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THE BLUE CRAB AND ITS FISHERY IN CHESAPEAKE BAY^{1/}

Part 2 - Types of Gear for Hard Crab Fishing^{2/}

By W. A. Van Engel*

ABSTRACT

During the 90-year history of the Chesapeake Bay blue crab fishery, many types of fishing devices were tried, but only pots, trotlines, and dredges proved suitable, and they emerged as the primary types of gear for catching hard crabs. In the early years of the fishery, trotlines with their various modifications were used principally for catching hard crabs in the summer. The Chesapeake Bay crab pot, patented in 1938 and modified only slightly since, gradually replaced the trotline. Pots now account for two-thirds of the Virginia hard crab catch and more than half of the Maryland catch. The dredge, first used about 1900 and relatively unchanged with time, is still the primary winter gear.

INTRODUCTION

The gradual increase in importance of the 90-year-old blue crab industry to the economy of the Chesapeake Bay region has been due chiefly to development of the hard crab fishery. It now ranks second or third among Virginia and Maryland's fisheries, exceeded in quantity only by menhaden and in value by oysters and occasionally by menhaden. On the national scale, the magnitude of the industry is equally impressive, for the total Chesapeake Bay hard crab catch is about equal to the total blue crab catch of all the other Atlantic and Gulf Coast states.

Prior to 1900 the Chesapeake Bay blue crab industry developed slowly and fishing for crabs remained a casual occupation. Although there has been a coast-wide consumer interest in the blue crab since colonial times, especially in the soft-shell crab, limited transportation and refrigeration facilities hindered the early expansion of the industry. The first out-of-state shipment of Chesapeake Bay soft crabs left Crisfield, Md., for Philadelphia by train in 1873. In 1878, a large summer trotline fishery was started near Hampton, Va., to supply hard crabs to James McMenamin and Company, the first to produce cooked crab meat in hermetically-sealed cans. Fresh-cooked crab meat in iced, unsealed cans was not made available until 1883. During those early years and un-

^{1/}Contributions from the Virginia Institute of Marine Science, No. 121.

^{2/}Soft and peeler crab fishing gears will be described in a later publication.

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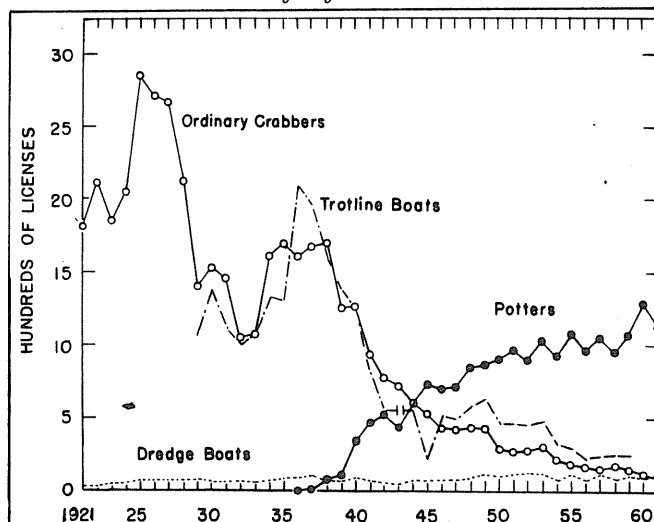


Fig. 1 - Virginia hard crab licenses, 1921-1961. Numbers of ordinary crabbers, potters and dredge boats are from unpublished license records of the Virginia Commission of Fisheries. Combined hand-dip and patent-dip trotline boats are from records of U. S. Bureau of Fisheries and U. S. Fish and Wildlife Service; no data available for 1943. Over 90 percent of the "ordinary crabbers" licenses are for hand-dip trotlines.

U.S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
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til 1900, average annual landings in Virginia and Maryland were less than 10 million pounds and were valued at less than \$350,000. Sixty percent of the weight but only one-fourth of the value was derived from hard crabs. The remainder was attributed to soft and peeler crabs^{3/} (Rathburn 1887, Roberts 1905, Churchill 1919, U. S. Bureau of Fisheries 1922).

In contrast, landings during a recent 15-year period, 1946-1960, averaged about 60 million pounds and valued at more than \$3.5 million. Over 90 percent of the catch and about 80 percent of the value was derived from hard crabs (U. S. Fish and Wildlife Service 1942-1961, 1961).

From 1929 to 1932^{4/} more than 85 percent of the total Atlantic and Gulf Coast catch of blue crabs came from Chesapeake Bay. Average Chesapeake landings were about 60 percent from 1933 to 1953, and since 1953 have been about 47 percent of the total (U. S. Bureau of Fisheries 1922-1941; U. S. Fish and Wildlife Service 1942-1961, 1961).

Almost the entire hard crab catch of the Bay is now marketed as fresh-cooked crab meat in iced, unsealed cans. In 1959, 7.5 million pounds of meat was produced, half from Virginia and half from Maryland. The extent of distribution has been somewhat limited by extreme fluctuations in the basic supply, the perishableness of the product, and the relatively high costs of production, transportation, and promotion (Quittmeyer 1950, 1957; Van Engel 1954, 1958). Some of the meat is processed as frozen deviled crabs and crab cakes, and canned crab soups. A relatively small number of large, selected male crabs, called "jimmies" or "channelers," are shipped alive direct to large cities to be served at seafood bars as steamed hard crabs.

At the base of the production pyramid is a force of about 1,800 watermen in Virginia and 3,300 in Maryland. Since their catch is limited by the basic supply and by restrictions imposed by legislation and market conditions, only by selecting the most efficient types of gear can the watermen maintain a reasonable income. While many types of gear have been used to catch crabs in the Chesapeake Bay in the last 90 years, only a few have proved economically

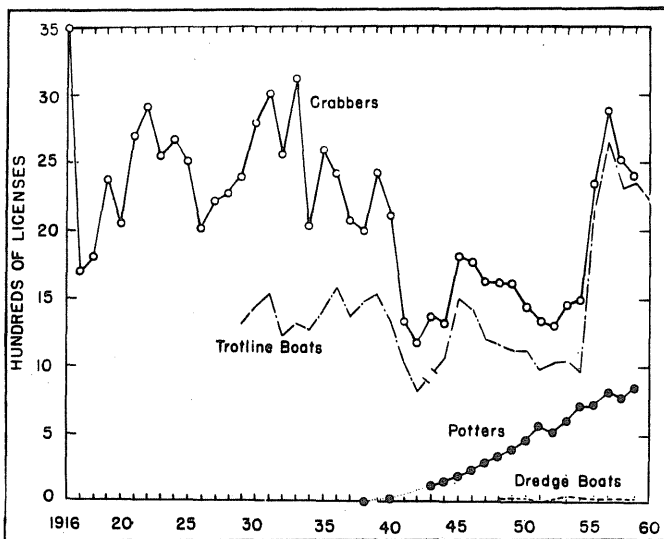


Fig. 2 - Maryland hard crab licenses, 1916-1960. Numbers of crabbers, potters and dredge boats are from the Maryland Conservation Department, Department of Tidewater Fisheries and Board of Natural Resources. Hand-dip trotline boats are from records of U. S. Bureau of Fisheries and U. S. Fish and Wildlife Service; no data available for 1943. Hand-dip trotline licenses account for about one-half the "crabbers" licenses prior to 1938.

practical. The bulk of the hard crab catch has been made by a few types of widely different design: crab pots and trotlines in summer and dredges in winter. Less than one-fiftieth has come from dip nets, crab pounds, hand scrapes, haul seines, and hand lines, and incidental catches by fish pounds, gill nets, otter trawls, oyster tongs, and oyster dredges. Modifications have made existing gear more efficient, resulting in more effective fishing time per unit of gear. A review of the types of Maryland crab fishing gear is given by Cargo (1954).

Continuous records of the types of hard crab gear in Virginia are available since 1921 (fig. 1) and in Maryland since 1916 (fig. 2)--(Virginia Commission of Fisheries, unpublished license records; Maryland, Department of Conservation 1924-1941, Department of Tidewater Fisheries 1942, Board of Natural Resources 1941-1959). Reports of the U.S. Bureau of Fisheries (1922-1941) and the U.S. Fish and Wildlife Service (1942-1961) show similar trends in types of gear, but continuous records are not available for years prior to 1929.

TRENDS IN GEAR

The hand-dip trotline was favored for many years as a summer gear. The exact number used will probably never be known. Until 1937 hand-dip trotlines were exempted from tax-

^{3/}Soft and peeler crab fishing gears will be described in a later publication.

^{4/}Comparative data are not available for earlier years.

tion in Virginia or included in a general "ordinary crabbers" license along with dip nets and peeler-crab scrapes (fig. 1). Since 1937 peeler-crab scrapes have been separately licensed, and trotline licenses have numbered probably more than 95 percent of the "ordinary" licenses. Patent-dip trotlines, introduced about 1920, have never been widely used and have accounted for a relatively small percentage of the catch. Combined estimates of hand-dip and patent-dip trotline boats (U. S. Bureau of Fisheries 1922-1941; U. S. Fish and Wildlife Service 1942-1961) are in good agreement with the numbers of "ordinary crabbers" licenses in Virginia since 1929 (fig. 1). It is probable that before 1929 over 90 percent of the "ordinary" licenses were hand-dip trotlines.

During the economic depression of the early 1930's, many Virginia watermen replaced their trotlines with dip nets, for which no license and little expense were required, and caught peeler crabs instead of hard crabs. A few years later, during a temporary return to trotlines, the Chesapeake Bay crab pot was introduced. The high efficiency of the pot has encouraged many watermen to abandon trotlines for them. Dredges have been the only gear used in Virginia in the winter fishery since its inception about 1900.

Similar trends have occurred in Maryland although the exact numbers of gear types used have not been reported. Since 1916 a general "crabbers license" has permitted the use of a trotline, peeler-crab scrape, dip net, push net, crab haul seine, or crab pound net (fig. 2). Between 1929 and 1938 approximately one-half of the "crabbers" licenses were for the use of hand-dip trotlines (U.S. Bureau of Fisheries 1922-1941); this relationship probably existed prior to 1929. The decline in number since 1938 is the result of the gradual replacement of trotlines with pots. The precipitous rise in 1955 and 1956 resulted from a new law requiring licenses for all trotlines over 100 yards in length. This was enacted to tax increased numbers of casual crabbers, and the figures are probably indicative of previously existing but unreported effort. Patent-dip trotlines have never been used in Maryland. Dredges were first permitted in Maryland in 1947 and are used only in the bays on the ocean side of the eastern shore.

CRAB POT

The first crab pot used in Chesapeake Bay was a small, baited poultry-wire trap, 36 x 30 x 12 inches, patented in 1928 by B. F. Lewis of Harryhogan, Va. (Virginia Commission of Fisheries, unpublished minutes; Wharton 1956). Lewis' early model pot was not widely used because it allowed too many crabs to escape. His modified gear, which was introduced in 1936 and patented in 1938 (fig. 3), is essentially the design used today. The principal feature of this patent is the separation of the main body of the pot into two chambers, a lower bait chamber which contains a bait holder and passageways from the outside, and a trap chamber lying over the bait chamber. Hard crabs enter the bait chamber through entrance funnels located at the lower edges of the pot and then rise to pass into the trap chamber through a slit in the partition. Crabs are removed by spreading an opening in one seam at the top and shaking the crabs from the pot. The seam is closed by lapping over the adjacent edges and locking them in place with a wire hook.

Usually pots are cubical in shape, 2 feet on each side, and made of 1 to 1½-inch hexagonal mesh, 18 gauge poultry wire, galvanized

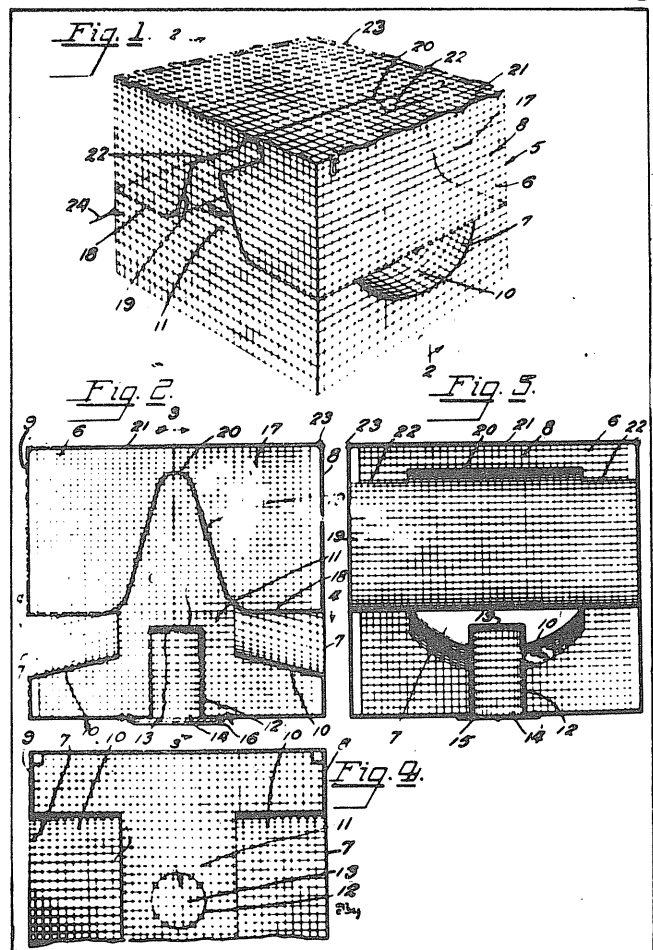


Fig. 3 - Drawings accompanying B. F. Lewis' crab pot (trap) patent, filed September 2, 1937. Fig. 1, External view; Fig. 2, Vertical section through entrance funnels, bait box and partition; Fig. 3, Vertical section, at right angle to Fig. 2, through bait box and partition; Fig. 4, Part of horizontal section top of funnels.

after weaving (fig. 4). Bait cups are made of 1-inch mesh wire or double thickness of $1\frac{1}{2}$ -inch wire. Nine pots can be cut from a roll of wire 150 feet long and 2 feet wide.

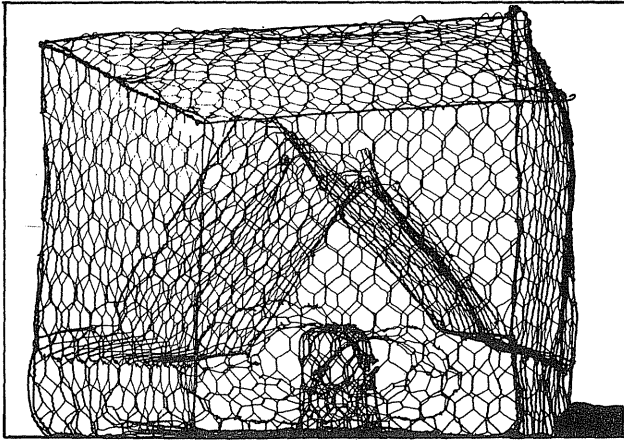


Fig. 4 - Chesapeake Bay crab pot is 24 x 24 x 20 inches, made of double-galvanized, 18-gauge, hexagonal-mesh wire.

James rivers, where there are strong bottom currents, pots are made only 20 inches high.

Pots are set along the flat, sandy or muddy edges of a river or Bay channels in depths ranging from 6 to 60 feet in continuous or parallel series, the number depending on the success of fishing in the locality but usually 100 or more feet apart. In 1928 as many as 30 to 40 pots were tied on a trotline, each pot attached to the line by a 4-foot rope. The ends of the trotline were marked by buoys. Later to avoid frequent thefts of pots, buoys were removed and the crabber depended on visible landmarks and good grappling technique to recover his line. That method of setting pots was soon abandoned, and for more than 25 years pots have been set with individual lines and buoys. Sometimes along the edges of a channel approaching a harbor or dock, pots must be tied singly to stakes, otherwise they could be dragged or washed to shoal water by boat traffic.

Potters lift their pots daily except Sunday, working from small inboard or outboard motor boats up to 40 feet in length. Most of the men leave their docks in early morning darkness to reach the crabbing grounds at day-break and return about noon. Actual fishing time averages $2\frac{1}{2}$ hours per 100 pots.

For better control of his boat while fishing a set of pots, the potter runs against the tidal current. With an almost continuous motion he approaches a buoy, slows the forward speed of his boat by reducing throttle and shifting gears to reverse, snares the buoy line with a short-handled hook, shifts to neutral, pulls on the buoy line to raise the pot to the surface and into his boat (fig. 5), shifts to forward gear, increases throttle and steers toward the next pot. Then he begins to empty the pot and re-bait it with menhaden, salted fish heads, or any kind or part of oily trash fish. Just before he reaches the next pot the previous one is tossed overboard.

Only minor improvements have been made to the basic design of Lewis' patent since 1938. Details of a design popular in the late 1940's are given by Andrews (1947). Frames of iron rod were lashed to the sides to increase the rigidity of the pot, but have not been used since wire manufacturers began using heavy gauge wire in the selvage.

Since all pots are handmade, their construction can be varied to suit local conditions, individual preference and budget. Continued use of pots has demonstrated a need to increase their stability. All watermen stabilize their pots with a square frame of $\frac{1}{2}$ to $\frac{3}{4}$ -inch iron rod tied to the base, or galvanized pipe, bricks or cement inserted in the bottom corners. In Tangier Sound and in the York and

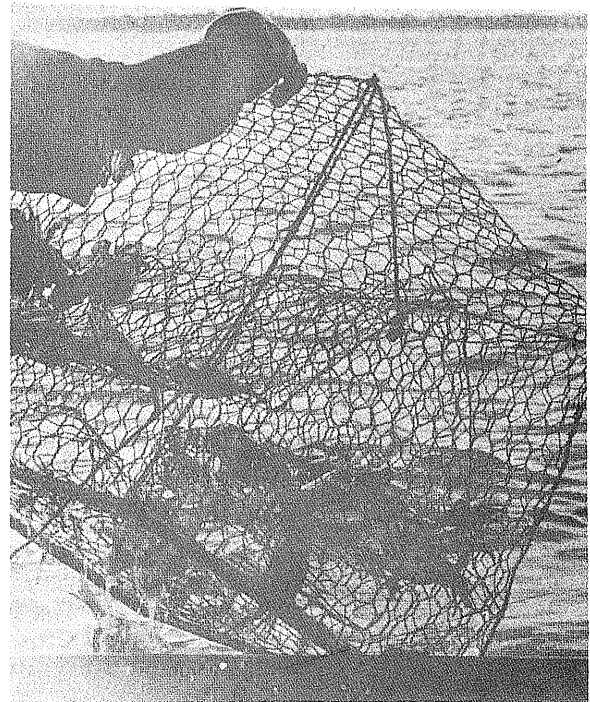


Fig. 5 - When stock size is large, catch may average 20 adult crabs per pot.

In early summer in some waters, algal growth may cover the mesh. Circulation of water through the pot is retarded, the pot is more easily tumbled by strong currents, and the escape of bait odors is restricted. For these as well as other reasons, the efficiency of the pot is effectively lowered. Sometimes pots are removed to land and dried for several days, but usually they are so fouled by the middle of June that they are discarded.

During the 8 months potting season, from April through November, the loss of pots from all sources is so great as to require one or more replacements for each pot initially set out. Large losses occur in storms, for strong bottom currents or turbulence may tumble a pot into deeper water or roll it a few yards until the buoy line becomes wrapped around it. In either event the buoy is pulled beneath the surface and out of sight of the fishermen. Sometimes pots may be recovered by dragging bars of ganged hooks.

Careful handling of pots is required to minimize cracking the protective zinc coating. Once the underlying iron core is exposed, corrosion is rapid. At best, pots withstand daily wear and corrosion about 16 weeks. Recent studies suggest that corrosive destruction may be prevented if a sacrificial anode of zinc is secured to the galvanized netting (Buck and Van Engel 1960). At the end of the crabbing season, usable pots are sometimes dipped in hot tar to prevent further corrosion until the next season.

The crab pot has become especially popular because it is highly efficient, simply constructed, easily handled, and requires relatively little time to gather the catch. An estimated 100,000 pots were used in 1960 in Virginia; about three-fourths that many in Maryland. The pot has almost completely replaced the hand-dip trotline in Virginia and now accounts for two-thirds of the annual catch of hard crabs.

B. F. Lewis' early model was called a "trap," a name also applied to the crab pound net. Separate names and license taxes for pots and traps were not applied until about 1938. The number of pot licenses has steadily increased in Virginia (fig. 1), and the number of pots allowed each man has changed. An unlimited number could be used before 1940, 35 per man until 1944, 50 per man until 1956, and an unlimited number since July 1956. Minimum mesh size was 1 inch until 1941. From 1941 to 1944, 1-inch mesh was allowed in Chesapeake and Mobjack bays, but 1½-inch mesh was required in all other waters. It has been 1½ inches in all waters of the Commonwealth since 1944.

Similar events occurred in Maryland. The pot was introduced in 1939 and then outlawed from 1941 to 1943. It is now permitted in some waters of that state (Cronin 1950). The allowance per man was 35 from 1943 to 1948 and has been 50 since 1948. Minimum mesh size is 1 inch. It is one of the most important types of crab gear in Maryland, where landings by pots represent over 55 percent of the total annual catch.

TROTLINE

The hand-dip trotline is a baited, hookless line anchored on the bottom in moderate to deep water, and is used to catch hard crabs when they are actively feeding, primarily from April through November. Lengths of $\frac{1}{8}$ to $\frac{3}{16}$ -inch cotton, sisal, or hemp rope are spliced together to form lines 100 yards to 1 mile in length, depending on the locality of the set and the "crab-biting-rate." When large numbers of crabs are being caught, lines may be shorter so that the crabber may lift his set before all the bait is eaten. The longest lines are used wherever bottom currents are strong, to insure a constant, effective number of baits lying on the bottom. Untarred lines are usually used because they do not give off odors offensive to crabs.

Trotlines have been used continually since commercial crabbing began in the 1870's. Formerly they were rigged with grapnel-type anchors tied to each end, and with a buoy line attached 30 or more feet from each grapnel (fig. 6A). With this system of rigging, while the trotline was lifted to the surface by pulling in the buoy line, it was necessary that the boat remain stationary over the end of the set, to avoid dragging the anchor and thus changing the direction of the set or getting the line fouled in the propeller.

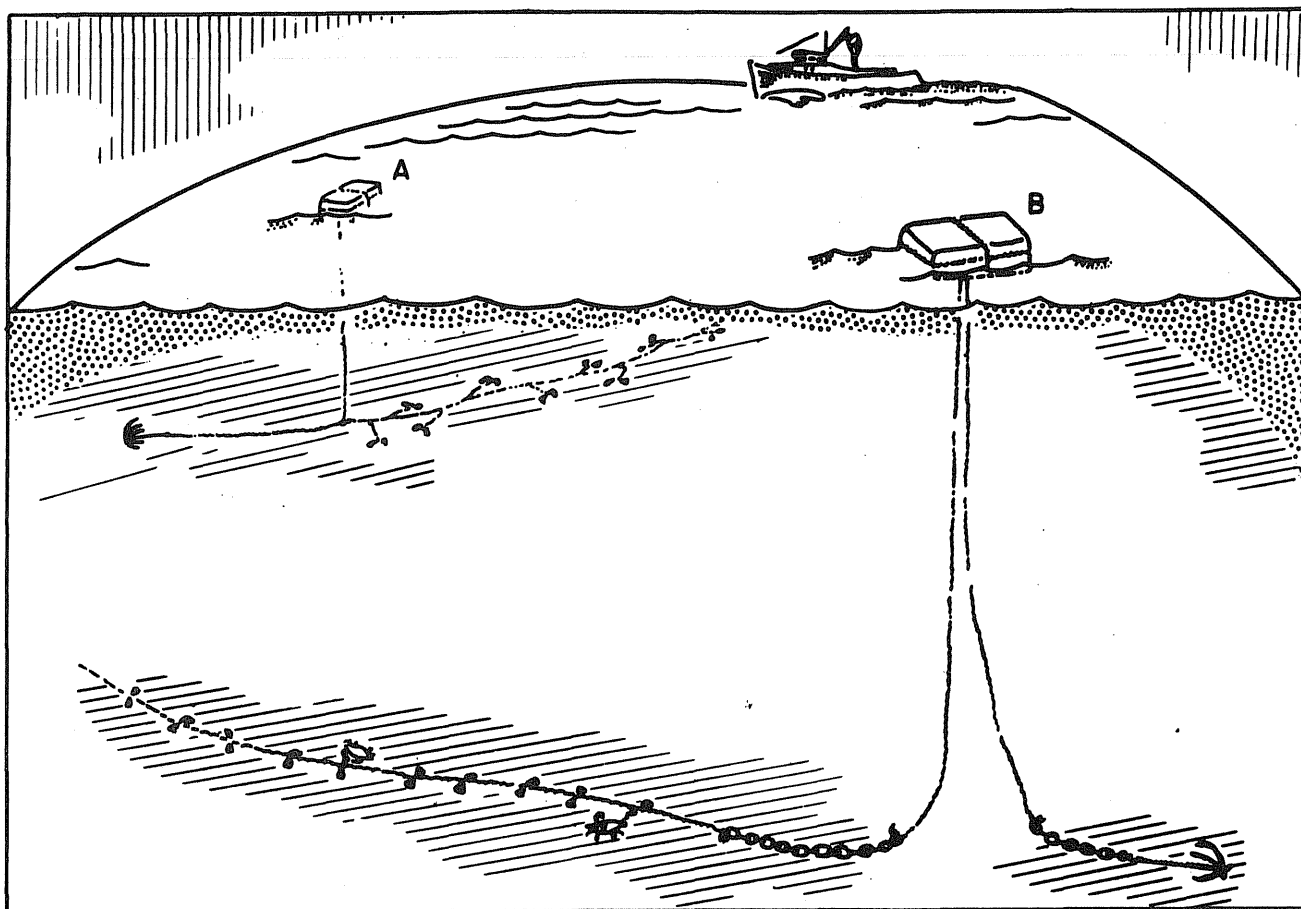


Fig. 6 - A. Former arrangement of buoys and line on hand-dip trotline. B. Present rigging of hand-dip trotline.

These problems are now avoided simply by dropping separate lines from the buoy to the grapnel and from the buoy to the trotline (fig. 6B; Andrews 1948). The ends of the buoy line and trotline are joined by a short length of heavy chain to keep the trotline on the bottom. This arrangement permits the crabber to approach the buoy, lift the trotline to the surface, place it over the spool, and begin fishing with the continuous forward motion of the boat.

Fresh beef tripe is preferred as bait, although salted tripe and eels, hog jowls and ears, and small, tough fish such as the hogchoker are sometimes used. About 200 pounds of tripe may be used each week during October and November on a 600-yard line. More bait is used in summer when crabs are more active. From 60 to 80 pounds of tripe are used on the first full baiting of the line.

When the trotline was first extensively used in 1878, bait was tied to the ends of 6- to 24-inch lateral lines, called snoods, spaced about 2 feet apart (fig. 6A). The size of the catch was partly dependent on how many times a crabber could run the same line in one day. In the earliest years of the fishery, the crabber pulled his boat forward by lifting and tugging, hand-over-hand, on the trotline. It was most convenient, but not comfortable for long periods of time, for him to lie prone on the bow of his boat while crabbing. A short-handled dip net was kept handy to scoop up crabs as they came to the surface clinging to the baited line. "Hand" trotlining was easiest "running" with the tide or with the wind.

Although most men used the "hand" trotline between 1900 and 1925, a few used sail, or motor power derived from either a 2-cycle or 4-cycle, 1- or 2-cylindrical marine engine. Most engines were direct-drive, and a clutch was optional equipment. At first, motor power was used primarily for transporting groups of 10 or more "hand" trotline crabbers

to and from the crabbing grounds. Men who used their direct-drive engines in working a line were forced to work against the tide, or to obtain slower speeds by means of a drag. This required a two-man crew, one to watch the trotline and scoop up crabs, the other to run the engine.

To take advantage of the greater speed of a motor boat, the trotline was no longer lifted by hand, but allowed to pass over a roller or spool extending outboard from the side of the boat (fig. 7). This forced abandonment of lateral lines, for they easily became entangled on the spool. Thereafter bait was secured either in a slip-knot or simply tucked between strands of the main line.

In the late 1920's automobile engines were converted for boat use. Since then their low cost has more than offset their inefficiency compared with marine engines of the same horsepower, and they have become almost standard as the power supply of present day crab boats (Chapelle 1955).

Trotlines usually are set parallel to shore to be fished with the tide up- or downriver. If fished during slack tide, it may be set in any direction, usually perpendicular to shore. To fish his line, the crabber approaches the buoy, picks up the line with a short-handled hook and places it on the spool which projects about a foot from the side of the boat. As the boat moves along the line, baits are raised to the surface and crabs clinging to the bait are scooped up by a dip net. Crabs drop off as the line breaks the surface of the water and crabbers must be quick with the dip net. Since crabs cling to a cotton mesh bag, the most effective dip net has a wire mesh bag.

Trotlines usually are fished from daybreak to late morning, and sometimes, though infrequently, fished again in the cooler evening hours. At the end of a day's fishing, baits are checked and renewed if necessary, and the line coiled in a barrel and well-sprinkled with salt to protect bait and line against rotting.

The trotline has been extensively used in localities where many undersized crabs are present, as in the upper-Bay waters of Maryland, for it permits easy culling of the catch.

Until the early 1940's it consistently accounted for two-thirds of the entire Bay catch of hard crabs, but in recent years, since watermen abandoned trotlines in favor of pots, less than 10 percent of the Virginia hard crab catch and about 43 percent of the Maryland catch has been obtained with trotlines.

PATENT-DIP TROTLINE

The patent-dip trotline differs from the hand-dip trotline only in the method by which crabs are dipped out of the water (fig. 8). The patent-dip consists of a rectangular or cylindrical cage about 3 feet square made of a framework of iron strips and rods. To the bottom is attached a cylindrical net of heavy twine, about 10 feet long, which is closed at the end with a piece of light twine. The iron cage is attached by heavy iron straps to a boom or spar which may be hoisted up against the boat mast or lowered to a horizontal posi-

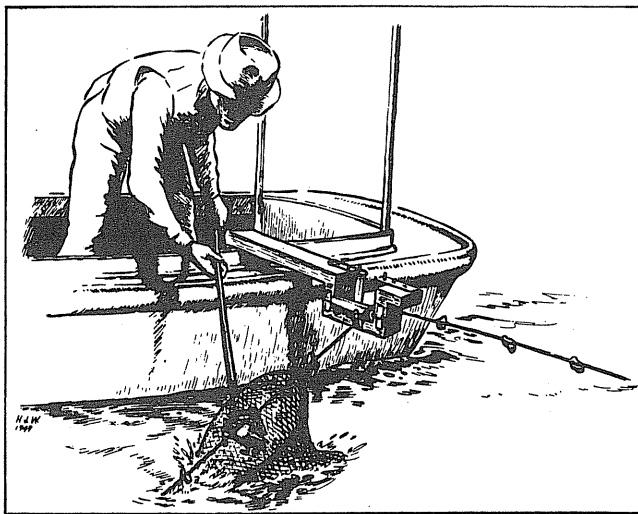


Fig. 7 - The hand-dip trotline.

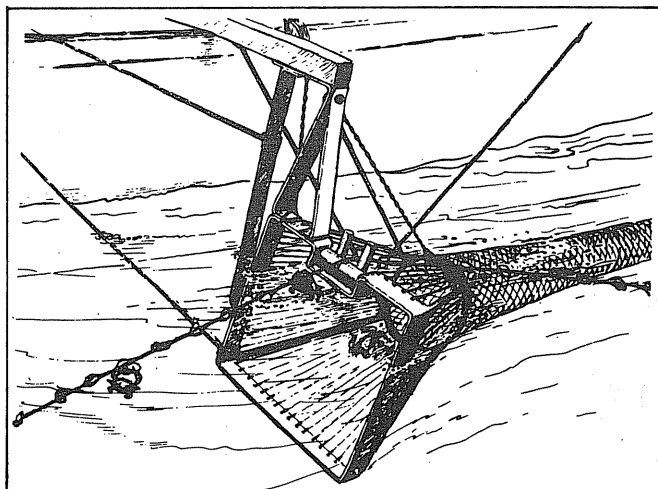


Fig. 8 - The patent dip is attached to a boom which may be hoisted up against the mast or lowered, as shown here, to a horizontal position when fishing the line, with the top of the dip at the surface of the water.

tion. When the boom is lowered, the cage lies in the water with the upper edge at the surface. On this upper rim of the cage are two upright pegs about 5 inches apart, and a roller. When the crabber starts his run of the trotline, he places the line over the roller between the upright pegs. Then as the boat cruises along the set, the line is lifted off the river bottom and over the roller. As they reach the surface, crabs drop into the iron cage and are caught in the trailing net. When the net is full, the boom is hoisted to an upright position, the tie-string at the end of the net is loosened, and the crabs are dumped into a barrel or into the bottom of the boat.

The patent-dip rig permits the waterman to run more sets than could be made with a hand-dip trotline, for culling of illegal crabs can be made any time after the catch has been made. Watermen claim that in early spring and late fall trotlines yield higher catches than pots. Crabs are less sensitive to bait odors when the water is cool. Trotline baits 2 to 4 feet apart are more quickly located than bait in pots spaced at intervals of 100 or more feet.

Since 1920, when patent-dip trotlines were first licensed, the number of licenses issued yearly in Virginia has been small and variable. Licenses are not considered a reliable index of the number of gear actually used, for crab pots or patent-dips may be used by holders of either license. Patent-dips have never been used in Maryland waters.

DREDGE BOAT

The dredge boat (fig. 9) varies from less than 32 to over 60 feet in length, 5 net tons or more, and carries a captain and a crew of two or three. On larger boats two dredges are towed simultaneously from opposite sides of the boat, the chain from each dredge passing

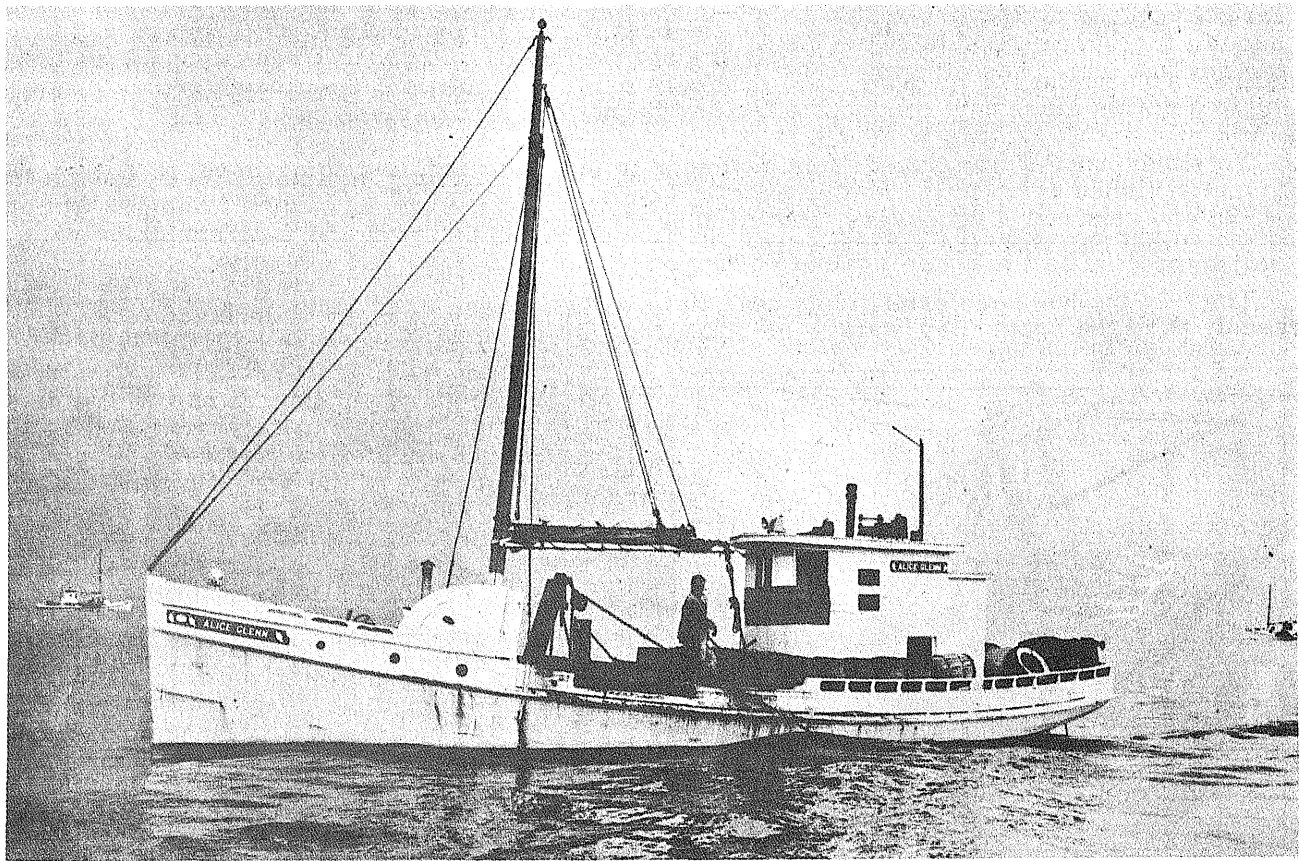


Fig. 9 - Dredge boats, often Diesel-propelled, are from 32 to 60 feet in length, five net tons or more, and tow two dredges simultaneously from opposite sides.

over a roller on the boat's rail, around a center post and then below deck to a windless operated from the pilothouse (fig. 10). Smaller boats often drag a single power-drawn dredge over the stern.

The heavy metal dredge consists of a rectangular iron frame, bearing a 6-foot, toothed drag bar on its lower edge and carrying a mesh bag made up of rings and cotton twine. The bag will hold between 3 and 4 bushels of crabs. The iron teeth, welded on the drag bar, are about 4 inches long and about $1\frac{1}{2}$ inches apart. A metal bridle attached to the dredge frame bears an eye to which the hauling chain is fastened. The length of a dredge, from the drag bar to the eye of the frame, varies with the amount of space available when the dredge is hauled on deck to be emptied, but should be about 6 inches less than the distance from the top of the dredge post to the roller.

Dredging is almost the only means of obtaining crabs from December through March, when the "crab-biting-rate" is almost zero and movements of crabs are minimal. Dredging is limited by law to the lower Bay and to the small bays on the ocean side of the eastern shore. Concentrations of crabs in the lower part of the Chesapeake during the winter occur as a result of the fall migrations of adult female crabs from the rivers and upper Bay following mating (Van Engel 1958). The best catches are made on the edges of broad banks adjacent to deep channels of the Bay, over "grassy,"^{5/} muddy-sand bottoms, in 25- to 75-foot depths. During an average fishing day from 65 to 100 ten-minute dredge hauls can be made, lifting the dredges alternately.

The dredge catch is highest in early December and becomes progressively smaller as the season advances. Approximately 85 percent of the crabs caught are adult females, and the remaining 15 percent are males and immature crabs of both sexes. About half the total catch is landed on the west shore of the Bay between the Piankatank River and the James River. The other half is landed on the Eastern Shore, principally for sale in Maryland markets.

Since the winter dredge fishery began in Virginia about 1900, there have been few changes in methods of dredging or in the gear. Dredges have been similar to those now in use, but varying from 4 to 6 feet in width. Before 1920, gasoline and semi-Diesel engines developing 20 to 60 hp. were in common use. Since then there has been gradual replacement by engines of higher horsepower. Dredge-boat captains unanimously believe that this change has increased daily catches, by shortening the running time from port to fishing grounds and thus permitting more time for dredging, rather than by increasing the average catch per dredge haul.

The "Geraldine," an 11-net-ton Gloucester County vessel, may be considered representative of the majority of vessels now used in the fishery. Built in 1928, she was first equipped with a 24 hp. Lathrop, a marine, gasoline engine with a straight drive and no clutch. Other dredgers were using 24 to 35 hp. Palmer, marine, gas engines, and a few of the larger vessels had 45 to 65 hp. Fairbanks-Morse, marine, semi-Diesels, all straight drive with clutch. A 50 hp. 20th Century, marine, gas engine was installed in the "Geraldine" in 1932. This in turn was replaced in 1944 with a 144 hp. Chrysler Royal gas engine converted for marine use and had a 3:1 reduction gear. A 165-hp. Gray marine Diesel with a 2:1 reduction gear was installed in 1946; this Diesel has had three major overhauls in the last 16 years and is still in use.

^{5/}Beds of colonial hydroids, *Thuiaria argentea*.

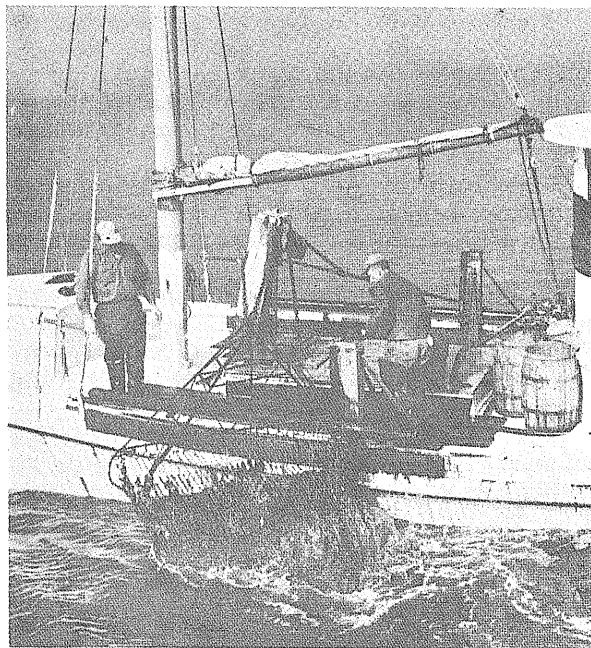


Fig. 10 - The crab dredge.

The number of boats dredging hard crabs in the Bay in the earliest years of the fishery is unknown, for they were often reported with boats dredging in ocean waters and sail boats scraping peeler crabs in summer. Since 1921, the number has increased from 50 to about 110 vessels (fig. 1).

On the ocean side of the eastern shore of Accomack and Northampton counties of Virginia, 3½ to 6 foot dredges were once used. Since 1937 dredges have been limited to 3 feet in width and must be hand-drawn, not power-lifted, into the boat.

Since its inception, the Virginia dredge fishery has landed from 10 to 30 percent of the total Virginia hard crab catch and at present accounts for about 20 percent of the landings. About 4 percent of the winter catch comes from the ocean-side bays.

Dredging was first permitted in Maryland in the winter of 1947-1948. Three-foot wide, hand-drawn dredges are now used in Chincoteague Bay, Sinepuxent Bay, Isle of Wight Bay, and Assawoman Bay and their tributaries in Worcester County, Md. (fig. 2). The Maryland winter catch is about one-third of the Virginia oceanside catch.

When trotline and pot catches in late November or early April are very low and insufficient numbers of crabs are being landed or shipped in to meet market demands, the Virginia Commission of Fisheries may permit crab dredging to begin as early as November 16 or last until April 16.

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