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**STATE OF CALIFORNIA DEPARTMENT OF FISH AND GAME
BUREAU OF MARINE FISHERIES
FISH BULLETIN No. 103
Trolling Gear In California**



By
W. L. SCOFIELD
MARINE FISHERIES BRANCH
1956

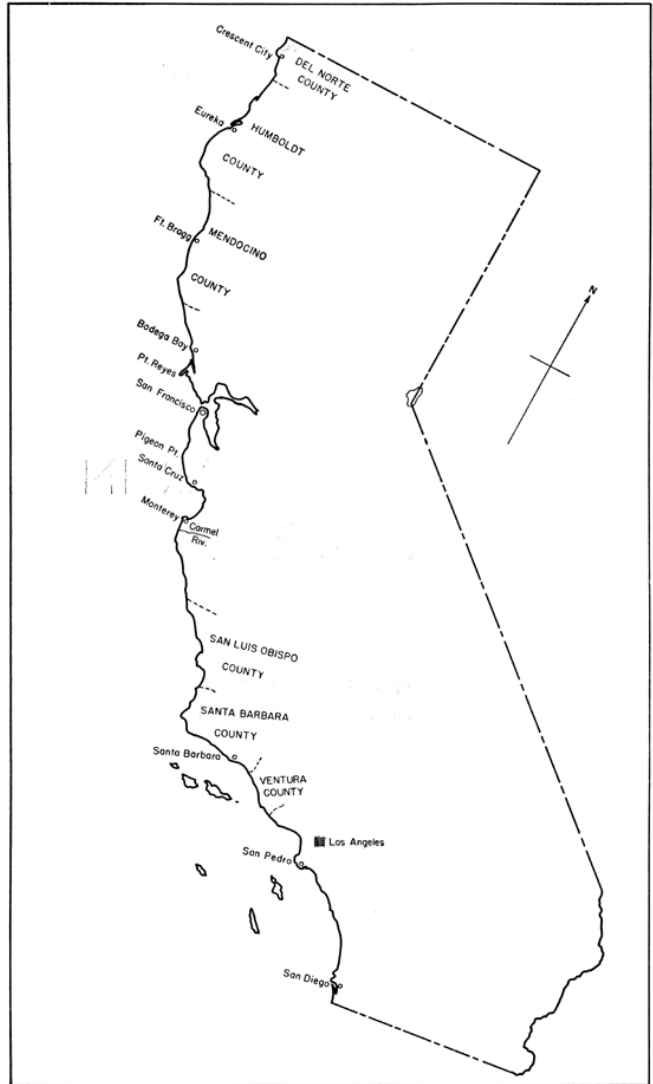


FIGURE 1. Outline map of California, showing the location of the more important fishing ports

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FOREWORD

Trolling may be conducted from a small boat thereby requiring a low original investment and the gear used is relatively inexpensive compared with netting operations. As a result, this manner of fishing has attracted hundreds of commercial fishermen along the 1,000 miles of California coast. In recent years, commercial men are being outnumbered by the host of sport fishermen, many of whom do trolling at some time during the year. Sport fishermen pioneered ocean trolling in California and have initiated several of the improvements that have been adopted during the 75 years since ocean trolling started in this State.

An account, from time to time, of the gear and methods of operating is desirable for each of our important fisheries. Not only may changes be noted, but gear and methods of fishing have a direct bearing when appraising the records of catch per unit of fishing effort in attempts to determine changes in the supply of fish in the ocean.

The following descriptions of gear (when not dated) apply to 1955.

W. L. SCOFIELD
September, 1955

1. DEFINITIONS

Each occupational craft invents, for its own use, a set of designating nicknames, but California fishermen in general and trollers especially, have not standardized their names for the different parts of the gear and the methods of operating. Usually one item of gear has more than one name. Occasionally, one name is applied to two or more items of gear, which is confusing, but in general the nicknames are useful and they sometimes have a left-handed humorous twist. In the accompanying text we have endeavored to use a standard set of names and their definition may be helpful.

1.1. Troll

Literally to drag about, to cause to circulate; to angle by use of a long line and lure drawn through the water behind a moving boat. When the boat stops, trolling ceases. Casting from and reeling into a stationary boat might be called "retrieving."

1.2. Angling

A sharp distinction between angling and trolling cannot be drawn. The California Fish and Game Code defines angling as the taking of fish by hook and line, and includes the attaching of the line to a pole held or "closely attended." This has been interpreted as including a moving closely attended pole and line. This means that trolling is one kind of angling. Snagging of fish is excluded from the definition of angling by the requirement that "the fish voluntarily takes the bait or lure in its mouth."

1.3. Outrigger Poles

A pair of wooden poles, one on each side of the boat and extending some distance over the side. The pole may be swung from its hinged base up to the vertical along the mast when not in use. When fishing, it may be swung out and down nearly to a horizontal position. The purpose of the poles is to spread the attachment of the fishing lines farther out than the beam of the vessel. Some boats fish four poles.

1.4. Bow Poles

A pair of secondary outrigger poles located forward of the mast. A bow pole seldom fishes more than one line and this bowline practically always passes aft inside the lines from the main pole. Most boats do not use bow poles.

1.5. Jigger Poles

Other names are spring pole, gaff pole, and sucker pole because it suggests a sprout at the base of a tree. It is a light pole, about 10 feet long, set into the main outrigger at a slight angle. From its tip is rigged one jigger or sucker line. It is used by a minority of the salmon trolling boats. In exceptional cases, two jigger poles may be set into each main pole.

1.6. Tag Line

A line from the outrigger pole to the main line at its junction with the inhaul line. The length of the tag line is the distance from its attachment at the pole to the gunwale at the cockpit of the boat. Thirty years ago the tag line was commonly called the pole line and this name is still in use. Other names are shock line, standing line, or drag line.

1.7. Inhaul

A short line from the gunwale of the cockpit to the junction of the tag and main lines. It is used to pull the main line in to the cockpit. It is sometimes called the haul in, lead line, or lead in and occasionally is referred to as the brail line. In many cases, it is not a separate line, but is actually a segment of the main line.

1.8. Main Line

As the name implies, it is the chief fishing line from the tag line to the attachment of the leaders and hooks. The number of such lines fished by each boat may vary from four to more than a dozen. There is no system for naming these lines, but many fishermen have their own nicknames.

1.9. Stern Line

One to four short fishing lines made fast to the gunwale at the stern so that they fish in the wake of the boat. For salmon, they must be heavily weighted, but they are fished at the surface for albacore.

1.10. Whiskey Line

A single long fishing line made fast on the mast or boom so that it fishes in the center beyond the other stern lines. It was the hope that the catch on this line would pay for the whiskey. Sometimes called the percentage line or dog line.

1.11. Tip Line

Occasionally a short and lighter line is used at the far end of the main line. This may be from two to a dozen feet long. It is sometimes called tippet or the trolling leader. Such an arrangement may be referred to as "light gear" in contrast to the usual heavy line all the way to the leaders. The term tip line frequently is used also for the outermost main line whose tag line is made fast at the tip of the outrigger pole.

1.12. Lure

As a verb, to invite or decoy. As a noun, it is that which attracts the fish to the hook. In trolling, the lure may be a spoon, a jig, a plug, a squid, or a small fish as bait.

1.13. Spoon

A common form of lure in trolling. The hook is attached to a curved piece of metal that, when pulled through the water, gives a wobbling motion suggesting a small fish trying to escape.

1.14. Squid

An artificial lure somewhat resembling the animal (squid) in that there are streamers of some kind suggesting arms and tentacles.

1.15. Jig

Literally, the verb means to move with a skipping or rhythmic motion. As a noun, the jig is an artificial lure attracting the fish to the hook. Usually, it resembles somewhat a small fish. Frequently, the jig represents the head and eye of a fish with streamers or feathers. The similar word "gig" is not used by our fishermen. It means to move an arrangement of hooks past a fish or through a school so as to snag the victim anywhere in the body.

1.16. Bait

Among trollers bait refers to small fish to be impaled on a hook, as contrasted with artificial lures. In a few instances, bait is used in combination with an artificial lure.

1.17. Plug

An artificial lure with hooks attached, usually of brightly painted wood or plastic, resembling a small fish. Used more by sportsmen than by commercial fishermen.

1.18. Leader

A short line from the main line to the lure.

1.19. Breaker Line

A light cord, strip of leather or almost any material that will break more easily than the fishing line. It is introduced at the bottom end of the tag line. When a heavy sinker hangs up on something, the strain parts the breaker cord instead of snapping the outrigger pole. The lost trolling line is more easily replaced than a broken pole. A breaker line is not used in albacore trolling because heavy sinkers are not used.

1.20. Shock

Short for shock absorber. A section of elastic material or a metal spring introduced in the trolling line to absorb some of the sudden strain on the pole and line when a heavy fish strikes the lure. The shocks may be at the pole, at the davit in the stern or at both places. Occasionally, a shock is used at the far end of the tag line.

1.21. Safety Loop

A small loop of line made fast to the tag line six or eight inches forward of and a similar distance aft of the shock absorber. There is plenty of slack to allow the shock to stretch even to the breaking point, in which case the safety loop saves the trolling line from being lost.

1.22. Gurdy

Powered spools or reels controlled individually by a clutch, brake and reverse gear so that any one main line may be payed out, reeled in or held at the point desired.

1.23. Stops

Stops or stoppers are wire or cord pairs of wrappings around a main line to prevent leader snaps from sliding along the main line. A different form of single stopper on the main line is sometimes used to engage a ring on the end of the tag line thereby throwing the strain, while trolling, on the tag line rather than on the gurdy.

1.24. Markers

A wrapping of twine on the main line at measured intervals (often every five fathoms) so that the fisherman may know how much main line is out either when paying out or reeling in.

1.25. Crosstree

Cross piece near the top of the mast, notched to saddle the outrigger poles when not in use.

1.26. Lift

A line made fast at the butt of the mast, thence upward to a block under the crosstree and thence to the outrigger pole. Used to hold the pole at the desired angle when fishing and to secure the pole in the saddle of the crosstree when not in use.

1.27. Nippers

Circular rubber bands, three to four inches wide, worn on the fingers and palms of the hands when pulling line. They are especially appreciated when handling a heavy fish on a steel wire or monofilament nylon leader. The rubber protectors are more properly called grippers. Thirty-five years ago they were commonly called clinchers and a manufactured form, with a deep groove for the line, was carried by ship chandlers. Then, as now, a section of automobile inner tube served very well. The general utility of the Model T was again demonstrated for its much patched inner tubes were the right size for clinchers and the old tire casings made satisfactory fenders for the boat. In the dark days before the Model T, old time fishermen used the upper part of a woolen sock as hand padding for pulling lines.

1.28. Stabilizers

A pair of small boards (usually metal) hung overboard, one on each side, from the outrigger pole. The face of the board, parallel to the water surface, reduces the roll of the boat in rough seas. Several nicknames are used by fishermen, flipper flappers, for example.

1.29. Ice Boats

Many trollers called "day" or "local boats" make one day trips and cover their fish with wet sacking. The majority are "ice boats" making trips of 2 to 12 days and carrying chipped ice in the hold for preserving the catch. In recent years, many of the larger boats are equipped with refrigerated holds, in addition to the chipped ice.

2. HISTORY OF SALMON TROLLING IN CALIFORNIA

The early history of ocean trolling in California was linked with the salmon fishery, so much so, that for many years trolling meant salmon fishing. This was in spite of the fact that early surveys of the fisheries of the State mention small scale trolling for bonito, barracuda, yellow-tail and albacore in Southern California (Jordan 1880).

The first great commercial fishery of California was the netting of salmon in the spawning streams from the Golden Gate northward. During the gold rush and at least as early as 1850, horses were used to pull beach seines on the sandbars of the rivers and the catches were heavy. The first fish cannery on the west coast (1864) was across the river

from the City of Sacramento for the packing of river caught salmon. During the next six years, the river catches increased greatly. The need for looking after the salmon supply of the State was an important reason for the creation in 1870 of the California Board of Fish Commissioners. Eight years later, the management of game was included and in 1878, the conservation body became the Fish and Game Commission.

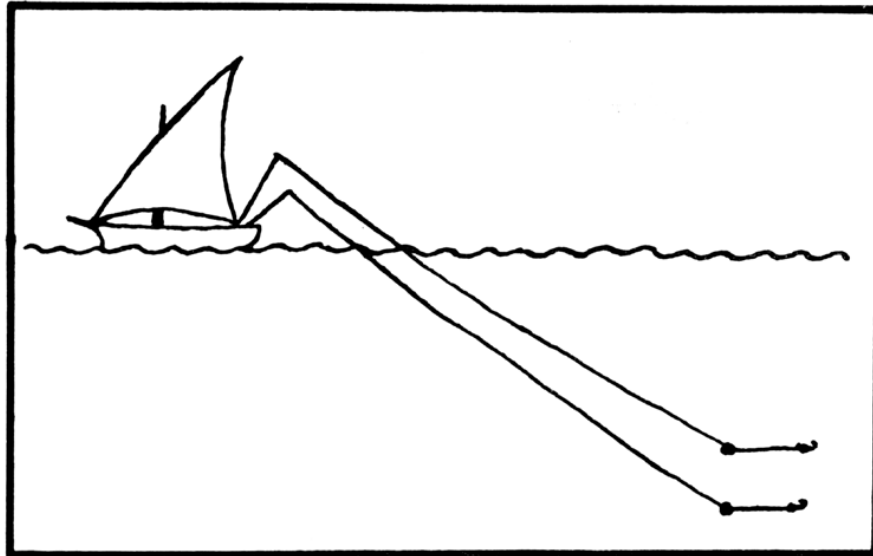


FIGURE 2. Early salmon trolling at Monterey Bay. Lateen sailboat. Two lines and two lures.

FIGURE 2. Early salmon trolling at Monterey Bay. Lateen sailboat. Two lines and two lures

During these years, it was not known that salmon could be caught in the open ocean in sufficient quantity to justify fishing for them. To be sure, an occasional salmon was caught by a sportsman angler and this led to the discovery by sportsmen at Monterey that these large fish could be hooked from a moving boat on sport tackle. In the early 1880's, salmon trolling was practiced by a few sportsmen on Monterey Bay and an occasional market fisherman made a catch that he could sell locally. The gear used was simple. A small sailboat supported two hand rods, one over each side with one hook and leader on each of the two lines (Figure 2). Sometimes, a line was provided with two leaders and hooks. The leader was about 30 feet long and carried a lead sinker midway between the main line and lure. The salmon season on the bay was June, July and August. In those days salmon sold locally at three cents per pound.

Commercial trolling through the 1890's amounted to little until the discovery of the mildcuring process (about 1898) following which it reached quantity production about 1901. In mildcuring, salmon 16 pounds and over were split from the backbone into two "sides" that were salted down in 800-pound barrels (tierces) for a time and then held in a mild brine solution. This packing process made it possible to hold large quantities of fish and it greatly stimulated salmon trolling at Monterey. By 1904, there were 175 sailboats trolling for salmon on

Monterey Bay and three boats were driven by gasoline engines. It was more than a dozen years later before fishermen realized that ocean trolling could be carried on at ports other than those on Monterey Bay.

Ocean trolling spread northward from Monterey only after gasoline engines replaced sail in the fishing boats. For 30 years the trolling boats (other than skiffs) at Monterey had carried sail, mostly the simple triangular leg-o-mutton, but many of the Italians used the lateen rig (Figure 2). The first gasoline engines were used in fishing boats as early as 1895 and by 1899 at San Francisco 49 of 82 boats



FIGURE 3. Salmon trolling boats tied up at the mouth of Noyo River.
Photograph by Wonacotts of Fort Bragg, 1931.

FIGURE 3. Salmon trolling boats tied up at the mouth of Noyo River. Photograph by Wonacotts of Fort Bragg, 1931

were sail and 33 had engines. By 1908, gas engines were installed in many of the fishing boats at Monterey, at San Francisco and in the delta area. By 1910, more than one-third of the boats at San Francisco had replaced sail with engines and some of these boats visited Monterey for salmon trolling. The conversion to gasoline power (roughly 1900–1915) facilitated small boat travel between ports. Within a few years after the adoption of gas engines, ocean trolling had been extended northward from Monterey to San Francisco (1914) and to Point Reyes. In another two years (1916), salmon trolling was carried on by small boats out of Shelter Cove, Eureka and to a limited extent at Crescent City (Figure 3). The troller catch of salmon quickly increased so that in the period 1916 to 1926 the ocean catch about equaled the catch by nets in the rivers. During 1927 to 1932, about two-thirds of the salmon catch resulted from trolling and since then, the river catch has dropped to a small fraction of the total. This shift to trolling was augmented by legislative restrictions curtailing river netting. Closed seasons, stream closures and gear regulations all tended to restrict the river catch. By 1947, it was estimated that more than 1,100 boats in the State delivered ocean troll-caught salmon.

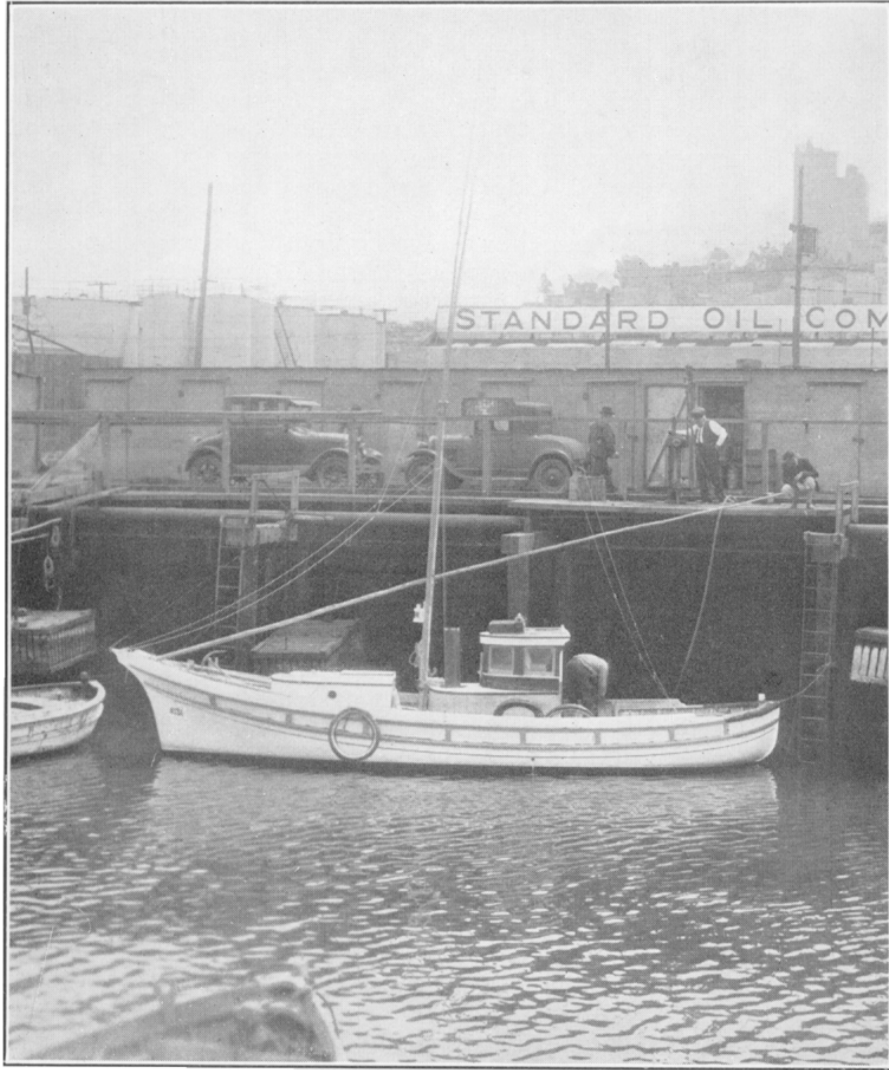


FIGURE 4. Thirty-three-foot salmon troller unloading at San Francisco.
Photograph by D. H. Fry, Jr., April, 1930.

FIGURE 4. Thirty-three-foot salmon troller unloading at San Francisco. Photograph by D. H. Fry, Jr., April, 1930

3. HISTORY OF ALBACORE TROLLING

In the accounts of the early days of fishing in Southern California (1870–1885), there is little reference to trolling. Possibly, the few troller catches were recorded as hand-lined or taken by hook and line. There are references to landings, both sport and commercial, of barracuda and white seabass, but the catches of bonito were irregular, and albacore were mentioned only in passing. For many years albacore were considered very inferior and commonly when one was caught it was hit on the head and thrown back. Sharks caught by a fisherman were similarly condemned and executed.

A few years later in the south, there was introduced by the Japanese fishermen, the "bonito" style of fishing, variously called the "Jap pole," live bait, jack-pole, striker or squid method. In this fishing, a tank of live bait is carried on the stern deck of the vessel with circulating sea water pumped through the tank to keep the bait alive. Fish are chummed up around the boat by throwing out small scoops of live fish from the tank. Catches usually are made on a short line and a 6 to 10-foot heavy bamboo pole, using a barbless hook with bait, squid, striker, or lure concealing the hook. Trolling became important as a preliminary step in this type of fishing, because the bait boats would troll several lines in the water when searching for fish. When there were one or two strikes on the troll lines, the boat was stopped or circled back to the spot where the strikes occurred. The crew on the drifting bait boat would then start chumming and jack-poling in the school.

After 1900, most of the albacore catches were made by the live bait method, but trolling, called jigging, yielded quite a few fish; so much so that a few boats, too small for bait tanks, started to use troll lines as their only gear. Trolling had certain advantages. A less costly boat could be used. One to three (usually two) men could operate it and the gear was less expensive. The bait boats, with a crew of about six men, made large catches during the height of the season, but the necessary netting of a supply of live bait was often a handicap and when fish were scarce the trollers, with lower operating costs, became strong competitors. During the period 1920–25, more small boats turned to trolling and they became responsible for delivering about one-half the albacore catch. During those years, bait fishermen began selling their large boats and trolling was taking over the albacore fishery. The bait fishermen (after 1925) turned to fishing other tunas and then began building still larger bait boats for the long trips "south of the border."

Canning of albacore started in 1906 on a small experimental scale and volume packing began in 1911, at which time there were two plants operating, one at San Diego and one at San Pedro. In 1912 there were five tuna canneries in Southern California. This increased to nine the following year and 11 in 1914. At this time (1914), the tunas, other than albacore, were not being canned. Fishermen sold albacore at \$30 per ton. The volume of albacore deliveries by trollers steadily increased for more than a decade until the collapse of the fishery in 1926. From that date through 1934, albacore catches were small, but they began picking up after 1934.

During the period 1900 through 1935, trolling for albacore on a commercial scale was confined strictly to Southern California, although a few fish occasionally had been taken as far north as southern Alaska. Beginning in 1936, commercial trolling for albacore began off the coast of Oregon and through the years 1939–1945, albacore trolling was extensive off Washington, Oregon and British Columbia. In recent years, there has been considerable migration of trolling boats up and down the west coast of the United States, but the chief movement has been by the northern salmon trollers lured to Southern California by the high price paid for albacore. When salmon trolling is not very satisfactory, there are many boats from Alaska, British Columbia,

Washington and Oregon, as well as from the north coast of California that make the trip to San Diego or San Pedro. They work back north as the albacore season advances, especially in September, October and November.

The albacore, once considered trash, has become one of our most highly prized fishes and much of the time the commercial catch has been sold by the fishermen at more than \$300 per ton.

4. ALBACORE TROLLING vs. LIVE BAIT FISHING

Essentially, the bait method was to troll until fish were located. The boat then was stopped and live bait or ground up fish was thrown out as chum until a school was actively feeding about the boat. The fish were caught by means of a short bamboo jack pole, short line and a lure or baited barbless hook. The commonly used lure was a bone or metal head with bright eye and brightly colored feather streamers. Originally, the lure was called a squid, but later was known as a striker and the short pole was called a jack pole. The live bait, striker, or jack pole method of fishing was used by many commercial fishermen for many species of fish, including several of the tunas, but bluefin tuna were seldom, if ever, so taken.

The two methods, trolling and live bait fishing for albacore, barracuda, white seabass and other species, are usually referred to as jigging and bait fishing. The latter term might better be "live bait" to be more specific, because there are several variations in fishing methods and in the use of dead bait. Some boats carry a small tank of live bait for jack-poling, as well as dead salted bait for trolling. Trollers sometimes carry salted bait and circle the boat about a spot where a fish has struck a troll line. Salted bait or ground fish is then scattered to chum up a school. By contrast, it is not uncommon for an albacore bait boat, with a tank of live fish, to find bait fishing too slow. The crew then turns to trolling. The catch for that day is partly from live bait and a portion from trolling. Occasionally, the delivery by a bait boat is as high as 90 percent jigged albacore.

Albacore are wary fish and frequently will make a slow pass at a lure and then turn aside. The fishermen call these "cold fish." At other times they may become excited and the "hot school" will strike at anything. At times, albacore may be seen deep under the boat, but they will not rise to the surface to take chum or live bait thrown out by the fishermen. At such times, a live fish from the tank may be hooked through the back and lowered to deep water by a hand line. Formerly, hand lines often were used, one line to each man with a hooked sardine or anchovy as bait, and on special occasions when fish are deep and "cold," hand-lining is still practiced. In order to excite a school of albacore, the Japanese fishermen used a "flicker" while throwing out live bait. This device, a tuft of feathers on the end of a light bamboo pole, was used to flick the water surface to resemble a surfacing school of sardines or anchovies. A tin cup on a light pole also was used to scatter drops of water on the surface.

In summary, live bait fishing makes large catches during the peak of the season, but the investment in boat, bait net, and other gear is heavy. Trolling is much cheaper and will "buy the baby shoes" when a bait

boat cannot operate because of scattered fish. Most of the trolling for species other than salmon and albacore is done by small boats, that is, under 30 feet in length.

5. TROLLING LEGISLATION

Nearly a century ago, in the 1860's, the chief fishery of the State was river caught salmon. It was believed that the supply of this fish was being decreased by the seining and trapping of salmon and the silting of the gravel spawning beds as the result of mining. To protect this fishery was one of the reasons for establishing, in April of 1870, the State Board of Fish Commissioners. Another reason for creating such a commission, was to promote the introduction of exotic species, in those days called "acclimatization." Following 1870, there were salmon statutes governing closed seasons, Saturday and Sunday closure, bag limits, mesh size provision for nets, and other gear restrictions. These laws were sections of the Penal Code and applied state-wide, to certain counties, or to described geographical areas, such as the drainage basin of a certain stream. The partitioning of the State into Fish and Game Districts came 43 years later (1913).

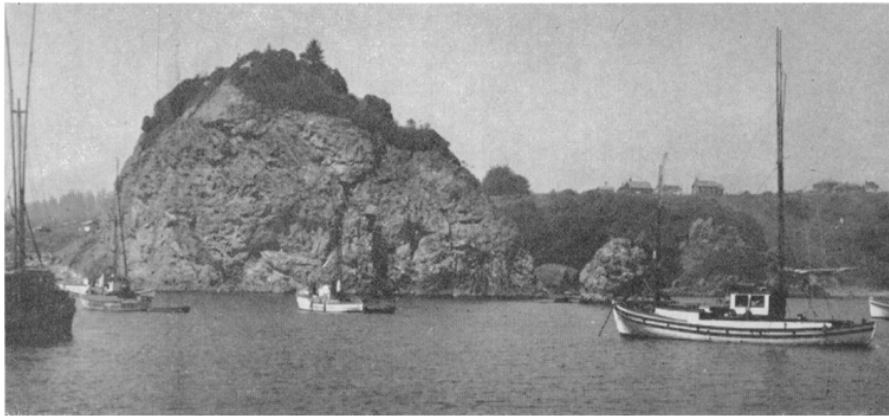


FIGURE 5. Salmon trolling boats at anchor in the lee of Trinidad Head.
Photograph by R. S. Croker, July, 1937.

FIGURE 5. Salmon trolling boats at anchor in the lee of Trinidad Head. Photograph by R. S. Croker, July, 1937

The first 15 or 20 years of this salmon protective legislation applied to stream caught fish, because there was as yet, little or no open ocean trolling. From the early 1870's to the present there have been changes in the salmon regulations at almost every session of the State Legislature, resulting in a complexity of laws governing closed seasons, fish and game districts, size limits, and gear restrictions. Few of these laws applied to trolling. The over-all effect of the laws was to curtail the river catch, thereby indirectly favoring the ocean trolling for salmon. The successive closing of river areas to salmon netting was the chief means of reducing the inland catch. The last river commercial cannery to be legislated out of business was at Requa (Klamath River) in 1934. An act of 1951 prohibited netting in most of the Sacramento-San Joaquin River system above Pittsburg. Through the years and down to the present time, probably there has been less legislative restriction of

trolling than of any other method of fishing, with the possible exception of hand-lining.

At present, there are only a few small refuges set aside where fishing is not allowed and the waters off the mouths of Smith, Klamath, and Eel Rivers are not open to trolling.

Since the creation of the Fish Commission in 1870, there has been a closed season for the taking of salmon, but the dates of closure have varied from time to time. At present (September, 1955), there is a closed season of several months for the trolling of king and silver salmon. There is no season closed to commercial trolling for albacore, barracuda, bonito or white seabass. There is no closure for several other species, such as yellowtail, skipjack, and yellowfin and bluefin tunas, but there is very little trolling for these fishes at present, so a closed season would have little effect.

There is now (1955) a minimum size limit on king and silver salmon, albacore, barracuda, yellowtail, white seabass, yellowfin and bluefin tunas, and skipjack, but none on bonito.

There is no bag limit on the commercial trolling of the above species, except that there is a possession limit on yellowtail and white seabass during a four-month summer season.

The laws governing sport trolling for salmon are rather involved and apply to certain areas, but in general, the sport trolling of salmon is limited by closed seasons, bag limits, and minimum size restrictions. There is no closed season on sport trolling for albacore, but there is a daily bag limit.

6. SPECIES CAUGHT BY TROLLING

In the early days of fishing in California, "salmon" meant king salmon, because silver salmon do not run in the rivers of the Sacramento-San Joaquin Valley where salmon fishing started. Since the development of open sea trolling, silver salmon have been an important, though secondary, species in the catch. A few pink salmon are taken in the northern one-third of the State, but the poundage is negligible. Salmon play no part in the trolling off Southern California where only an occasional stray king or silver salmon is taken. The normal range of salmon on our coast is from Alaska to a few miles south of Monterey.

In the southern part of the State nearly all the trolling is for albacore, which range from Baja California to Alaska, but the chief catch is made south of Monterey with the height of the season from July through October. There is a very secondary commercial catch of barracuda with a little white seabass and bonito, but it is probable that the sport troller catch of these secondary species exceeds the commercial take. Recent sport trolling for barracuda and white seabass has been from outboard motored skiffs, but most skiff fishermen prefer casting from and reeling to a stationary boat, which by definition, would be called retrieving rather than trolling.

The leading species caught by trolling are:

King salmon	}	----- <i>Oncorhynchus tshawytscha</i>
Quinnat		
Chinook		
Sacramento		
Spring		
Tyee		

TABLE

7. SALMON vs. ALBACORE TROLLING

At first glance, one sees little difference in the operation of trolling gear along the coast of California. Many boats, with their outrigger poles, lines, gurdies, and other equipment, migrate along the coast to be on hand when there is a run of either salmon or albacore. There are a few important differences in the two types of trolling. The following summary points out these differences:

	<i>Salmon</i>	<i>Albacore</i>
Trolling speed	1 to 3 knots	Average 6 knots
Bow poles used	Occasionally	Rarely
Average number pole lines per boat	6	8
Number stern lines per boat	1 or 2	2 to 5
Average total lines per boat	7	11
Average lures per line	4	1
Catches made	Deep	Near the surface
Sinkers used	Commonly	Occasionally
Weight of sinkers	Heavy	Very light
Catches made in wake of boat	Seldom	Frequently
Lines pulled by	Gurdy	Hand

8. DEPTH FISHED

Trollers are now, more than in the past, paying close attention to the depths at which fish are taken, but it is difficult to generalize about depths, because the catch is influenced by so many variables besides depth, such as boat speed, sky conditions, time of day, wind, water surface, and kind of lure. Often it is found that when fish stop biting they can be hooked at a greater depth. This seems to be true particularly of albacore. Slowing boat speed lowers the gear in the water, but most fishermen insist that in general it is better to add sinker weight than to alter speed.

In general, the king salmon is taken deep while silver salmon and albacore are taken near the water surface. The depth at which kings may be hooked varies from six fathoms to more than 35 fathoms, but normally the depth is 20 to 30 fathoms. Silver salmon are caught at 5 to 10 fathoms, probably more often at five fathoms. Albacore are taken frequently with a lure dancing along on top of the water or very close to the surface at one to five fathoms. At times, they may be found at much greater depths, at which times fishing with hand lines may be more successful than trolling.

9. BOAT SPEED

In past years, the normal trolling speed for king salmon was two and one-half to three knots, but trollers now fish at one or two, commonly at two knots for kings and two or three knots faster for silver salmon. Albacore take the lure at much higher speeds, even up to 10 knots, but it is then difficult to pull lines, so most albacore trolling is at six knots, although some men prefer three to five and others fish at seven to eight. Yellowtail trolling is at three or four knots with bone jigs and spoons, but up to six with feathered lures that are said to hold to the water better than bone jigs.

Larger boats with more powerful engines have difficulty slowing down to two knots, the favorite speed for trolling king salmon. This is especially true when running before a following wind. A few such boats use some form of sea anchor to retard speed. A home-made type is an equilateral triangle of plyboard about two and one-half feet on each side. If there is danger of tangling fishing lines, one of the chain bridles may be shortened to kite the sea anchor outward. The lower corner of the board may be weighted with 12 to 15 pounds of lead to keep it below the water surface. One such anchor board may be employed alone or a pair used if wind and current require two.

10. BOATS

Practically all trollers are built of wood, but almost any small to medium sized vessel may do trolling. Even the live bait boats that jack-pole their catches, do trolling while scouting for fish. Trollers vary in size from 16-foot skiffs to vessels 60 feet in length, but the majority are 35 to 45 feet long. Boats under 30 feet could be classified as small trollers. The proportional number of boats under 30 feet has been declining through recent years. The general trend has been toward larger trollers, especially in beam and depth, to accommodate larger engines and allow larger iced fish stowage space below deck. Some trollers carry a steadying sail and most of them employ small boat stabilizers (Figure 7).

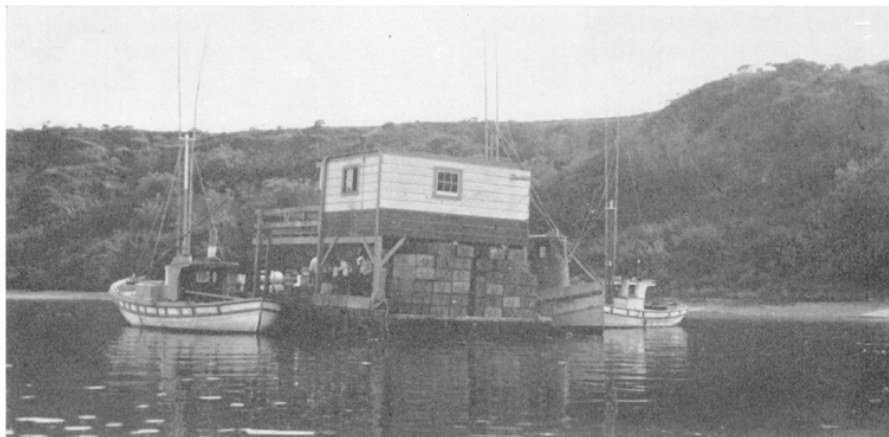


FIGURE 6. Salmon trolling boats delivering to a buyer-barge anchored near the entrance to Bodega Bay. Photograph by H. B. Nidever, June 30, 1934.

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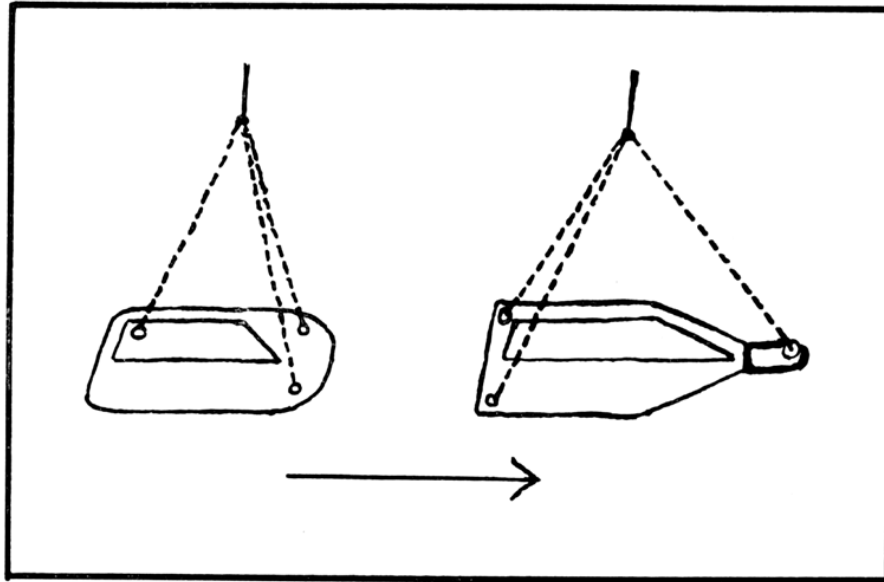


FIGURE 7. Two of the many types of small boat stabilizers
 FIGURE 7. Two of the many types of small boat stabilizers

11. POLES

Nearly all outrigger poles used by trollers are of wood and the great majority are of eucalyptus. Occasionally, a 10-foot section of galvanized pipe serves as a base into which a wooden pole is fitted. Poles entirely of metal pipe, are being tried out, but very few boats are so equipped (1955). When bow poles are used they are of wood. Poles usually are oiled or painted (Figure 8).

A rule of thumb is: that the main poles are the length of the boat and that bow poles are two-thirds that length. However, most poles are longer than the boat and range in length from 25 to 60 feet with the majority 25 to 40 feet long. Bow poles are 10 to 20 feet shorter, frequently 20 feet long. Poles taper in size from a four or five inch diameter at the butt to about two inches at the tip.

Usually, the butt of a pole is set in a metal bracket at the gunwale opposite the mast, which is a little forward of amidships. Bow poles, when used, are set in a bracket on deck forward of the mast. The main pole is guyed forward by two galvanized steel wires or by two bridles (branched guy wire) and is guyed aft on the outside of the gunwale near the stern. The poles are slanted a little forward of a right angle to the boat.

Near the top of the mast is a notched crosstree into which the poles may be saddled when not in use. The pole is held in place by a lift line which passes through a block just under the crosstree. The pole may be lowered to any desired angle by the lift line, usually with the pole tip 8 to 10 feet above the water, but higher in rough seas. The main poles are fished at an angle of 20 to 35 degrees to the water surface. When not in use, bow poles may rest in a spring clamp against the mast, or on top of the wheel house, or lowered aft along the gunwale.



FIGURE 8. Salmon trolling boat at Eureka. Outrigger poles made fast at the mast. Bow poles forward of the house. Photograph by D. H. Fry, Jr., July, 1948.

FIGURE 8. Salmon trolling boat at Eureka. Outrigger poles made fast at the mast. Bow poles forward of the house. Photograph by D. H. Fry, Jr., July, 1948

12. GURDIES

It is not known when the first pulling of troll lines was accomplished by powered gurdies. As early as 1920, a few salmon trollers at Noyo were experimenting with home-made drums powered by rod, and gearing off the main engine (Scofield, 1921). At that time, a drawback was the lack of easily detachable leaders so that only the main line to the first leader could be wound on the drum. A decade later (1931), manufactured gurdies were appearing in stock at ship chandlers, but there were few sales. About 1943, factory-made gurdies and steel troll lines were on the market, and by 1945, the larger boats and full-time trollers were using power for pulling wire lines, although many fishermen still pulled by hand. Fry (1949) estimated that in 1947, power gurdies were in nearly all the boats north of San Francisco, in 80 percent of the boats at San Francisco, and in 20 percent of the Monterey boats. In 1954, hand pulling of salmon lines was not unusual in the smallest trollers and in those boats that trolled only during brief periods and spent most of the year at some other type of fishing.

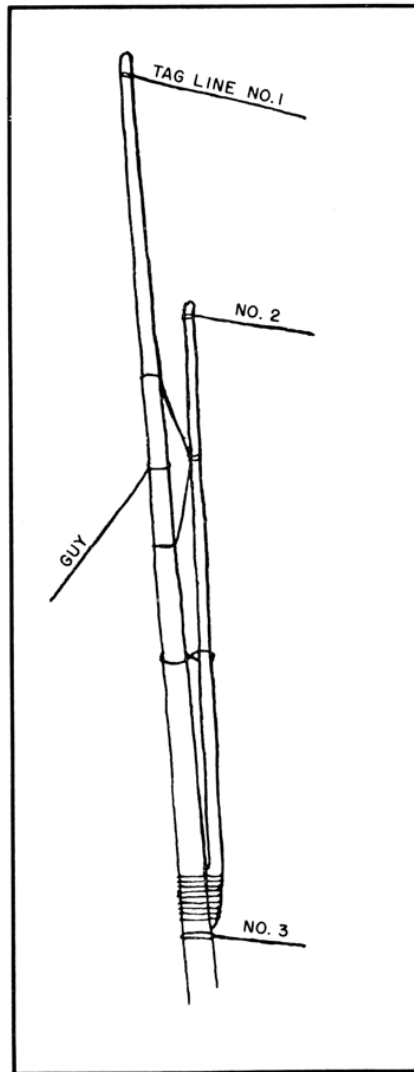


FIGURE 9. Jigger pole set into the outrigger pole of a trolling boat

FIGURE 9. Jigger pole set into the outrigger pole of a trolling boat



FIGURE 10. The three portside spools of the gurdy in the stern of a salmon trolling boat. Cannon ball sinkers at the extreme right. Photograph by D. H. Fry, Jr., 1949.

FIGURE 10. The three portside spools of the gurdy in the stern of a salmon trolling boat. Cannon ball sinkers at the extreme right. Photograph by D. H. Fry, Jr., 1949

The use of gurdies never has been standard practice among albacore trollers, although there was some power pulling until it was determined that hand pulling was faster for albacore fishing.

The gurdy is powered from the boat's engine and consists of two sets of spools, one set at each side of the cockpit arranged fore and aft. There may be two, three or four spools on each side, but the standard set consists of three spools to a side (Figure 10). Each spool may be controlled individually by a clutch, brake, and reverse gear. The main line may be fed through a block at a stern quarter davit and then directly to a spool, but more frequently an overhead crossframe carries a second block. The object is to keep the lines high enough overhead to allow the fishermen to work underneath in the cockpit. Crossframes and davits usually are of steel tubing.

13. TAG LINE

In most commercial trolling, outrigger poles are used to spread the fishing lines beyond the beam of the vessel, so that more lines may be fished without tangling. Some of the lines, while fishing, may be 30 feet or more beyond the gunwale, so it is necessary to have some arrangement for pulling the lines to the cockpit before they can be hauled aboard. Also, it is desirable to have the fishing lines detachable from the pole so that they may be coiled and stowed separately. These problems have been met by the use of a pole line, later called tag line, and sometimes brail line, shock line, drag line, or standing line. In length, this line was the distance from the attachment at the pole to the place on the stern gunwale where lines are secured when not fishing, plus a little slack. The aft end was provided with some kind

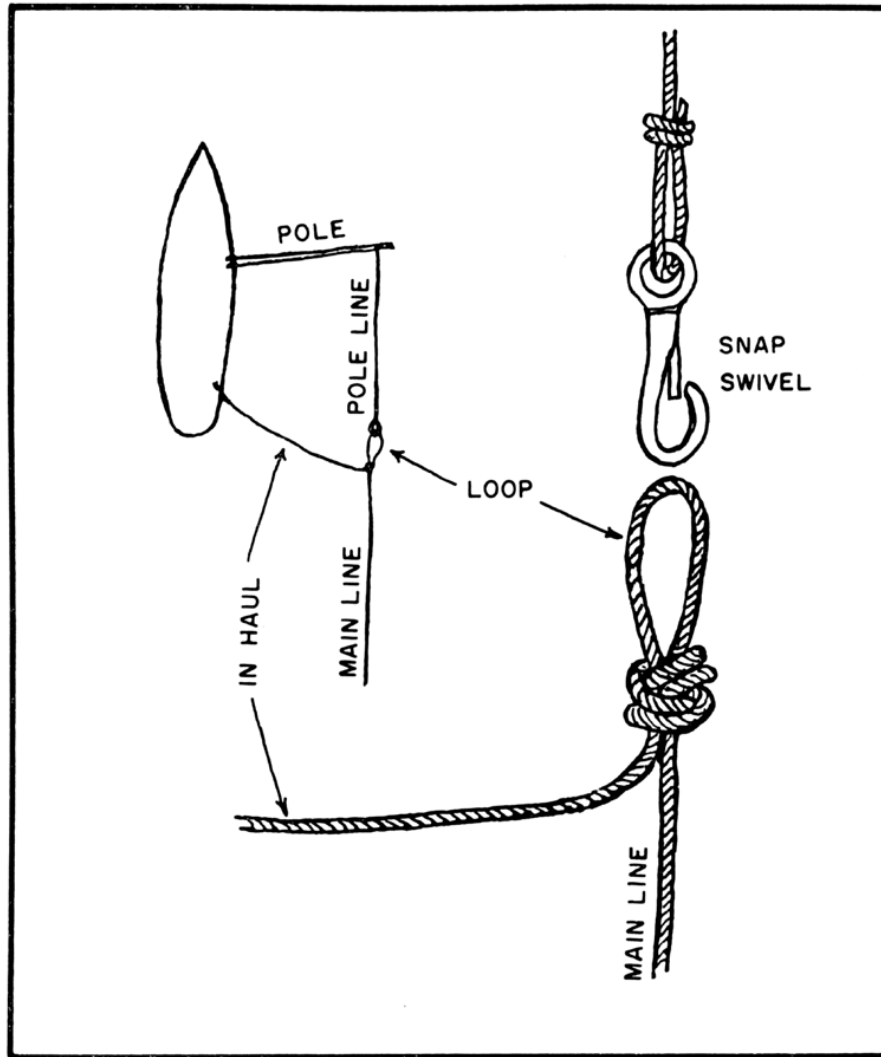


FIGURE 11. Early method of knotting a loop in the main line. Tag line ended in a snap swivel to engage the loop. Segment of main line served as inhaul.

FIGURE 11. Early method of knotting a loop in the main line. Tag line ended in a snap swivel to engage the loop. Segment of main line served as inhaul

of a swiveled snap fastener for holding the main line. From this snap, a line ran to the cockpit to serve as an inhaul.

In the early years of trolling, and until sometime after 1920, there was no separate inhaul line. The main line was knotted, leaving a loop into which the pole line was snapped. A segment of main line, from the loop to the cockpit, served as inhaul (Figure 11). In this arrangement, the main line could be shortened or lengthened simply by tying another loop in the main line at any point desired. This is still a simple way of rigging with the minimum of equipment, for temporary trolling. In some cases the pole line ended in a ring through which the main line was threaded and carried to the cockpit (Figure 13). This allowed easy adjusting of length of main line payed out, but it was

awkward in that the pole line could not be detached easily. This arrangement, exceptional in 1920, was widely used in later years.

The use of a loop tied in the main line was replaced by a spreader bar or some similar device, but these had the disadvantage that the length of main line, attachment of inhaul, and detachment of the pole line could not be adjusted readily.

The attachment at the end of the tag line of a large snap which engaged a ring at the forward end of the main line allowed the easiest detachment of lines. The inhaul was snapped into the large snap of the tag line (Figure 12). A possible disadvantage is that the length of main line can be altered only by tying in a ring at a different

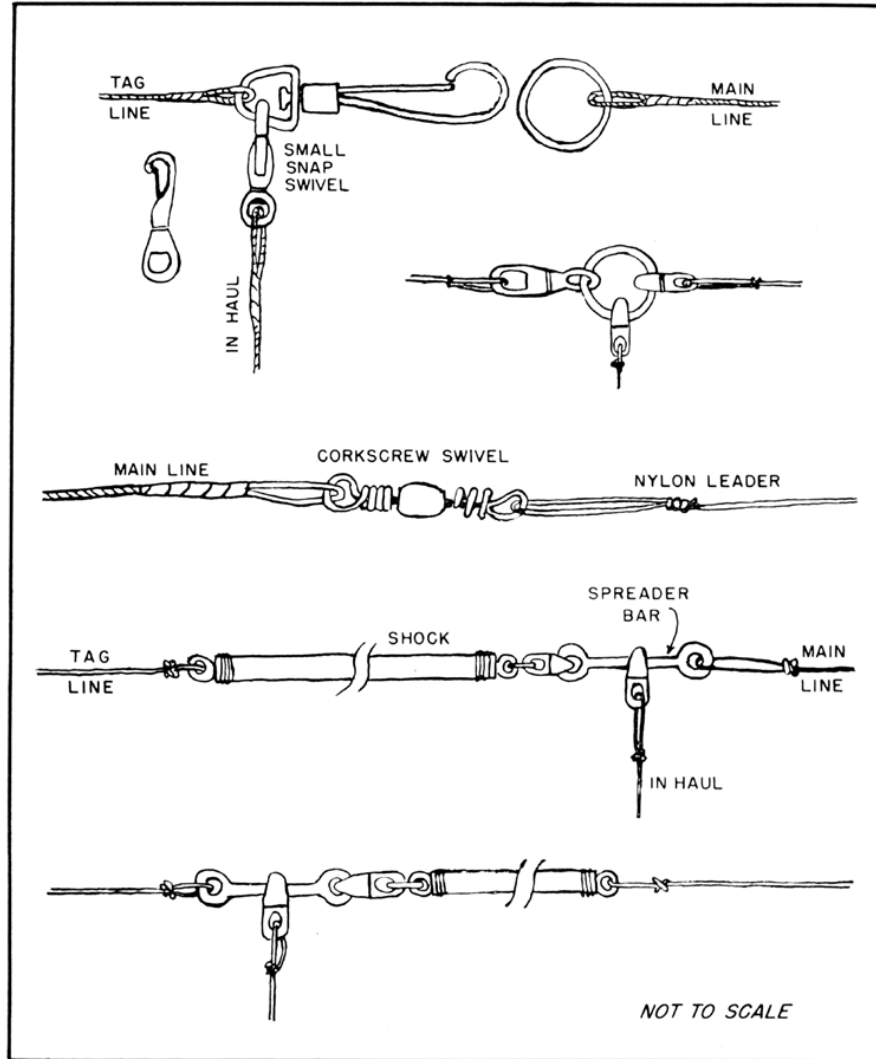


FIGURE 12. Arrangement at the junction of tag line, main line and inhaul, employed chiefly by albacore trollers. In the center is pictured the attachment of the single leader to the main line by means of a corkscrew swivel. Spreader bar and shock absorber are shown at the bottom.

FIGURE 12. Arrangement at the junction of tag line, main line and inhaul, employed chiefly by albacore trollers. In the center is pictured the attachment of the single leader to the main line by means of a corkscrew swivel. Spreader bar and shock absorber are shown at the bottom

length of main line. Apparently, this is not serious in that altering the length of main line is not frequent.

Another assembly plan which could be altered only by retying knots, was to use a ring with three swivels engaging it. One of the three lines was tied to each swivel (Figure 12). These three lines were: the end of the tag line, the far end of the inhaul, and the forward end of the main line.

Probably the most common arrangement was to substitute a spreader bar for the ring (Figure 12, lower half). In this case, there were two swivels attached to the bar instead of three attached to a ring. Since the bar was free to revolve, a third swivel was not necessary.

A simple arrangement is now used by many trollers, especially salmon fishermen. The tag line ends in a wire snap to engage a short line ending in a ring of metal or a porcelain insulator (Figure 13). The main line threads through the ring and thence to a block hanging from the stern davit and thence to the gurdy. A stop, engaging the ring, would throw the full strain of the main line on the outrigger pole, but as the main line runs free through the ring, much of the

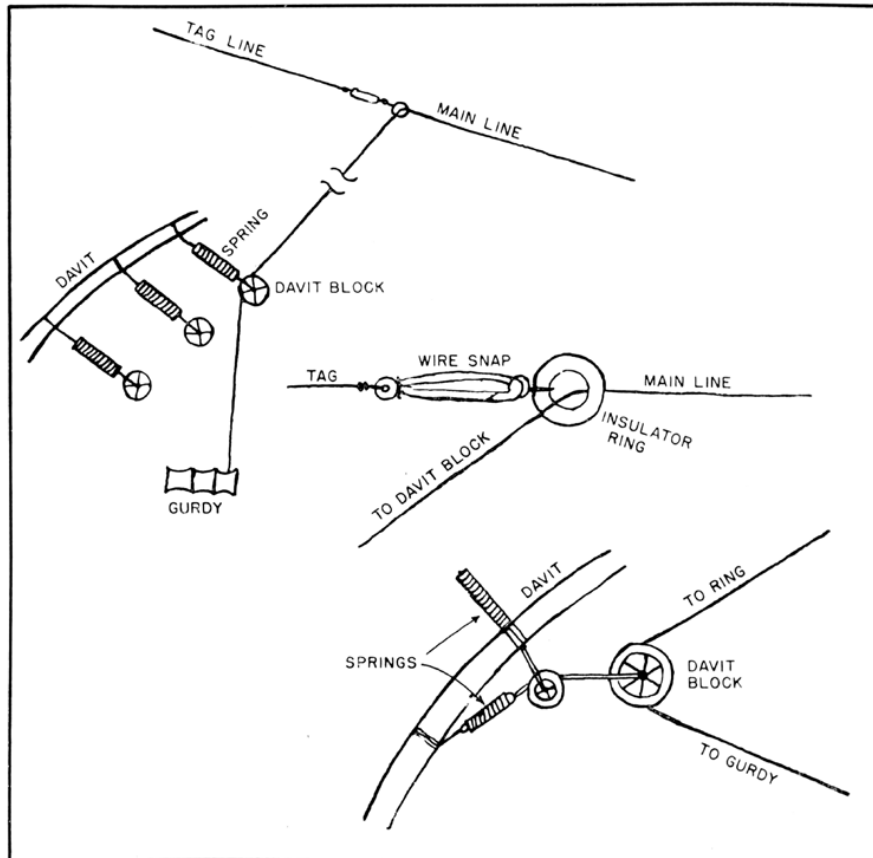


FIGURE 13. Diagram to show use of an insulator ring at the end of the tag line. The main line runs free through the ring to the davit block and thence to the gurdy. Lower right-hand corner illustrates use of two shock absorbers and a double block arrangement at the davit.

FIGURE 13. Diagram to show use of an insulator ring at the end of the tag line. The main line runs free through the ring to the davit block and thence to the gurdy. Lower right-hand corner illustrates use of two shock absorbers and a double block arrangement at the davit

strain falls heavily on the block and gurdy. In this case, shock absorbers on the davit block are very desirable. In this arrangement, there is no separate inhaul. The segment of main line from ring to block serves that purpose. The wire snap allows a quick disengaging of the tag line.

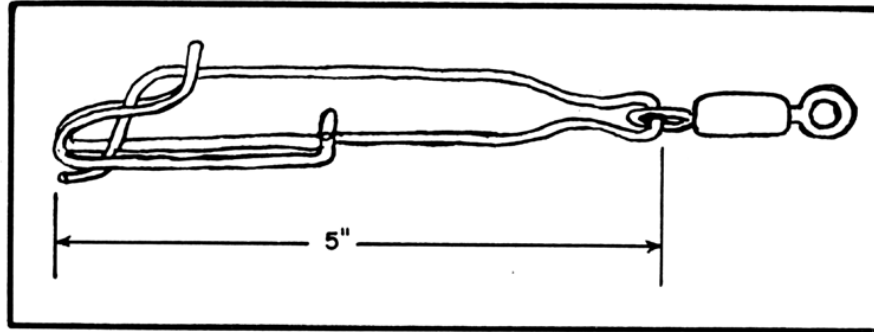


FIGURE 14. A wire spring or snap-on connector used by salmon trollers in attaching leaders to the main line

FIGURE 14. A wire spring or snap-on connector used by salmon trollers in attaching leaders to the main line

A wide variety of materials are used for tag lines. Some are small hemp rope, others are heavy cotton fish line or three-eighths-inch cotton rope. Some fishermen prefer twisted, stainless steel wire, because it is less affected by the wind. Others are trying out some of the newly marketed plastic lines.

Each outrigger fishing line is attached to the pole by a pole line, so the number of tag lines corresponds to the number of fishing lines to be used at any one time. Usually, tag lines are spaced about five feet apart on the pole, but there is variation in the spacing and in the number of lines. The usual number of lines is three or four per pole. At the end of the tag line often there is introduced a breaker cord to protect against snapping the pole in case the main line hangs up on some obstruction.

14. SPREADER BAR

A spreader bar frequently is employed at the junction of the tag line, main line, and inhaul. This is a strong metal bar about five inches long with an eye at each end. Most bars carry a swivel at one eye and another on the shank of the bar (Figure 12).

The name "spreader bar" frequently was used for an entirely different piece of gear, employed chiefly by sportsmen. This was a stiff metal bar two to three feet long attached by two short bridles at the far end of a main trolling line. A short leader was made fast at each end of the bar. Sometimes one end of the bar carried a leader and the other end supported a line to a lead sinker. Such spreader bars are rarely, if ever, employed at present.

15. SHOCKS

When a heavy fish, such as a salmon or albacore, strikes, there is a sudden and heavy strain on the outrigger pole. To offset this, some form of shock absorber is used. Among salmon trollers, it is usually

a coiled metal spring about 18 inches long (often two of them), attached to the pole and to which the tag line is made fast (Figure 15). Albacore fishermen are more apt to use one of several other elastic materials. Sometimes, an additional small shock absorber is inserted at the far end of the tag line. When the main line runs free through the ring of the tag line, the strain at the pole is further eased by coiled spring shocks supporting the troller block at the davit (Figure 13).

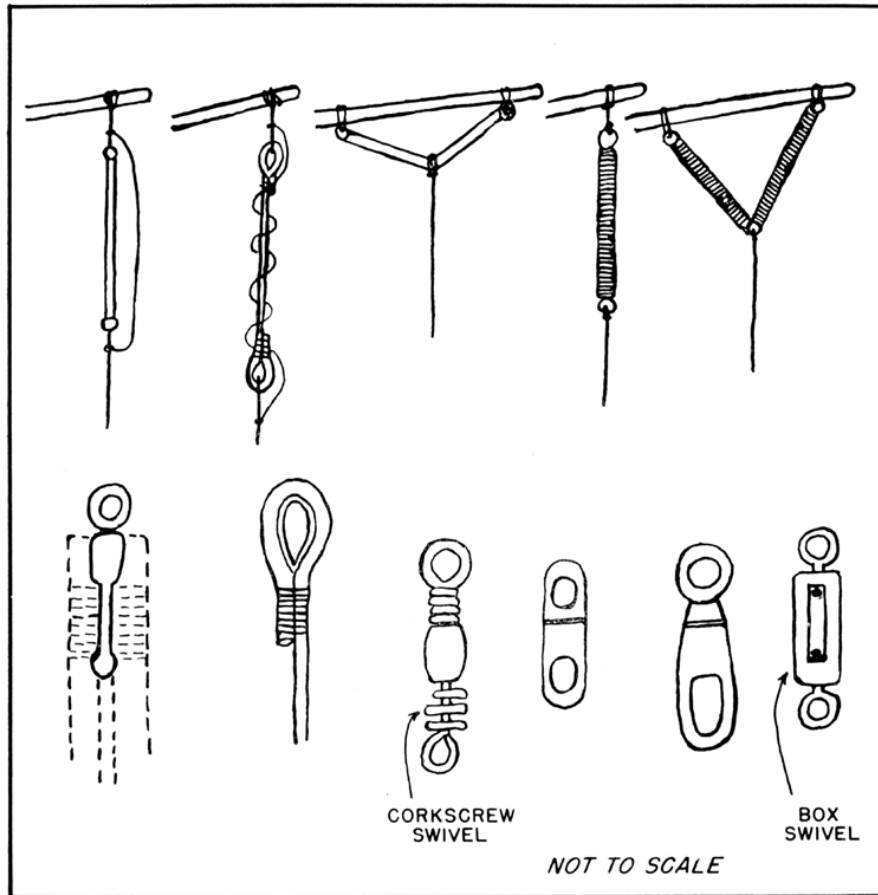


FIGURE 15. Above, shock absorbers at the outrigger pole. Shock cord and wire springs. Lower left, a swivel inset in surgical rubber tube and a shock cord over a metal thimble. Lower center, a corkscrew swivel. Lower right, other types of swivels.

FIGURE 15. Above, shock absorbers at the outrigger pole. Shock cord and wire springs. Lower left, a swivel inset in surgical rubber tube and a shock cord over a metal thimble. Lower center, a corkscrew swivel. Lower right, other types of swivels

A black rubber shock, one-half inch in diameter and about 21 inches long, is called "Fishermen's Friend," but not many fishermen use it. A more popular material is army surplus aviation cord which is made of elastic fibers coated with braided cotton thread. Each end of a four or five foot length of this is made fast (30 inches apart) to the pole and the tag line is fastened at the mid point. Another popular material is "latex" or "surgeons rubber," a thick rubber tube with a small hole through it. A special knob-headed swivel may be forced into the hole and lashed firm, making a convenient swivel eye for attaching

where needed. If this swivel is not used, each end of the tube may be bent over a metal eye or thimble and lashed. Occasionally, the pole shocks are home-made with strips of rubber from an inner tube.

Most pole shocks have a "safety loop" of strong cord made fast to the tag line on each side of the shock, so that if the elastic material of the shock is stretched to the breaking point, the main line need not be lost. In case the shock is a straight tube, the safety cord is not a loop, but is wrapped around the shock, allowing sufficient slack (Figure 15).

16. MAIN LINES

16.1. Names

Groups of fishermen used such a variety of names for the different pole lines that no set of names could be selected as representative. To avoid confusion, it was decided to number the main lines from the outside or tip of the pole inward to the base of the pole. of the half-dozen names used for Line No. 1, "tip" and "long line" were the two most common. The line with the heaviest sinker was sometimes called the "heavy line." Shorty, robber, pig, float, and spring were common, but the name dog line was variously applied to fishing lines. Nicknames were legion.

16.2. Materials

Many different materials are used for main lines and the present is a period of experimentation with new plastics for lines and leaders. In general, the salmon trollers pull by gurdy and prefer some kind of wire—solid, twisted, or braided (often one-sixteenth inch in diameter). Most albacore fishermen pull by hand, so they prefer a line that will be easier on the hands. Cotton line of 72 to 108 thread is common and extra hard laid line is chosen because it coils easily and is less apt to kink. Lines are usually dyed dark blue or green. A few lines are of hemp rope, sometimes tarred. Occasionally, twisted nylon is used. Wire lines may be galvanized, stainless steel, bronzed, or plow steel, usually twisted or braided. Nylon, dacron, and other plastics are being tried.

16.3. Arrangement

The general rule in both salmon and albacore trolling is to arrange the lines on the outrigger pole with the longest line at the pole tip (No. 1 line) and each line toward the base of the pole, progressively shorter. There are many variations, the most common being to place the longest line at No. 2 position. Occasionally, the longest line is No. 5. In general, the lines used for king salmon are long, ranging from 4 to 30 fathoms, exclusive of tag line and leaders. For silver salmon more and shorter lines are fished and for albacore the lines are also more numerous and shorter, ranging from 4 to 15 fathoms. One or two stern lines may be used for salmon, but two to five are frequently fished for albacore. Arrangements of pole lines for albacore trolling, exclusive of tag lines and leaders, are as follows: (Lengths in fathoms).

<i>Line number</i>	<i>Typical</i>	<i>Variations</i>		
1	15	15	10	2
2	11	20	6½	16
3	7	8	4	12
4	3	3	2	8
5	--	--	16	6

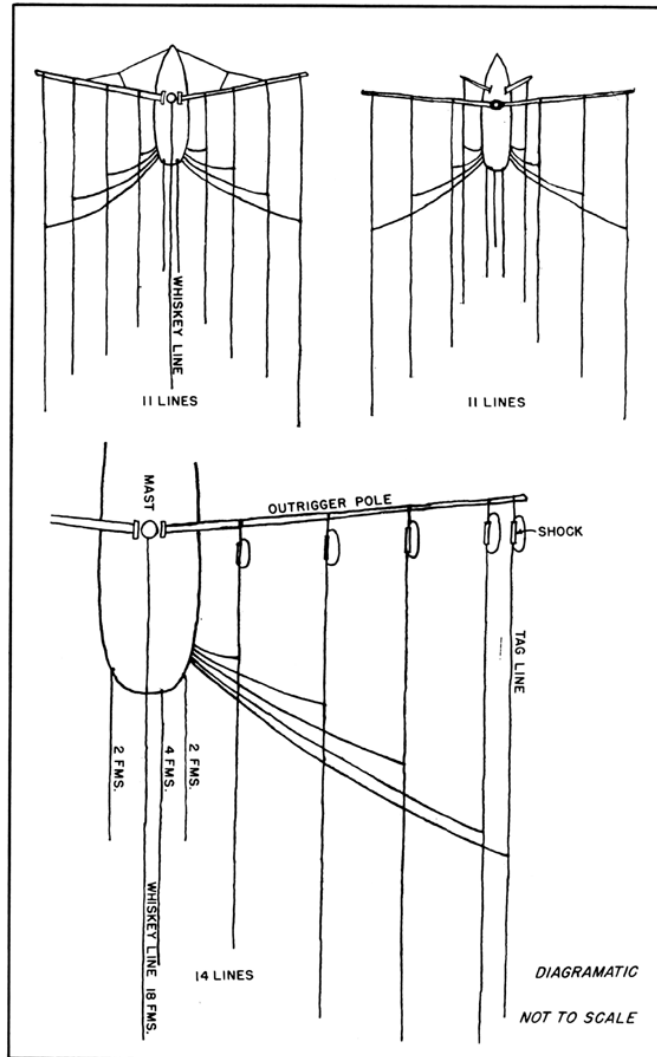


FIGURE 16. Diagrammatic drawing of the arrangement of lines for three different albacore trolling boats. The upper right-hand boat employed bow poles. In the sketch at the bottom, the shocks and safety loops at the outrigger pole are indicated.

FIGURE 16. Diagrammatic drawing of the arrangement of lines for three different albacore trolling boats. The upper right-hand boat employed bow poles. In the sketch at the bottom, the shocks and safety loops at the outrigger pole are indicated

The boats carry an abundance of line and 100 to 150 fathoms may be wound on a gurdy spool of a salmon boat. It is very easy to change the amount of line payed out and this is frequently done to better fit fishing conditions. More line (with sinkers) means deeper fishing, as do added weights and slower boat speed.

Bow lines fall inside the last pole line and they are usually short and heavily weighted.

16.4. Number

For a few years following 1920, among salmon trollers there was an attempt to increase the catching power of each boat by adding to the number of lines fished. Instead of about four pole lines per boat, the number was more than doubled. Later, the adoption of the power gurdy for pulling lines permitted quick boating of the hooked fish and return of the line to the water. Fewer lines were needed and the number of pole lines per boat was reduced to six or eight.

Two types of lines are recognized: those from a pole, and the stern lines from the aft gunwale; but usually, when referring to lines, the fisherman means pole lines. In general, more and shorter lines (both pole and stern) are used for albacore than for salmon trolling. For salmon, the average boat fishes three lines per pole, but many boats carry four lines on each pole or three on the main pole and one from a bow pole. In addition, there are usually one or two stern lines, totaling about eight lines per boat. Most albacore boats carry four lines per pole, and possibly one from a bow pole, plus two to five stern lines, making 11 or 12 lines per boat. There is variation according to the ideas of each fisherman. Larger boats with longer outrigger poles may carry five lines per pole; one bow line, and three or four stern lines, totaling 15. One 60-foot boat was equipped with five lines on each main pole and four on each bow pole, totaling 18; but, in this case, the bow poles, seldom fished, were carried as stand-bys in case a main pole was broken.

The fisherman usually is equipped with all the lines he may wish to use, but all of them may not be fished. When fish are "hot" the longest lines may remain idle, while attention centers on the short lines so that the fish may be boated and the lure returned to the water as quickly as possible.

17. STERN LINES

Salmon trollers usually fish only one or two long stern lines for king salmon, but an additional one or two shorter lines are added for silvers. Because albacore will follow in the wake of a boat, the stern lines are more important than in salmon trolling, and albacore boats will usually fish three or four lines, but occasionally five or six if tangling can be avoided. For this reason, one of the central stern lines may be weighted, and the lines on each side may be longer with little or no sinker weight.

The whiskey line, attached high on the mast or boom, is always the longest of the stern lines (16 to 20 fathoms) and seldom interferes with the short lines made fast at the gunwale. It rides so high over the stern that sometimes a short "down haul" line is required to lower it to within reach of the fisherman.

18. LEADERS

The leader is a short line, bearing the lure, the forward end of which is attached to the main line. It is usual in albacore trolling to fish but one lure per line, so the leader is made fast to the end of the main line. In salmon trolling several lures are fished on each line so that the leaders are attached at intervals along the main line. To avoid tangling, the distance separating leaders is usually somewhat greater than the length of each leader. There are exceptions to this rule, as is the case with almost any rule of thumb applied in fishing gear. The main line is provided with pairs of stops at desired intervals between leaders, so that lures on leaders may be attached or removed readily. Enough stops may be prepared to receive a maximum of eight leaders, even though the fisherman rarely fishes that many. He may wish to experiment with lures at different positions along the line, and the number fished may vary several times during the day.

In general, in king salmon fishing, fewer leaders are used now than in past years, attributed to the speed obtained by gurdy pulling where lines are hauled in and lures returned to the water quickly. Some fishermen, when trying for silver salmon, use one or two more leaders than for king salmon, but each leader is somewhat shorter.

The number of leaders used for king salmon varies from one to eight, but seldom fewer than three or more than six. Four is the number most frequently used. The interval between leaders may be 12 feet while fishing silver salmon, but for kings it is 15 to 24 feet. The over-all length of leaders for king salmon varies from six to more than 40 feet, but 12 to 18 feet is the usual range.

In the early years, cotton line was used for leaders. Beginning about 25 years ago, leaders were frequently stainless steel piano wire throughout their length. With the development of plastics, monofilament nylon, braided dacron, or one of the other new plastics make up most of the leaders, but a short wire is placed just forward of the lure to prevent the teeth of the fish from cutting the leader. Occasionally, no wire is used but most commonly a two- to four-foot wire or even a six-foot wire is fitted to the leader. A wire is practically a necessity when trolling for barracuda. The over-all length of albacore leaders is 4 to 20 feet with 18 feet the average.

19. TAPER LINES

For several decades preceding 1938, the taper line was the standard rig for commercial salmon trolling. There was little sport trolling in Northern California during those years. The taper line took its name from the graduated sizes of line used, and diminishing weights of sinkers from top to bottom. The theory was that when caught on a rock, light tackle at the bottom allowed the line to break without loss of the heavier gear above. A separate lead weight was used just below the attachment of each leader, except the bottom leader which was tied to the bottom sinker (Scofield, 1920). A typical arrangement of gear included 108-thread, hard-laid cotton seine line as main line between the pole and the second leader (numbering from the top); 60-thread line between the second and the fourth leader; and 33-thread line between the fourth leader and the end. The weights of lead sinkers

might be graduated from seven pounds at the top to six, four, four, three and three. Six leaders per line was the general rule.

Beginning in 1938, experiments were made with a nontapered main line having a single cannon ball weight at the extreme end. In 1939, several such lines were in use and the changeover from taper lines became general in the early 1940's.

20. TIP LINE

Trolling leader is a poor name for what is often called "light gear" or "tippet," but most frequently tip line. The term tip line further confuses it with the main line at the tip of the outrigger pole (line No. 1). It is a short line, lighter than the main line, introduced between the end of the main line and the leader. It might be considered a taper of the main line, or a forward extension of the leader. It is used in albacore trolling, especially by sportsmen, and in scouting when fish are scarce. Commercial fishermen object to it because it is hard on the hands while landing a fish. This is an important consideration, because albacore lines are pulled by hand. The trolling leader may be of linen, but more commonly of braided nylon cord dyed green. In length, this additional leader may be only three or four feet, but usually is 10 to 12.

21. SINKERS

In salmon trolling, the use of about six sinkers spaced along a main line was common practice until about 1938. The "taper line" was generally abandoned in the early 1940's for a uniformly heavy main line with a single lead weight (cannon ball) at the extreme end of the line. Lead weights have been preferred throughout the years, although other materials and diving devices, to serve as sinkers, have been tried. Lead does not corrode in salt water and can be molded into the shape and weight desired, but it is expensive. Cannon balls sometimes snag rocks on the bottom and are lost, so spares are usually carried aboard. King salmon, in most cases, are hooked in deep water so that heavy leads on the line are used. Silver salmon nearer the surface require lighter weights and albacore gear may not have sinkers at all.

The weights for king salmon gear vary from about 8 to 50 pounds, or even 60 in a few instances, but the usual range is from 18 to 40. If bow poles are used, the bow lines carry the heaviest leads, 40 to 60 pounds, to prevent tangling the outer lines. The whiskey line with attachment high on the boom or mast is not so apt to tangle other stern lines, so it may carry a heavier ball, but in many cases, this line is very long and affixed with only a moderately large sinker. A common arrangement of salmon lines is for the longest line from the pole tip (No. 1 line) to have a sinker of 8 to 15 pounds. Lengths of lines are progressively shorter toward the boat with increasingly heavier sinkers; i.e., 15 to 20 pounds for No. 2 line, and 20 to 35 pounds on No. 3. Some boats carry sinkers nearly double the weights given above. The weights are changed frequently according to the fishing conditions at any particular time, and the depth desired for the lures at that time.

In general, albacore trollers use very light sinkers or dispense with them entirely. Leads may be useful for sinking one line below a

neighbor to avoid tangling. This is especially true for stern lines. If used, bow lines carry weights.

The arrangement of lines for albacore trolling is often the same as for salmon. Line No. 1, the longest, carries the least lead, and lines No. 2 and No. 3, progressively shorter, are heavier weighted. In some cases, the albacore troller prefers just the opposite order. In all cases the leads weigh but a few ounces. Leads often are used on the "light" or "tip" gear, in which case a four to eight ounce lead is introduced a fathom or so ahead of the leader.

During the past 20 years, a variety of otter boards and diving vanes have been tried in an effort to replace the heavy lead sinkers, but the cannon ball is still used by the majority of salmon trollers. One form of diver, used successfully by a few sport and commercial trollers, is a 10-inch length of two-inch diameter plastic tube open at both ends and sliced open on a long diagonal, so that the forward end tapers almost to a point. Short bridle lines are attached at the forward and upper aft end. The leader may be attached at the aft end of the tube or, for greater depth, may be made fast at the junction of the two bridles. It is claimed that this device does not wobble too much from side to side. Another type is made from a short length of galvanized pipe filled with lead and with the aft end flattened into a vane. The forward bridle line is made of light material which breaks easily, or a rubber tube that stretches and lessens the tendency for the device to hang up on a rocky bottom. This diver is rare. Otter board divers obviously have been found wanting after trials. Boat-shaped leads, somewhat concave on one side have been used as partial vanes to kite out a line and lessen the danger of tangling.

In sport trolling for king salmon, a heavy sinker is needed to keep the lure deep in the water, yet much of the excitement of landing the fish is lost to the angler when he has to pull against a dead weight instead of a fighting salmon. To overcome this, several devices have been developed to detach the sinker when the fish strikes. This leaves the line free of weights and gives the angler an opportunity to play his catch. One method is to introduce, in advance of the lure, a two and one-half inch tube with a coiled spring inside holding a pin in place. The pin secures the sinker to the line. The sinker usually is a cast iron windowsash weight. When the fish strikes, the spring is contracted, the pin frees the line of the sash weight and the sinker drops to the bottom, leaving the angler's line free. To be sure, the sinker is lost each time there is a strike, but the cost of sash weights is not such a big item compared with the other expenditures of a fishing trip. The general use of this, and other devices for dropping the sinker, has increased among sportsmen in the last few years and we are apt to consider the idea new. Al Wilson, the designer of the famous salmon trolling spoon, worked out a device of light wires that held the weight only until the fish struck and then broke, releasing the sinker. This was about the turn of the century, more than 50 years ago.

Floats have been used, especially on albacore lines, to keep the lures closer to the water surface. These usually are boat-shaped boards a few inches wide and a foot and one-half long with a wire spring clamp to snap on the line in advance of a leader. Sometimes a float or paravane is to be found on a salmon boat. Usually, it is a board one and one-half

feet long by six to eight inches wide, with a keel board, about six inches deep, on the under surface. The keel is at a slight angle, so that it will kite outward and avoid tangling a neighboring line. In addition to the paravane action, the board serves to float the line closer to the surface when the fisherman wishes to do shallower fishing. On the keel is a wire spring to clamp on the main line. Occasionally, the float board is larger, two and one-half feet long by a foot wide, with rounded forward end and keel with clamp spring. When such a device is used, it generally serves to kite one particular line out beyond the others.

22. LURES

Lure is a general term for whatever attracts a fish to the hook and includes spoon, jig, squid, plug, and bait which is alive, or dead fish, or a piece of fish. Many fishermen make a distinction between bait (fish) and other lures which are artificial. The lure carries a hook which is usually concealed when using bait, squids, and feathered jigs, but exposed on spoons and bone jigs.

22.1. Spoons

Since the early days of salmon trolling, there have been discussions as to the relative merits of spoons and baited hooks. The fisherman may have his preferences, but he plays it safe by carrying an assortment of spoons in the boat, even when fresh bait is available. Some claim that spoons are better at the beginning and end of the salmon run and bait is best when the run is heaviest. In any case, spoons are in general use at the opening of the salmon season.

Nearly two dozen different makes of spoons of many shapes, sizes, and colors are on the market. Twenty years ago, large spoons were preferred for king salmon, but the trend has been toward smaller sizes. In albacore trolling, feathered jigs are more popular than spoons. Many fishermen select bright silver or brass spoons for dull days and dull colored spoons when the sun is shining. Colors include bronze, bright red, orange, shiny brass, and silver. Some spoons have a different color on each side. The sizes most used are numbers 6, 7, and 8. Many fishermen select No. 7 spoons with No. 10 hooks for king salmon. Number 5 spoons with No. 7 hooks are much used for silver salmon. There is such a variation in make, size, shape and color of spoons that the selection had best be left to the whim of the individual fisherman. Experiments are conducted by fishermen to determine which type of spoon is best, and spoons are compared to bait; but usually no records of such experiments are kept and too often the catch is affected by some other variable, such as: water surface, wind, depth, time of day, boat speed, or impatience with the gear being tried. Some fishermen have made good trials, but they do not broadcast their results.

In general, the metal spoon is curved or cupped to insure a wobbling motion while fishing. In most cases, a single hook is linked to the lower end of the spoon so that it hangs free to turn. In a few spoons, the hook is bolted to the body of the spoon. Occasionally, a hook is fastened about one-third of the way up the body of the spoon (Figures 17 and 18). Spoons for albacore trolling are one or two sizes smaller than those used for salmon (Figure 18). A popular spoon for silver salmon trolling was

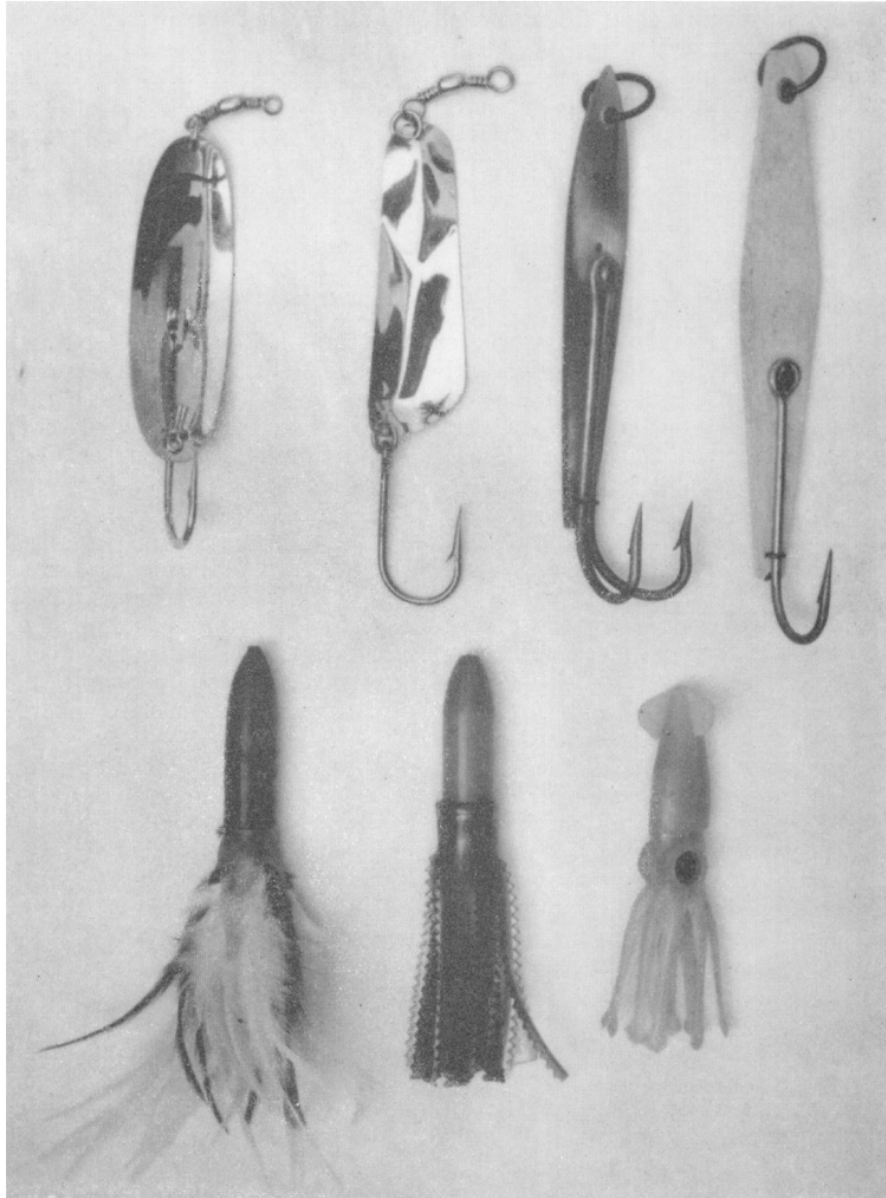


FIGURE 17. Albacore lures. Upper half, two spoons, a double hook plastic jig and a single hook bone jig. Lower half, a feathered jig and two squids before hooks have been attached. Photograph, September, 1955, by Jack W. Schott.

FIGURE 17. Albacore lures. Upper half, two spoons, a double hook plastic jig and a single hook bone jig. Lower half, a feathered jig and two squids before hooks have been attached. Photograph, September, 1955, by Jack W. Schott

called an Egg Wobbler, because it was oval in shape and the size of a hen's egg. It usually carried a No. 5/0 or No. 6/0 hook.

Forty years ago, two spoons, McMahon and Al Wilson, were the favorites and practically all salmon trollers carried them. The McMahon (Figure 17) is still in common use. Probably the best known spoon, the

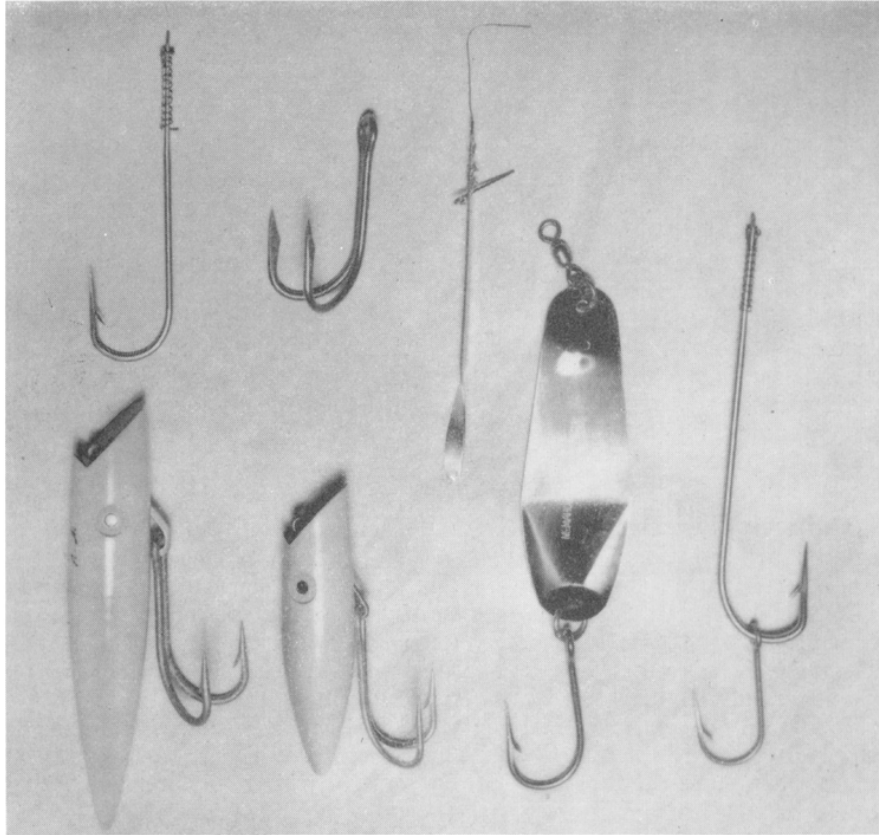


FIGURE 18. Salmon lures. Upper half, a long-shanked bait hook with wire for securing bait. The flattened double "argo" hook is used most in albacore jigs. The salmon trollers "E Z baiter" blade with wire. Lower half, two plugs, the McMahon salmon spoon and a bait hook with wire and a suspended trailer hook. Photograph, September, 1955, by Proctors of Eureka.

FIGURE 18. Salmon lures. Upper half, a long-shanked bait hook with wire for securing bait. The flattened double "argo" hook is used most in albacore jigs. The salmon trollers "E Z baiter" blade with wire. Lower half, two plugs, the McMahon salmon spoon and a bait hook with wire and a suspended trailer hook. Photograph, September, 1955, by Proctors of Eureka

Al Wilson, is no longer known under that name, although almost identical spoons are available under other names.

22.2. Bait

Fish as bait is used by trollers all along the California coast, but it is more prevalent in the northern half of the State. Fresh sardines are preferred, but during periods of scarcity, salted sardines serve as a substitute. Large anchovies and medium sized herring are used for bait when sardines are not readily available. Fillets of larger fish and chunks of fish occasionally are substituted. In a few instances, the rich meat on the side of a salmon head (cheeks) serves as bait. Sometimes a small fillet is used in combination with an artificial lure. The albacore trollers depend largely upon artificial lures.

One effective method of preparing bait, is to give the fish a bend and a slight twist and then skewer it with a wood splinter, so that it will have a weaving or wobbling motion in the water. Other fishermen insert a narrow metal blade in the mouth of the bait fish. The aft end has a twist of one quarter turn with a hole for attaching the hook. The length

of blade varies with the size of bait, but usually is four inches long for smaller bait and six inches long for larger fish. The forward end is provided with a pliable wire for securing the head of the bait fish. A commonly used blade is marketed under the name "E Z baiter" (Figure 18).

There are several methods of impaling the bait fish on the hook, including wiring the mouth shut or tying the fish on with cord. Several forms of bait holders have been tried and one became a fad among salmon trollers in 1955. This was variously called Canadian wonder, herring baiter, silver horde, super duper, and the worm. In reference to a popular song, it was most frequently called "the thing." It is a metal holder for a fish fillet that looks like a small spoon having the forward one-third or less bent back. A small hole through the bent portion and the main spoon permits pinning the fillet into the holder with a small wire or toothpick. The leader is attached off center to the upper corner of the holder so that the holder and the bait will have a weaving motion in the water.

22.3. Squids

Originally, the term "squid" was applied, especially by Orientals, to the 10-armed squid, a mollusk, used as bait. Later, the word meant an artificial lure (made of wood, metal or rubber) resembling the animal. Still later, the term was used for almost any artificial lure, especially in the pole and line method of live bait fishing. Even the short pole in this fishery was called a squid pole. For the past decade or two the name has been used by trollers in a more restricted sense for a squid-like lure with some kind of dangling cords resembling the trailing arms and tentacles of the animal. Other artificial lures, without "tentacles," are more apt to be called jigs, but a distinction between squid and jig is not sharply drawn.

A few of the older type squids are still in use. These were made of dull colored rubber, sometimes with a brightly painted or abalone shell eye, rather closely resembling the animal and its tentacles. Most rubber squids are now painted in bright colors, preferably fluorescent. Recently, plastic materials have begun replacing rubber and even the older rubber lures have been dressed up with "hula skirts" of fluorescent nylon cords in brilliant colors. A variety of new plastic squids with plastic cord tentacles are now appearing on the market. These are called "hoochi-coochis" by some fishermen.

Most of the squids have a small hole running lengthwise through the body, through which the leader wire can be passed. The double hook is attached to the wire and the leader is pulled snug so that the hook is nestling among the tentacles.

A few lures, made to mimic small fish, present almost perfect imitations of the shape, fins, eyes, lateral line, spots, stripes, and other coloring, and are dark above and have silvery underparts. These look very inviting to humans, but they are not very successful in attracting salmon and albacore.

22.4. Jigs

Fishermen, like other humans, are subject to fads, and the selection of trolling jigs offers an opportunity to try new gadgets. often, a new lure appears on the market, is popular for a couple of years and then

drops back to a position of secondary importance. As the years have passed, there has been collected a large assortment of artificial lures. In spite of the variations, two basic types have persisted since the time when ocean trolling started in this State. The simplest and probably the oldest type, is the large whalebone jig with a large single hook bolted to the boat-shaped white bone. For salmon fishing the hook is usually barbed, but it is barbless for albacore. This primitive jig may still be found occasionally, on sale and in use. More than a dozen variations of this jig are now on sale at ship chandlers. They are smaller than the original and carry a double hook instead of a single. They may be of bone, horn, partly metal, plastic or burnished aluminum, but old time fishermen are apt to refer to this type of jig as "a bone."

A second basic type consists of a head with a tail of feathers concealing a double hook. A jig of this type may be referred to as "a feather." A small hole through the head allows a leader wire to pass through, to which the double hook is attached. Around the base of the head there is a groove into which a tail of brightly colored feathers may be whipped. Shark skin, dolphin fish skin, or other tough material may serve to protect the base of the feathers, leaving four or five inches of tail streaming behind and hiding the hook (Figure 17). The head may be metal, wood, bone, rubber, or a plastic, and may have inset or painted eyes. There are dozens of variations from this style of jig and many different heads are on sale separately. From these, the fisherman makes up the tail to suit his own preferences. The "bone" jig (with variations) and the head plus tail feathers or "feather jig" (with variations) constitute the two types most used by albacore trollers. In the past, bone jigs were in common use by most fishermen, but at present feathered lures are preferred, especially in albacore fishing. Some fishermen claim that it is necessary to troll a little slower with bone jigs, because they are apt to jump on the surface and tangle with nearby lines. This is a reason given for the widespread use of feathered jigs in albacore trolling.

In the last several years, the use of plastics has added many new lures, so that no one troller has all of them, but many fishermen have in their possession a large assortment of jigs, squids, plugs, and, if a salmon troller, he may be well supplied with several kind of spoons and hooks for bait. Under these circumstances, it would be difficult to select a set of lures that could be considered as representative.

22.5. Plugs

Sportsmen who go ocean trolling frequently use plugs, but these lures are not generally favored by commercial trollers. Salmon fishermen in the north are beginning to employ plugs, and during the last three or four years their use has increased decidedly. Albacore trollers of the south may carry a few on board, but they are not in common use. Until recently, most plugs were made of wood, but now plastics are being utilized. A plug roughly resembles a small fish four to six inches long, but it lures more by its brilliant coloring than by its imitation of an actual fish. They may have a triple hook at the aft end and sometimes carry several such multiple hooks along the body, but generally, the small plugs have a single hook, and medium sized plugs are fitted with a double hook (Figure 15). Hook sizes 6/0 or 7/0 are common. Some of

the longer plugs are jointed. There is a large assortment of these lures on the market and many different shapes, sizes, brilliant color patterns, and arrangement of hooks can be had.

22.6. Flasher

The flasher is a bright piece of metal which reflects light to attract fish. The idea was first used by sport fishermen several years ago and commercial trollers began adopting the gadget about 1953 or a year or two earlier. of the several different forms, the most common is a thin metal sheet three and one-half inches wide and 12 inches long. One-third of the length is bent up at an angle of about 30 degrees and another one-third is bent down at the same angle to give a weaving motion in the water. Bright colors used are silver and red, or orange fluorescent paint, and sometimes, each longitudinal half of the metal sheet is painted a different color. This form of flasher, introduced into the leader about two feet forward of the lure, is thought to attract the attention of the fish which investigates, sees the lure and proceeds to take it. Sometimes, two such flashers are used in tandem. A newer type of flasher, popular in 1955, is 14 inches long by two and one-half inches wide.

Another form is a metal sheet about 18 inches long hung on the stern of the vessel from one of the davits to just above the gunwale. There is enough slack so that the metal turns in the wind and its flashing is supposed to attract fish from a considerable distance.

Some fishermen paint their small boat stabilizers a bright color with fluorescent paint to serve a dual purpose of steadying the boat and at the same time attracting fish and keeping them interested until they take the lure.

23. HOOKS

We have no records of the hooks used in the early days of trolling in this State. The 1880's seem to us a long time ago (70 years), but this was only a moment in the history of fish hooks. Barbed hooks of stone are said to have been used in the Neolithic Age and curved hooks in Egypt dated at some time prior to 4000 B.C. Thirty-five years ago, California salmon trollers, when fishing bait, used kirby hooks with a knobbed shank, but now practically all hooks are straight and have a ball eye. The sizes most frequently employed are Nos. 6/0, 7/0 and 8/0. There are many variations in shank length. Impaling a small fish as bait on a hook requires a long shank of five to eight inches, whereas short hooks may be preferred in feathered jigs, bone jigs, or in a squid. Single hooks may be satisfactory for bone jigs, but double hooks are more effective in feathered jigs. Most spoons carry a single hook.

A significant difference in hooks is whether or not they are barbed. In general, salmon hooks have barbs and albacore hooks are barbless, although there are many exceptions and many barbed hooks are used in the albacore fishery. Some albacore trollers hammer down the barb to make a solid lump near the point of the hook. Fishermen claim that slow moving fish like salmon are more apt to shake the hook, and therefore, barbs should be used. Conversely, fast moving fish like the albacore, trolled at greater boat speed, are less apt to be lost off the hook and therefore do not require barbs on the hook. Fish are removed more

rapidly from a barbless hook and the lure may be returned to the water more quickly.

A double hook is generally used in feathered jigs and in squids. These may be barbed or not according to the locality fished. The double hooks in jigs are hung to ride points up when possible. In very recent years, a flattened double hook, the "argo," has been very popular for albacore fishing with feather jigs or squids. These hooks are barbless, but have a triangular flattened hump just below the point (Figure 18).

In some instances, a long-shanked hook is used for sardine, herring, or anchovy bait in salmon fishing and a naked short-shanked "trailer hook" is hung on the bend of the larger hook.

24. STOPS

The stops or stoppers are attached to the main line in pairs, three to seven inches apart. The leaders are snapped onto the main line between stops which prevent the leader snaps from sliding along the main line. Stops are commonly used in salmon fishing, because there are several leaders from each main line, but they are not needed when only one leader is fastened to the end of the main line, as in albacore trolling. The number of pairs of stops naturally depends upon the number of leaders that are to be fished from each line and the distance between stop pairs determines the spacing between leaders. The stops are permanently fastened to the main line by wrapping or seizing a wire or cord around the main line and securing it in position by passing one or two turns through a strand of the line. Stops on metal lines commonly are of German silver, nickled, or monel metal wire.

A different form of single stopper once was used widely, but is not so common now. In salmon trolling, the upper end of the main line was run through a ring at the end of the tag line and thence to the cockpit, requiring no separate inhaul. The large stopper on the main line engaged the ring so that the strain in trolling fell on the pole line instead of on the gurdy. The ring was large enough to allow the passage of the small paired leader stoppers. (See tag line.)

25. MARKERS

The main line is marked at regular measured intervals, so that the fisherman may know how much line is out, either when paying out or when reeling in the line. Usually, a few turns of linen twine are wrapped tightly (seized) around the line, but a light pliable wire may be used. In past years, when main lines were cotton only, a simple hard knot was tied in the line, one knot for each measured segment. The interval between markers depends upon the preference of the individual fisherman and varies from two to five fathoms. Spacing between markers is most frequently either four or five fathoms.

26. KITE LINES

A novel method of trolling is credited as having originated at Santa Catalina Island in 1909. (French, 1916.) The angler in the stern of the moving boat fished with rod and reel, but his line did not enter the water. Only the hooked bait (flying fish) was skipped along the surface by one of two ingenious devices. The best known method was to fly

a kite in the air, and a cord from the kite line kept the angler's line out of the water. This line would break when the fish struck, leaving the angler free to play the catch, chiefly bluefin tuna and yellowtail. The other device was a sled which was towed on the surface by a long line attached to the top of the mast. Forward of the sled, a light cord from the towline was attached to the angler's wire leader. This cord would be broken when the fish struck. These two bait skipping devices have not been used in recent years. The use of a kite to manipulate the position of the bait is not a new idea. The Egyptians (2000 B.C.) used a kite to carry the bait to a greater distance from the angler.

27. ELECTRONIC DEVICES

of seven new electronic devices, three (radio-telephone, depth recorder, and direction finder) are being employed by trollers as a distinct aid to fishing and navigation.

A radio-telephone (ship to ship and ship to shore) is almost a necessity even to a small troller. It gives the news of fishing conditions in various areas, it allows the fisherman to keep in touch with other boats, especially in fog, and it is a means of reporting trouble or accidents. Consequently, most boats have it.

Many boats have a sonic depth recorder which is used as a safety factor in fog and to avoid areas where gear might be lost on obstructions on the bottom. By watching depths as recorded on the instrument and reference to a navigational chart, the fisherman frequently is able to locate his position even in fog. Naturally, it is of little help in locating fish that usually do not congregate in dense schools, but some fishermen claim that knowledge of depth helps them to "stay on the fish" when a school is following a certain depth contour.

Many fishermen use direction finders as an aid to navigation, especially in fog. They frequently are used to locate another fisherman who has reported being "in the fish."

Some of the large boats have an automatic pilot, but its aid to fishing is not considered of sufficient importance to small boats to justify the cost. It is claimed for the pilot that it allows the fisherman to handle and repair gear in the cockpit while under way. Also, the crews of some two-man boats have been reduced to one man and the automatic pilot.

The small boats used in trolling may recognize the advantages of radar for navigating in fog and on dark nights, but the cost is such that very few of the trollers are equipped with it.

The "Sea Scanar" for locating fish is being tried out by purse seiners and other large boats, but as yet, has not been adopted by trollers. Obviously, scattered salmon or albacore offer difficulties in scanning as compared with schools of sardines or mackerel.

In the northern part of the State, U. S. Government loran stations are established and many of the trawlers (drag boats) have loran instruments, but only a scattered few of the salmon trollers are so equipped.

28. MOTHER SHIP

One of the oldest fishing systems in America was the use of a schooner rigged sailing vessel carrying nested dories which were dropped off, one at a time, at intervals over the New England cod banks, with one or

two hand line fishermen to each dory. Later, if they could be found in the fog, the dories, fishermen, and their catch were picked up by the mother ship. Incidentally, the racing to port by these codfish schooners played an important role in developing the American sailing skill, so prominently demonstrated in the days of the clipper ships.

Unexpectedly, a revival of the mother ship principle was attempted by a few of the salmon trollers owning larger vessels. The troller, acting as a mother ship, carried on deck one or two skiffs, each with its own motor and trolling gear. The skiffs, dropped over the side by the ship's boom, were able to scout a much larger area than could be explored by the mother ship alone, and when a skiff was "in the fish" it signaled to the others of the group. The possible advantage of this wider scouting was counteracted by the adoption of the buddy system in which several trollers operate as a group, keeping in sight of each other. Widespread use of ship to ship radio-telephone, and the free exchange of fishing information have contributed to making the use of the mother ship principle impractical.

29. BUDDY SYSTEM

For many years, it was common practice for each trolling boat to go its own way scouting for fish. The lone fisherman working his lines in the cockpit, might, and sometimes did, slip and fall overboard while the engine was running. Frequently, the drifting boat, out of gasoline would be recovered by a passing vessel, but seldom was the fisherman found. There were instances of loss of life even on a two-man boat, when one fisherman was in the galley unaware that his partner had met with an accident. There were frequent instances of engine breakdown, which resulted in a night spent adrift, sometimes dangerously close to reefs.

There developed among some northern trollers, both commercial and sport fishermen, a group action plan called the buddy system. This was instigated partially to overcome the danger of losing men overboard, and partially to increase the coverage of an area when scouting for fish. Under this plan, two or more boats, commonly three or four, always traveled within sight of each other. Fishermen of the group kept an eye open for breakdowns or other possible accidents. Much of the difficulty of operating in fog remained, but this trouble was reduced when ship radio came into general use, allowing boats to check on each other at frequent intervals.

The buddy system is now rather general among the commercial and sport salmon trollers, and it has been adopted by some of the albacore trollers, especially by those from the north that go to San Diego or San Pedro for the albacore season. Most of the southern trollers now depend upon radio checks at intervals during the day, but groups of boats do arrange to anchor together at night.

30. SILENT HOUR

By voluntary arrangement among trollers, there was established a so-called silent hour on the ship radio-telephones. This usually was a half hour period twice a day. Fishermen refrained from making calls at such times and listened in at the radio for broadcasts from a chosen

small group of skippers who reported fishing conditions and all pertinent news from their respective areas. This systematized the exchange of news so that all could have it, and at the same time required less attention at the radio through the day and greatly reduced the number of air messages. All boats benefited.

In the summer of 1955, a somewhat different arrangement was employed in Southern California. One boat was chosen to act as monitor and call for reports, by locality, from any boats in the area. The geographic area was reported, and in some cases, the Department of Fish and Game catch locality charts were used to report by numbered block areas. The range of ocean covered was from the northern coast of Baja California to north of Santa Barbara. The reports to the monitor were made by species of fish. The half hour between noon and 12:30 was devoted to commercial fishermen's reports and the half hour from 12:30 to 1:00 p.m. was reserved for reports from sport boats.

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