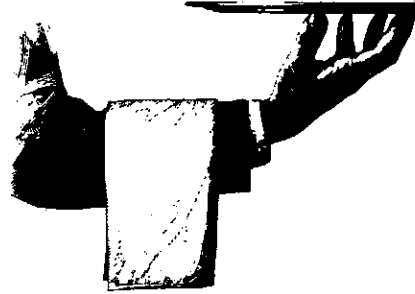
Paulich said that even if the rest of the cooperative project were scrapped, the surimi training workshop would continue as scheduled.

Energy bar is really rolling

United Sciences of America's newest product, the Fiber Energy Bar, is now being produced at a rate of 500,000 bars per week.

USA's granola-type snack bars, introduced in January, contain a complement of surimi and cottonseed proteins. The bars are part of a health regimen which includes a high-protein drink powder that also contains surimi, and diet supplements containing fish oil. (See The Lodestar, Winter 1986.)

Food for thought



Putting his money where his mouth is: Surimi sausage maker talks bucks

When AFDF displayed surimi-based sausage at the recent Western States Meat Association convention, meat processors flocked to taste the curiosity.

But when they were told they could save \$40 on every hundred pounds of sausage using 10% surimi, curiosity suddenly became cause for further investigation.

Howard Buysman, owner of Alaska Butcher Supply and maker of the sausage, maintains that by increasing the yield and improving nutritional value, surimi could help increase profitability for sausage processors.

"Surimi doesn't replace any of the meat ingredients," Buysman said, "so its use in sausage shouldn't alienate meat producers. You start with all the same ingredients that you would normally use in pork or beef sausage. And your regular formulation has a base yield level, which is important to maintain. Then just add 10% surimi to everything, and exclude the fillers."

In Buysman's formulation, surimi is used in place of milk or soy protein fillers. The amount of surimi used can be decreased because of its functional properties, Buysman said, making surimi even more economical.

Buysman said there are three other advantages to using surimi as a binding ingredient in sausage: high protein content, strong gelling ability, and stabilizing properties.

"Surimi stabilizes the product for a longer shelf life than sausage usually has," he said. "All our in-store tests have proven that surimi-based sausage

has one-third longer shelf-life than sausage using milk products." Buysman said the cryoprotectants in surimi contribute to the product's extended shelf-life.

The use of surimi in a sausage will increase yield by 10 to 15 percent because as the sausage cooks, less of its fat cooks out. "When you cook sausage at 140° F the energy separates the fat and meat molecules, and yield decreases. But surimi, which contains no fat, binds the meat with the fat tissue, so less fat is lost during the cook stage," he said. "Using 10% surimi in your formulation, you can offset the basic cost of sausage production by 25 percent."

Buysman said a processor could choose to use higher fat content in the product without detrimental effects because the high protein content of surimi would balance the nutritional value. "If you use too much fat the product tastes funny and leaves a residue on the palate," Buysman said. "But using surimi increases the fat binding without adding any unpleasant taste."

Buysman estimates that, in making 120 pounds of uncooked sausage using only 10% low-grade surimi, a processor could save 30% on processing costs.

Because surimi used in sausage doesn't have to be white or high-grade, Buysman said he can count on getting surimi for 50 cents per pound.

"There's no end to what this surimi can do," he said.

Ingredients:	Price:	Ingredients:	Price:
lean beef (30 lbs.)	\$1.25/lb.	lean beef (30 lbs.)	\$1.25/lb.
beef trim (40 lbs.)	.65	beef trim (40 lbs.)	.65
pork trim (20 lbs.)	.85	pork trim (20 lbs.)	.85
surimi (10 lbs.)	.50	soy/milk (10 lbs.)	2.00
spices (8 lbs.)	1.50	spices (8 lbs.)	1.50
water (12 lbs.)		water (12 lbs.)	
TOTAL=120 lbs.	\$97.50=\$0.80/lb.	TOTAL=120 lbs.	\$112.50=\$0.93/lb.
Cookout yield = 95%	= \$0.85/lb.	Cookout yield = 75%	= \$1.25/lb.
			\$40.00 SAVINGS

Technologist goes to work on water-holding capacity

Editor's note: The Fishery Industrial Technology Center (FITC) in Kodiak, Alaska has completed the first of a series of studies for AFDF of the factors affecting quality and functional properties of surimi. The studies are part of an overall effort by AFDF, NMFS and the FITC to provide technical information about surimi to the U.S. food industry, and to develop an Alaskan center of expertise on matters relating to surimi.

What makes surimi hold water?

One of the most important functional properties of surimi when it is used in a food product is its water holding capacity. New tests show that the water holding capacity of surimi is determined by the amount of each individual protein present in the surimi after washing.

John French of the FITC has undertaken an AFDF-sponsored study of the relationship between the composition of individual proteins found in surimi and the functional and water-holding characteristics of surimi. Most important among the results was confirmation that higher levels of tropomyosin result in wetter surimi; high presence of tropomyosin, troponin and myosin result in surimi with a stronger gel.

French studied 47 lots of surimi produced at Alaska Pacific Seafoods in Kodiak. The proteins in a given sample of surimi were separated into three fractions based on their relative solubility in pure water, salt solution and a strong detergent solution. The water-extractable fraction contained mainly actin, tropomyosin, troponin, and varying amounts of non-myofibrillar proteins. The salt-extractable fraction contained myosin and less soluble forms of actin and tropomyosin.

Two general trends occur in surimi samples as the ability to hold water decreases. First, there is an increase in the amount of non-functional protein, especially actin and myosin, the principal myofibrillar proteins present.

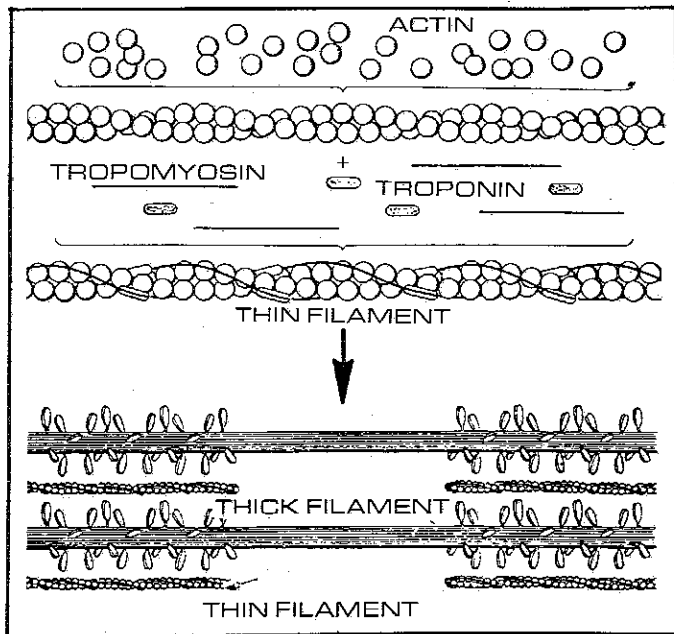
Second, there is a decrease in the amount of water-extractable tropomyosin and possibly troponin. These are the two proteins most directly involved in maintaining the contacts between—and the three-dimensional structure of—the actin and myosin filaments, which create gel strength.

Fig. 1 shows the interactions which form a muscle fiber. The majority of water is trapped in the spaces between the filaments when a stable matrix is formed. In the absence of complete thin filaments, the matrix collapses and the thick filaments interact with each other. The removal of tropomyosin and/or troponin causes a collapse of the protein structure and results in a drier product.

The tropomyosin content of surimi samples varied from 1% to slightly over 6% of the total protein. Tropomyosin levels are directly proportionate to the water-holding capacity of surimi. This analysis indicates that a surimi sample with all the tropomyosin washed out would only have a water-holding capacity of 16 grams water per gram of surimi protein, as compared to the highest values of 60 grams water per gram of surimi protein.

French also found that the stiffness of cooked surimi increased as the tropomyosin was lost from the surimi.

According to this trend, a surimi sample containing 15% protein but no tropomyosin should be fairly brittle, with a stiffness of 56g/mm. No significant correlation was found between gel strength and water-holding capacity, but French did observe that for surimi samples of the same water-holding capacity and similar tropomyosin concentrations, the sample with the highest gel strength always contained the most troponin. This suggests gel strength is the result of a composite interaction of at least actin, tropomyosin and troponin—in addition to the role myosin has been recognized to play in forming protein gels.



The results of these studies indicate that there are at least two factors which can alter the water-holding characteristics of surimi: First, any handling of the pollock can result in unnecessary denaturation and breakdown of muscle proteins. This results in the retention of nonfunctional proteins in the surimi, which add to yield but do not contribute to the functional or water-holding characteristics.

Second, there is strong evidence that concentrations of tropomyosin, troponin and other water-soluble myofibrillar proteins are determined by the washing conditions during surimi production. The FITC and NMFS groups in Kodiak are planning to undertake studies during the upcoming season to optimize the retention of these proteins in surimi products.

How does RSW holding affect surimi?

The past season's production has shown that high quality surimi can be produced from pollock which were held in refrigerated seawater (RSW) systems for up to 5.5 days. However, pollock held in RSW for 4.8 days produced surimi with lower water-holding capacity than 1-day old fish.

Two studies were recently completed of the effects of RSW on the quality of surimi. The first study compared the effects of holding pollock in an RSW system at 31°F to pollock held in slush ice for up to seven days. The second study compared fillets, washed mince and surimi produced at APS from pollock held in RSW for varying periods.

Salt concentration in the RSW fish increased to 0.94% after four days and to 1.14% after seven days in 3% salt; salt content of samples held in slush ice remained constant.

The water-holding capacity of unwashed mince produced from RSW fish was determined in water and in 3% salt solution. The water-holding capacity of mince from RSW fish decreased 56% in water, and decreased 72% in 3% salt after four days. In contrast, the water holding capacity of mince from fish held in slush ice remained constant for seven days. This indicates RSW holding has a much greater effect on water-holding capacity than slush ice holding does.

Protein profiling was used to identify changes in myosin, tropomyosin, actin, troponin and total extractable protein in the pollock mince. With the exception of water-soluble troponin, all proteins studied were either equally or less extractable in RSW treated fish than in iced fish.

In general, the higher the concentration of extractable tropomyosin and troponin proteins in surimi, the better its water-holding capacity and the stronger the gel strength will be.

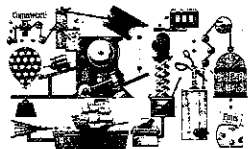
It is still unclear whether the increases in water-extractable tropomyosin in mince from iced fish and increased troponin from RSW fish will be reflected in the surimi.

Further studies were done on salt concentration in fillets, mince and surimi as fish was processed. It was found that 12% of the salt initially in the fillets was retained in the surimi, indicating an 88% washing efficiency. The water-holding capacity of surimi produced from 4.8-day RSW fillets was less than half that of surimi made from one-day-old fish.

Comparisons of the functional properties of various batches of surimi showed that the batch from the oldest fish had the highest stiffness and the lowest gel strength. However, the protein profiles of these samples showed that total water extractable protein, water extractable tropomyosin and troponin all decreased with the length of RSW holding, while the breakdown of actin and myosin increased. All these changes decrease gel strength in surimi by breaking down the associations between the thin and the thick protein filaments and destroying the three-dimensional protein matrix which gives surimi its functional strength.

FITC is continuing its studies of the above issues as well as bacteriological tests and shelf-life studies of surimi. Results will be published in The Lodestar as they become available.

For more information, contact the Fishery Industrial Technology Center, 201 Center St. Suite 202, Kodiak, AK 99615. Phone: (907)486-6034.



"If we work upon marble, it will perish; if we work upon brass, time will efface it...but if we work



Salmon, surimi highlight next year's project

Organizations vying for Saltonstall-Kennedy fisheries development funds for fiscal year 1987 will find less available money, more competitors, and a no-nonsense policy by the National Marine Fisheries Service.

Despite nearly 15 references to surimi in the NMFS 1986/87 request for proposals, the AFDF staff predicts a shift away from surimi toward a new product concept: seafood blends.

AFDF director Chris Mitchell, in explaining AFDF's new proposal to NMFS, said: "What are seafood analogues but blends of pollock and crab, or pollock and egg whites? Surimi/salmon jerky is a product of blended proteins. This is the trend we see in the meat industry, and it's mirrored in the seafood industry as well. By blending or custom-mixing protein products, we can give them a higher value and help expand the market for the product."

The proposal calls for the development of a new product combining surimi and pink salmon, as well as the creation of a stand-alone surimi-based product. Mitchell said he hopes to capitalize on AFDF's experience in surimi production and its leadership position in the industry to begin developing a new "custom blend" technology.

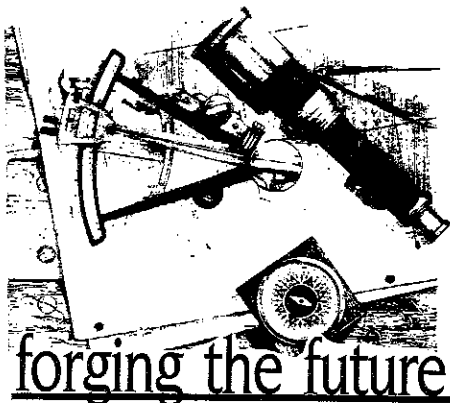
Mitchell said "the natural next step" of the surimi project is to broaden the applications of surimi beyond analogues and to help create diversified markets for several different species of seafood."

"People now are looking for new opportunities for pink salmon. It's the next big hurdle between us and a fully developed seafood industry in Alaska," Mitchell said.

AFDF's proposal also provides for further improvements in surimi technology and testing methods to help the U.S. surimi industry compete with Japan. "Part of our goal is to develop the capability to produce finished products in Alaska, rather than shipping out raw fish which are of relatively low value. We don't have a General Foods here, or a Ralston Purina. So our solution is to produce a finished, value-added product here—like surimi—which is a raw material for someone else to process further.

Surimi can be processed into a number of different products, but you don't have that diversity with raw fish or with a finished product. Fish fillets are sold as they are, and so are analogues. But surimi has nearly unlimited possibilities as a raw material," he said. "We don't want to limit market opportunities, we want to diversify them."

AFDF's proposed project includes a benefit to Alaska: rather than continuing to build a nationwide network of experts, as was done during the surimi project, AFDF will focus on helping build an Alaskan center of expertise in the seafood protein field.



AFDF's 1987 program also provides for more surimi production technology improvement, an analysis of the economics of making analogues in Alaska, and a continued industry education program.

Seafood R & D Center

AFDF and the New England Fisheries Development Foundation are submitting a joint proposal to NMFS which, if funded, would plan the development of a national research and development center aimed at identifying problems and opportunities in the seafood industry.

The project would lay the groundwork for a seafood R & D center which, if feasible, would be privately financed and staffed. Such a center would be a private entity independent of federal funds and capable of addressing seafood industry market-and product-development problems of national importance.

The center's activities would concentrate on market research and development, product development, and applied research.

AFDF director Chris Mitchell said the R & D Center is needed because the U.S. seafood industry is fragmented, cooperation between regional projects is difficult, and the "big R & D folks in the food industry know little about fish."

"The seafood industry doesn't have anything like National Food Processors Association to conduct research for the industry," Mitchell said. "Our industry is so regionalized that there's no way for a company in one part of the country to benefit from new research going on somewhere else. We want to see if a central R & D facility would fly."

If funded, the project would provide for a feasibility study, from which a business plan would be drafted aimed at attracting private financing.

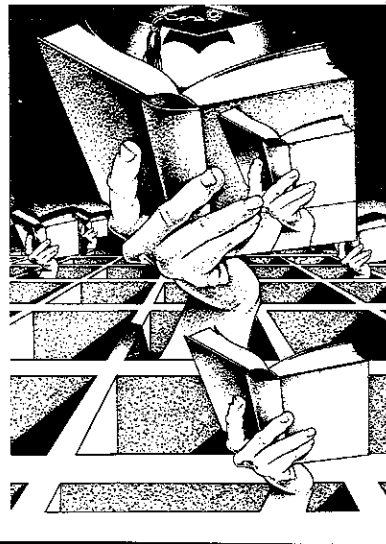
THE LODESTAR LIBRARY

AFDF's new film, "White Gold: The Alaska Pollock Blues," is available for sale. The upbeat 8-min. film produced by AFDF's Michael Broili features a cinematic jaunt down a surimi production line, showing each step of the process. Appropriate for board meetings, conferences, or just as an introduction to the surimi process. Copies are \$45 each.

AFDF also has a full library of surimi-making videos, including "Surimi: An American Opportunity," and "Surimi: Building Block for Formulated Foods," featuring Dr. Tyre Lanier.

The last copies of "The Explosive Blended Seafood Market" are still available from AFDF. R. Woodman Harris's review of the surimi industry through 1984 is a valuable reference tool for anyone who needs facts, figures, tonnages, values, or projections about the surimi industry. Book sells for \$1500; only \$195 to AFDF voting members, \$295 associates! (Buy a \$300 or \$500 membership to AFDF and still get a deal.)

"Promise of Profits" is a 100-page review of the Trident Seafoods experience as the nation's largest shore-based white fish processor. Detailed, informative writing by Kenneth Hilderbrand makes for very interesting reading. Copies are \$10 each, from AFDF.



Surimi-poultry blends studied

Surimi protein technology will change the poultry products of the future, according to Rae McFarland, CEO of Beehive Machinery, Inc. and owner of Far Land Foods.

Beehive and Norbest, one of the nation's top poultry processors, have funded a project at Brigham Young University in Provo, Utah, to develop new products blending surimi with turkey meat.

BYU graduate student Frost Steele is studying the use of surimi and surimi technology in combination with various cuts of turkey, McFarland said. Steele's studies include trying to increase the bind in turkey franks, using mechanically deboned white turkey meat in a nugget-type product, development of a surimi/turkey skin product for use as a binder for turkey, and possible use of injection-molded turkey products.

McFarland said Steele also will be studying the matrix development between turkey and surimi proteins, fat emulsions, the effect of nitrite on white pigments in turkey meat, and other ways surimi and turkey meat may interact during processing.

Steele's report is expected to be finished in August.

"We've already used surimi technology on poultry to make poultry surimi, but there's no commercial interest in

that technology yet," McFarland said. "But there are other immediate uses for surimi technology in poultry processing. Used as a flavor booster, there may be real high potential for surimi to replace chicken or beef extracts. We're not making any claims, we're studying it. But there are a lot of possibilities."

McFarland said after Steele's current work, Beehive plans to sponsor further work on products made from blends of poultry surimi and seafood surimi. "There's good potential for that kind of product as an extender, and you can use colored surimi because you need the strong gel but not the whiteness," he said.

McFarland said Beehive is sponsoring the surimi-related research because of a strong feeling that surimi technology will have an impact on the future of the poultry industry. "What we've learned from surimi will have a tremendous spin-off benefit to the meat and poultry industry," he said. "We've learned how to form gels better, how to protect our meat. We've learned another aspect of protein technology."

"The new knowledge generated by the surimi industry will help us make better hams, better franks, and will help us create a better bite in our products," he said.

upon immortal minds, we engrave on those tables something which will brighten all eternity."

— Daniel Webster

THE VIEW FROM HERE

By Chris Mitchell
AFDF Executive Director

Just before I sharpened my pencil to write my "words of wisdom" for this column, I looked again at my last editorial. (I always want to make sure I don't repeat myself too often, and hope that in re-reading my most recent treatise, I haven't embarrassed myself or anyone else.)

In my last editorial, I wrote of our need to look to and plan for the future. In the three months since I wrote that, it has become strikingly clear—and our membership survey affirms this—that our future includes salmon. During those months, our thoughts, our ideas and our plans have gelled; our 1986/87 S-K proposal will be in the hands of NMFS before this editorial is read.

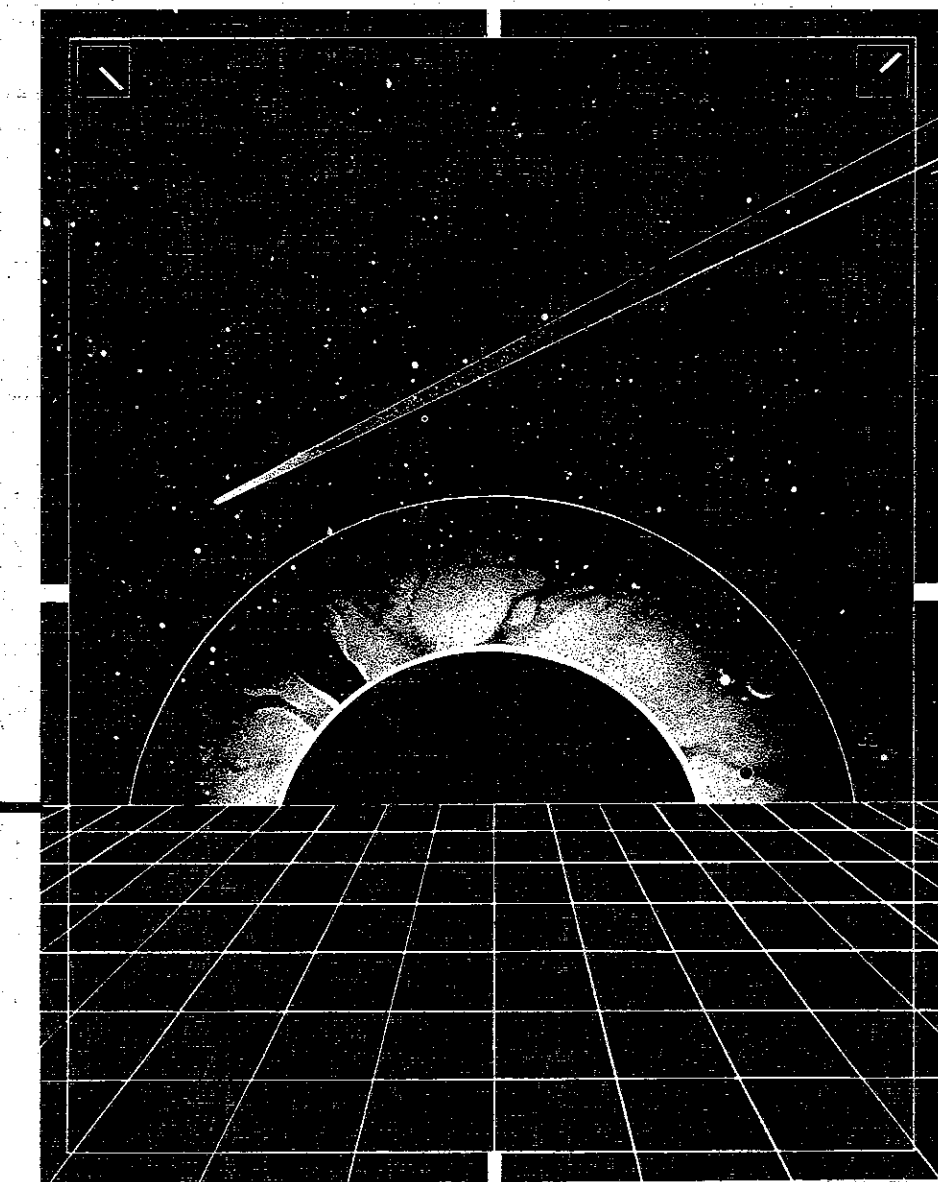
In the process of preparing our proposal, we came across at least 15 direct references to surimi-related projects in the NMFS Request for Proposals. There were mentions of projects from nearly every region of the country, constituting strong evidence that surimi has emerged as a national industry priority.

That surimi should be on the tip of the national tongue this year interested me greatly. I dug out my copy of AFDF's first surimi project proposal, written in November 1982, and read the NMFS solicitation for that year. I found not one single mention of surimi or surimi-related projects. Nor did they appear until FY 1984/85, by which time AFDF was nearly two years into its multi-year surimi involvement.

The current popularity of surimi, and the current heat of activity now being applied to develop new products from it, indicate we were successful in our objective. That's gratifying, but we do recognize that part of the reason we and NMFS were so successful with our surimi project was that the available funds were concentrated on just a few recipients for even fewer projects.

Success breeds imitators. This is neither good nor bad, but is a fact. However, as is some concern in the crabstick business now, too many imitators will siphon off available resources, generate more politics than progress, and slow the industry's development momentum.

This year, AFDF has been asked to turn its attention to salmon, the backbone of the Alaskan seafood industry. It's obvious that the application of S-K funds to breathe life into this comatose fishery has not been a high priority to NMFS. Just as in 1982, this year the subject of our new effort received no mention in the NMFS solicitation.



IDEAS IDEAS IDEAS

The editor's turn

Off the Cuff

By Kryz Holmes
Editor

I read in the latest issue of Smithsonian that scientists at the University of Arizona are building an 8-meter mirror, two and a half times larger than the biggest space-watching mirror in the world, which will be able to collect the feeble rays of light from outer space more accurately, and with less distortion, than ever before.

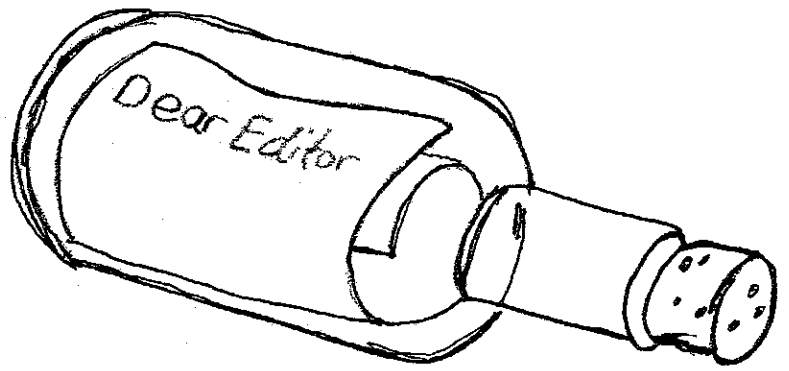
Writers never invent anything, except fictional characters who we create in order to put them through traumas we wouldn't go through ourselves. That's why we're so fascinated with those who do invent, and with those exceptional people—they may have the greater talent—who can take someone else's invention and improve upon it, ending up with something as far from its original form as the telescope is from the looking-glass.

In the same issue was a feature on flavor-makers who analyze the chemical constituents of flavors and try to reproduce them. (So far they can't imitate coffee, chocolate, strawberry, or roasted meat flavors.) Of the two, the article on multiple-mirror telescope technology was more glamorous, it better satiated our current fascination with space technology (we are most captivated by what we can't control), it was high-tech, it was what

advertising agencies in the last ten years have given the unlikely adjective, "sexy."

But the story on flavors was more interesting. I sat before the TV screen like everybody else when Voyager II slipped through the ring of Uranus, so I am interested in telescope technology. But I *know* a chili pepper when I meet one, my life depends on a good cup of coffee in the morning, and when I was three years old I drank a slug of Tabasco sauce right out of the bottle. These things have touched my life.

Folks probably won't crowd around their Magnavox to witness a food technologist flavoring surimi to taste like a bacon bit, and Smithsonian may never cover the transfiguration of fish flesh into moisturizing cream. But satellites represent what's beyond most of us mortals, and food represents what's in our bellies. Protein technology will improve the lives of nearly everyone alive now, and while no advertising agency would call it "sexy," it is indeed a very lively science.



“The meat industry faces a task similar to one now being tackled by the seafood industry: marketing new products in new, creative ways to the nation’s more sophisticated consumers.”

On nutritional equivalency

Dear Editor:

We have compiled data that may be useful in disputing FDA’s contention that surimi is “nutritionally inferior.”

FDA has been vague about the facts which led it to that questionable conclusion. The agency seems to have implied that surimi is not only inferior to “natural” seafoods, but that it is nutritionally substandard in and of itself. The following is sufficient to dispute either argument.

We have compared the amino acid content of surimi to that of king crab and three species of the most commonly eaten shrimp. The amino acids have been classified into two categories: non-essential amino acids are those which the body can manufacture on its own, while essential amino acids must be supplied by the diet. Consequently, it is the number and quantity of essential amino acids in a protein that defines quality.

The amino acid composition of surimi compares quite favorably with that of natural seafoods. With respect to the essential amino acids, surimi possesses a slightly higher histidine, leucine, isoleucine, lysine, methionine, theonine and tryptophan content than the king crab or the shrimp. Overall, surimi’s protein profile is equivalent to that of the natural shellfish foods.

We also have compared the amino acid pattern in surimi to that of a high quality protein. The third column in the table below lists surimi’s chemical

score for protein quality for each essential amino acid. The scores reflect the percentage by which each amino acid in the test protein differs from the standard’s values. In other words, the chemical score is expressed as a percentage of the test protein’s amino acid content. The standard perc protein pattern is always assigned a value of 100. The overall score for any protein is that of the lowest score for a single amino acid, which is termed the limiting amino acid. In surimi’s case, the aromatic amino acids are limiting, so the overall score for surimi protein is 101. The closer a test protein’s overall score is to the standard protein’s assigned value of 100, the higher the quality of the protein. The data here indicates that the quality of surimi protein is equivalent to that of the standard for high quality protein (100 for the standard vs. 101 for the surimi). Notice also that surimi contains 47% more nistidine, 51% more leucine, 48% more phenylalanine and tyrosine, 31% more threonine, 18% more tryptophan, and 2% more valine.

On the basis of the biochemical data, surimi cannot be considered a nutritionally inferior protein source. The term “nutritionally inferior” does not specify what in surimi is substandard to identical components in unprocessed seafoods. With regard to protein quality, “nutritionally inferior” does not apply.

Barry Nash
Wendie Jenkins

Is surimi the answer to meat woes?

By Barbara Batson

The red meat industry in the U.S. must become more market-oriented in the future, according to H. K. Johnson, speaker at the Third Annual Meat Marketing Conference held recently in Dallas.

Johnson, vice president of the National Livestock and Meat Board, said that the U.S. meat industry — like the seafood industry — must move away from its traditional production-driven stance and listen more closely to consumer desires for more nutritious, convenient meat products.

Johnson’s comments, and those of other speakers at the conference, indicated that the introduction of surimi to the processed meats industry could not have come at a better time.

Historically, Johnson said, the red meat industry has been production-driven. It has manufactured and packaged products in the easiest and most economical ways, filled highly predictable volumes of orders, and relied on post-convention socializing to fulfill marketing obligations. Since consumer tastes coincided with available products, red meat processors enjoyed a relaxed pace, ever-increasing profits, and consistent buying patterns for a number of years.

The 1980s, however, revealed a health-oriented market. Nutrition and safety in food products are growing concerns. Today’s market is more educated than that of a decade ago, is more interested in ingredient information, and has a strong preference for fish, poultry and other protein sources over traditional pork and beef products.

The red meat industry met this trend unprepared and unwilling to accommodate, Johnson said, and it now finds itself in need of a “savior” to help regain lost market shares and lost profits.

Some believe that savior could be surimi and the accompanying surimi technology, which could be applied to transform “cholesterol-ridden, fatty, salty, unhealthy, and unnatural” products into lean, natural, low-sodium, nutritious products.

The meat industry also faces a task similar to one now being tackled by the seafood industry: marketing new products in new, creative ways to the nation’s more sophisticated consumers.

Timing could not be better for the introduction of surimi to this industry. The excellent binding and other functional properties of surimi are attractive to meat processors. The versatility of surimi allows streamlined production and innovative applications. In addition, surimi is a natural, nutritious product and may enhance consumers’ perceptions of red meat products by increasing nutritional value. The incorporation of surimi in value-added meat products could help revive sales while increasing profit margins to processors and retailers.

Surimi could prove to be a major component of the meat industry’s solution to its faltering market share problems. It is conceivable that surimi will come to be known as the catalyst that put new consumer-driven marketing and product development to work in the red meat industry, and provided the tool which initiated an industry-wide turnaround.

The future looks bright for the red meat industry, and peripheral groups are rallying in support. As the conference reflected, the industry is undergoing an unprecedented change as it begins to show a progressive posture in seeking solutions to its declining sales figures. And many predict that surimi-enhanced products and surimi technology could be part of the solution.

Barbara Batson is a marketing consultant based in Seattle, Wash.

Comparison of surimi’s amino acid composition with that of king crab and shrimp (all uncooked):

Amino Acid	Raw Surimi	Raw King Crab	Raw Brown Shrimp	Raw Pink Shrimp	Raw White Shrimp
% of total protein					
A) Essential					
Histidine	2.5	2.2	1.9	1.9	1.7
Leucine	10.6	6.9	7.7	6.4	7.5
Isoleucine	6.2	4.2	4.3	4.1	3.8
Lysine	11.7	7.5	7.1	8.9	5.4
Methionine	3.1	2.2	2.3	2.9	2.7
Phenylalanine	3.8	3.8	3.3	4.3	3.6
Threonine	4.6	4.0	3.6	3.0	4.2
Tryptophan	1.3	1.0	1.4	—	0.8
Valine	4.9	4.3	4.4	5.2	4.3
B) Non-Essential					
Alanine	6.5	5.6	6.0	6.5	5.9
Arginine	7.0	9.9	9.5	4.8	5.4
Aspartate	11.6	9.3	9.4	8.5	9.7
Cystine	1.0	1.1	1.2	—	0.7
Glutamate	18.9	13.1	12.9	13.4	15.4
Glycine	3.6	6.9	7.2	6.3	7.5
Proline	4.5	4.2	4.5	5.7	4.4
Serine	5.2	3.8	3.7	4.2	3.5
Tyrosine	3.6	3.5	2.4	3.6	4.0

Raw Surimi: Suzuki, T. 1981. *Fish & Krill Protein: Processing Technology*. Applied Science Publishers LTD. London, p. 162.

Raw King Crab, Raw Brown Shrimp, Raw Pink Shrimp, Raw White Shrimp: Sidwell, V.D. 1981. *NOAA Technical Memorandum NMFS F/Sec-11: Chemical and Nutritional Composition of Finfishes, Whales, Crustaceans, Mollusks, and their Products*. U.S. Department of Commerce, p. 166-169.

Bulletin Board

U.S. fishermen landed a record 3.2 billion lbs. — 59% of the total catch — within the 200-mile U.S. fishery conservation zone in 1985. U.S. harvests rose 9 percent since 1984, while foreign harvests dropped 14 percent to 2.6 billion lbs. Joint ventures in 1985 increased 37 percent to 2 billion lbs. Alaska provided 92 percent of the foreign-caught fish within the 200-mile limit.

NMFS

"What moved exceptionally well during Lent?" reads The Erkins Seafood Letter. "Imitation crab surimi. What will housewives buy in '86? Survey shows... 71% predict much more fish and shellfish... 29% feel a little bit more," the newsletter reads.

The Congressional Record of March 21, 1986, carried a recipe for salmon-burgers suitable for back-yard grilling. The recipe called for 1 1/2 oz. of canned salmon, egg, oats, onion, parsley, lemon, mustard and oil, and was submitted by Sen. Ted Stevens (R-Alaska).

Domestic groundfish deliveries from the Gulf of Alaska in the first quarter of 1986 were double the deliveries made during the same period of 1985. Processors in Kodiak estimated 500 residents were employed in groundfish processing in the peak of the season.

Kodiak Daily Mirror



NMFS laboratories in Seattle, Charleston and Gloucester are studying the composition of marine fish oils, and plan to develop a "blueprint" for processors to produce pure fatty acids from fish oils. Fish oil capsules have been recommended by some in the medical industry to fight heart disease, migraine headaches, and other maladies.

Congress is considering an increase in foreign fishing fees for countries who catch excessive amounts of U.S.-origin salmon or who the Secretary of Commerce deems have not tried significantly to aid profitable development or protection of U.S. resources. Japan is strongly protesting the bill.

BANR

Japan is experimenting with surimi production from New Zealand blue grenadier and Chilean jack mackerel in an effort to replace decreasing groundfish catches in U.S. and Soviet waters. Jack mackerel surimi produced at the Nagasaki Fishery Processor Cooperative plant was reportedly "good quality." The Japanese also are closely following the production of surimi from menhaden on the U.S. East Coast, and are positioning themselves for entry into that industry.

NMFS

Alaska Seafood Marketing Institute (ASMI) has concluded a month-long pollock fillet promotion in hopes of increasing the domestic market for pollock fillets by consumer education. The Alaska Factory Trawlers Association also is mid-way through a nationwide pollock fillet promotion which has received significant attention.

MEMO

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Krys Holmes
Editor



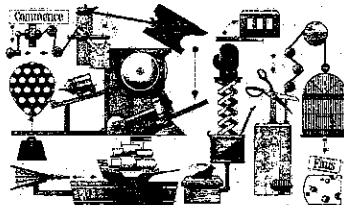
the LODSTAR

Charting the course of fisheries development.

Volume IV, No. 2 Spring, 1986

Alaska Fisheries Development Foundation

"Men have always turned from the ascertained, which is limited and discouraged, to the dubious, which is unlimited and full of hope for everyone."
— Agnes Repplier



Perpetual motion: the motion of a hypothetical device which, once set in motion, would operate indefinitely by creating its own energy that exceeds the energy dissipated.

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