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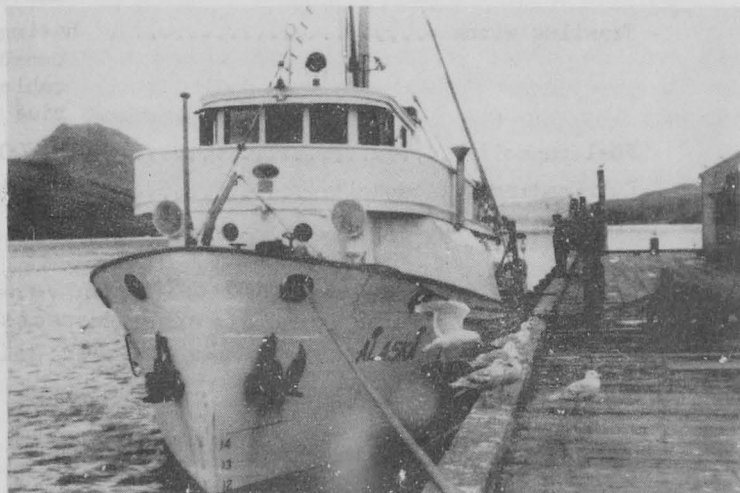
EXPERIMENTAL FISHING TRIP TO BERING SEA

By Joseph E. King*

INTRODUCTION

The motor vessel Alaska, property of the Reconstruction Finance Corporation and operated by the Pacific Exploration Company, left Astoria, Oregon, on July 21, 1947, to fish for king crabs in Bering Sea. Aboard were 13 men: the master of the vessel, a chief engineer, an assistant engineer, a cook, six fishermen, a representative of the International Fisheries Commission, a cannery technician from a commercial West Coast packer, and the author who served as observer for the Fish and Wildlife Service.

The objectives of the trip were several. The crew's chief aim, of course, was to make a profitable trip in as short a time as possible and return to the home port. The International Fisheries Commission desired to learn more of the size, movements, distribution, and abundance of



THE ALASKA TIED UP AT THE DOCK AT FALSE PASS, ALASKA

halibut in Bering Sea and had an agreement with the Pacific Exploration Company whereby all live halibut taken incidental to crab fishing operations were to be tagged and released by a representative of the Commission. The Fish and Wildlife Service hoped to supplement the information gained earlier by the studies^{1/} of the Alaska Crab Investigation pertaining to the size, distribution, and abundance of the king crab and bottom fish in Bering Sea. All the above groups were interested in determining whether or not a vessel of the type and size of the Alaska could operate satisfactorily and with profit in Bering Sea.

A condensed log of the trip follows:

Left Astoria, July 21; arrived south side of Alaska Peninsula, July 27; made three test drags, then proceeded through Unimak Pass to Bering Sea; en-

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1/ "The Alaskan King Crab," Fishery Market News, May 1942 - Supplement, Vol. 4, No. 5a, U. S. Fish and Wildlife Service.

Note: Detailed tables giving data recorded for each drag made in Bering Sea and south of the Alaska Peninsula; catch for each drag in actual numbers of crab and halibut and estimated pounds of cod, pollock, and flounders; weight distribution of male and size distribution of male and female crabs, halibut, cod, pollock, yellowfin sole, flathead sole, rock sole, lemon sole, and herring; air, water surface and bottom temperatures in degrees Centigrade taken in the fishing grounds; and list of fishes collected or observed in the Bering Sea trip will appear as an appendix to this article when it is published as Fishery Leaflet 330.

gaged in trawling in Bering Sea from August 1 to September 5; made twelve additional drags on the south side of the Aleutian Peninsula; vessel then departed for Astoria, arriving September 16.

THE VESSEL

DESCRIPTION:

| | |
|--------------------------------|---|
| General type of vessel | trawler |
| Over-all length | 100 feet |
| Beam | 25 feet |
| Draft | 13 $\frac{1}{2}$ feet |
| Main engine | supercharged diesel, delivering 600 hp. at 400 RPM |
| Auxiliary engines | 2 diesels, 75 hp., each with power take-off for driving trawling winch, and each driving a 220 v. generator |
| Trawling winch | having two main spools each with a capacity of 500 fathoms of 5/8-inch cable (on this trip the vessel car- ried 450 fathoms on each spool) |
| Fuel capacity | 17,700 gallons |
| Lubricating oil capacity | 1,200 gallons |
| Fresh water capacity | 2,240 gallons |

As crab legs are very light and bulky, the vessel was never carrying sufficient weight to be properly trimmed. In all other respects, the Alaska was quite seaworthy and performed very well in heavy seas whether going into the wind or before the wind.

MISCELLANEOUS EQUIPMENT ABOARD THE VESSEL:

- 1 - Radio-telephone, 65 watt
- 1 - Radio-direction finder
- 1 - Sonic depth finder, non-recording type

A 125- or 150-watt radio-telephone would have been much more satisfactory than the 65-watt set. On many occasions, perhaps due to atmospheric conditions, the operator could not contact shore stations or other vessels within 150-200 miles.

The radio-direction finder was of little value when fishing in the eastern Bering Sea area, as the Alaska was beyond the accurate range of the beacons which serve that region. Within 100 miles of the beacons, however, it was very useful.

The fishing would have been greatly handicapped without a sonic depth finder. The one aboard the vessel operated very well in good weather but did not function properly when the vessel was heaving and pounding in rough seas. Rolling did not throw the instrument off as much as pitching.

DESCRIPTION OF TRAWLS USED:

| | |
|--|---------------------------|
| Type of trawl | Eastern or North Atlantic |
| Number of new trawls at start of trip | 6 |

| | |
|---|--|
| Number of unused trawls at finish | 2 |
| Trawls completely torn up | 1 |
| Trawls in fair shape at finish | 3 |
| Foot rope | 118 feet in length, 5/8-inch cable |
| Head rope | 95 feet in length, 3/8-inch cable |
| Splitting strap | 1/2-inch cable |
| Dandylines | 17 fathoms in length, 1/2-inch cable |
| Buoyancy floats | steel, 7 inches, 19 to 20 in number |
| Bag rings | 3 inches, galvanized |
| Twine in body of net | No. 60 medium lay cotton |
| Cod end | 9 thread sisal, held together with hog rings |
| Mesh sizes (stretched mesh): | |
| Wings, square and belly of net | 6 inches |
| Intermediate bag | 4 1/2 " |
| Cod end of net | 5 " |
| Trawl doors | about 700 pounds each, 4 x 7 1/2 feet |

The trawls used functioned quite satisfactorily when towed at the proper speed and under normal weather conditions. When the sea became exceptionally rough, the catch would drop off. It was assumed that the net was not hugging the bottom and fishing properly.

The normal towing speed was 2 to 3 knots with the main engine at 200 to 220 RPM. If the rate were increased to 260 RPM, the net would not remain on the bottom.

THE REFRIGERATION SYSTEM:

- 2 compressors, 2-cylinder, vertical type, size 5" x 5". Driven by 2 motors, 20 hp., 220 v., 60 cy., 3 phase.
- 1 pump, cooling with ammonia.
- 2 pumps, vertical centrifugal, for brine agitation.
- 2 tanks, for sharp freezing, each of approximately 1,100 cubic feet of space and located about midway on port and starboard sides of the vessel. Each tank containing 582 feet of 1 1/4" ammonia refrigeration coils on walls, and 2,660 feet of 1 1/4" shelf coils.
- 1 hold, main or forward, containing approximately 14,735 cubic feet of space and 2,212 feet of 1 1/4" ammonia refrigeration coils.
- 1 hold, aft, of approximately 12,500 cubic feet of space and containing 1,892 feet of 1 1/4" ammonia refrigeration coils.

CRAB COOKING EQUIPMENT:

- 1 Steam generator, approximately 3-4 hp. capacity.
- 1 Cooking tank of 3/8" steel insulated with 1 1/2" wood planking. Cover in four sections of 1 1/2" plank. Inside dimensions of tank--94" long x 35 1/2" wide x 38" deep. Bottom of tank contains about 63 feet of 1 1/4" steam piping.

AREAS FISHED AND GENERAL RESULTS

Most of the fishing of the Alaska was performed in an area about 50 miles in length (SW-NE) lying 30 to 60 miles offshore between Port Moller and Black Hills, in the outer portion of Bristol Bay. This was one of the areas explored by the Alaska Crab Investigation in 1941. Upon leaving Bering Sea after 36 days of fishing, the vessel had a total catch of 14,172 crabs (approximately 50,000 pounds of crab legs), for an average of 107 crabs per drag. The bulk of the catch came from the general area indicated above and shown in Figure 1. The prospecting done in

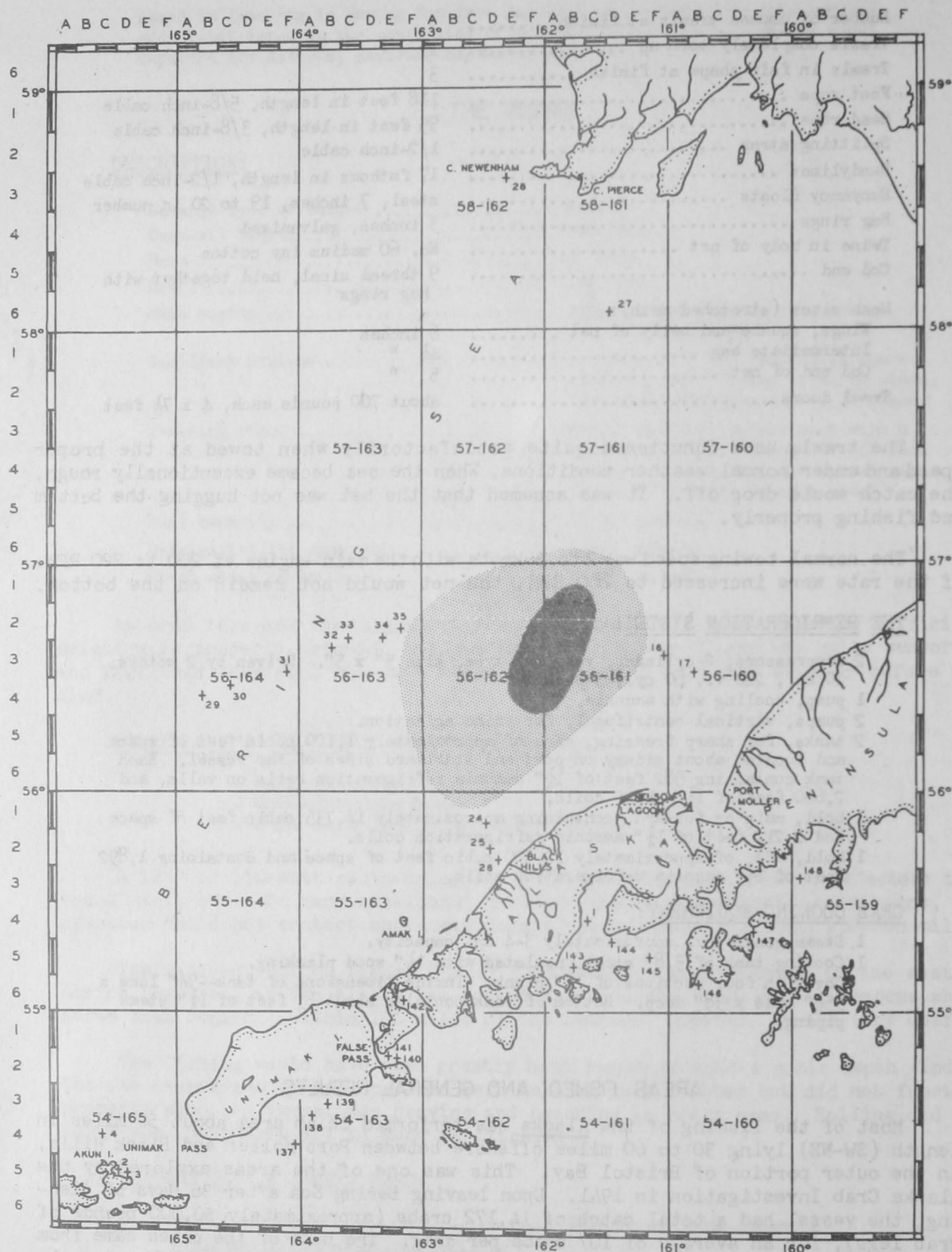


FIGURE 1 - FISHING OF THE ALASKA WAS PERFORMED IN AN AREA ABOUT 50 MILES IN LENGTH (SW-NE) LYING 30 TO 60 MILES OFFSHORE BETWEEN PORT MOLLER AND BLACK HILLS, IN THE OUTER PORTION OF BRISTOL BAY.

Bering Sea outside this area and on the south side of the Peninsula accounted for a very small percent of the catch and was quite unprofitable fishing. Table 1 presents the catch of crabs and major fish. While the numbers given for crabs

Table 1 - Catch of Crabs, Halibut, Cod, Pollock, and Flounders

| Area | C r a b s | | | | Cod | Pollock | Halibut | | Other Flounders |
|----------------------------------|-----------|---------|--------|--------------------------------|--------|---------|--------------------|---------------------|--------------------|
| | Males | Females | Total | Average per hrs. Fishing | | | Med. ^{1/} | Small ^{2/} | |
| | No. | No. | No. | | | | No. | No. | |
| Bering Sea | 13,332 | 840 | 14,172 | 52.9 | 42,800 | 37,925 | 98 | 336 | 98,285 |
| South Side of Peninsula | 37 | 7 | 44 | 2.4 | 2,560 | 135 | 46 | 271 | 6,925 |
| Total | 13,369 | 847 | 14,216 | 47.7 | 45,360 | 38,060 | 144 | 607 | 105,210 |

^{1/}Fish 10 pounds and over (heads off).

^{2/}Fish under 10 pounds, including legal-sized chickens (5 to 10 pounds) and babies less than legal size (under 5 pounds).

and halibut are actual counts, the poundages for the balance of the catch are estimates based on the concensus of opinion of several members of the crew.

The entire catch was taken by trawling. No tangle nets or other types of gear were used.

The apparent scarcity of halibut in Bering Sea was disappointing, both to members of the crew and to the International Fisheries Commission, but the vessel may not have been operating on the most abundant grounds. As indicated by the length frequency distributions of the 434 halibut taken in Bering Sea and the 317 from the south side of the Peninsula, the average lengths of these fish are considerably less than those normally taken by the commercial fishery. As most of these fish were alive when brought aboard, those over 65 cm. total length were tagged and released while the smaller fish were measured and released without tagging. Not more than a dozen halibut classed as medium-size by market standards were frozen during the entire trip. The catch of baby halibut (under 5 pounds) was a very significant part of the catch. According to the International Fisheries Commission, of the 317 fish taken on the south side of the Peninsula, 72 percent by number were under 5 pounds, and that of 434 halibut taken in the Bering Sea proper, 44 percent were under 5 pounds.

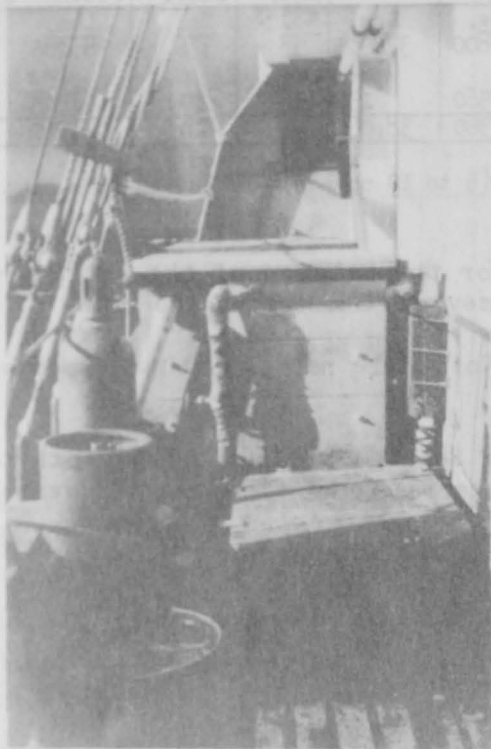


LOOKING FORWARD ON THE ALASKA; BUTCHERING TABLE IN THE FOREGROUND BEARING TWO BUTCHERING KNIVES, TRAWLING WINCH LOCATED JUST BEYOND; IN THE PORT-SIDE WALKWAY THE OPENING TO THE SHARP FREEZER CHAMBER, THE COOKING TANK, AND THE COMPARTMENT HOUSING THE STEAM GENERATOR.

The other species of bottom fish taken in Bering Sea were mainly the yellow-fin sole (Limanda aspera), cod (Gadus macrocephalus), Alaska pollock (Theragra chalcogramma), and rock sole (Lepidopsetta bilineata). The flathead sole (Hippoglossoides elassodon), arrow-toothed flounder (Atheresthes stomias), and lemon

sole (Pleuronectes quadrituberculatus) were taken in lesser abundance. During the limited work south of the Alaska Peninsula, a higher proportion of flathead, lemon, and sand sole, and a lower proportion of the yellowfin sole, cod, and pollock were found.

Most of the yellowfin sole taken in Bering Sea and south of the Peninsula were thin-bodied fish and below the size desired for filleting by the present market at Seattle. The flathead sole taken in Bering Sea were also small and comprised a smaller portion of the catch than south of the Peninsula. In the latter area, many of the flathead sole were of marketable size, and in some locations, appeared to be the most abundant flat fish. The lemon sole taken were a thick-bodied fish but did not constitute a substantial portion of the catch in either locality. Flounders (Platichthys stellatus) were taken south of the Peninsula but none were encountered in the area of operations in Bering Sea. The majority of the rock sole taken in Bering Sea were small in size. This species constituted only a minor portion of the catch in the few drags made on the south side.



NEARER VIEW OF PORT-SIDE ARRANGEMENT SHOWING ENTRANCE TO SHARP FREEZE CHAMBER, COOKING TANK, AND STEAM GENERATOR COMPARTMENT ON ALASKA.

The pollock accounted for a substantial portion of the catches in the deeper waters of Bering Sea and may have commercial possibilities.

During the course of the trip, between 90 and 100 tons of cod, pollock, and flounders were discarded. The demand for these fish at the time was such that it did not pay the fishermen to spend valuable time in dressing and freezing them. A great amount of work had to be expended, however, in clearing the decks of this waste.

It has been suggested that in operations where the chief objective is to catch crabs, some modification of gear, such as cutting back the head rope and enlarging the mesh size, might be employed, which would increase the escapement of these presently undesired fish. It is quite possible, however, that at some future time, the economic factors of supply, demand, and cost of production, which greatly influence the development of a fishery, may be changed so as to encourage the utilization of these fish.

It is recognized that the statements above pertaining to the relative size and abundance of crabs and fish are based largely upon observations made in a limited period of time and area. They represent conditions, however, as found in that portion of the Bering Sea at that time of year. As the major fishing effort of the Alaska was concentrated in a relatively small area lying off the Black Hills and chiefly at depths from 30 to 50 fathoms, it was certainly possible that large concentrations of both crabs and fish may have been missed. In view of the fact that the Alaska was being operated on a test commercial basis, it was not feasible to spend considerable time in pure exploration. Therefore, after a few exploratory

drags, the remainder of the time was spent on the grounds which were found to provide the most profitable fishing. This particular area was described in the Service's report, "The Alaskan King Crab," as being one of the richest grounds located during that investigation. This agreed also with the experiences of the other crab fishing enterprises which were conducted in Bering Sea in the summers of 1946 and 1947. Also, the Alaska and the other vessels were operating in the area at the time of year recommended by the Alaska Crab Investigation, and all have reported generally similar experiences.

MISCELLANEOUS BIOLOGICAL OBSERVATIONS

THE KING CRAB: Very young king crabs were taken in only one drag. This was made close to the beach in 18-21 fathoms and netted 5,000 to 10,000 young of 2.5 to 3.5 cm. in carapace width. The width and length measurements were nearly identical in most of those measured. The sexes were apparently of equal numbers and similar in size.

In another drag made offshore in Bering Sea at a depth of 37 to 47 fathoms, the catch included 40 large male crabs and about 100 small males and females of 2½ to 3 inches carapace width. None of the small females were carrying eggs. Crabs of this size were not encountered in the deeper offshore waters. In four other drags, at depths from 26 to 37 fathoms, the sex ratio was about equal and, in many cases, the females were in the majority. At depths from 38 to 40 fathoms, the catch was nearly all males, a desirable feature from a commercial viewpoint.

All females of adult size taken during the expedition were carrying eggs. No individuals of either sex were observed in a stage indicating a recent molt or an approaching molt.

The females were one-third to one-half smaller in weight and size than the males. The crabs taken south of the Peninsula were definitely larger than those from Bering Sea.

A great number of crab stomachs were examined and found to be either empty or containing a small amount of material difficult for analysis. The animal's mandibles and gastric mill are exceedingly efficient. The most frequently identified objects among the stomach contents were fragments of brittle stars, and small clam shells, scale worms, pieces of sponge, and body parts of other small crabs.

According to the work of Marukawa,^{2/} three species of king crabs occur in the cold waters of the northern Pacific, Paralithodes camtschatica, P. platypus and P. brevipes. Only P. camtschatica was included in the catches of the Alaska, as far as could be determined.

^{2/}Marukawa, Hesatoshi. 1933. Biology and fishery research on Japanese King Crab, Paralithodes camtschatica (Tilesius). Jour. Imperial Fisheries Experimental Station, No. 3, March. Tokyo.



A CREW MEMBER HOLDING A SPECIMEN OF A KING CRAB.

FEEDING HABITS OF SOME OF THE COMMON FISH

No attempt was made to analyze stomach contents on a quantitative basis but whenever time was available, fish of different species were examined. For example: rock sole--found to contain sea cucumbers, echiuroid worms, and scale worms; yellowfin sole--contained small clams and amphipods; cod--an omnivorous fish, contained remains of such other fish as flounders, sea poachers, herring, pollock, etc., also crabs, shrimp, and tunicates; pollock--those examined contained mostly shrimp and a few small fish.

CRAB BUTCHERING AND PROCESSING

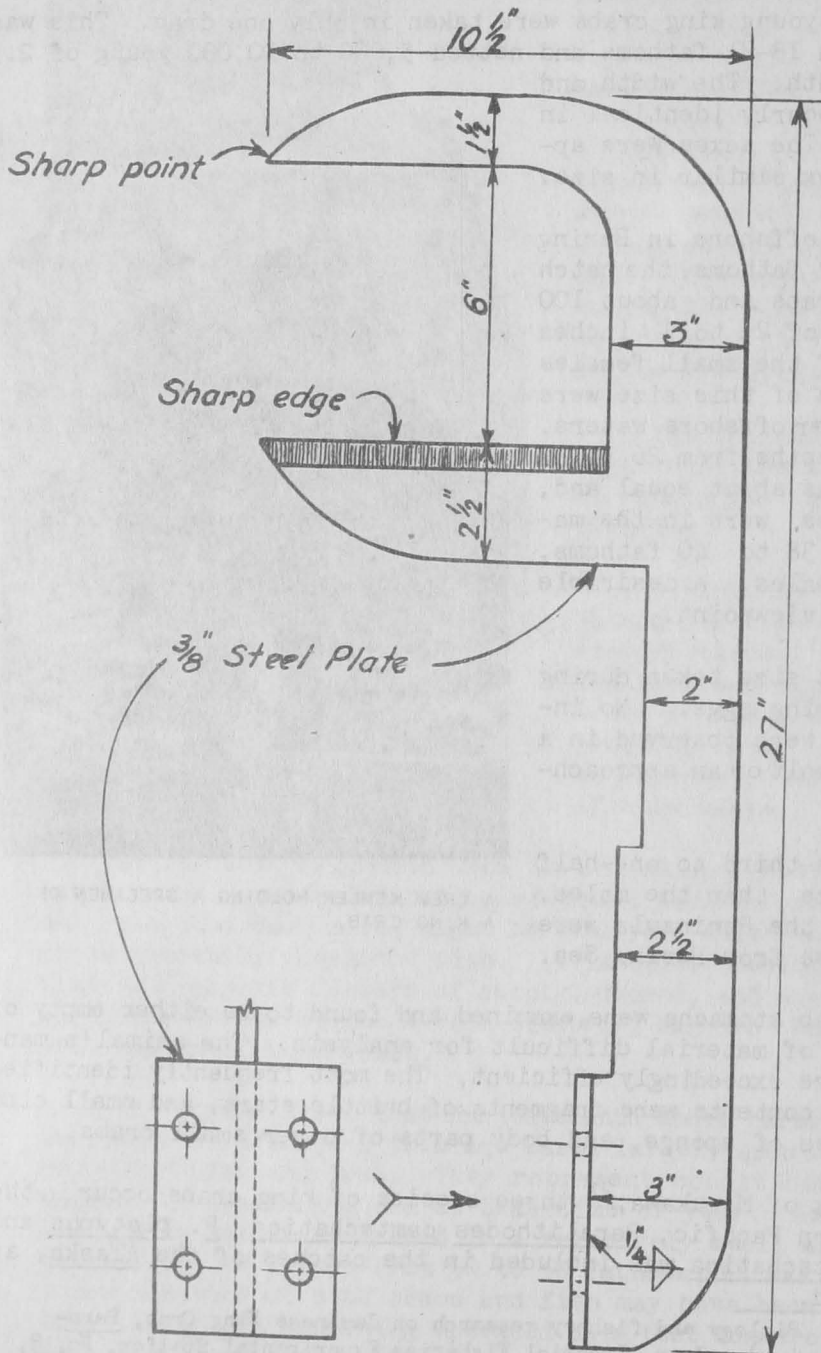


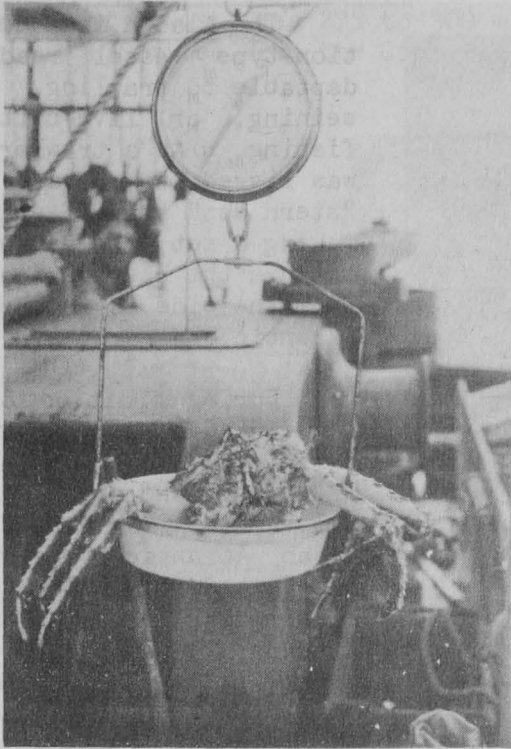
FIGURE 2 - DRAWING OF THE TOOL OR KNIFE USED IN BUTCHERING THE CRABS.

When the contents of the bag were dumped on deck at the end of each drag, the crabs were picked out and thrown onto the butchering table which was actually the raised hatch cover of the main hold. The carapace was removed by hand with the assistance of the butchering tool shown in Figure 2. The ventral part of the body was broken in the mid-line over the sharp edge of this tool and the remaining gills and other undesirable material were cleaned from the bases of the legs. The legs were then washed and stacked in wire baskets until enough were collected for a cook (about 200, depending on size). The average rate of butchering was about 53 crabs per man per hour.

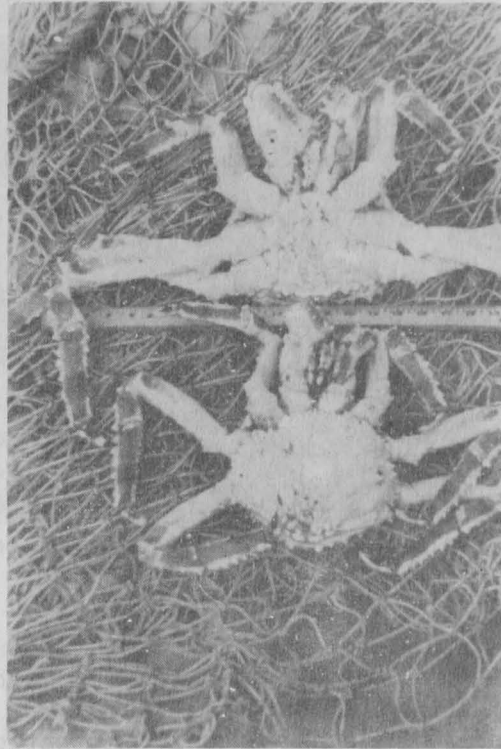
The crabs were cooked in boiling sea water for 17 minutes, quickly cooled by running sea water through the tank for 20 minutes, then removed by hand and replaced in wire-mesh baskets, (31 1/2" x 17 1/2" x 4"). The capacity of each sharp freezer was about 60 baskets holding the legs of 600 crabs. About one-half hour was required to

load each freezer. The temperature of the freezer varied from -12° F. to -4° F. and the crabs were usually left in the freezer about 12 hours.

At the end of this time, the baskets were passed into the forward cold storage room where the crab legs were glazed by dipping the baskets twice in fresh water. The legs were then stowed in side bins and at intervals during the trip were sprinkled



AN ABOVE-AVERAGE SIZE MALE KING CRAB.



MALE KING CRAB ABOVE WITH TRIANGULAR-SHAPED ABDOMEN; FEMALE BELOW WITH BROAD FAN-SHAPED ABDOMEN.

with water to maintain a heavy glaze. The temperature of the cold storage holds remained at 10° F. to 12° F. At the end of the trip, the catch appeared to be in excellent condition.

On August 8, for experimental purposes, 28 crabs were weighed, cooked in the whole state, weighed again, butchered, and then the legs weighed. The live weight was 305.55 pounds, the final butchered weight 150.25 pounds, thus indicating a 51 percent loss in weight resulting from the cooking and butchering processes.

OPERATING PROCEDURE OF CRAB COOKING EQUIPMENT

Steam was generated in boiler until 75 pounds of pressure was reached, which required about 10 minutes. Steam was then turned into pipes in the cooking tank, at which time pressure immediately dropped to 25 pounds where it remained during the cooking process. About 2 to $2\frac{1}{2}$ hours were required to heat the water to boiling. The tank was usually about two-thirds full of boiling water when the crabs were introduced. Capacity of tank was about 200 crabs, depending on their size.

The water would not stay in the tank in rough weather even with the tank cover in place. On a few occasions, the person loading the tank with crabs received minor

burns from boiling water splashing out of the tank. At times, it was necessary to heat two or more tankfuls of water in order to have enough remaining to cook the crabs. The cooking procedure might have been rendered less hazardous by the use of a closed retort rather than an open tank.

SUITABILITY OF VESSEL FOR FISHING OPERATION



TRAWL DOOR BEING FASTENED IN PLACE AT END OF DRAG ABOARD ALASKA.

same locality. On several occasions when the weather, the Deep Sea was fishing nearby and being, mainly, that on the latter vessel, the men handled the gear amidship, protected from following seas by the wheel house astern; also with the "side set" type of operation the entire net is not hauled aboard after each drag and, what is probably more important, the bag does not swing pendulum-like from a high boom when it is being lifted aboard. Some of the men barely escaped injury on several occasions when trying to get the bag aboard and dumped during rough weather. With no protection astern, high seas sometimes came aboard adding to the difficulties.

During the first week in September, weather conditions became such that even the Deep Sea had to stop fishing. When weather permitted, however, the Alaska, with her type of gear, seemed to take just as many crabs per drag as the other vessel.

There is considerable question as to whether or not vessels of this size, 100 feet and 130 feet, can profitably engage in the Bering Sea king crab fishery as a year-around enterprise. It is generally conceded that after October 1, weather conditions in Bering

The Alaska is a combination-type vessel readily adaptable to trawling, purse-seining, or live-bait tuna fishing. As a trawler, she was rigged to operate with a "stern set" type of gear. In making a set, the net was put out over the stern rather than from the side as in the North Atlantic draggers.

During conditions of very bad weather, such as was experienced in the latter part of August, the vessel did not prove nearly as satisfactory as an Atlantic-type dragger, the Deep Sea, which was also fishing for king crabs in the



THE ENTIRE NET WAS TAKEN ON BOARD AT THE END OF EACH DRAG AND LAID-OUT ON THE STERN IN PREPARATION FOR THE NEXT DRAG.

Sea are such that if fishing is attempted, much time will be wasted regardless of type of gear, and that in the event of a severe storm there is no adequate shelter.

HAZARDS TO FISHING ENCOUNTERED IN BERING SEA

NEED FOR NAVIGATIONAL AIDS: The most profitable fishing area, as found in the month of August, was 275 to 300 miles from the St. Paul marine radio beacon and about 175 miles from the Cape Sarichef station. As the accurate range of



THE TIE-ROPE IS JERKED AND THE BAG EMP-TIED. SHOWING THE TYPICAL CATCH OF COD, POLLOCK, AND A FEW CRABS.

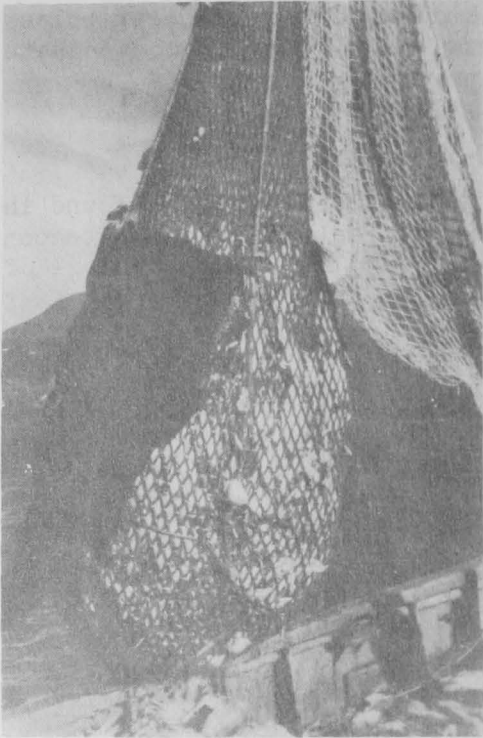


HOLDING THE NET CLEAR AS THE BAG IS DUMPED.

these stations is only 100 miles, they were of little value in determining the vessel's position. If a more active fishery should develop with more vessels using these waters, there would be a definite need for radio beacons nearer the fishing grounds.

Because of the almost continual fog in late summer, land is seldom sighted. Also, the drift due to strong tidal currents is considerable. As a result of these factors, vessels must depend upon sonic devices, loran, or radio fixes in addition to dead reckoning.

LACK OF PORT FACILITIES: The only port on the Bering Sea side of the Peninsula within a reasonable running distance of the fishing grounds tested is Port Moller. This port is reached through a shallow channel which, at present, is buoyed only by the local fishermen each season. The captain states that it is hazardous for a boat to be at the cannery dock when a strong southwest or southeast wind is blowing. Although adequate for the existing salmon fishery, if a substantial offshore fishery



HOISTING THE BAG ABOARD. COWHIDE CHAFING GEAR WAS USED TO PROTECT THE BAG FROM ABRASION.

should develop in the area, additional docking space and facilities would be necessary.

IMPEDIMENTS TO TRAWLING: The area tested has, in general, a very good bottom for trawling. The bottom material is of grey volcanic sand or ash, with occasional patches of mud. On four of the drags, snags were encountered, probably rocks, which resulted in bad tears in the net and loss of at least part of the catch. In two other drags, tons of a peat-like material were picked up in such mass that the net could not be lifted aboard the vessel. On 16 drags, dense colonies of a stalked ascidian were encountered which, in some instances, completely clogged the net and greatly interfered with its effectiveness. During two other drags, several thousand pounds of sponges having a very foul odor were picked up and it was quite a chore to dispose of them.

OTHER OBSERVATIONS ON WEATHER CONDITIONS:

During the first two weeks of August, fine fishing weather was experienced in Bering Sea. There was some fog every day, and light rain on frequent occasions, but the sea was relatively calm. In the latter part of Aug-

ust and the first week in September, there were several strong blows reaching gale proportions. Hail and snow fell a few times and it appeared that winter had arrived. The more severe storms were accompanied by winds from the southwest or northwest. On August 31, during a heavy southwester, the anchor line parted resulting in the loss of the vessel's only sea anchor.

While in Bering Sea and the North Pacific, air temperatures were recorded three times daily: in the early morning, noon, and late afternoon. In Bering Sea, during the period August 1 to September 5, the minimum recorded was 43° F., the maximum 64° F., with the average for the period being 51° F.



CRAB BUTCHERING IN PROGRESS AT RIGHT. THE MEN ON THE LEFT ARE CLEANING GILLS AND OTHER ORGANS FROM THE BASES OF THE LEGS. IN THE BACKGROUND, MAN IS PICKING CRAB MEAT.

IN SUMMARY:

Period spent in Bering Sea
Total number of days

-- August 1 - September 5
-- 36

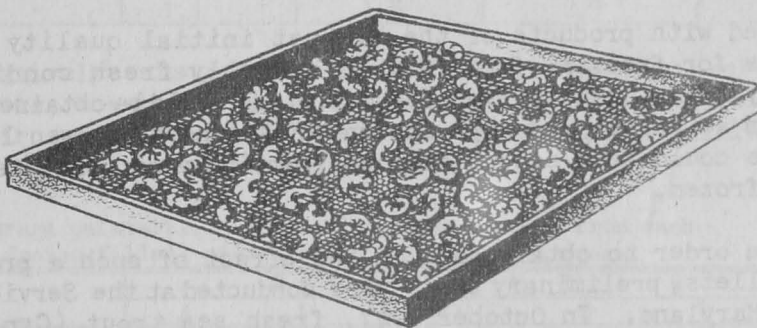
| | |
|---|-------------------|
| Days on which sun shone at least part of time | -- 10 |
| Days on which rain fell | -- 20 |
| Number of days spent in port | -- $4\frac{1}{2}$ |
| Fishing time lost due to bad weather--hours | -- 105 |

BOTTOM TEMPERATURES: At intervals, when conditions permitted, the temperature of the water near the bottom was obtained by means of a reversing thermometer. In general, the lowest temperatures were found in the deepest waters, which was to be expected. On the best crab fishing area, the bottom temperatures ranged from 3°C . to 4°C . The best drag, yielding 502 crabs, was made in water of 41-45 fathoms with a bottom temperature of 3.01°C . Crabs were taken from waters with bottom temperatures ranging from 1.65°C . to 7.25°C . Air and water surface temperatures were taken at each station where the bottom temperature was obtained.



SMOKING SHRIMP

Smoked shrimp are cooked shrimp which are smoked for additional color and flavor. Shrimp smoked in the shells retain their flavor and texture, and remain moist--a desirable condition. When lightly smoked, the shells should have a light reddish-brown color and the meats should be sweet with a faint trace of smoke flavor. To satisfy some preferences, however, shrimp may be given longer processing to impart a heavy smoke flavor and dark color.



Drying of the shrimp on the trays should be rapid, if necessary using an air-draft created by placing fans in front of the trays.

The yield should approximate about 60 percent; that is, 100 pounds of headed green shrimp should yield about 60 pounds of cooked smoked shrimp.

Shrimp may be smoked after the shells are removed, but the finished product is usually dry-textured and bitter, and the yield is smaller.

Smoked shrimp can be stored satisfactorily at temperatures under 40°F . for 2 to 3 weeks, depending upon the degree to which the shrimp were smoked. Smoked shrimp are perishable and should be refrigerated at all times.