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THE CHESAPEAKE BAY CRAB INDUSTRY

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INTRODUCTION

The crab industry of the Chesapeake Bay area, though one of the youngest seafood industries on the Atlantic Coast, ranks high in importance. Its growth seems striking when one remembers that its beginning can scarcely be placed earlier than 1875. About that time, certain merchant pioneers saw wider market possibilities for the Chesapeake Bay blue crab, Callinectes sapidus. They began to offer crab meat ready-picked from the steamed hard crab, as well as soft crabs[1/] shipped to reach the consumer alive.

UNLOADING HARD CRABS AT HAMPTON FROM A MOTORBOAT EQUIPPED WITH A PATENT DIP TROTLINE

It is difficult to believe that the traffic in soft crabs, in particular, is so recent. While soft crabs are today one of the most sought after and highest priced seafood delicacies in America, evidence shows that less than a century ago they were not nearly so popular. In Europe today, even, they are almost unknown. An American cookbook of 1887 refers to them as "often quite cheap" and prescribes the best known way at that time of keeping them alive till eaten--wash in cold water every day, also wash the eel grass they are packed in. Refrigeration is not mentioned! Some years ago, when the Williamsburg Restoration made an intensive search for Colonial Virginia recipes, a great number were found for many varieties of foods, including crab meat. But there was none for soft crabs.

Nutritionists recommend the blue crab because of its high mineral value. Its iodine content is among the highest of any food; also present are potassium, calcium, iron, copper, and phosphorus. Thiamine, riboflavin, and ascorbic acid are found. The ash is of high alkalinity.

Statistics showing the condition of the Chesapeake Bay crab industry in its infancy are not sufficiently complete to provide a thoroughgoing comparison with today. In 1886, however, the drain on crab resources was already beginning to be felt. In a statement dated that year, the Commissioner of Fisheries for Virginia, referring to the industry as "but a few years old," recommended a partial curb on crabbing by the prohibition of dredging. Crabs were declared to be economically more important than oysters in the Tangier-Crisfield area. Enterprising shippers about this time began to send fresh cooked crab meat west of the Mississippi. Crabbers were steadily increasing in numbers.

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1/ A soft crab is a crab which has shed its shell in order to grow and whose new shell has not yet hardened.

In view of the fact that good refrigeration, a necessity in the handling of cooked crab meat, was not to be counted on in the early days, it is not surprising to learn that crab meat was canned then to a larger extent than today. At the present time, canned Chesapeake Bay crab meat has almost disappeared from the market, but the fresh meat, packed in 1-pound cans and efficiently refrigerated is available throughout the country.

It may safely be said that with an industry attempting to build on the blue crab resource, severe fluctuations in supply were, and are, detrimental to a stable industry. The number of crabs in the Bay tends, for reasons not always clear, to be much less numerous some years than others. Conferences in which control measures have been discussed by fishery officials of the two States sharing the resource, Maryland and Virginia, have been held ever more frequently as the industry developed. It is indeed a nice question to determine how to have just the right amount of crabs present in the Bay each season. For, if too many crabs are caught (as when they are abnormally abundant), the price drops to the point where the crabber has little incentive and turns to another means of making a living. If, on the other hand, too few are caught (because of scarcity), the industry suffers by losing its market outlets.

In the production of fresh cooked crab meat, however, there is one factor contributing to stabilization--the crab picker. Crab picking is a semi-skilled occupation, the supply of pickers is relatively limited and those available desire year-round employment. During years of war and the meat shortage, crab meat producers might have sold more of their product if more crab pickers had been available. In several instances, we had the anomaly of crabs plentiful and cheap, and crab meat scarce and high. Shortage of pickers was the major factor in this condition. In this regard, it is noteworthy that the crab meat industry has never become mechanized, and real mass production is unknown. The devices introduced from time to time for handling crabs by machinery have not proved themselves practical. The latest step in this direction is a machine to remove meat from the crab claw. This has not yet met with general adoption. However, time studies have been made which indicate that it is possible materially to increase the output of crab pickers by the adoption of time-saving methods of extracting the meat.

With a well defined limit to production of the meat itself and with the ever present necessity of handling crabs as soon as they are landed, a limit frequently is placed upon catches in years of plenty. Crab dredge vessels, for instance, are instructed not to bring in more than a certain amount of crabs to the dock on pain of losing the surplus. Consequently, at such times the production of fresh crab meat ceases to be an accurate index of the supply of crabs.

The importance of some biological control of the Chesapeake Bay blue crab has been stressed by those most concerned. Control is said by some to hinge upon protection of the mother crabs about to spawn, called "sponge crabs." If these are taken without restriction, the argument goes, a decrease in crabs follows. But it has also been shown that weather plays a most important part in survival. The consensus is that more study is needed, and the fisheries laboratories of Maryland and Virginia have allowed an important place for such study in their programs. The publications of these agencies yield some of the most valuable information available on the Chesapeake Bay blue crab.

A hint of what the crab industry means to Chesapeake Bay economically may be briefly set forth.

In 1947, in Virginia, 109 crab businesses operated, ranging from one-man firms shipping perhaps 500 dozen soft crabs, or 50 barrels of hard crabs per season,

up to picking houses working the year-round and producing 100,000 pounds of crab meat annually, at an average of $1.00 per pound. Similarly, in Maryland, there were 134 such businesses. During warm weather, the soft crab industry enters the picture. Its season is limited to about four months. Contemporary statistics show the soft crab catch of Chesapeake Bay to be five times that of the entire coast from North Carolina to Texas. The hard crab production of the latter area does not substantially surpass that of the Chesapeake. Year-round employment is offered to an estimated 1,000 people, and seasonal to 3,500 more.

CAPTURE

A number of methods of taking crabs, more methods perhaps than for any other one creature of the sea, are in use in Chesapeake Bay. Two of them have been patented. Such methods range from dredging, which usually requires a boat of 5 net tons or more, carrying heavy dredges and a crew of four or five men, down to a lone youngster without a boat, wading over the river flats with a home-made push net. There are incidental catches also, as when soft crabs are caught in shad gill nets, and hard crabs in pound nets, haul seines, eel pots, catfish pots, oyster tongs, and by hand lines. For that matter, every fishing gear known in the Bay has brought in crabs at one time or another.

Described below are the best known and most used ways of capturing crabs. Some, like the dredge and crab pot, are limited in their activity by law; others only by the nature of the crab itself. "Average catch" means the catch reasonably possible in an average year.

The Dip Net

The dip net is a ring or "bow" of $\frac{1}{4}$-inch iron, 1 foot in diameter, to which a net, usually hand-woven of cotton twine, is attached. It is set on a pole handle about 8 feet long and is used by the crabber as he stands on the bow of his skiff. Sometimes his skiff is "sharp ended." That is, each end is bow-shaped for quick maneuvering. Such skiffs are specially designed for soft crabbing. In shallow water, the fisherman poles the skiff with the handle end of the net until he spies a soft crab or peeler,[2/] which is usually resting on the bottom, almost indistinguishable to the inexperienced eye. With a swift motion, he scoops the crab up and, if it is a peeler, "nicks" its claws and drops it in a specially constructed "well" in the center of the skiff. Nicking the claws is important because it prevents the crabs from preying upon and destroying each other. It should be done with skill to avoid the wounding which might possibly cause death from bleeding. The correct method is to force out the movable prong of the claw carefully until it snaps at the hinge. The purpose of the "well," which is nothing but a live-car built into the skiff, with holes in the bottom for the free passage of water, is to insure the good condition of the crabs until they are delivered to the shedding house. The well is divided--one side for peelers, one for soft crabs.

Many dip netters carry a bottle of linseed or menhaden oil. When the water is ruffled by the wind so that visibility at the bottom is difficult, a few drops of oil will clear up the immediate area around the skiff.

The number of crabs caught by the dip net varies greatly. Weather conditions must be just right for maximum catches. The average may be placed at 5 dozen per day. Dip net crabbing is at its best in the calm of early morning, especially

2/A peeler is a crab which is about to shed its shell.

if the weather is clear and the tide low. Many crabbers arrive at the grounds before sunup; by noon, their workday is usually over.

The Push Net

WADING FOR SOFT CRABS. THE NETS ARE SPECIALLY ADAPTED FOR PUSHING OVER THE BOTTOM.

The push net is used while wading and serves to capture soft crabs hidden in the eel grass that often grows thickly on crabbing grounds. It resembles a dip net except that the iron bow is about twice as large and flattened where it is designed to come into contact with the bottom. As it is pushed, it becomes filled with everything in its path. As the crabber empties it, he removes any soft crabs or peelers and places them in his skiff or in the live-box floating in the water behind him, towed by a line fastened round his waist. Average catch is about the same as for the dip net with perhaps a shade of advantage to the dip net.

The Crab Scrape

The crab scrape is an efficient instrument for gathering soft and peeler crabs in water deeper than that worked by dip netters. Its use is necessarily confined to bottoms where leased oyster ground is not extensive. This limits it almost entirely to the eastern shore.

Fashioned like an oyster dredge, that is to say, a metal frame with a mesh bag attached, its drag bar, about 42 inches wide, is without teeth in order to prevent injury to the crabs it strikes and to keep it from digging too deeply into the bottom. Attached by ropes, it is pulled by a small powerboat. However, under some conditions, a sail is used. Sometimes two scrapes are operated per boat, and large vessels may operate three or four. One man can raise, dump, and cull the first scrape load, which together with crabs, contains grass, mud, and shells, while the second scrape is being dragged along by the boat at low speed. Scrapes have to be operated usually at high tide in order to accommodate the draft of the boat. Catches average 400 peelers per day per scrape.

The Crab Fyke

The crab fyke is an ingeniously simple and often productive device permitted by Virginia but not by Maryland. Essentially, it is a pound net designed for peeler crabs and constructed of galvanized poultry wire netting.

A wire fence or leader, 2 feet high, is staked out on flats frequented by peelers, running from high water mark out 50 or 60 feet to a preliminary inclosure which is followed by a funnel leading into a wire box or trap from 3 to 6 feet square. The box is not baited, but during favorable periods, several hundred peelers may be entrapped in one day. Some mortality occurs when "green" (as distinguished from "ripe") peelers or mature hard crabs attack the crabs in the process of shedding.

Because of certain specialized conditions surrounding their successful operation, such as shore-line contour and quality of bottom, crab fykes are not numerous in the Bay; only 700 were licensed in 1947. The average daily catch is 4 dozen crabs.

The Crab Haul Seine

Compared to other crabbing gear, crab haul seines have little popularity in the Bay. They may, however, be used to advantage--with or without a skiff or other boat--on shores where crab scrapes are impractical.

The net is like a miniature fish seine and is operated by two men wading. Its length averages 40 feet; its width, 3 feet; its mesh, about ½ inch. Weighted by chain at the bottom it has corks at the top and a pole at each end. It is dragged over the flats by hand and at intervals it is raised and the crabs removed and placed in a float, or the catch brought up to the shore. A yield of 100 crabs per day, principally peelers, is average for this gear.

The Crab Pot

The crab pot, invented and patented by B. F. Lewis of Harryhogan, Virginia, in 1938, is a box 2 feet square constructed of wire mesh on a rigid metal frame, divided into a lower or bait chamber which contains a cylindrical bait cup in its center, and an upper or trap chamber. The crab, attracted by the bait, enters, and in swimming upward after grasping at the bait, goes through the opening into the trap chamber and is imprisoned.

TAKING UP A CRAB POT.
RAPPAHANNOCK RIVER

General practice is to set the pot in water of about 4 fathoms with a buoy attached. In Maryland, each licensee is limited to 35 pots, in Virginia, to 50. Extensive restrictions have been placed upon pots by State laws to keep them from being destructive of small crabs and other marine life and to keep them away from navigation channels. One and one-half inch mesh is prescribed to allow undersized crabs to escape.

One man can fish a series of pots from one small boat. Average yield is between 2 and 5 barrels per day, with peelers ranging around 1 percent. Bait most frequently used is salted fish heads or menhaden. At times of bait shortage, crab potters have been known to discontinue crabbing altogether.

The fragility of the pot makes it liable to destruction in storms and very susceptible to corrosion from salt water. It is necessary to have new pots each season, except in those cases where they are tarred periodically; often replacements are required during the same season. They are usually constructed by the crabber himself and the cost is small--under $3.00 apiece. An estimated 60,000 were operated in 1947 in the Bay and its tributaries.

The Crab Dredge

If it were not for the crab dredge, fresh crab meat from Chesapeake Bay would not be available in the winter months. Cold weather sends crabs to deep water where they cease migration, and bury in the mud. The dredge is designed to capture such crabs.

A crab dredging vessel is usually among the larger class of bay fishing boats, say 5 net tons or more, and carries a crew of four or five men. It is usually diesel-

propelled and its two crab dredges are hauled by the same power. The dredge itself is a strongly reinforced triangular iron frame, with a meshed bag consisting of steel rings below and cotton twine above attached to a drag bar about 2 yards wide. Iron teeth 4 inches long are spaced along the under side of the drag bar. These teeth cause the dredge to dig into the bottom and collect most of the buried crabs in its path. Both dredges are operated at the same time, one on each side of the vessel. They are drawn by heavy chains which pass over rollers at the vessel's rail, thence to pulleys attached to a post at mid-deck, then below to the motorized windlass, which is controlled from the pilot-house. However, each dredge can be operated separately--while one is hauled aboard, the other continues dragging. Two or three men empty the dredge on deck and separate the marketable crabs from the debris, which is shoveled overboard.

In Maryland, winter crab dredging is prohibited except in two counties. In Virginia, it is limited as to area and season. Biological studies have indicated that hibernating female crabs choose waters of relatively high salinity, while males prefer it lower. Thus, males, to a great extent, escape dredge capture, since they remain in the rivers and in the upper Bay, where crab dredging is prohibited. The best legal grounds for crab dredging are in the saltier lower Bay and there the take is preponderantly females, most of which have been fertilized and would spawn in the following warm season.

Dredged crabs are sold by the barrel which contains about 100 pounds. A barrel yields about 12 pounds of meat. During a period of crab scarcity in 1947, the price, which normally stays around $5.00 per barrel, reached a record of $21 at the Crisfield docks. An average daily catch is 12 barrels (per boat or dredge).

The Trotline

The trotline is used when the water becomes warm enough for the crab to resume his activity in hunting food.

It is usually a line of 3/8-inch cotton twine varying in length according to locality and to what might be called the "crab biting rate," from 100 yards to 1 mile. At intervals of from 9 inches to 5 feet, chunks of bait which may be salted eel, some tough unmarketable fish like hogchoker, or meat, prices permitting, tripe or other meat scraps, are fastened by loops or occasionally, with short snoods. After the line is baited, it is anchored to the bottom and marked with a buoy. As it is fished (usually by one man in a small powerboat which is kept moving at low speed), it is pulled over a roller projecting about a foot beyond the gunwale. Crabs, once having taken the bait, usually hang on until near the roller. Then, they are scooped off and placed in barrels. Peelers make up from 1 to 5 percent of trotline catches; sometimes doublers (a mating pair) are caught. This happens when the male clutches the bait and brings his mate up the line with him. Mating females are in either the peeler or soft stage. The trotline is fished from end to end several times a day if the biting activity of the crabs warrants it. Other adjustments are made by the crabber according to conditions. The spacing of baits may be changed proportionately to the rate at which crabs bite; similarly, changes are made in the length of line. The average daily catch is 2 to 4 barrels. Higher catches are made with a trotline fished with a "patent dip." This rig is similar to the one just described, except that it permits faster movement of the boat, and lessens the labor of the crabber, since the crabs are removed from the baits automatically as they pass through a specially constructed net fastened by a brace to the boat's side. Patent dip trotlines are used principally in the deeper waters of the lower Bay from James River to Cape Charles. They average from 4 to 10 barrels a day with highest catches usually in November.

Trotlines are rebaited after each day's use, coiled in a barrel and well sprinkled with salt to be ready for setting early next morning. Crabs, it is widely believed, bite best in the early hours of the morning.

In order to comply with the legal minimum limits on hard crabs (5 inches), peelers (3 inches), soft crabs (3½ inches), most crabbers carry a small notched stick as a gauge. Occasionally, crabs as wide as 8 inches are caught.

MARKETING

Methods of marketing crabs differ, according to the kind of crab. Hard crabs are handled in a way that would be unsuitable if applied to soft crabs and peelers. Described below are the customary procedures.

The Buy Boat

Crabbing is practiced in many far-flung, relatively inaccessible sections of the Bay, which lack a central loading point. The "buy boat" and "run boat" solve the problem of transportation of hard crabs by visiting the crabbers individually on the crabbing grounds and buying their catch. They then transport their loads to the crab picking house. Although the terms "buy boat" and "run boat" tend to be used interchangeably, the strict meaning of the first is that the boat captain buys the crabs himself to sell where he wishes; of the second, the captain freights crabs and acts as buying agent for a dealer.

Crab industry centers, like Hampton and Crisfield, send out scores of such vessels to all parts of the Bay. When feasible, loads of crabs are transported by truck. Most crabs produced in the Maryland-Virginia Atlantic Coast area beyond the range of Bay vessels, are so handled.

Crab-transporting vessels are from 40 to 60 feet long with a capacity up to 100 barrels. When, as sometimes happens, the captains bid against each other in order to acquire a full load, the crabbers benefit from prices higher than they had anticipated. Buy boats may carry stores of bait to be sold to the crabber.

The Shedding House

The place where soft crabs are prepared for market is called the shedding house. It is always on the water front in a soft crabbing area and has a landing convenient for the small boats in which crabbers transport their catches. Moored nearby are the shedding floats or live-cars in which peelers are retained until they shed their hard shell. Floats are home-made, with a rough plank bottom and laths on the sides. They are about 12 feet long and 4 feet wide, and of a depth of perhaps 18 inches or enough to prevent the escape of the crabs. A wooden flange along the outer sides regulates the depth of submergence, usually 9 inches. A shedding house uses from 4 to 50 such floats, depending upon its volume. Often they are kept in a fenced-in inclosure to protect them from rough water. Floats are taken from the water and allowed to dry every week or so during the season. This keeps them free from parasites such as moss, shipworms, and barnacles, and prevents their becoming waterlogged. At some houses, peelers are divided into five classes (named in order of shedding time required): busters (partly emerging from the shell), and, so-called from the changing appearance of the flipper, "red sign," "pink rim," "white rim," and "green." These are placed in floats appropriate to their stage of moulting. Floats must be carefully watched by an experienced attendant, and the crabs removed for shipment at the proper

moment. This means that, among any sizable group of floats, a constant going over is necessary both night and day.

A crab which has just moulted--jelly-soft and delicate--cannot survive shipment. Since soft crabs reaching the consignee dead are discarded and hence are a total loss to the shipper, it is customary to allow the newly-shed ones to remain in the float an hour or two after they emerge from the shell. They thus develop a body firmness and a certain toughness of skin that insure their shipping well and in no way affect their standing as a genuine soft crab. There is danger in leaving soft crabs too long in the water because they quickly harden beyond the desired stage and become "paper shell" or "buckram" crabs, unacceptable in the soft crab market and too watery and thin to pass as a hard crab. When soft crabs are removed from the water, the hardening process is suspended indefinitely. Four size grades are in use: mediums ($3\frac{1}{2}$ inches spike to spike, the legal minimum), hotel primes, primes, and jumbos. In some houses, the hotel prime classification is not used.

Soft crabs are packed snugly one against the other, with legs folded and mouths elevated, in shallow wooden trays which hold from 3 to 8 dozen (according to size of crab and size of tray) covered with parchment paper, seaweed, and cracked ice, and the trays boxed. Shipped thus, they travel long distances and remain alive for days. Good refrigeration in transit is important. Occasional mortality occurs if the weather is extremely hot.

Shedding houses are classed as small businesses. They seldom employ more than 2 or 3 men. They operate from May to September and the volume of the largest of them would scarcely exceed 250,000 peelers in that period. The number of peelers bought from the crabber is not indicative of the number of soft crabs shipped to market because there is the seemingly inevitable mortality of peelers in the shedding floats which hasfor various reasons at times reached the startling figure of 60 percent.

A profitable side line for some shedding houses is the sale of live peelers to sports fishermen for bait. The price charged for them is often the same as for edible soft crabs.

A remarkable feature of the shedding house is its absolute independence, if the waterproof paper and the ice be excepted, of any manufactured equipment whatsoever. The shipping trays and boxes are made on the spot during spare time out of thin scrap lumber. The insulating grass or sea oar, so necessary for safe shipment, is gathered locally along the shores. The floats and dip nets are homemade. Little else is needed.

The Crab Picking House

Almost the entire catch of hard crabs goes to the picking house to be turned into crab meat. The exception is the large sized or "Jimmie" crab, which is in demand at bars, and for picnics and steamed crab feasts. It represents a negligible fraction of the whole.

When crabs arrive at the picking house, which usually has a dockside for unloading, they are still alive. They are promptly placed in an iron basket and lowered into a large pressure cooker. After approximately 20 minutes of steaming they are withdrawn and carried to the picking room where pickers, working at long metal covered tables, await their arrival. The picker extracts the meat from the shell with a small sharp knife. Some crab houses use a specially designed

knife with the end bent into a sharp hook. The picker tries to preserve the original flaky condition of the meat as far as possible, because the best unbroken flakes, known in the trade as "lump" or "backfin," bring premium prices. Meat that is broken up or not entirely freed of bits of shell is graded lower. The third grade, and lowest priced, is the meat from the claw, so classed because it lacks whiteness and flakiness. All meat is graded by the picker, as she extracts it, by placing it in the 1-pound metal cans lying on the table before her. The cans are perforated at the bottom to keep moisture in the meat regulated, and these are the same cans in which the meat is iced and sold.

Washing crab meat in cold water gives it an additional whiteness, but the practice is not favored in the Bay area because it is believed to impair the flavor. Crab picking is supervised by Federal and State health services. Picking rooms are closely screened; in addition, the almost complete elimination of flies by DDT is now being effected. All implements are sterilized daily and the utmost precautions are taken to insure adequate and constant icing of the product. At Crisfield, a testing laboratory is maintained by a group of picking houses, and samples of meat are collected at frequent intervals for examination and approval.

CANNING AND BYPRODUCTS

Little crab meat has been canned in Maryland or Virginia in recent years, although there is considerable canning of this product in the New England, South Atlantic and Gulf States, Pacific Coast States, and Alaska.

Soft crabs have been canned successfully, but as a rule, canning is attempted only during years of glut when the price falls to levels which permit the pack to be offered at a moderate price. A growing volume in packaged frozen soft crabs has lately been noted.

The shell refuse of the picking house can be turned into meal which is in demand as an ingredient of farm animal feed. The manufacturing process is simple. The material is dried in a heated rotating drum until it is rid of its water content, which is about 85 percent. It is then ground. One or more such dehydrating plants are usually located conveniently near crab picking centers.

EDIBLE CRABS

The marine waters of the United States yield three species of crabs possessing all the qualifications of an important food resource--abundance, wholesomeness, and good flavor. These crabs are the blue crab of the middle and southern Atlantic Coast and the Gulf of Mexico, the rock crab of New England, and the Dungeness crab of the Pacific Coast. There are also several other species of good quality and sufficient abundance to support small fisheries. Among them are the Jonah crab of New England, the stone crab of the south Atlantic Coast, and the king crab of the Alaskan coast.

--Fishery Leaflet 71