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BUREAU OF COMMERCIAL FISHERIES
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The California Shrimp Industry[1]

By
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CONTENTS

1. HISTORICAL ACCOUNT[2]

Fishing for shrimp in San Francisco Bay started about 1869. The first fishermen were Italians and there were 8 boats engaged in the fishery. They used small meshed seines 60 feet long and 8 feet deep with a bag in the center. The nets were used in deep water and took very few small shrimp or fish. They usually took from 50 to 75 pounds of shrimp in a haul and made from 3 to 5 hauls on each tide.

In 1871 the Chinese introduced the Chinese shrimp net and began to take large quantities of shrimp, but as the market for fresh shrimp has always been limited, the greater portion of the catches was dried for export to China. The Chinese fished in Tomales Bay and San Francisco Bay. The Tomales Bay camps were abandoned during the early nineties. In 1885 public opinion became aroused against the Chinese nets, as they took large quantities of young fish, and the controversy on this subject continued until 1901, when the Legislature passed a law placing a closed season on shrimp fishing for the months of May, June, July and August. The Chinese hired attorneys to fight this. A boat crew was arrested for a test case, which the State won through all the courts up to and including the United States Supreme Court. In 1905 the shrimp interests managed to get the four-month closed season removed, but at the same time it was made unlawful to export dried shrimps. In 1909 a closed season of three months, June, July and August, was again adopted, and in 1911 the use of the Chinese nets was prohibited altogether. During the period from 1900 to 1911 there was constant trouble over the shrimp fishing. Fish and game deputies were arresting the Chinese crews and there was continual agitation. In 1915 the backers of the Chinese put through a bill which again allowed shrimp fishing on south San Francisco Bay (District 13) with the Chinese shrimp nets. At about the same time a trawl was put in use in the northern end of the bay. The law prohibiting the exportation of dried shrimps was retained until 1919, when it was repealed. From 1919 to the present time Chinese shrimp nets have been used in District 13, the shrimp trawls in District 12, and not more than one-half of any one catch could be dried legally.

Shrimp fishing is carried on under several methods of organization. Frank Spenger Company and Quan Brothers maintain their own camps and buy the shrimps from the trawlers, who fish for them at a definite price per pound. The fishermen in this case have no more interest in the shrimps after they have delivered them. The Chinese camps in South San Francisco are organized under three working plans. The larger number of camps are owned by Chinese companies maintaining offices in Chinatown. These camps are leased to a group of men who work on shares among themselves. The company which owns the camp is paid for its use by handling the total catch at a definite price which allows it a profit. The price paid to the camps for fresh shrimps, for

[2] Most of the material for this section was taken from "Shrimp fisheries of California," by N. B. Scofield (1919).

TABLE 1

Shrimp Camps in South San Francisco Bay Using Chinese Shrimp Nets—1930

Shrimp companies	Number of nets used	Number of boats	Type of boat	Number of men
Leuong Shui Shrimp Company	20	1	Small fishing boat	2
City Shrimp Company	53	2	Junk, power junk	5
Quong Fat Shrimp Company	27	1	Power junk	3
Quong Sang Shrimp Company	43	1	Power junk	5
California Shrimp Company	50	2	Junk, tow boat	5
Golden West Shrimp Company	50	1	Power junk	5
Yip Fook Shrimp Company	25	1	Small fishing boat	3
See Hop Wo Shrimp Company	40	1	Power junk	5
George Shrimp Company	40	1	Power junk	5
Golden Gate Shrimp Company	52	1	Power junk	5
Wing Hing Wo Shrimp Company	54	2	Junk, power junk	5
Quong Duck Chong Company	59	2	Junk, tow boat	5
Totals	504	16		53

TABLE 1

Shrimp Camps in South San Francisco Bay Using Chinese Shrimp Nets—1930

TABLE 2

Shrimp Camps in North San Francisco Bay Using Beam Trawls—1930

Shrimp companies	Number of nets used	Number of boats	Type of boat	Number of men
Frank Spenger Company	30	15	Small fishing boat	15
Quan Brothers	8	4	Small fishing boat	4
Totals	38	19		19

TABLE 2

Shrimp Camps in North San Francisco Bay Using Beam Trawls—1930

instance, has been 5½ cents per pound for a number of years. The camp crew maintains the boats, gear and buildings, and manages its own commissary as a community affair. One man is usually camp boss and has the responsibility of supervising the activities of the camp. There are two camps which depart from this procedure. In one of these, two

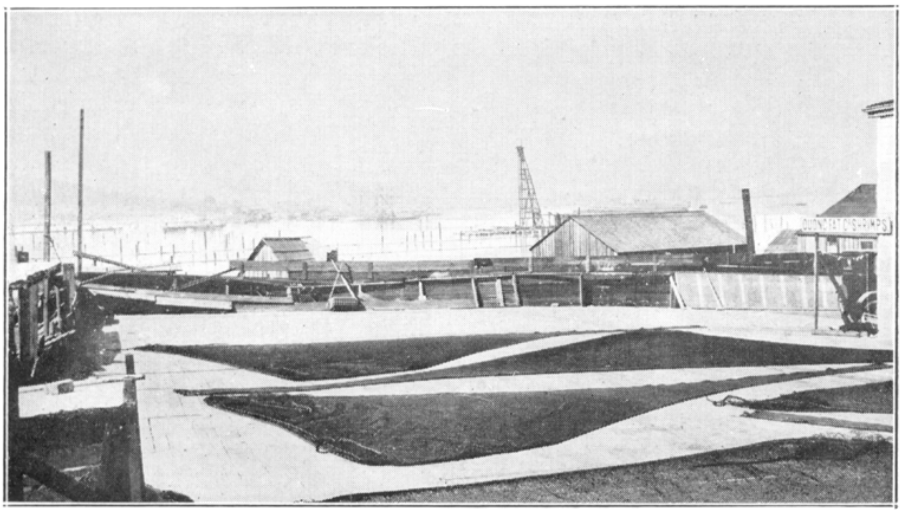

FIG. 1. Chinese shrimp nets drying at Hunter's Point near San Francisco. Photo by Paul Bonnot, November, 1930.

FIG. 1. Chinese shrimp nets drying at Hunter's Point near San Francisco. Photo by Paul Bonnot, November, 1930

men own the camp and gear and pay definite wages and found to the crew, and in the other, two men own the boat and gear and work in partnership, sometimes hiring a third man.

The present day camps vary from a 2 man outfit fishing 20 nets to a camp of 8 men using 50 nets.

The first of September is the beginning of the fiscal year in the camps. At this time the shareholders are at liberty to break away if they choose and go to some other camp. Very few groups stay together more than a year, and there is considerable shifting around, though few men leave the fishery and very few new men come in.

FIG. 2. Chinese shrimp camps and beds in south San Francisco Bay.

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The beds maintained by each company are held from year to year. They were originally laid out on a first-come-first-served basis. There are unwritten rules concerning the staking of new beds. A new bed must be far enough away so it will not "cork" an old bed. "Claim jumping" is rare, but a controversy over this between two large companies nearly precipitated a tong war in 1930. The matter was, however, amicably arranged. A bed does not necessarily have to be operated to be held. The larger companies generally have two or more beds, although they seldom work more than one. In some portions of the bay the beds can be used only during the summer due to weather conditions, and these are left idle during the winter.

2. CHINESE SHRIMP NETS

The Chinese shrimp nets are hand-made and imported from China. The best ones are made of hemp, while some are constructed of a twisted grass-like fiber. They are 40 feet long and shaped like a cone. The round mouth is tied in the form of a rectangle 4 by 30 feet. The last 8

or 10 feet of the small end is a cylinder about 18 inches in diameter. The small end is made of American cotton twine (9-strand) and is of 1-inch mesh. The mesh of the larger portion of the net is from 3½ inches at the mouth to 1 inch where the final section is attached. This diminution of mesh is gradual, the net being in one piece and not made up of sections of webbing of gradually decreasing sizes.

The nets are fished for ten days or two weeks and are then washed and dried before being used again. About once every six weeks or two months the nets are soaked in a solution of tan bark and dried. After five or six of these tannings they are put in a large wooden hopper, built over the cooking tank, steamed and again dried. With careful handling, nets will last three or four years. During the winter and spring when the catch is normally light the new nets are stored and the older patched nets are used.

The shrimp beds are laid out at right angles to the tide flow in from 6 to 10 fathoms of water. Anchor pins are driven into the mud 30 feet apart. At each end of the string of anchors another is driven, in line with the string and spaced 90 feet from the last at that end. The anchor pins are driven by a long wooden pole which has at its larger end a length of iron pipe. The pins are driven some distance into the mud. From each anchor a rope runs to a brail. The length of rope varies with the depth of water (8 fathoms of water, 180 feet of rope). Each brail is slung to its anchor line by a bridle, 28 feet long (included in the 180 feet). The brails are tied together by a rope which is clove-hitched to their centers. Another rope runs along the string of brails half way between the top and center, being looped and pinned to each and attached to a keg buoy at each end. The nets are fastened to the bottom rings of the brails by slip knots and to the top rings by loops and wooden pins. The pins are connected to each other by a quarter-inch rope which is attached at each end to the buoy line. (See fig. 3.) The reason for this will appear later.

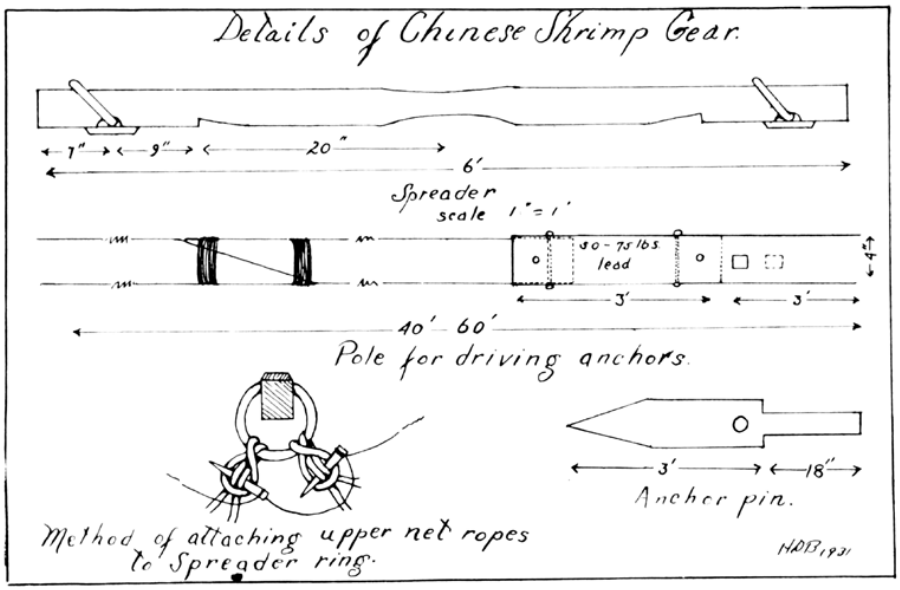

FIG. 3. Details of Chinese shrimp gear.

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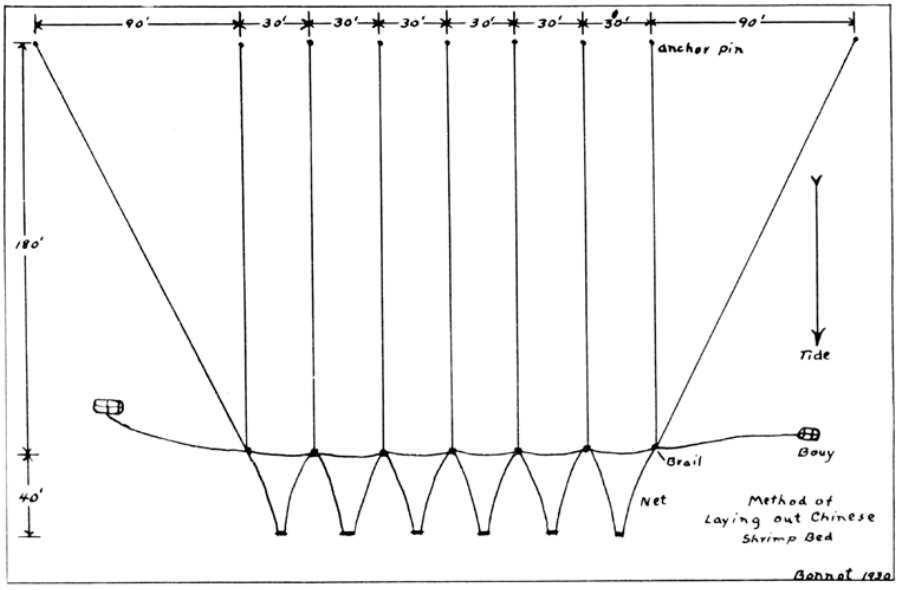

FIG. 4. Method of laying out Chinese shrimp bed.

FIG. 4. Method of laying out Chinese shrimp bed

The most efficient bed is laid out at an exact right angle to the tide flow. (See fig. 4.) If the angle of the flood tide varies from that of the ebb, due, perhaps, to an outthrust of the shore line, the bed must be made to compromise between the two, or if the angle is too great, it can be used for one tide only. In a clear channel where the tide runs back and forth on the same line a bed will fish both tides. The ground tackle, anchors, ropes and brails are left down for the season, and, though the brails and anchors are reclaimed, the rope is left on the bottom or picked up and thrown away. The rope used is three-quarter-inch manila, and a bed to accommodate 50 or 60 nets represents several miles of rope which is used only one season.

The nets are set at slack water. The first brail is lifted by bringing in the buoy line with the winch. One side of the net is attached, the next brail is brought in and the other side of the net attached and one side of the next net. The whole string is run in this manner. The brails and the attached nets are let down on one side of the boat while the brails are brought up on the other side. When picking up the nets the same procedure is used. The pins which attach the nets to the top rings are important in lifting the nets. The lifting is started before the tide has stopped running. As it would be difficult to raise the nets with the mouths wide open to the force of the tide, after the brail has been lifted from the bottom a jerk on the quarter-inch line pulls out the wooden pin and releases the top of the net and the rectangular opening collapses. The net is attached only to the bottom rings and so comes up flattened out. A pull on the slip knot and the net is free to be pulled in by several men. If the catch is heavy the small end of the net will be stretched into the shape of a large ball. When too heavy to be lifted by hand a tackle is used. A cord is wound about the small end and tied with a slip knot. A pull on this and the catch is dumped into the shrimp bin or into baskets. The nets are left down

for the entire run of the tide, five to eight hours, as it would be impossible to lift them when the tide is running strong. The nets must be lifted at each change of the tide. The ground tackle can swing around and face either tide but the nets would become tangled. Five or six men are necessary to handle a large number of nets as the time in which they can be set or lifted is limited.

3. THE SHRIMP TRAWL

In 1914 Frank Spenger of Berkeley introduced the shrimp trawl in the north end of San Francisco Bay. This net is a beam trawl. The mouth is a rectangle, 20 by 2½ feet, held open by brails and a wooden pole. The side wings are 20 feet long. The net is 60 feet long and tapers to about a foot in diameter at the small end. The wings are of 2-inch mesh; the next 20 feet are of 1#-inch mesh; and the last 20 feet are of 1-inch mesh. Over the small mesh is generally a coarse piece of webbing of 5-inch mesh as chaffing gear. The lead line is made up of old webbing rolled and lashed with twine to form a "rope" about 2 inches in diameter which will not dig into the bottom. The lead line sets about 10 inches behind the cork line when fishing. The brails at the end of each wing are 2 feet, 6 inches long, and slide on flat iron shoes which turn up in front. (See fig. 5.) The shoes are

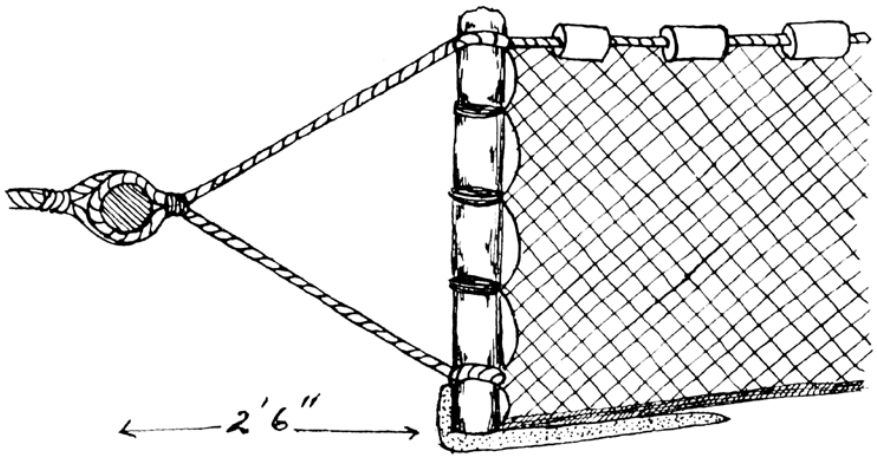

FIG. 5. Shrimp trawl brail in detail.

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about 4 inches wide. The trawls are pulled with the tide at about 3 miles an hour, in from 1 to 5 fathoms of water. A drag of a mile or more is made, then the net is lifted with the aid of a short boom, the small end untied and the catch dumped on deck. The boat is put about and started back to the starting point. While making the run back the catch is sorted and put into baskets. These are one-man rigs. Each man has two nets which are used alternately, one being used while the other is laid out for repairs or drying.

4. BOATS

The early shrimp fishing was done entirely with the Chinese junk. These boats were about 50 feet long, with square sterns and blunt bows, and were propelled by the Chinese slatted sail and later by an ordinary

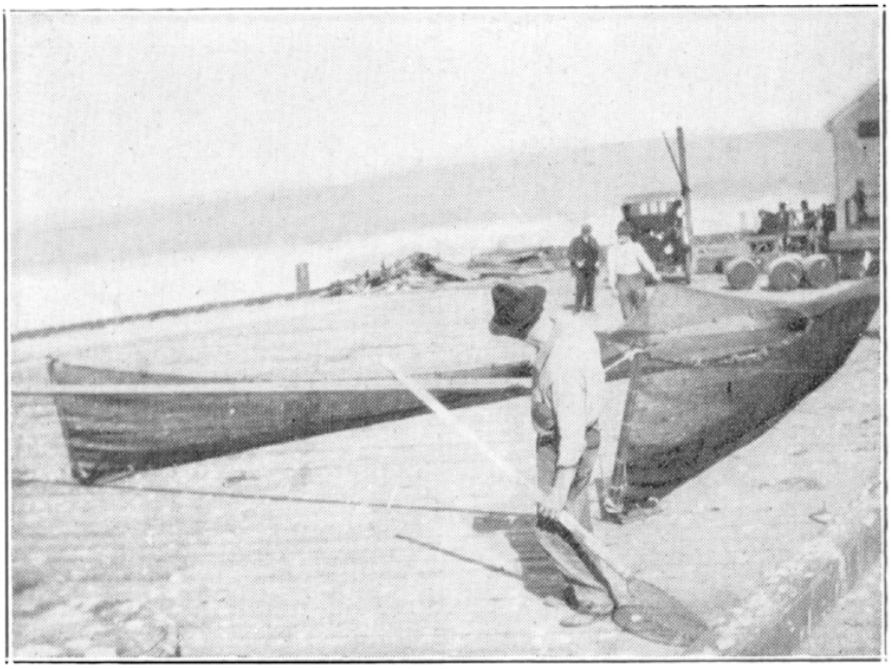

FIG. 6. The shrimp trawl. Photo by R. Steele, November, 1921.

FIG. 6. The shrimp trawl. Photo by R. Steele, November, 1921

canvas sail. The large wooden rudder could be lifted when not in use. There was a space for the nets and another for the catch. A space in the bow was left clear to handle the nets. A reel with 4 spokes at each end was used as a windlass to manipulate the fishing gear. One or two men worked this windlass.

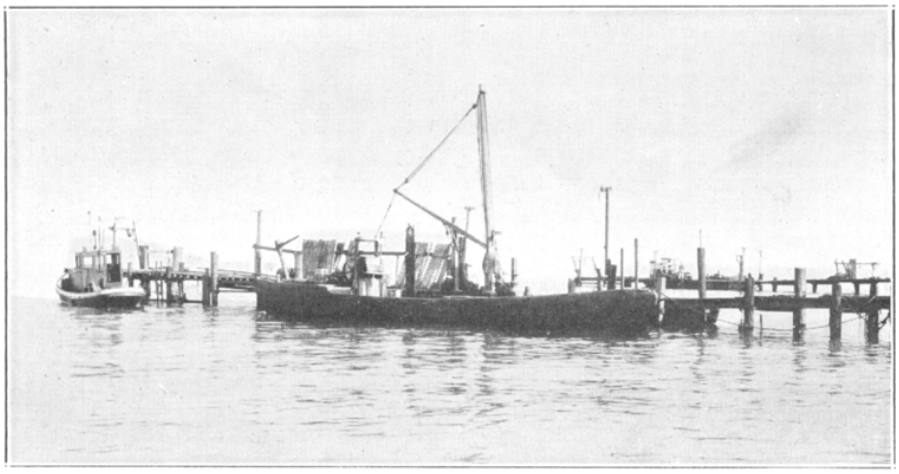

FIG. 7. City Shrimp Company junk at Hunter's Point near San Francisco. Photo by Paul Bonnot, January, 1931.

FIG. 7. City Shrimp Company junk at Hunter's Point near San Francisco. Photo by Paul Bonnot, January, 1931

The present day fishery utilizes several types of boats. The old style junk is still used in some cases, with the mast cut down and rigged as a hoisting boom; the hoisting winch is operated by a small gas engine and motive power supplied by a tow boat. This type of boat is towed to the fishing ground and left there. The tow boat goes out for it about the time the nets are lifted at the end of the tide. A modification of these boats is the power junk with from 30- to 50-horsepower gas or

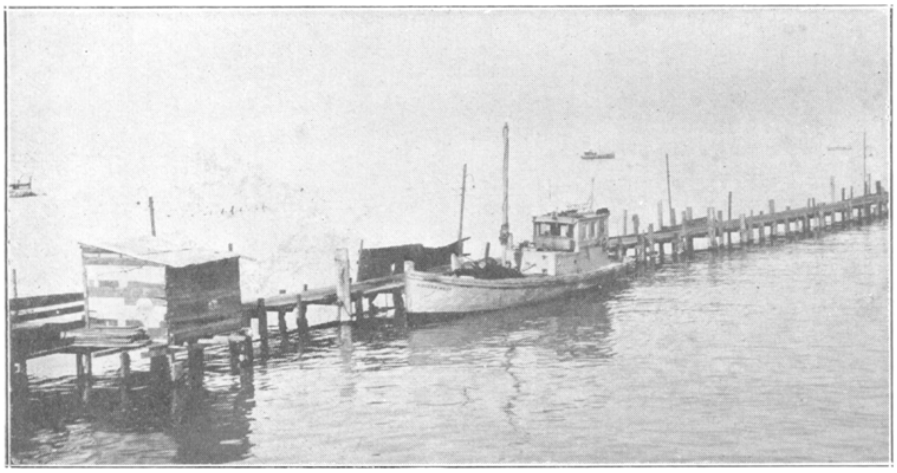

FIG. 8. Golden West shrimp junk at Hunter's Point near San Francisco.
Photo by Paul Bonnot, January, 1931.

FIG. 8. Golden West shrimp junk at Hunter's Point near San Francisco. Photo by Paul Bonnot, January, 1931

oil engines. These have a pilot house and cabin built toward the stern over the engine room. There is only one company at present which uses the hand reel for lifting the nets. The beam-trawlers in the northern part of San Francisco Bay are ordinary 30- to 40-foot fishing boats, fitted with a short stubby mast and boom to facilitate the lifting of the net and catch from the water.

5. METHODS OF PREPARING SHRIMPS FOR MARKET

In the early days of the fishery, many more men were employed than there are today. Some of the old camps maintained three distinct crews—a day boat crew, a night boat crew, and a shore crew that cooked and cared for the shrimps which the boat crews brought in. Today all this is changed. The Frank Spenger Company and Quan Brothers, with a crew of 3 or 4 men, handle the shrimp brought in by their fishermen; and the crews of from 2 to 6 men in a Chinese camp catch and also prepare the shrimps.

A Chinese shrimp camp during the height of the season is a busy place. The boats fish 3 tides, so one haul is generally at night. As soon as the shrimps are landed in round baskets, weighing from 70 to 90 pounds each, the crew goes to eat. One man is generally left ashore as camp tender and he prepares the meal and starts a fire under the shrimp boiler. As soon as the men have finished eating they start boiling the shrimps. Several baskets of shrimps are dumped into the boiling tank with several scoop-shovels of coarse salt. The shrimps are boiled for about 15 minutes, scooped up with shallow brails made of copper wire and put again into baskets. The steaming baskets are dumped on benches made of square-meshed galvanized wire and several of the crew start at once to screen the shrimps. This is done by shaking a quantity of shrimps in a hand screen made of a wooden barrel hoop and square-meshed wire which varies in size from one-half to three-quarters of an inch. The small shrimps fall through and are spread on the outdoor drying floors. The larger ones are put into barrels and

sent to Chinatown to be hand-picked by Chinese women and girls. If the market demand is small, a 4-inch cylinder of galvanized wire is placed in the center of the barrel for ventilation and the barrel sent to cold storage where it is frozen solid until the market improves or the camps fail to make further catches.

The shrimps put out to dry remain on the drying floor for several days. They are turned at intervals. When dried a heavy cleated wooden roller is pushed back and forth over them to break the meat from the shell. After being sufficiently broken up, the whole mass is put into baskets and dumped into a fanning machine. This is a wooden arrangement with a large enclosed wooden fan which sends a strong current of air through a long box, square in cross-section. As the broken shrimps drop into the air current, the heads and shells, being much lighter than the solid meat, are blown out at the end of the box while the meat falls to the bottom and into baskets placed there to receive it. After hand-picking the meat for fish scrap and bone, the dried shrimp meat is ready for market.

TABLE 3

Dry Products of the Shrimp Industry—1930

Month	District 12, trawl		District 13, shrimp net		Totals	
	Dry shrimp (pounds)	Shrimp meal (pounds)	Dry shrimp (pounds)	Shrimp meal (pounds)	Dry (pounds)	Meal (pounds)
January	4,189	8,650	1,473	3,092	5,662	11,742
February	2,606	7,000	1,481	3,009	4,087	10,009
March	468	2,000	1,354	2,411	1,822	4,411
April	219	2,800	2,597	4,252	2,816	7,052
May	824	4,000	1,989	3,971	2,813	7,971
June	4,228	8,500	12,287	19,322	16,515	27,822
July	8,740	16,750	25,602	34,290	34,342	51,040
August	15,686	31,300	18,272	36,675	33,958	67,975
September	13,228	25,000	5,548	10,720	18,776	35,720
October	12,000	19,000	3,210	6,413	15,210	25,413
November	3,843	7,500	2,693	5,451	6,536	12,951
December	1,364	11,050	2,841	3,950	4,205	15,000
Totals	67,395	143,550	79,347	133,556	146,742	277,106

TABLE 3

Dry Products of the Shrimp Industry—1930

Quan Brothers, near McNear's Point in Marin County, process their shrimps in the same manner as the other Chinese camps, with the exception of the use of a mechanical shaker over which the shrimps are passed as they come from the boiling tank. This does away with hand-screening. Frank Spenger Company at San Quentin Point in Marin County, has a very up-to-date plant. Every device for saving labor has been installed. The shrimps are dumped into the boiler which consists of a large iron tank which nests inside of another tank. When the shrimps are cooked the inside tank is raised and tipped over by a tackle. The shrimps go into a hopper which feeds them to an endless belt by which they are lifted to the second floor. Here they go into a large mechanical shaker which separates the large from the small. The larger ones, which are sold fresh, go down a chute to a table where they are hand-picked for culls. The small ones are piled on a long table covered with square-meshed wire. This table has a raised center and has under it a wooden box from which a current of hot air is forced up

through the shrimps. This method of drying eliminates any waste due to rain or bad weather and is faster than sun-drying. The dried shrimps in this case are run into a rotary tumbler which breaks them up, and they are then fed through a blower of the same general construction as those used in the Chinese camps except that it is much larger and can therefore handle many more shrimps in a given time.

Sund-dried shrimps lose three-fifths of their weight in the process. The dried material yields one-third shrimp meats and two-thirds shrimp meal by weight. The shrimp meat is shipped to China and used locally for human consumption. The shrimp meal, consisting of broken and ground shells and meat, is sold for fertilizer and for fish food.

6. SPECIES OF SHRIMPS TAKEN

Three species of shrimps make up the bulk of the commercial catch. These are all members of the genus Crago. They are found in the catches in the following order of relative abundance: C. franciscorum, C. nigricauda, and C. nigromaculata. This order varies a little seasonally; nigricauda and nigromaculata changing places occasionally in the late summer. Other shrimps are found occasionally in the catches. Pandalus danae, the shrimp which supports a good part of the Alaskan fishery, is represented by a few specimens. Spirontocaris cristata, a small red species, occurs in considerable numbers but is too small for any commercial use. Occasionally considerable numbers of Upogebia pugettensis, a burrowing ghost shrimp, are found.

Crago franciscorum is found from Alaska to San Diego. It can be distinguished by the narrow chelipeds or hands in which the finger when bent is almost parallel with the hand. The length of the hands is approximately 4½ times the width. The color is a mottled yellowish gray. Large specimens are a trifle over 3 inches in length.

Crago nigricauda, the black-tailed shrimp, occurs from Alaska to Lower California. It is a dark gray with a blackish tail. The hand is a little more than twice as long as wide. The finger when bent is almost at right angles to the hand. The length of this species is about 2½ inches.

Crago nigromaculata seems to be a more local species. It resembles C. nigricauda, the hands being the same. Most specimens are a bluish fawn color with a round spot of blue enclosed by a black and a yellow ring on each side of the sixth abdominal segment.

Little is known concerning the life history of these shrimps. Eggs may be found attached to the swimmerettes of the females during the whole year. These eggs are in all stages, from newly laid ones, showing no internal structure, through several stages. The oldest eggs contain small shrimps nearly through the zoea stage. There are no available records of young shrimps being taken with the catches. The catches sometimes contain vast numbers of a schizopod (Euphausia pacifica) which might be mistaken for small shrimps. Schizopods, however, can easily be distinguished by their eight pairs of biramous legs.

On the carapace (thorax) of many of the Cragos will be found a smooth bean-shaped lump. This is caused by a parasitic isopod

(Argeia pauperata). The lump is part of the continuous surface of the chitonous covering of the shrimp, and is shed with the rest during the molt. The isopod is imprisoned therefore between the hard outer covering and the gill chamber. On opening one of these lumps the female isopod will be found nearly filling the cavity. The female is nearly round, has no eyes and the legs have degenerated to short hooked affairs. On the dorsal surface is the brood pouch, which has overlapping flaps which fit together like the shutters of a camera. This pouch is generally filled with young isopods. A small male will be found with the female. He is only about one-tenth the bulk of the female. He has functional legs and eye spots, and is shaped like a long parallelogram with rounded ends.

7. OTHER MARINE FORMS CAUGHT IN CHINESE SHRIMP NETS

The chief objection to the Chinese shrimp nets during the early days of the fishery was the fact that they captured and killed vast numbers of young fish, notably salmon and striped bass. This was to be expected as the nets were fished in District 12 through which run the Sacramento and San Joaquin rivers on their way to the sea. District 13, or the southern end of San Francisco Bay, to which the shrimp nets are confined today, is a backwater, as few fresh water streams empty into it and these bring less water every year, due to the extensive irrigation carried on in the Santa Clara Valley. Very few commercially valuable fishes are found in District 13 and the shrimp nets are not therefore destructive. The trawls in District 12 take only a few species besides shrimps. A few small crabs (Cancer magister) are taken, but these are thrown or crawl overboard. Small sharks (Triakis semifasciata) and cottoids (Leptocottus armatus) are caught and generally killed before going overboard. The trawls also take small numbers of whitebait, young anchovies, sardines, herring, smelt and a few striped bass at certain seasons, but the average striped bass is too spry to be taken in any such rig.

The Chinese shrimp nets take many different species of fish, most of them occurring in small numbers. The appended list shows their relative abundance. The edible fishes are eaten by the Chinese or given away to others for food. During the winter and spring the shrimp nets sometimes take vast numbers of the hydroid medusa polochis. These will occasionally outnumber the shrimp, making up 75–80 per cent of the catch. There are, of course, a great many other species of the lower forms represented.

FISHES TAKEN IN THE CHINESE SHRIMP NETS

Food Fishes		
Starry flounder	Platichthys stellatus	few
Pointed-nosed sole	Parophrys vetulus	few
Fringe sole	Psettichthys melanostictus	scarce
Northern anchovy	Engraulis mordax	few, young
California sardine	Sardina caerulea	few, young
Pacific herring	Clupea pallasii	few
Smelt	Spirinchus thaleichthys	few, young
Kingfish	Genyonemus lineatus	scarce
Rockfish	Sebastodes sp.	rare, young
Tomcod	Microgadus proximus	sometimes plentiful
Shiner perch	Cymatogaster aggregatus	few
Rough Fishes		
Sea snail	Liparis pulchellus	rare
Lamprey	Lampetra cibaria	rare
Pipefish	Siphostoma californiense	few
Butterfish	Pholis ornatus	scarce
Sculpin	Leptocottus armatus	plentiful
Midshipman	Porichthys notatus	few
Sting ray	Myliobatis californicus	few
Big skate	Raja binoculata	plentiful
Electric ray	Tetronarce californica	rare
Bat sting ray	Aëtobatus californicus	rare
Seven-gill shark	Notorynchus maculatus	few
Gray smooth-hound shark	Mustelus californicus	plentiful
Leopard shark	Triakis semifasciata	plentiful

8. CATCH STATISTICS

The following tables 4 and 5 and figures 9 and 10 show the amounts of shrimps caught in San Francisco Bay during the period, 1915–1930, inclusive.

TABLE 4

Data Relating to Shrimp Catch in San Francisco Bay—1915-1930

Year	Shrimps taken (pounds)	Number of camps	Number of men employed	Number of boats
1915	298,000	6		
1916	411,847	6		
1917	725,385	6		
1918	722,178	6		
1919	813,035	6		
1920	818,042	6		
1921	909,844	9		
1922	990,349	9		
1923	1,113,358	9		
1924	1,551,086	9		
1925	1,460,234	9		
1926	1,431,511	13		
1927	1,697,365	13		
1928	2,280,871	13	60	25
1929	3,054,748	13	70	34
1930	2,687,831	14	72	35

TABLE 4

Data Relating to Shrimp Catch in San Francisco Bay—1915–1930

9. TRAWL EXPERIMENT, IN SOUTHERN CALIFORNIA

During 1920–1921 (December 12, 1920–March 15, 1921), the Division of Fish and Game issued a permit to Paul Skrmetti of San Pedro to fish for shrimps with a trawl in southern California waters. Skrmetti came from Florida, where he had engaged in shrimp fishing. He used for his experimental fishing the small otter trawl with which much of the Florida shrimping is done. The Division of Fish and Game required that he keep a record of his hauls, and the following data are derived from his records:

Number of days fished	59
Number of hauls made	299
Average number of hauls per day	5.0
Shrimps taken (pounds)	1,489
Average pounds per haul	4.9
Largest take of shrimps (1 haul)	40
Largest take of shrimps (1 day)	87

While this experiment was successful, in that shrimps were taken, the greater portion of the individual and collective hauls was composed

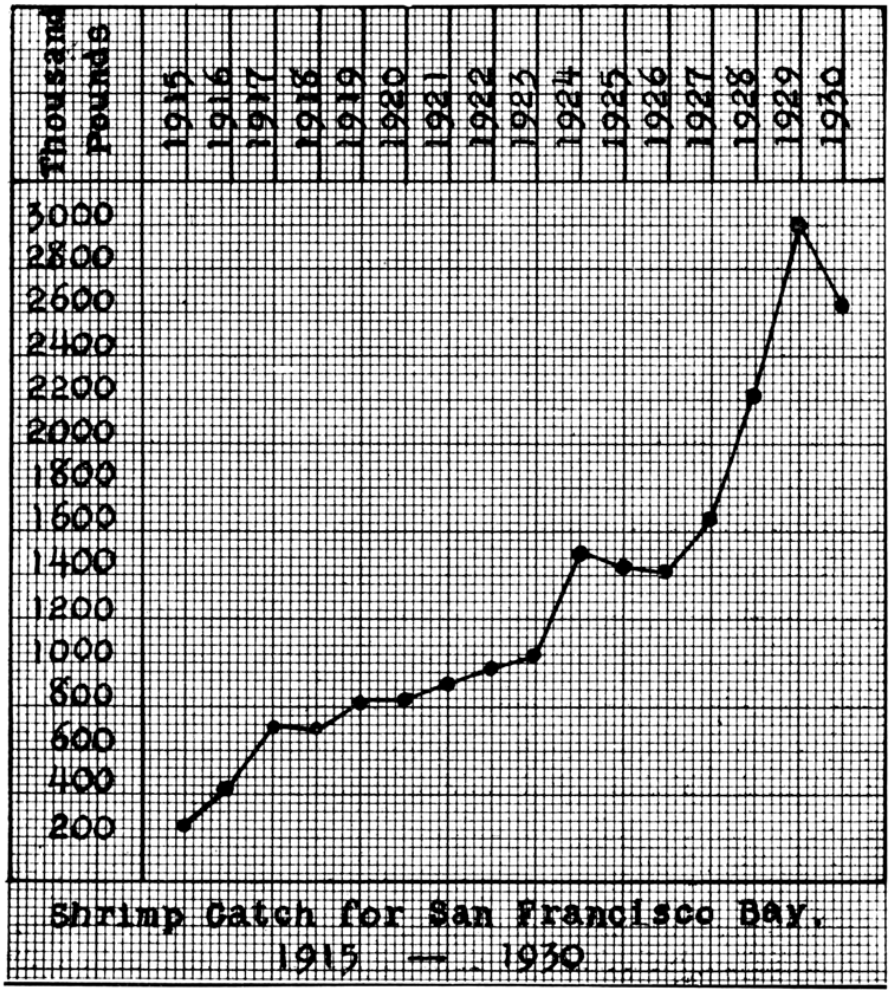

FIG. 9.

FIG. 9

TABLE 5

Shrimp Catch in San Francisco Bay—1930

Month	District 12, trawl (pounds)	District 13, shrimp net (pounds)	Totals (pounds)
January	103,400	48,205	151,605
February	63,211	52,630	115,841
March	13,057	44,750	57,807
April	6,482	81,960	88,442
May	36,671	47,550	84,221
June	97,712	174,240	271,952
July	168,278	336,344	504,622
August	287,766	232,962	520,728
September	270,064	105,740	375,804
October	227,464	37,980	265,444
November	79,897	51,580	131,477
December	37,582	82,306	119,888
Totals	1,391,584	1,296,247	2,687,831

TABLE 5
Shrimp Catch in San Francisco Bay—1930

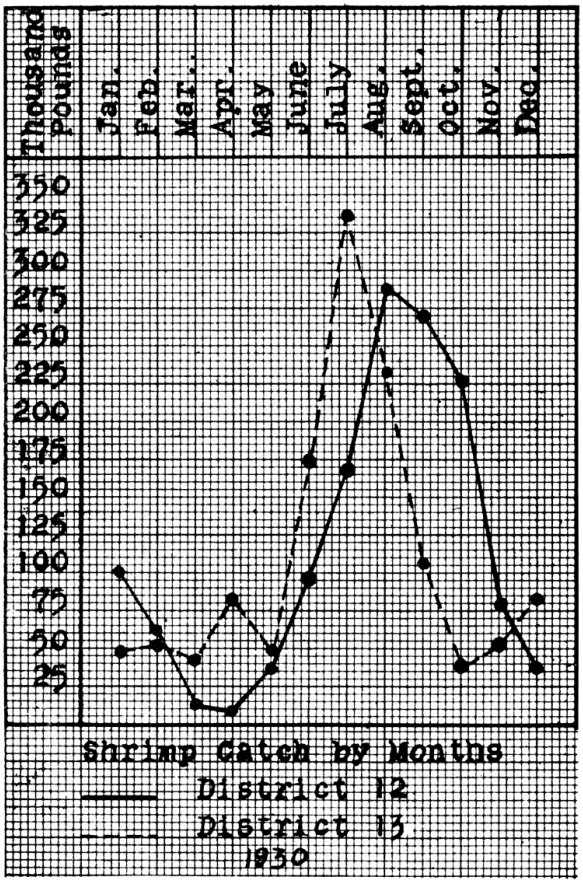

FIG. 10

of other fish. The amount of shrimps taken did not justify the effort and the permit was canceled after a four-month trial.

The shrimps taken were some species of either Pandalus or Peneus, but as no specimens were kept and no record made of the species, I am not certain whether there were one or more than one species involved.

Many fish of different species were also taken in these hauls. These are all enumerated by the common names, some of which are not familiar to me. The following list gives the relative weights for the experiment:

Fishes	*Pounds*
Kingfish	10,010
Stingaree	5,730
Halibut	3,288
Shrimp	1,489
Perch	1,046
Brim (?)	444
Shark	240
Flounder	92
Anchovy	80
Spiny lobster	42
Total	22,461

10. SHRIMP FISHING AT MONTEREY

During the latter part of 1930 several fishermen at Monterey accidentally took a few large specimens of Pandalus platyceros in their octopus traps. They made serious attempts to capture more of the shrimps and succeeded for some time in landing 50 to 150 pounds a day. The traps used were round, bottle-shaped affairs, made of bamboo, 5 feet long and 3 feet in diameter, with a funnel at the larger end. The fishing was carried on about 4 miles southwest of Point

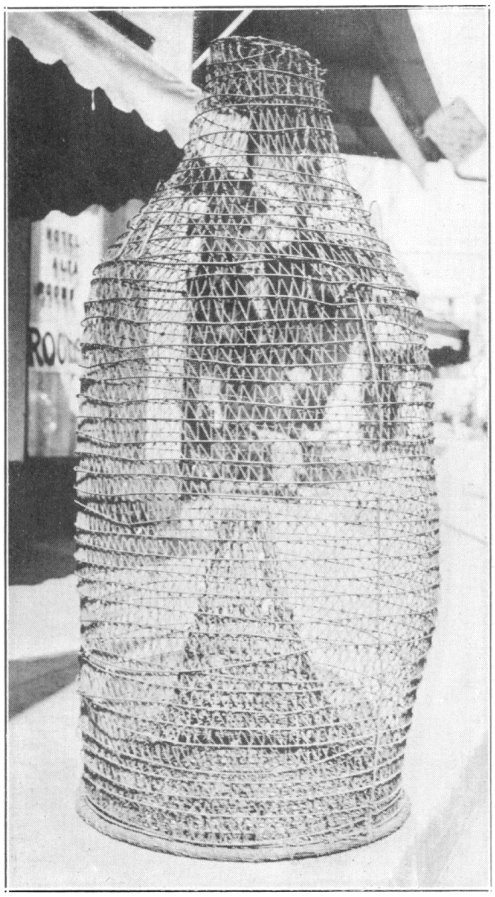

FIG. 11. Octopus trap at Monterey. This type of trap with modifications, is being used to take shrimps in deep water. Photo by Paul Bonnot, November, 1930

Cypress, Monterey County, in 150 fathoms of water. The shrimps ran very large, averaging about 8 inches in length and 6 to the pound. Several men fished for the shrimps after the first fishermen were successful, but due to the difficulty of working in such deep water and a storm which destroyed most of the traps, the majority of the men went back to other types of fishing.

Month	*Pounds*
August	27
September	1,203
October	1,951
November	1,782
December	3,773
Total	8,736

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