

ALASKA KING CRAB HISTORICAL DOCUMENT

By

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Regional Information Report¹ No. 4K92-27

Alaska Department of Fish and Game
Division of Commercial Fisheries
211 Mission Road
Kodiak, Alaska 99615

July 1992

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INTRODUCTION

This anonymously written document contains historic information on the king crab. The three chapters on 1) history, 2) biology, and 3) boats, gear and methods of fishing are important information that may be valuable to future managers of this resource. Since we are not able to retrieve the original source of this report we are publishing it in its original (as we know it) entirety as a regional information report to make it more available in the future.

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ALASKA KING CRAB HISTORY

There are few records that relate to the early King Crab experimenting in Alaska. The potential industry languished; without production there were no reports filed by the federal fisheries bureau, the taxing authorities, customs and shipping agencies. What documentary references are to be found relating to those first efforts prior to the late 1930's are cryptic and infrequent items in trade journals and newspapers.

One of the earliest experimenters in King Crab in Alaska was the late "Kinky" Alexander, a cannery executive with, at different times, the Pacific American Fisheries which is one of the industry's largest firms with headquarters at Bellingham, Washington, and the Alaska Pacific Salmon Company which was another major packer related to the Skinner & Eddy enterprises of Seattle.

While he was a cannery superintendent at plants near Kodiak, False Pass and Seldovia, Kinky tried experimental packs of King Crab brought in by salmon fishermen. In later years the PAF set Alexander up in an experimental cannery at Seldovia where he worked on techniques for processing King Crab and other shellfish. (The PAF has since quit Alaskan fisheries. Many of its plants were transferred to Pacific Alaska Fisheries of which Stan Tarrant, former president of the King Crab Institute, is the chief executive.)

Another of the first recorded King Crabbing by Alaskans was in Seldovia between 1921 and 1925. An operation in which the principals were Al Soeneke and Jack Salmon (Alaska Year-Round Fisheries and General Fish Co.) canned a few cases every season to test techniques and potentials. They failed to gather any substantial enthusiasm, however, and abandoned the work after the fourth season. Soeneke, incidentally, was an experienced canneryman and Salmon was well established as a canned fish broker in Seattle.

There are other reports of attempts to utilize King Crab in Alaska in the 1920's and 30's but none proved successful. Generally the cost factors (depression days of the 30's notwithstanding) were too far above the competitive factor set by the Japanese importations.

Then, starting in 1938, an enterprise was undertaken that gave King Crabbing a major try from Alaska. From it stemmed the eventual success of the industry as it has developed today, 30 years later.

A floating processing factory gave crabbing a try. This was the "Tondeleyo," a 113-foot motorship fitted with a cannery. The promotional and operational head of this effort was one Lemuel G. Wingard who had previously served for a decade as the Alaska chief of the U. S. Bureau of Fisheries. His backers were Washington State people with venture capital enough for the risks involved and they organized the Pacific Fishing and Trading Company for the occasion.

In the fall of 1938 the Tondeleyo received King Crab from fishermen (recruited from salmon fishermen, mostly, but also including some Puget Sound "draggers") working coastal bays from Seldovia to the Aleutians and in the Bering Sea. More than any previous efforts, the cruise of the Tondeleyo was a success. That is, it was a success in that King Crab were actually caught and processed even if the venture was a 100% financial flop.

From this 1938 effort stemmed something else. There is no clear record of exactly how things transpired but it's quite likely that Wingard had a hand in developments because of his interest in the Alaska King Crab potential and by means of his connections in Washington (D.C.) that dated back to the days when he was the czar of the territorial fisheries. He was a pretty convincing sort of an operator when it came to talking up an Alaskan fishery potential that might yield a financial reward. Also, reportedly, among those interested in the Pacific Fishing and Trading Company were a U. S. senator and a congressman.

At any event, by 1940 the U. S. Congress enacted a piece of special legislation that directed that a survey be made of Alaska's King Crab potential and it gave the undertaking \$100,000 to operate on, a sum that was a pretty substantial amount for that day. This special survey started in the fall of 1940 and the Tondeleyo was a part of the task force, skippered by Art V. (better known among fishermen as "B.S.") Nelson, a longtime associate of Wingard's.

The survey was completed in 1941 with three fishing vessels participating. They were the 93-foot schooner "Dorothea" with Ellsworth F. Trafton skipper, the 69-foot dragger "Champion" with Anders Nilsen skipper and the 58-foot "Locks," also a dragger, skippered by Harry Guffey. All were Seattle vessels and their gear included trawls, tangle nets (or "divers" nets as U.S. fishermen then called them) and pots.

Explorations were carried on in northern waters of Southeastern, along the coast of the Gulf into Prince William Sound and then down along the Kenai Peninsula, the Kodiak Island area, the Alaska Peninsula and into the Bering Sea as far as Norton Sound and St. Lawrence Island.

(When they put into Cordova in the course of their explorations they had a problem. It seems that the corks they were using on their "divers" nets – made of Spanish cork and used to keep one edge of the net above the other so that it forms a sort of fence on the floor of the sea – were unsatisfactory. They became sodden in the depths required to fish for King Crab and they soon failed to serve as floats. Consultation between fishermen of the expedition and those of Cordova – engaged in, appropriately, one of the town's eight bars – quickly solved the problem. They had bartenders save beer bottles for a couple of evenings while in Cordova and this yielded them enough saturation-proof net floats to complete the expedition.)

As is so often the case with formal fisheries explorations, the 1940-41 "King Crab Expedition" resulted in a report that wasn't especially favorable. In fact, the document that was eventually issued (in May, 1942) characterized the King Crab populations of lower Cook Inlet, Kodiak Island and down the Alaska Peninsula into the Aleutians as "small." The whole tone of the report was discouraging. This, plus the fact that World War II's Pearl Harbor Day occurred with the expedition's end and enemy forces had invaded areas adjacent to grounds with King Crab potentials, closed the door on further government interest in replacing foreign harvesters of King Crab with Alaskans.

But not everybody gave up. Alaska fishermen who had been hired to work on the expedition and some fish processors thought they saw possibilities and, each in his own way, persevered toward establishing an Alaska King Crab fishery. Included among these were the Wakefields who were then engaged in processing herring at their Kodiak Island plant and the Suryan family who worked in salmon operations on the south end of Kodiak Island.

When the King Crab expedition terminated in the fall of 1941, the skipper of one of the expedition's vessels prevailed on to "dump his used-up fishing gear overboard on the beach in front of Port Wakefield instead of somewhere at sea between Alaska and Seattle." That gear, coupled with a few other circumstances, literally proved to be the beginning of today's industry's largest operation – Wakefield Seafoods.

The Suryan family's efforts also continued through the years. John Suryan's son Bill operated the King Crabbing activities less than a decade later that started on the factoryship "Reefer King" and that broadened into today's Ralston-Purina interests in the fishery and there are also others of the family still giving leadership, like grandson Bob Suryan of the B&B Fisheries in Kodiak.

During the years between 1942 and 1946 the field was pioneered by exploration of crabbing grounds around Kodiak Island, experimentation with different types of gear (nets, trawling and pots), development of cooking and canning

processes and, as a result of such work, a couple of hundred cases of the product were produced each year. These packs sold without the troubles that had faced earlier efforts.

The Wakefields built a "mini-dragger" (as it might have been termed today) with which they did most of their early work with a trawl and also with tangle-nets or divers-nets. The Suryans concentrated on the use of pots.

When World War II ended and materials became available for more intense work, Lowell Wakefield converted an east coast trawler for crabbing — the "Bering Sea." Facilities were installed aboard her for processing her catch as she proceeded.

This led the way for the "Deep Sea," a 140-foot trawler-processor built by Lowell Wakefield especially for King Crabbing. Based on what had been learned about the industrial potential during the war years, she replaced the "Bering Sea" in 1947 and produced a pack of frozen King Crab meat in two cruises in the Bering Sea. Freezing the product instead of canning it was found to yield better market response; it was in keeping with the trend toward frozen foods, a trend that accelerated thereafter as shipping, handling and retail facilities increased and improved in the U.S. after World War II.

(Incidentally, first mate and later captain of the "Deep Sea" was Ralph Jones who is presently the executive in charge of operations of Pan Alaska Fisheries. Also, it was aboard the "Deep Sea," before the 1950's, that Wakefield's crewmen developed a method of removing crab meat from shell by means of a compressed air blast which reduced the extraction labor to about 30% of the hand-picking previously employed.)

In the same year that Wakefield's "Deep Sea" began fishing and processing King Crab effectively, Harry Guffey who had skippered one of the federal exploratory crabbers in 1940-41 also entered the field with a 70-footer he had built. He operated her for Libby, McNeil and Libby and he also froze his production with facilities aboard ship. Ellsworth Trafton, another of the exploratory skippers in 1940-41, also re-entered King Crabbing a couple of years later with a vessel he secured for the purpose — the "Lynn Ann."

The most ambitious venture of this pre-50's era, however, was one put into operation by Nick Bez who had been associated very successfully with salmon canning enterprises for a quarter century. Among his enterprises was a cannery ship — the "O'Gantz" — which was lost during the war by enemy action while under lease to the U.S. government. Her replacement was a specially-built 5,000-ton factory ship that was named the "Pacific Explorer."

**Alaska King Crab
History — Page 5**

In 1948 the "Pacific Explorer" worked the Bering Sea with a dozen Puget Sound draggers supplying her crab. She packed 17,000 cases of crab meat and reportedly failed to show a profit. That was her only season in King Crabbing. The "Pacific Explorer" differed from other operations in that she did no actual fishing and was strictly a processing and supply facility.

This technique was also used two years later when the "Reefer King" entered the King Crab fishery under management that included Bill Suryan, a King Crab pioneer.

The decade following 1948 was one of notable significance in the Alaska King Crab industry. The basic pioneering had been done by then.

The center of the new industry gradually shifted from Bering Sea to the Kodiak Island region. Harvesting methods changed from trawling to fishing with pots. Fishing was also expanded into locations along the south coast of Alaska from lower Cook Inlet into the waters south of the Alaska Peninsula during the early and mid-1950's and then on out into the Aleutian Chain in the 1960's.

There was little governmental "management" of the King Crab fishery during its early existence. Federal fisheries people assisted in exploratory work, in processing technology and in preliminary biological studies but few restrictions were imposed on operations. Conservation efforts were not stressed until the new state of Alaska took control of its fisheries in 1960, largely because the need did not exist for it at first and also because of a lack of biological knowledge of the crab resources.

Alaska — as a territory — took initial interest in conservation management in 1954, about the same time that federal scientists started their studies.

Many of the men who subsequently played leading parts in later development in the Alaska King Crab field, both in industry and in government activities, started in that era of the 50's include: Robert J. Simon, Guy C. Powell, Robert S. Roys, who are still on the state's scientific staff; Tak Miahara who is now operations superintendent of Wakefield Fisheries; Dr. Murray Hayes who heads up the Federal Fisheries Technological Lab at Ketchikan; and Royal Frew of the Pan Alaska Fisheries.

Fishermen engaged in King Crabbing during the 1950's were principally from the ranks of other Alaskan fisheries. Some were Alaskan residents, including men of native parentage and others were from Pacific Coast areas "outside." Principally, however, they were Alaskan residents seeking off-season earnings for their labors and with their vessels and equipment. In those cases where they were non-Alaskans they soon changed residence, bringing families to the central Alaskan coastal communities because the new fishery gave them year-around employment and prosperity in a measure that had never occurred before in the North.

The people who went into the processing portions of the King Crab industry in the 1950-decade (following the pioneer firms) were a mixture of: (1) fishermen from King Crabbing ranks, (2) businessmen in coastal towns who saw the potentials of the new fishery and invested in processing plants as additions or auxiliaries to other enterprises, and (3) fish-processing operators who had been active with Alaskan salmon, halibut, etc. There was considerable changing of proprietorship in these processing firms as time went on due to experiences in the new game. Operations located in places that lacked crab stocks or that had problems with operational needs sometimes were absorbed by more successful ones. Inadequately financed attempts had to consolidate with others who were in better shape.

The larger King Crab processors at the close of the 1950's era consisted of Wakefield Fisheries, Reefer King, Inc., Alaska Packers Association, Pacific American Fisheries, King Crab, Inc. of Kodiak, and Pan Alaska Fisheries.

The start of a new decade (as the State of Alaska assumed control of fisheries management and regulation in 1963) witnessed additions and changes that continued through the succeeding seven years. For one thing, King Crab were located in limited quantities in Southeastern Alaska and this added operators of the region that had processed salmon, halibut and shrimp, including Kayler-Dahl, Petersburg Fisheries and Petersburg Cold Storage, Juneau Cold Storage Co., and the Bellingham Canning Co. at Yakutat. In the Prince William Sound region the Washington Fish & Oyster Co., and Point Chehalis Packers both tried it; and both also operated in the Kodiak area at about the same time.

There were numerous additions to the Kodiak operations — the Ouzinkie Packing Co., Alaska Ice and Cold Storage Co. at Kodiak, the Columbia-Ward Fisheries took over the Alitak plant of Pacific American Fisheries, Kodiak Fisheries absorbed an operation in Kodiak (city), Ray Martin started a business shipping fresh and fresh-frozen crab as a custom business.

The 1964 earthquake and tsunami catastrophes had a great effect on the industry. Besides a heavy loss of fishing vessels, many processing plants were rendered useless which resulted in changes. A Whitney-Fadalgo operation and

Sutterlin and Wendt operation, both at Seldovia, moved to Kodiak. Two other lower Cook Inlet firms remained and re-established where they had been — a Wakefield plant at Seldovia and Alaskan Seafoods at Homer.

More processing plants were also established on floating equipment as expedients to get into production following the earthquake damages, although this was by no means a disaster-inspired novelty as a method of operations. The M/V "Medina" and the "Nelco I" had been used as processors by Roy Furford (formerly at Point Chehalis Packers principle) and the Nelson Crab Co. of Washington; Pan Alaska operated the "Mercator" and the "Alaska Trader"; and later additions included the M/V "Northgate" and M/V "Mary-Jo" operated by the Point Adams Packing Co. (a division of Westgate-California Foods); M/V "Sourdough Queen," owned by a corporation of Alaskan investors; M/V "Sonja" and M/V "Theresa Lee," owned by American Freezerships; M/V "Skookum Chief," owned by Northern Processors, Inc.; "Reefer II," by Northern Reefer, Inc.; the M/V "Iceland" by B&B Fisheries which subsequently moved into a shore-plant at Kodiak.

In the Aleutians (in addition to reefers previously mentioned) operations were also opened up in the 1960's by Aleutian King Crab Co. at Unalaska (Captain Nils Thompsen and Associates) by San Juan Fishing and Packing Co. (later consolidated with New England Fish Co.) near Unalaska, and the Wakefields operated at Akutan village, the site of a former whaling station.

With this array of processors, and a corresponding fleet of King Crab harvesters, production in the year following the earthquake disaster (that is, in 1965) burgeoned to 132 million pounds (from 8 million in 1955).

Fishermen were paid nearly \$12,750,000 for catching the crab and it was processed into about 200,000 cases of meat and nearly 28 million pounds of other products in frozen forms. Its "wholesale" value was over \$31,665,000 (compared to \$1,570,000 in 1955).

The peak of King Crab production was the following year (1966) when a total volume of over 159 million pounds of raw crab was harvested by the Alaskan fleet. It yielded almost 320,000 cases of canned crab meat and over 37 million pounds of frozen products with a total "wholesale" value listed by the State of Alaska at \$44,458,000.

In 1967 and 1968 King Crab production suffered big declines. It totalled 127.7 million pounds and about 85 million pounds, respectively, in those years.

Why the big decline? There is no single answer agreed on by all interested parties. It is certain to prove out to have been due to a combination of reasons — a combination that varies in emphasis from one fishing region to the next. The elements involved include: (1) in places like the Kodiak area, a substantial measure of over-fishing of some of the stocks; (2) generally, a reduction of the size and weight of harvested crab due to catching of older specimens and a "levelling-off" of stocks to age and size limits consistent with maximum sustainable yield; and, probably (3) biologically-caused phenomena that are not yet fully understood by scientists.

Whatever the cause, there is reason to believe that, while lowered production has hurt all segments of the industry in differing degrees, correction is being secured and the stocks will survive and continue to yield on a stabilized level that may even swing upward again toward earlier attainments.

On the brighter side from the drastic King Crab volume decline is the fact that the industry, aided by the Alaska State Government, has promoted its product's value in the marketplace by convincing the public that it has a really first-class seafood that cannot be made to take a lesser place as a delicacy than such items as lobsters.

Consequently — to illustrate the benefit — Alaska's fishermen who were paid \$15.7 million to harvest the 1966 peak of 159 million pounds of raw King Crab took a set-back of only \$0.7 million when they produced 127.7 million pounds in 1967. That is, they produced about 20% less crab but the industry was able, nevertheless, to pay them with a reduction of only 4.5%.

This maintenance of high value is an achievement of the Alaska King Crab Marketing and Quality Control Board, a program in which the state and industry cooperate. (See Vol. V, No. 4, "Review of Business and Economic Conditions," Dec. 1968.)

ALASKA KING CRAB

BIOLOGY

King Crab is a creature living only in the North Pacific Ocean along the coasts of Alaska, Siberia and northern Japan. A related crab inhabits the far southern waters of South America but not in large numbers.

There are three branches of the King Crab family. In popular reference these sub-species are named "red," "blue" and "deep water" King Crab. Their scientific names are "Paralithodes Camtschtica," "Paralithodes Platypus," and "Paralithodes Brevipes." Excepting for size, coloration and other minor distinctions there are few differences between the sub-species and, as far as the meat extracted from each is concerned, they are practically indistinguishable.

Individual King Crab have been caught with weights between 22 and 24 pounds. When the Alaskan fishery was developing they probably averaged about 12 pounds apiece. This average has been reduced, however, with intensified fishing; and also reduced has been the frequency with which very large (20-pound or greater) specimens are being found.

Nowadays average King Crabs probably run between 8 and 10 pounds, with smaller averages occurring at times due to biological processes.

King Crab occur in the ocean and tributary waters at depths which vary with the seasons and run as much as 150 fathoms (900 feet) and as shallow as five fathoms (30 feet) or less.

It starts life from an egg from which it hatches in the upper layers of the seawater in the spring of the year. At first it is a wriggling larva that can move about in the water. Then it gradually changes form and loses the swimming ability that has enabled it to remain near the surface and slowly settles to the bottom where, by the time it is between two and three months old, it begins to look and act like a crab.

By the time it has attained this crab-like appearance its carapace (or back shell) is only a scant 1/8-inch across and it has shed its shrimp-like body covering five times to accommodate growth. This is called "molting," a process that will take place many times before it has attained full maturity and size.

During the first year or so the tiny King Crab frequents crevices and other shelters on the bottom while it attains growth — a rapid process during the crab's youth. It is also a process that requires frequent molting so that it can acquire an appropriate exterior shell to accommodate the growth of its body.

King Crab can live to be 15 or 16 years old, according to U.S. biologists. By the time the crab are five years old, both males and females have grown to sizes between four and five inches across the carapace (back shell). They have attained reproductive capability which increases as they grow older. A female's first batch of eggs will total about 45,000 — an annual capacity that eventually increases tenfold to 455,000.

Early each spring the King Crab migrate into relatively shallow areas of coastal bays and offshore banks to spawn and to reproduce. Since the preceding summer or early fall they have been pasturing on the bottoms of deep reaches of the sea. There is evidence that they lead a segregated existence in the deeps, males in one area and females in another.

With the migration to the shallows — areas about 30 fathoms (180-feet deep) — the female releases the eggs she has been carrying during most of the previous year. They rise to the surface where plankton are flowering and a new generation is on its way.

The female is then ready to repeat the reproduction process, but first she undergoes a molt in which she sheds her entire outer body-covering and also her eyes, antennae, mouth, esophagus, stomach, teeth, gills and tendons. In other words, she really strips down. This process, biologists relate, takes only five or ten minutes, depending on the age and size of the crab.

"When a male King Crab encounters a female that is nearly ready to molt and mate," says an Alaska Department of Fish and Game description, "he clasps her walking legs with his claws. This hold is retained until the female molts . . . and after the molt mating is soon accomplished. The male then leaves her and goes in search of a new mate."

She is serviced with her shell down, as it were. As simple as that. No romance or ritual. And for another year she harbors a brood pouch of new eggs between her underbelly and a tail that folds up to cover it from her posterior.

Immediately after a molt the crab are also the most vulnerable to predators because they lack an effective covering and have limited mobility. This does not last long, however. In about three days, biologists say, the new shell has formed. It is soft, but in ten days it has developed sufficiently so that the crab can walk around again, normally.

While females molt every year after they have attained maturity, males go through the process less frequently after attaining adulthood in about their fifth year. There is evidence that they molt every other year for awhile and then every third year — if some fisherman hasn't succeeded in catching them in the meantime.

Alaska conservation regulations restrict the taking of King Crab to males with at least a seven-inch carapace and all females must be restored to the sea unharmed. A seven-inch male crab is in its seventh or eighth year, depending on what sub-specie it's from and the area it is in. Such a male has been a breeder for two or three seasons and biologists hope that a stable stock of King Crab can be sustained at a maximum level by the seven-inch restriction on males, plus the prohibition of all fishing during the breeding season and a reasonable time before and after it when propagation migrations are in progress.

During 1968 the Alaska Department of Fish and Game imposed emergency restrictions on King Crabbing because of serious reductions in the available stocks. They effected the largest producing areas in the state, from Kodiak Island westward into the Aleutian Islands and the Bering Sea.

Subsequently these emergency restrictions were formally made permanent, effective for 1969, by the Alaska State Board of Fish and Game.

The only exception permitted for the taking of King Crab under seven inches was in the Bering Sea and that was limited to the approximate times that foreign fishing fleets (Japanese and Russian) are in the same area and are permitted (by international agreements) to take smaller crab. During such times the Alaskan fishermen may keep crab as small as 5¼-inches across their back shells.

Fishing for King Crab has no time limits in the Bering Sea although the authority to declare emergency closures there when foreign fleets are not fishing, rests with the state fish and game biologists. In the Aleutian Islands and all coastal waters to and including the Kodiak region, fishing has been restricted to a five-month season — from August 15th to January 15th. Eastward of Kodiak fishing time is more liberal but these areas are not heavy producers. In Cook Inlet and on Prince William Sound fishing is allowed for a seven-month season — from August through February — and in Southeastern Alaska it is allowed from August 1st to mid-March.

A quota basis regulation is also being tried in the Cook Inlet region to provide state scientists with experience in this type of restricting so that they can use it elsewhere later on if it proves feasible. This type of restriction allows a limited amount of crab to be harvested — 4½ million pounds a year in the case of the Cook Inlet trial — during the prescribed season.

Another innovation being tried in the Cook Inlet grounds is the establishment of "sanctuary" areas. In these areas, where biologists believe breeding is concentrated and where immature crab seem to concentrate, fishing is prohibited. The effectiveness of this is being tried and studied.

A complication in conservation regulation of King Crab stocks has been the fact that they exist in waters beyond the jurisdiction of U.S. authorities and they are fished by Japanese and Russian, as well as Alaskan fleets. These complexities are diminishing, however. In recent years territorial jurisdiction has been extended by the U.S. out to the 12-mile limit and also beyond that, wherever the continental shelf extends farther.

The Russians have acknowledged this jurisdiction (they exercise the same laws for their own shores) but the Japanese have resisted both the 12-mile and continental shelf doctrines although this position, on their part, may be weakening, judging from diplomatic retreats that nation took late in 1968. Meanwhile, the United States has not been pressing the Russians to leave Alaskan King Crab alone to any greater extent than the Japanese can be pushed away from these stocks.

Another complexity facing Alaskan conservation authorities stems from a desire to keep King Crabbing basically a "resident" industry. There is a fear, that is, that if fishing is cut too drastically as a measure to rebuild stocks it will force fishing vessels to leave the state for other occupations and to return only seasonally. Much in the same way, there is also a fear that processing plants will operate with labor brought in for the season instead of giving employment to residents over a larger period of time, if restrictions are too stringent.

ALASKA KING CRAB BOATS, GEAR AND METHODS OF FISHING

United States fishermen catch King Crab with devices called "pots" that operate as traps into which the crab enter and from which they find escape practically impossible.

Each pot is a box-like structure that usually measures about 7 x 7 x 4 feet. Each pot consists of a heavy, rigid steel frame over which is fashioned a metal or nylon webbing that completely encloses it, excepting for openings from which tapered tunnels of nylon webbing extend inward. Crab enter through these tunnels, attracted by bait placed inside the pots. Crab pots also have special openings through which undersize crabs can escape.

The crab pot is lowered to the floor of the sea from a fishing boat. A rope, attached to a buoy, trails to the surface from the pot so that it can be recovered and emptied periodically.

United States crabbing boats fish "strings" of crab pots that vary in number according to the size of the vessel. A large crabber may work 80 pots in its string and a few even work over 100. In 1966, the year of Alaska's greatest production of King Crab, government tabulations listed 14,400 King Crab pots in use, with an average of close to 50 pots per boat. There were roughly 300 U.S. King Crabbing vessels that year, manned by 1,200 fishermen. In 1967 there was a greater amount of gear committed to King Crabbing, but when production fell off that season some of the boats entered other fisheries again so the 1966 figures are probably more typical.

Vessels in the domestic King Crabbing are evolving from a hodge-podge fleet toward two or three distinct types that fit the peculiarities of this fishery. The first fishing for the industry was done by small off-shore trawlers (or "draggers") of the established West Coast seine-type and the well-deck schooner that has been traditional in the Pacific halibut fleet. These boats ranged from 60 to 90 feet.

Following the initial crabbing with trawls (mostly in the Bering Sea, but also around Kodiak and the lower Cook Inlet) was a period in which many of Alaska's salmon seiners — which are limited by law to 50-foot maximums — were used as crabbers during their off seasons from September to June.

These small vessels had to fish close to canneries and freezers in order to deliver their crab alive for processing, as required. A few managed to stretch their operating range by adding to crab life with sea water sprays and others "live-boxed" crab near their fishing grounds to extend their ranges. But these arrangements were less than satisfactory in the long run.

Crabbing changed from a trawl fishery to a pot fishery at about the same time that it experienced an up-surge in production demands. And with this change and growth there was also the development of a requirement that King Crab be kept alive in tanks aboard the boats (and at processing plants) to insure maximum quality in the ultimate product.

These developments combined to bring into the fishery a variety of vessels. Most were conversions from military surplus or were diversions from other fisheries.

One of the largest of these, for example, is the "Chief," a 174-foot craft that had been a Navy vessel used to supply oil fuels to other military craft in World War II. Her tanks were converted so that they were used as "live tanks" in which King Crab were retained alive between fishing grounds and processors' plants.

The "Shishaldin" is another vessel that was similarly converted from a World War II 159-foot LCI. The 91-foot "Viking" was converted from a small freighter that had been in the Army Transport Service.

Several crabbers were tuna "clippers" that were re-rigged with live tanks and pot-hauling gear. Others were made over from halibut schooners that had previously fished the North Pacific successfully for, in a few cases, more than 30 years. Also used were California "sardine" seiners and draggers of the 70 to 90 foot class.

And the salmon fishery also contributed boats. There were cannery tenders and also 49-foot "limit seiners" pressed into use.

At first time did not permit designing vessels for the King Crab fishery even though many of the conversions were less than ideally suited to the work.

The incidence of losses, both of vessels and of men, was high because of this rush to get into the fishery. As time progressed through the late '50's and early '60's the problems became more acute. Men had to go farther out to sea

to catch King Crab. They used larger pots and carried top-heavy deckloads of these oftentimes as they shifted around on the grounds at sea looking for better fishing. Often the converted vessels had not been designed with this sort of activity in mind and trouble resulted.

There was also trouble in that many of the men who joined the fishery were not experienced seamen. Their lack of experience generated accidents with vessels capsizing or breaking up in heavy seas and sometimes from icing down in winter storms.

This situation continued past the mid-1960's. By then new vessels had started entering the fishery, vessels that were designed to meet conditions that are unique to King Crabbing.

Marine architects devised three basic types for King Crabbing. They were vessels that cost half a million dollars to build and equip, in some cases. This cost factor added a new problem. In order to pay for vessels like this, as well as to operate, maintain and insure them, fishermen face the problem of keeping them in production — if not in King Crabbing then in some other fishing. This is a problem that has not been fully solved as yet, even though some of the vessels have been designed for easy conversion to other kinds of fishing such as shrimp or ground-fish trawling, scalloping and even seining for species like herring or pilchard. These are fisheries potentials in Alaska and not developed operations. And, in the meantime, King Crabbing is being restricted more and more by conservation authorities who fear depletion of the stocks.

Along with vessel development in King Crabbing there has also been a parallel development in machinery and related equipment used in the fishery.

At first — early in the 1950's — the crab pots that were used were comparatively small. They started at approximately 4 x 4 x 3 feet and grew to as much as 7 x 7 x 4 feet.

As the pots that were fished increased in size, and as the fishermen ventured farther and farther off-shore and fished with greater intensities in rougher weather, their gear handling problems increased. Another factor that added to this was a competitive element that came with more fishing vessels and fewer crab.

Consequently, where fishermen at first hauled small pots with the help of simple machinery in the 1950's, they sought sophisticated improvements which were designed and built for them by modern engineering firms. Power transfers were perfected by means of hydraulic developments.

Electronic mediums also played an increasingly important part for the fisherman. He located favorable or promising fishing grounds with sonar-type depth finders and related devices. He found that if he employed LORAN navigational equipment he could find the pots easier — those that he had "put to soak" 30 or 40 miles offshore. Radiophones were indispensable for keeping track of what the processing-buyers were paying for King Crab and which port he should go to for the best deal for his fare.

Few fisheries industries in the United States are conducted with standards of quality and freedom from impurities to equal those of the Alaska King Crab industry. There are several reasons for this.

The industry polices itself rigidly; governmental agencies (state and federal) maintain a rigid surveillance over it; and, nature has helped keep things clean by having located the resource that is the industry's foundation in an area where it has been relatively easy to stay safe and sanitary. The Alaskan coasts where King Crab thrive are far removed from pollution sources. Temperatures there are relatively low and uninviting for bacterial growth. Sources of materials needed to keep clean — ample pure water, for instance — are frequent in that area.

When industry leaders started processing King Crab for U.S. markets two decades ago, they quickly learned that purity and quality were very necessary requisites for a successful industry. They sensed that the U.S. markets were changing and that many types of products, including seafood delicacies, were being better received as fresh-frozen merchandise than in other forms, principally canned products. And this change, they realized, required departures from the oldtime "fish monger" methods of preparing for markets.

Perishable items such as shellfish were subject to "spoilage" and worse if not handled with utmost propriety and skill. Besides, in most of the market areas where seafood delicacies were popular — areas like New York City, Washington and Boston — there were strict laws that were rigidly enforced to keep out all but the best products. And without access to these markets they could not hope to successfully process and sell their products. So, the pressures for quality and purity entered the King Crab fishery early in the game.

All measures and cautions for maintaining an extremely high-standard product were not learned or instituted at the outset of the industry, of course. These were achieved and perfected over a decade in which the industry grew from fledgling to the approach of its full growth.

Today all parts of the industry are careful to process only freshly killed crabs. Only live crabs are accepted from fishermen and they are kept alive at processing plants until moments prior to being butchered and processed — and the process starts with cooking.

The fishermen must keep the crab alive in circulating seawater from the time they are caught until they are delivered at the processing plant. To do this, their vessels are equipped with special tanks filled with constantly circulating seawater. Temperatures of water in these tanks are carefully guarded so that bacterial growth is not promoted. The tanks must be constructed of materials that will not absorb or harbor germs (stainless steel, aluminum or fiberglass reinforced plastic) and they must be cleaned constantly. Also, vessels with crab aboard are not moored or anchored in waters of a harbor where there is a chance of contamination getting into their circulation systems. If they have to pass through such a harbor they must temporarily stop their circulation pumps.

At the plants the crab are transferred to other storage tanks where similar precautions are maintained.

King Crab are started through processing procedures while still alive. They are butchered and completely eviscerated in a matter of seconds from a live state and are then immediately cooked under conditions that reduce chances of contamination to the smallest possible factor.

Meat extraction from crab shell, or the preparation of "in-shell" sections, as the case may be, is done immediately after cooking — before the product has had a chance to chill, in fact. Mechanical means are used to separate meat from shell.

In order to eliminate chances of bacterial contamination, each step in processing is done in separate rooms or compartments; all equipment is made of stainless steel or similar impervious material; machinery is designed so that constant flows of water maintain cleanliness and each item is constructed so that it has no "traps" in which contaminants can build up; all water that is used in the plant is sterilized with chlorine treatment; and workers involved in processing or handling are required to adhere to rigid sanitary practices.

Each plant that processes or participates in handling King Crab products is inspected regularly and frequently by state and federal sanitarians and the industry itself has a program of internal scrutiny against conditions and practices that could make it possible to produce substandard products.

Through the state-sponsored King Crab Marketing and Quality Control Board, there is also maintained a continuing inspection of the products of all processors in Alaska. The Board has promulgated legal standards for all King Crab production which are aimed at maintaining quality as well as purity. Levels of tolerated impurities exceed those of all other governmental requirements.

To make these standards meaningful, a system of constant checking against infractions, accidental or otherwise, is maintained. The daily King Crab meat production of each plant that employs freezing as its processing medium must be sampled and submitted for bacteriological examination as well as for adulterating qualities that may not be toxic / but are otherwise objectionable — for instance, the presence of shell particles, too much moisture, etc. These samples are examined by technicians employed by the operators, then by independent laboratory scientists, and the results are then reviewed by the State Quality Control Board which has summary police powers that can close down operations for quality or purity violations.

A similar system is also in effect with the production of "in-shell" crab. And canned crab meat is similarly given rigid scrutiny in a program that coordinates functions of the State Board with operations of the U.S. Food and Drug Administration and the industry-sponsored National Cannery Association.

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