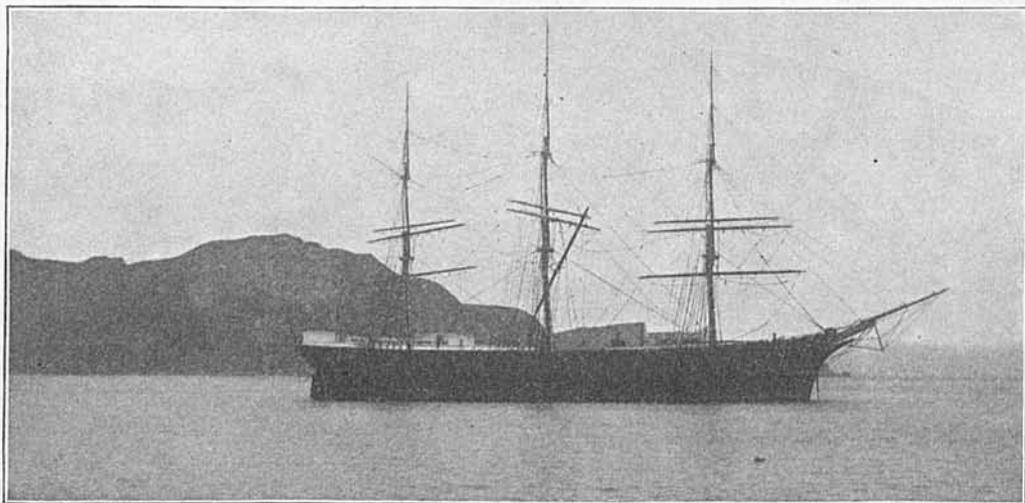


## ESTABLISHMENT OF SALMON CANNERIES IN ALASKA.

As it will be necessary in this report to refer frequently to the commercial organizations doing a salmon-packing business in Alaska, it may not be out of place here to give a short account of the growth of this industry, in order that the references may be properly understood, although an account of each cannery will be hereafter given.

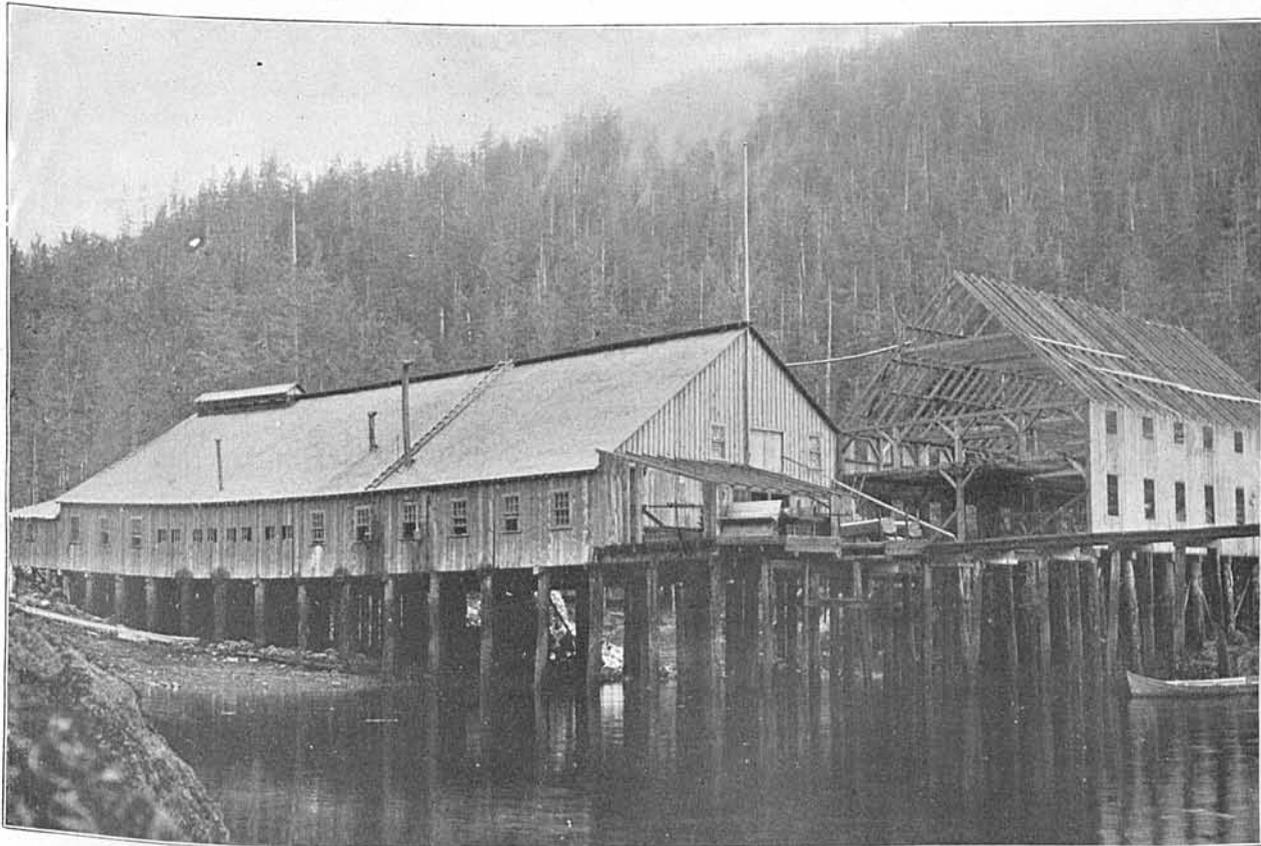
The first canneries in Alaska were at Klawak and Old Sitka, both built in the spring of 1878. At the former place the North Pacific Trading and Packing Company erected their plant, made a pack that year, and have done so every year since. At the latter place the Cutting Packing Company commenced operations, and, after making two packs (1878 and 1879) the cannery was closed. In 1882 its available machinery was moved to Cook Inlet by the Alaska Packing Company of California, and there utilized in a cannery built that year at Kussilof, now known as the Arctic Fishing Company.



Transport ship at Chignik.

No additions were made to the Alaska canneries until 1882, when the cannery just mentioned was built and the first cannery on the Karluk River appeared, built and operated by Smith & Hirsch, and now known as the plant of the Karluk Packing Company.

The year 1883 saw three additions—Pyramid Harbor Packing Company, Chilkat Packing Company, and Cape Fox Packing Company, all in southeast Alaska. In 1884 the first cannery in Bering Sea, the Arctic Packing Company, on the Nushagak River, commenced operations, followed in 1886 by the Bristol Bay Canning Company and the Alaska Packing Company, both at Nushagak. In the year 1887 one more cannery was added to the list, that of the Aberdeen Packing Company, on the Stikine River, in southeast Alaska. During the same year the plant of the Cape Fox Packing Company was moved to Tongass Narrows and operated under the name of the Tongass Packing Company.



CANNERY AT BOCA DE QUADRA.



SALMON SALTERY ON THORNE BAY.

In 1888 the following additional canneries were in operation: Alaska Salmon Packing and Fur Company, at Loring, southeast Alaska; Cape Lees Packing Company, at Burroughs Bay, southeast Alaska; Northern Packing Company, at Kenai, Cook Inlet; Kodiak Packing Company and Aleutian Islands Fishing and Mining Company, both at Karluk, Kodiak Island; Arctic Packing Company, at Larsen Bay, Kodiak Island, and the Nushagak Packing Company, on the Nushagak River, Bering Sea.

The increase of canneries in 1888 and their large output called the attention of the public to the Alaska salmon fisheries, and in 1889 there was a further increase of canneries, as follows:

*Southeast Alaska:* Boston Fishing and Trading Company, Yes (McDonald) Bay; Baranoff Packing Company, at the Redoubt, near Sitka; Astoria and Alaska Packing Company, Freshwater Bay; Bartlett Bay Packing Company, Bartlett Bay, and Chilkat Canning Company, Chilkat Village.

*Prince William Sound and Copper River:* Peninsula Trading and Fishing Company, Little Kayak Island; Central Alaska Company, Little Kayak Island; Pacific Packing Company, Eyak, Copper River, and the Pacific Steam Whaling Company, Eyak, Copper River.

*Kodiak and Chignik:* Hume Packing Company, Karluk; Alaska Improvement Company, Karluk; Arctic Packing Company, Alitak Bay; Kodiak Packing Company, Alitak Bay; Royal Packing Company, Afognak Island; Russian-American Packing Company, Afognak Island; Chignik Bay Company, Chignik Bay; Shumagin Packing Company, Chignik Bay; Chignik Bay Packing Company, Chignik Bay; Western Alaska Company, Ozernoi, Alaska Peninsula; Thin Point Packing Company, Thin Point, Alaska Peninsula.

The cannery of the Alaska Improvement Company, at Karluk, was built and ready for operation in 1888, but the loss of the *Julia Ford*, the cannery ship, with all the season's outfit on board, kept the cannery closed, and the first pack was therefore made in 1889.

In 1888 there were 17 canneries in operation in Alaska with an output of 412,115 cases, and in 1889 there were 37 canneries with an output of 714,196 cases. Two more canneries were added to the list in 1890—George W. Hume, at Kussilof, Cook Inlet, and the cannery of the Metlakahtla Industrial Company, in southeast Alaska. In 1891 only one new cannery, that of the Bering Sea Packing Company, at Ugashik, Bering Sea, was added, while several operated the year previous were closed, and in a few other cases there was a consolidation of interests. In 1892 and 1893 there was a further consolidation of cannery interests, and in the latter year one additional cannery was operated, that of the Hume Canning and Trading Company, in Tanglefoot Bay, near Karluk. There were no new canneries built in 1894, but in 1895 two more were in operation at Naknek, in Bering Sea, the Arctic Packing Company and the Naknek Packing Company.

In 1896 the following new companies were in operation:

*Southeast Alaska:* Quadra Packing Company, in Mink Arm, Boca de Quadra; Pacific Steam Whaling Company, Hunter Bay.

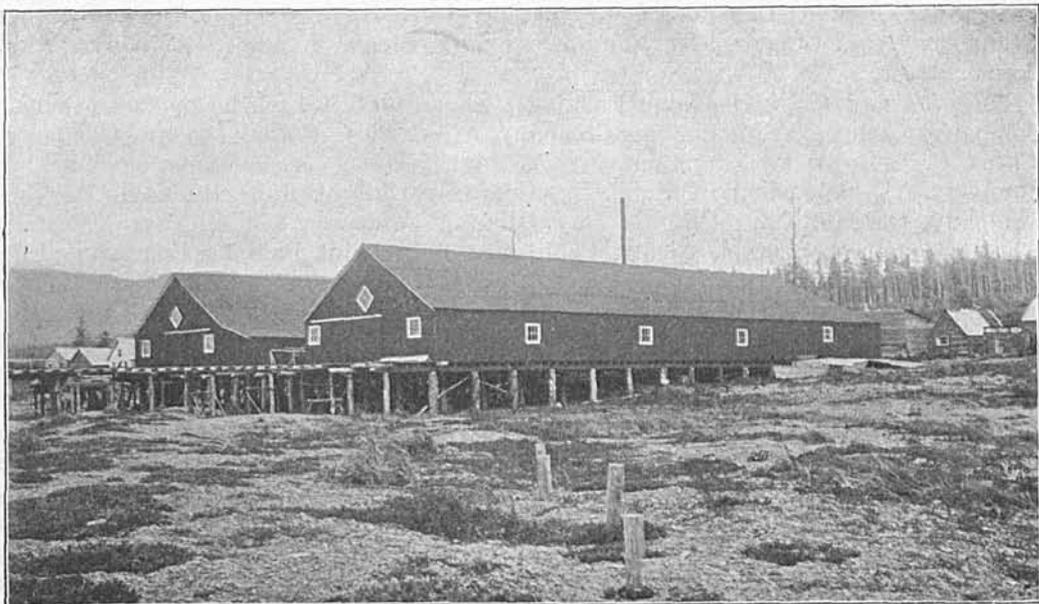
*Kodiak Island:* Uganuk Fishing Station, Uganuk Bay.

*Alaska Peninsula:* Hume Brothers & Hume, Chignik Bay; Pacific Steam Whaling Company, Chignik Bay.

*Bering Sea:* Point Roberts Packing Company, at Koggiung, Kvichak River; Ugashik Fishing Station, Ugashik River.

In 1897 two more canneries were added—Hume Brothers & Hume and the Pacific Steam Whaling Company, both at Uyak Bay, Kadiak Island.

The foregoing account gives briefly the dates of the building of the canneries in Alaska. After 1891 several of the canneries were consolidated, a few were burnt, some were dismantled, and the available machinery utilized in the construction of plants in more favorable localities, and in some instances the sites were entirely abandoned. The large increase in canneries in 1888 more than doubled the pack for that year over that of 1887, and the addition of twenty more canneries in 1889 increased the pack for that year and for the two years following to nearly double the quantity packed in 1888. The market became glutted, and in order to reduce the output a consolidation of interests followed. This was not very difficult, as a few individuals controlled a large number of the canneries. One firm in San Francisco alone controlled six canneries, with an output in 1889 of 155,118 cases; others controlled several.



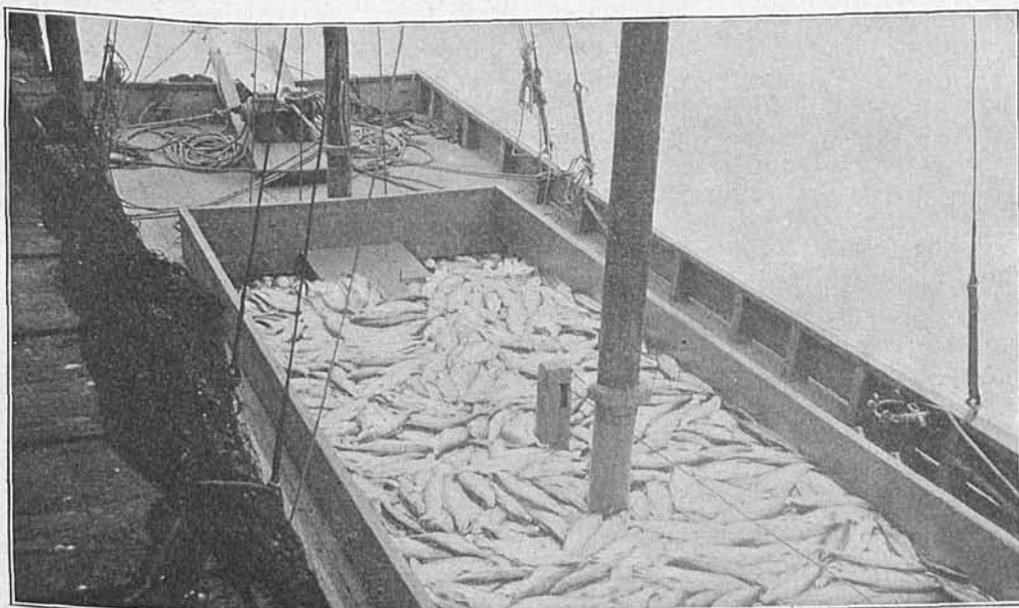
Cannery at Chilkat.

In 1890 the three canneries at Chignik combined under an operating agreement known as the Chignik Bay Combination, under which the plant of the Chignik Bay Company was operated, the three canneries sharing the expense and dividing the output equally. This arrangement remained in force during the seasons of 1890 and 1891. Its evident success in 1890 probably led to the local combinations on Kadiak Island in 1891, and then to the association which now exists.

The large packs during this period and the glutted market caused the cannery interests to devise some scheme to meet the conditions. The combination at Chignik in 1890 permitted the pack to be made there at a lower rate and, as previously stated, it was continued in 1891. The same year (1891) the canneries at Karluk, Uyak, and Afognak entered a combination under the name of the Karluk River Fisheries, under which it was agreed that each cannery should have a quota of fish from the several

localities, based upon the average packs of each cannery in 1889 and 1890. The estimated pack for the canneries interested was placed at 250,000 cases, and upon this estimate the apportionment of the work at each cannery was made. Under this agreement four of the eight canneries were closed, their quota being packed in the other four canneries as follows, viz, that of the Royal at the Karluk, of the Arctic at the Kodiak, of the Aleutian Islands at the Hume, and of the Russian-American at the Alaska Improvement.

In the summer of 1891 the Kodiak Packing Company\* and the Arctic Packing Company, both at Alitak Bay, also had a mutual agreement under which only one cannery, the Arctic, was operated, the quota of fish of the Kodiak being packed in the Arctic cannery. By these combinations the full pack of the Karluk district was made in half the number of canneries and the expense of packing very considerably reduced.



Fish scow at dock, Chignik.

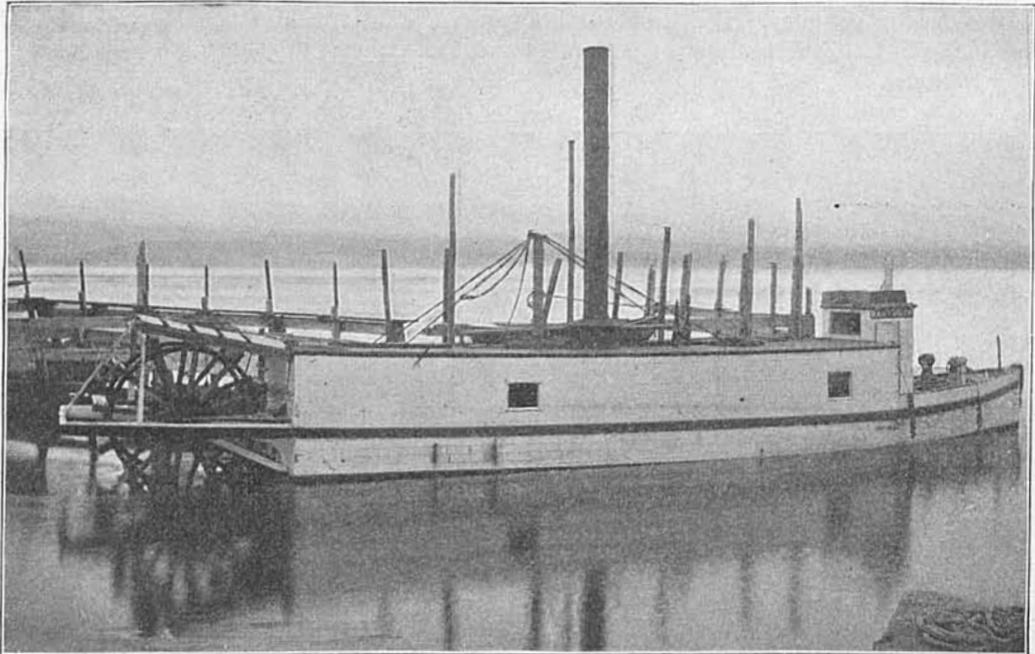
In September, 1891, the Alaska Packers' Association was formed to dispose of the unsold salmon of that season's pack (some 363,000 cases), and five trustees were appointed to manage the business. This association was not incorporated, and expired after the salmon were sold.

The successful operation of these arrangements led, in 1892, to an arrangement in which nearly all (thirty-one) of the canneries joined, entering under the name of the Alaska Packing (not Packers') Association, for the purpose of leasing and operating and therefore controlling the canneries and reducing the Alaska pack for that year, it being found too great for the market's demands. All the canneries in operating condition in 1892 were members of this association except the following, viz: Met-

\* Though the present approved spelling of the name of this island is Kodiak, the company retains the former spelling Kodiak.

Iakahltla Industrial Company, at Metlakahltla; Boston Fishing and Trading Company, at Yes Bay; Baranoff Packing Company, at Redfish Bay; Chilkat Canning Company, at Pyramid Harbor; Alaska Improvement Company, at Karluk, and the Bering Sea Packing Company, at Ugashik.

The association was regularly incorporated on January 13, 1892, and shares were distributed on the basis of one for each 2,000 cases packed in 1891, and the profits were divided equally on all shares regardless of the amount of profits derived at the different points. Of the 31 canneries, 9 were operated by the association, while the others were closed, the Alaska pack being reduced one-half.



Stern-wheel steamer used in towing fishing boats and setting nets, Chignik.

The year 1893 found the Alaska Packers' Association organized and incorporated (February 9). This association was formed from the canneries that had joined the Alaska Packing Association of 1892, except the Pacific Steam Whaling Company, at Prince William Sound, and the Peninsula Trading and Fishing Company, the latter's cannery having been moved from Little Kayak Island to the Copper River Delta in 1891.

The agreement of 1893 was similar to that of 1892, except that the amount of profit was taken into consideration, in addition to the probable average quantity which could be packed at the different points. This was subject to adjustment for each district and no arbitrary rule was followed. Each cannery entering the association was obliged to purchase an additional amount of stock equaling two thirds of the number of shares received by it for its plant; that is, a company which received 1,500 shares for its plant was required to purchase 1,000 shares additional. The money received from this sale of extra stock was used as working capital. No shares were sold to the general public, the owners of canneries subscribing for the full amount.



SALMON SALTERY, KETCHIKAN.

The Alaska Packers' Association is the largest canning operator in Alaska. Of the 29 canneries operated in 1897, 17 belonged to this association, with an output of 669,494 cases, or nearly 74 per cent of the total pack, while the other 12 canneries packed 239,584 cases, or 26 per cent. In addition to the 17 operating canneries the association had as reserves 8 other establishments, besides several in a dismantled condition which have not, however, been abandoned.

The Pacific Steam Whaling Company has increased the number of its canneries during the past two years. In 1889 the company built and operated a cannery at Eyak, Prince William Sound; in 1893 it controlled the plant of the Peninsula Trading and Fishing Company in the Copper River Delta. In 1896 it built and operated a cannery at Hunter Bay, in southeast Alaska, and another at Chignik Bay, Alaska Peninsula. In 1897 a cannery was built and operated in Uyak Bay, Kadiak Island, and cannery buildings were erected at Kenai, Cook Inlet. Machinery will probably be installed in the latter ready for operation in 1898.\*

#### SALTING SALMON.

Redfish are salted only in localities like Bristol Bay, where a large run sometimes taxes the cannery facilities, when the surplus is salted, and at Egagak (Bering Sea) and Tyonek (Cook Inlet), where the run is not large enough to maintain a cannery. A few king salmon are salted for private use at canneries where stragglers are taken in the general catch, and at places like Killisnoo, where a little salting is done on special orders.

The commercial salting outside of Bering Sea consists chiefly in whole cohoes and humpback bellies. In the latter the number varies according to the cutting. One saltery (Ketchikan) delivered humpback bellies under contract to a cannery at \$3.25 per half barrel, and tried to cut 160 bellies to that measure. This product should reach retailers on the Pacific coast at, say, \$5, and if sold at 5 cents per belly would bring \$8, making a good profit for the venture and a cheap fish for the consumer.

It is very difficult to obtain accurate saltery statistics. The low price of salt salmon, and the terms offered by the canneries in the purchase of fresh fish, have induced the men formerly engaged in salting to sell their fish fresh, the cannery tender calling for them, and to salt only those that are not called for in time, or the surplus in the event of a large run. Small schooners frequently move from one stream to another when the run is small and salt a few fish on board. It is doubtful if there are more than three or four salteries in Alaska, outside of Bering Sea, that are conducted purely as such, and these are in remote places where the catch is uncertain or it is inconvenient for the cannery steamer to call; the others are operated only to make use of the fish not sold fresh.

On account of the variation in the weight of the same species it is rather difficult to give even an approximate estimate of the number of live fish necessary to make a barrel of salt salmon, but the following may give a general idea of the subject: A barrel of salt fish contains 200 pounds of fish washed from the salting tub; 1 barrel of redfish has from 40 to 52 fish; cohoes from 25 to 35; humpbacks, from 70 to 80; king salmon, from 10 to 14. A barrel of humpback bellies represents from 300 to 320 fish.

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\* The machinery was installed and the plant operated in 1898.

## FISHERY AND CANNERY METHODS.

## THE FISHERIES.

The methods employed in taking fish at the fisheries are given in detail in the descriptions of the canneries and streams, and will only be briefly referred to here. Each locality has its own methods, obtained by experience and believed to be the best. In general it may be said that in localities where the water is discolored gill nets are used, and if the topographical conditions are favorable traps are added; where the water is clear, drag seines give the best results. In southeast Alaska drag seines are used exclusively except at Chilkat and Wrangell. Drifting gill nets are used in Chilkat Inlet and at Taku by the cannery fishermen, while the Indians use small nets and gaffs in Chilkat and Chilkoot rivers, as described under other headings. The cannery at Wrangell uses gill nets in the fisheries at the mouth of the Stikine, but all fish obtained for this cannery in other localities are taken in drag seines. Spasmodic attempts have been made to work traps in southeast Alaska, but the results have not warranted the expense. Gill nets and purse seines have been tried in the lower section, but with indifferent success.

The canneries in Prince William Sound fish the Copper River delta with drifting gill nets, and the Prince William Sound streams with drag seines. In Cook Inlet the fishing is done with drifting gill nets, and by traps at prominent points along the shore leading to the rivers, and in the mouths of the rivers.

On Kadiak Island drag seines are used—a description of which will be found in the report—though gill nets have been experimented with, and for several years huge floating traps have been tried at Uganuk. The fishery at Chignik is carried on principally with traps, but drag seines are also used and formerly gill nets, but these are not much in vogue now. In Bering Sea the fish are taken in gill nets and traps.

Outside of southeast Alaska the fishing is carried on entirely by the canneries; that is, when the cannery ships proceed to their stations in early spring they carry fishermen with whom contracts have been made for the season. Occasionally fresh fish are bought from the natives; but there are few natives, and fewer still who care to exert themselves beyond taking fish for their own wants, so that the number of fish thus furnished is extremely small, and the canneries can not depend upon this source of supply.

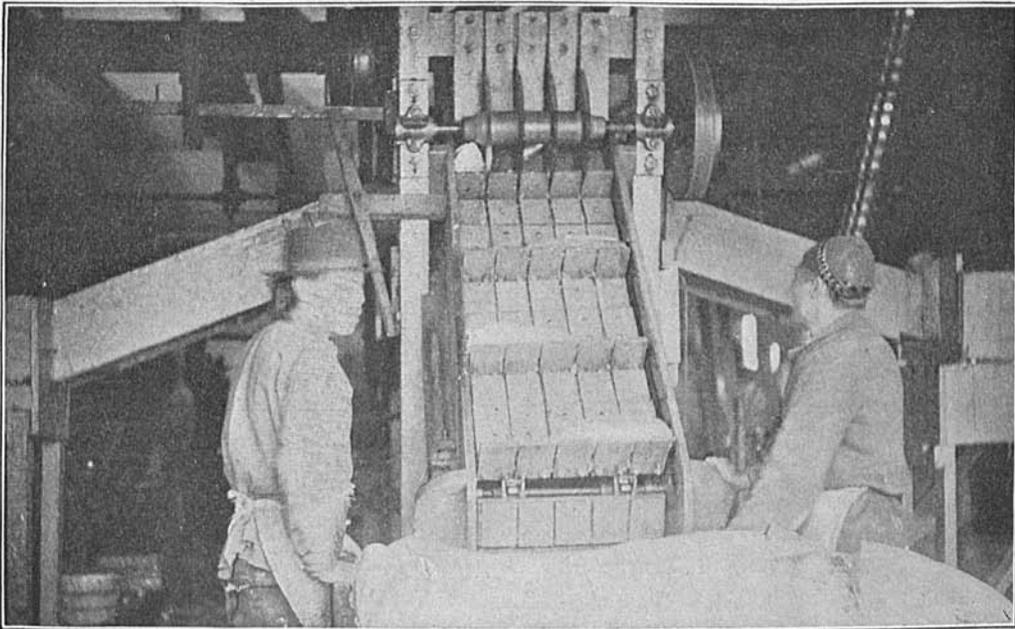
In southeast Alaska, while each cannery has fishermen of its own, a large part of the supply comes by purchase from native and white fishermen. These fisheries are conducted in various ways. A saltery may have been established by a white man near some stream or streams, and a certain right to the fishery is recognized. A cannery makes a contract with him to take all his catch at a certain rate, the steamer calling for the fish at fixed intervals. He employs his own men, boats, gear, etc. Or a cannery may supply natives, who claim to have rights in a stream, with nets and boats on condition that they sell all their catch to the cannery at certain fixed rates. A third method is for a cannery to send its own fishermen into a locality to do the fishing.

Many disputes arise concerning the fisheries. A native, whose ancestors have lived on a certain stream for many generations, and whose rights are respected by

other natives, supplies a certain cannery with his catch, as possibly he has been doing for years. A rival cannery tells the native that he must sell his catch to it, and that otherwise their men will fish the native's stream. The result is overfishing, complaints, bad feeling, blows, and threats of bloodshed. So far as can be learned, there are now no legal rights or title to any fishing-grounds in Alaska except what force or strategy furnish.

#### LABOR AT THE CANNERIES.

The cannery fishermen are nearly all foreigners, the majority being "north countrymen," or, as they are termed, "hardheads," though there are some fishing gangs comprised of what are called "dagoes," consisting of Italians, Greeks, and the like. When these two classes form different fishing gangs for the same cannery, the north-country crew is referred to as the "white crew."

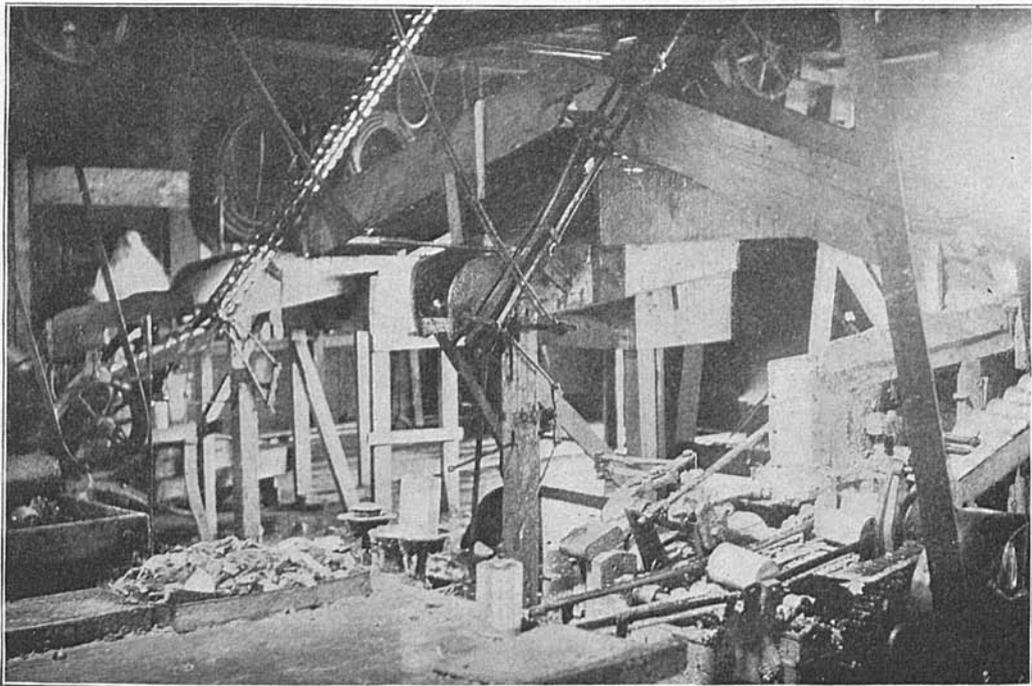


Cutting machine.

With the exception of Metlakahtla and Klawak, the packing at all canneries is done entirely by Chinese, and it is very satisfactory labor. The canneries make a contract with the Chinese controlling the labor at a stipulated amount per case, guaranteeing a certain pack. If the guaranteed pack is not made, they are paid as though it had been; if the pack is overrun, they are paid for the extras. They are conveyed to and from the cannery in the ships, are given a bunk-house where they all live, are provided with water, fuel, and salt, and are paid collectively, according to contract, from 40 to 46 cents a case, depending upon the location of the cannery and the facilities for packing. The Chinese make all the cans, receive the fish on the dock, where they are tossed into bins from the boats, and do all the labor until the

product is ready for shipment; in other words, they receive the fresh fish at one cannery door and place them at the other in tin cans, boxed, ready for shipment. They have their own bosses, are ready to work at any and all hours, and apply themselves strictly to the work for which they are paid.

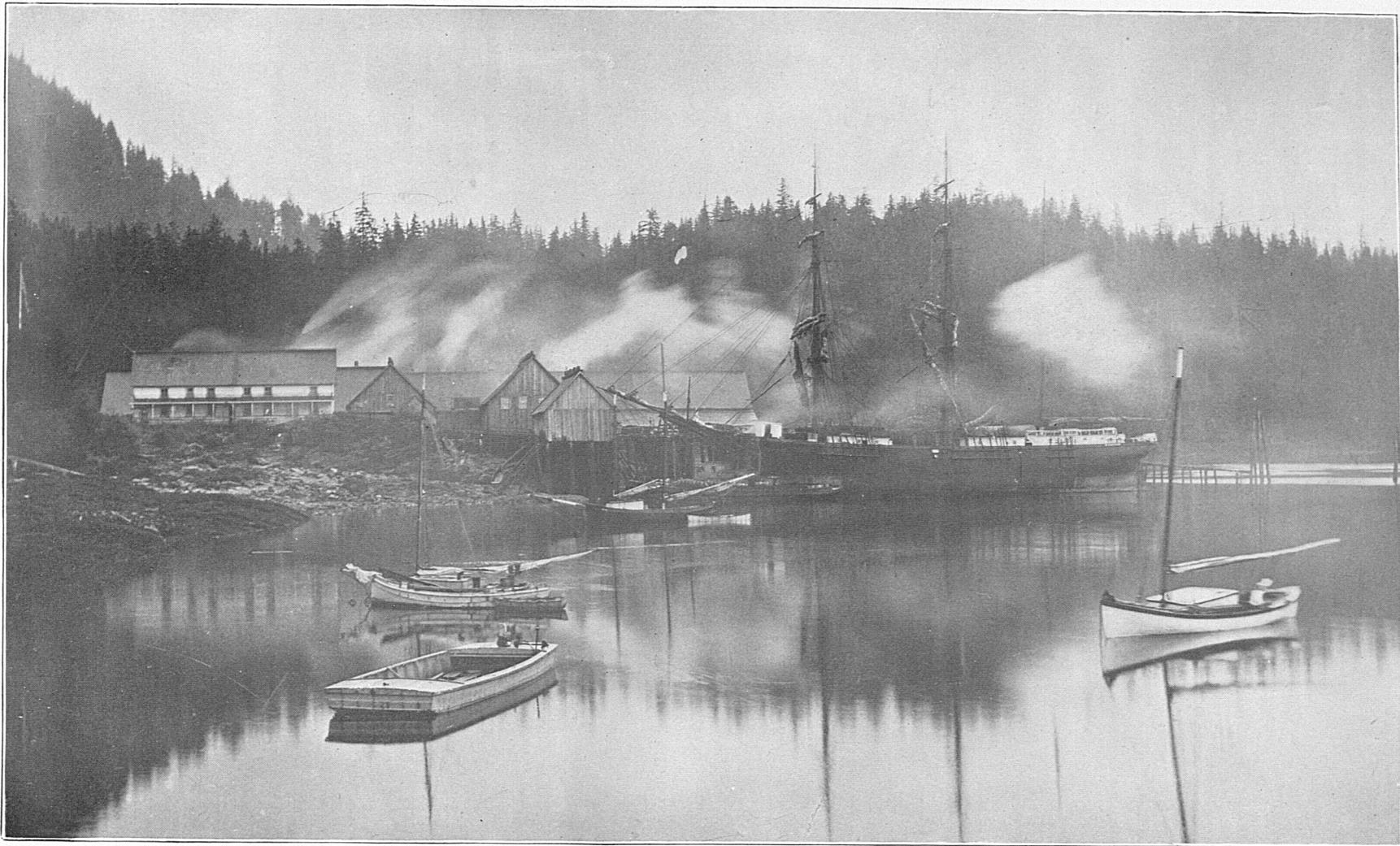
At Klawak in the early days Indians were paid \$1 per day. Demands for higher wages resulted in a gradual increase until \$1.50 per day was reached, while as the Indians became more expert they grew lazier and constantly clamored for increased wages. As the point had been reached where the prices paid for the work done made the pack too expensive to warrant a further increase, the manager decided to pay by piece-work. This was rather difficult to arrange, but was eventually accomplished. It was then found that each one performed about twice the amount that he had ever done by day's work.



Filling machine.

Under the piece-work system the Indian is still dissatisfied. During the time of our visit the labelers struck for higher rates; 25 cents was paid for 12 cases; they demanded 25 cents for 10 cases and got it. It is said that it now costs the cannery 60 cents a case to make the pack; one-half is paid in coin and the other half in store checks; but, deducting the fixed store profits, it still costs the cannery 51 cents a case. Chinese can be employed to make a hand-pack for about 45 cents per case.

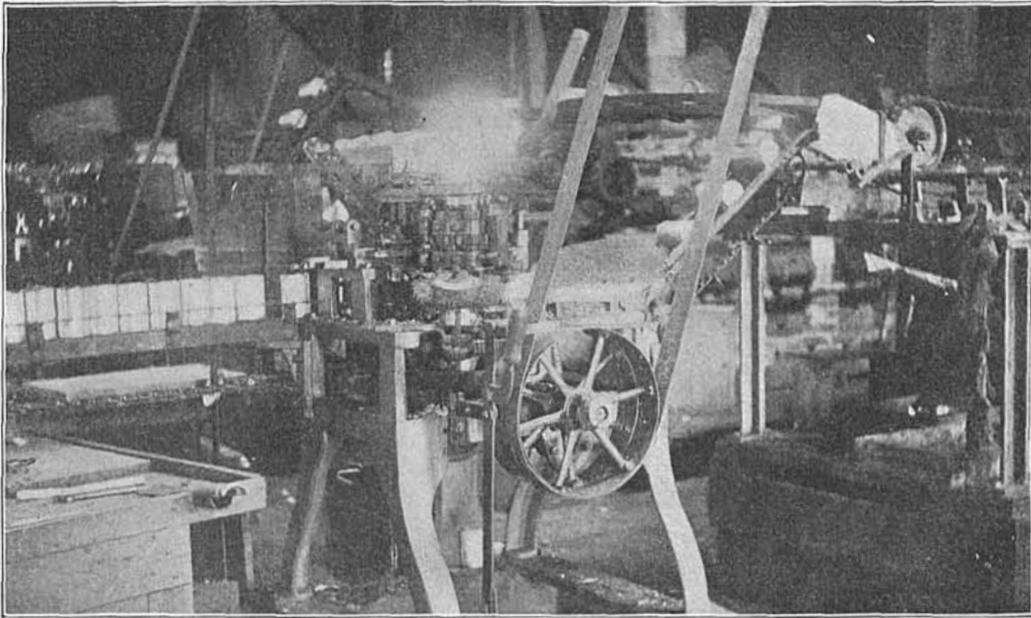
At Klawak native women (klootchmen) are employed as labelers, fillers, cappers, and washers; boys as carriers and to assist at the gang-knives; and men in all other capacities. The least amount earned under the schedule is \$1.50 per day for women, and from that amount to \$2, and one woman has made as high as \$4 a day as a labeler;



CANNERY AT LORING.

butchers have made as high as \$5.60 a day. The work is not steady, but for the season the native women make from \$80 to \$100, and the better class of men \$200. Fishermen are paid \$2 a day, without board, and laborers \$1.50 per day, for the time employed.

The complaint is made everywhere that Indian labor—that is, the labor of the men—is uncertain. After making sufficient wages to supply their personal wants and getting a few dollars ahead, the desire for hunting or fishing seizes them and they are apt to leave when they are most wanted. To provide against this contingency, a contract is made with the fishermen, upon which they are paid \$1.50 down for every day's work, and the remainder is held until the end of the season; it is then paid if they remain, but forfeited if they leave without permission.



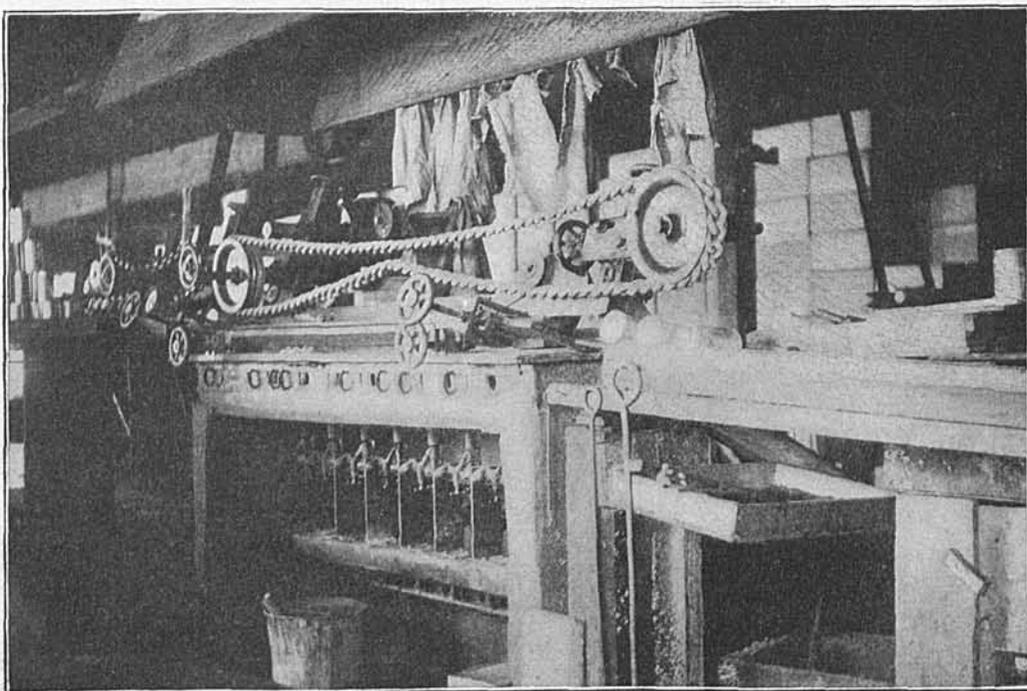
Topping machine.

The Indians are doubtless improvident, knowing that nature has provided for them without much labor. Their frequent boast is that white men and Chinese must work to get something to eat, while the waters and the forests furnish the Indians with all they want. A very small amount of money will supply them with the few necessaries which money alone will purchase.

In the spring of the year, when the cannery is opened, the Indian has spent his money and consumed his supplies. His wants are many, and he is willing to do any work; after these wants are satisfied he relapses, becomes lazy, and demands more wages. The Indians fancy the cannery is getting \$6 and \$7 a case for salmon, and that they are not getting what is due them. The manager at Klawak said that year after year he had acceded to their demands, but that now they had passed beyond the limit. The Indian is perfectly capable and can probably do the work as well as the Chinese if he could only be made to understand the exact conditions.

## THE CANNING PROCESSES.

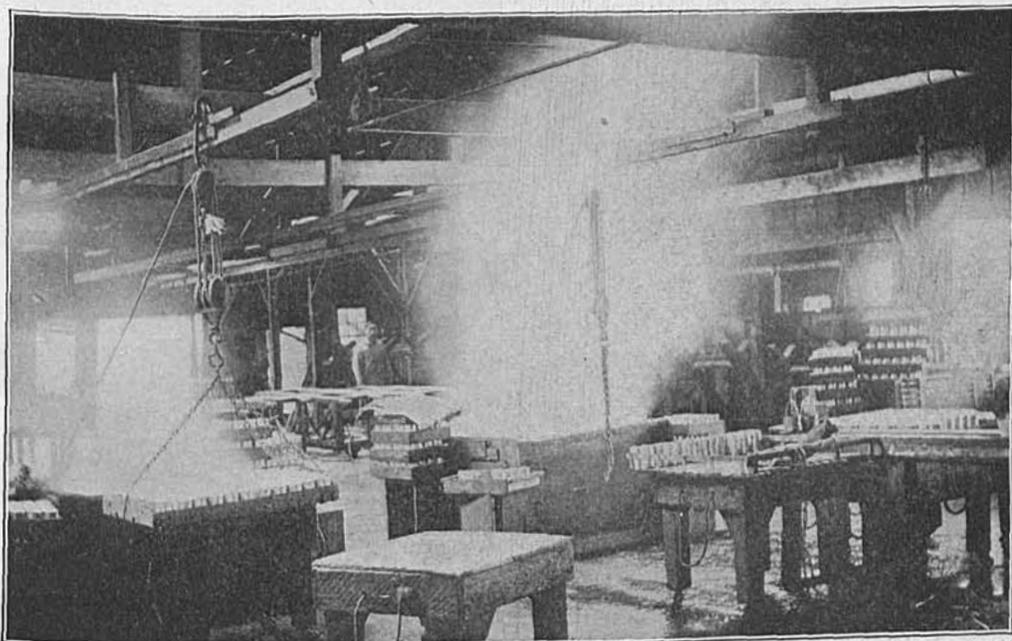
When the salmon collected from the various streams by the cannery steamers are brought to the fish wharf, they are transferred to the fish-bins by men armed with pews (single-tined forks). These men stand knee-deep in fish on the steamer or scow, impale one or two fish at a time, and by a rapid movement toss them to the top of the wharf, where others, also using pews, toss them into bins. The men become very expert in the use of these implements, and a constant stream of fish seems to flow from the steamer or scow to the wharf and thence to the bins. Elevators are used in some canneries, but they are not common in Alaska.



Soldering machine.

It is claimed that fish should be twenty-four hours out of the water before packing, so as to allow them to shrink, as when packed perfectly fresh so much juice is formed that in "blowing," after cooking, light weights are produced. In the fish-house and near the bins are arranged the butchers' tables, where the fish are cleaned. A stream of water is kept playing over the fish in the bins to remove the dirt and slime that collect on them, and they are then transferred to the tables, where the "butcher," after removing the head, seizes the fish by the tail, grasping it at the caudal peduncle, and with a few rapid strokes removes the fins, with one slash opens the fish along the ventral line, and by another removes the viscera. The fish is then transferred to a tank of water, where it is washed and scraped and the tail removed. In a well-regulated cannery it is passed to another tank of water, where it receives a second washing, scraping, and final brushing with a whisk-like broom. Being then thoroughly clean, the fish is transferred to large bins on either side of the cutting machine.

There is great variation in different canneries in all the various processes, but one principle in cutting is kept in view by all; that is, to cut the fish transversely in sections the exact length of the can. The usual method is to have a large wooden, cylindrical carrier, with ledges or rests on the outside the length of the carrier, wide enough to hold the fish, and slit in cross section through the ledges and outer casing to receive the gang-knives. The gang-knives are circular, fixed on an axle at the proper distances apart, and revolve at the highest point reached by the carrier and independently of the latter. The carrier and gang-knives are set in motion, each revolving on its own shaft. As a rest on the carrier comes to a horizontal position, men stationed at the fish-bins lay a fish on each ledge as it passes. Thence it is conveyed to the revolving gang-knives, and, after being divided, passes through and on the downward course the severed fish slides off the rest upon the filling-table.



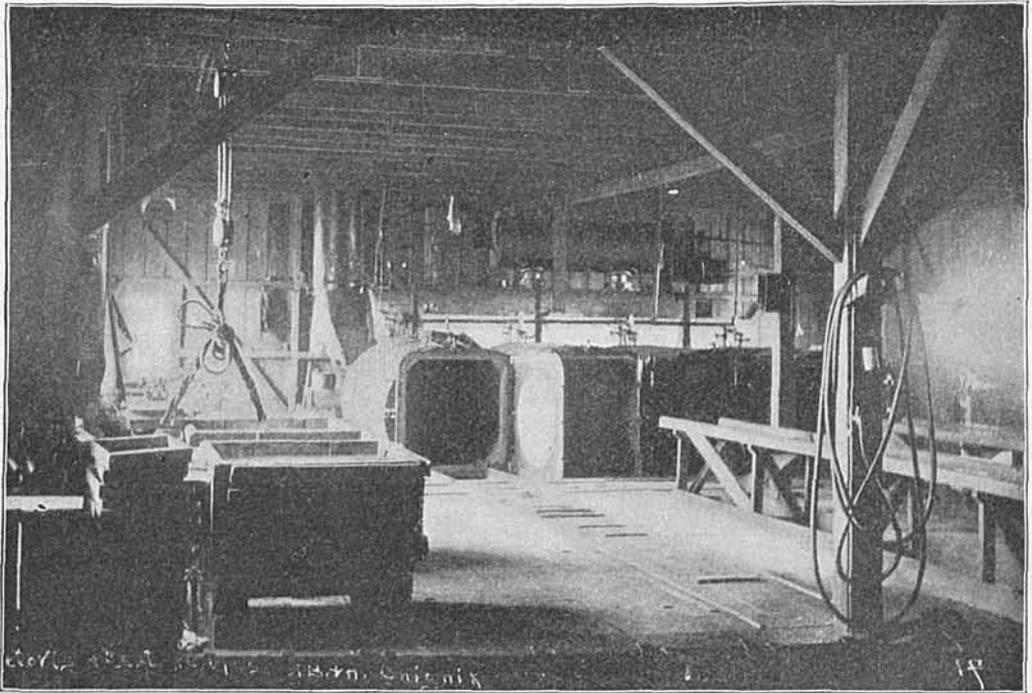
Test kettles.

The cutting carriers of the larger canneries are usually elliptical. This form gives a larger carrying capacity and transfers the divided fish to a higher point, from which the filling is more readily done. In some of the smaller canneries the gang-knives are worked by hand. In this case the knives are not circular, but elongated or semi-circular in shape, tapering at the outer ends. They are mounted on an axle having a large iron lever at one end, and when this lever is raised the ends of the gang-knives are thrown up and back. The fish is then placed in position under them and the lever pulled forward, when the knives, with a scimiter-like movement, divide the fish.

Most canneries use filling machines, but as these machines are covered by a patent owned by one of the large packing organizations they are difficult to obtain. One filling machine will fill 800 cases per day, and the larger canneries have from two

to three, and, exceptionally, four filling machines. At some of the smaller canneries filling is done by hand. These are usually establishments that have a capacity of from 400 to 600 cases per day. The machines are only adapted to what is known to the trade as "talls"—that is, the ordinary high 1-pound can. All fancy cans, such as "flats," elliptical, half-pound, etc., are filled by hand.

The filling machine consists of a receiving platform, on which the empty cans are fed, each one reaching a distinct position in its turn. One man at the filling table overhead feeds the divided fish into a hopper, from which it is conveyed to the can underneath, and by a gentle pressure of a piston is pressed into the can, when a movement of the machine conveys the filled can to a table and an empty can into position to be filled. The movement is so rapid that a continuous stream of filled cans



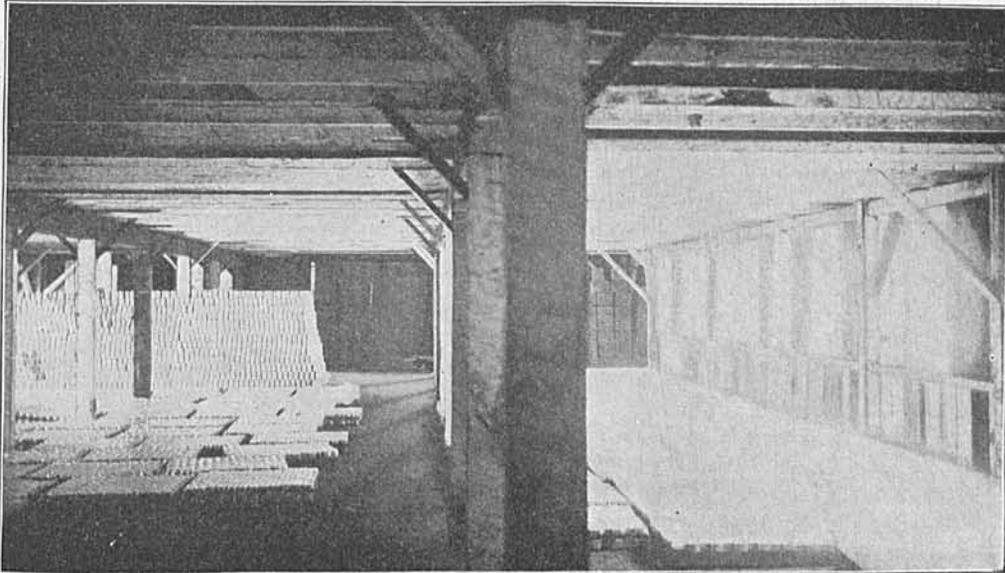
Retorts and test kettles.

is poured on the table. Here the filling is inspected, and, if for export, the cans are carefully weighed, so that there may be no short weight. If they are not quite full a small quantity of fish is added, a supply of small bits being kept at hand for this purpose.

The can is now ready for the top, which in some canneries is put on by hand, but in most cases by a machine. The cans are placed in line and conveyed by a belt to a machine, the tops being fed in through a separate aperture. As the cans emerge with the tops on, a crimping attachment presses the edge firmly around the body, and as it is still carried by a belt, it is turned by the movement of the belt on its side and rolls down a trough to the soldering machine. Here an endless revolving chain passes over the can near the top and rolls its edge into the molten solder. As it emerges from the soldering machine it rolls down a trough and under several jets of water to cool,

and as it comes from the trough it is placed on a table where Chinese seal by hand the central vent, which was left open in the capping process and in the soldering machine, where it becomes quite hot, to let the air escape.

After the central vent is closed the cans are placed vertically in single layers in large open-work trays made of heavy strap iron and holding two cases. The filled trays are now lifted by tackles and iron tongs and lowered into a square wooden tank filled with water heated by steam. This is the first test for leaks. The experienced eye of the Chinese tester at once detects a faulty can by the escape of air, and the can is removed with a pair of tongs and placed aside, where one or more solderers remedy the defects. After removal from the hot-water test the trays are placed one on top of another on cars, and are carried by a railway into the retorts for the first cooking.



Cooling a day's pack.

The cooking is all done by steam in a part of the cannery called the "bath-room." In some canneries the retorts for first cooking are made of heavy plank, well bolted to resist the steam pressure, but in most places they are made of iron or mild steel plate. In the early days the cooking process was a grave secret and none but those interested in the cannery were intrusted with it.

The time of cooking differs somewhat in different canneries, according to the ideas and experience of the superintendent. It is desired to not only cook the fish, but the bones must be cooked so they will crumble between the fingers, as if this is not done the contents may spoil. In some establishments the canned fish is 60 minutes in each retort, in others 50 minutes in the first and from 70 to 80 minutes in the second.

The trays with the hot, steaming cans, bulged out at the ends by the steam within, are then placed on tables where the bath-room men test the cans by the process known as "blowing" or "venting." These men, armed with small wooden mallets, having on the broad face an awl-like point, tap rapidly the top of one can after another,

making a small perforation in each. A fountain-like jet at once appears, caused by the steam escaping, and carrying with it some of the liquor. The vents, after blowing, are immediately soldered and the trays run into the second retort for final cooking. The reason for the two separate cooking operations is that if the cans are kept in the first retort a sufficient length of time to complete the cooking, the steam generated would be so great in the cans that they would be ruined.

At one cannery inspected, where it seemed that more attention was given to exact details of cooking than in some others, there was on the top of the retort a thermometer, connected with the interior, and a separate steam-gauge. The cans to be cooked were placed in the retort, the doors securely clamped, and the steam turned in. The steam gauge was carefully noticed until it showed 6 pounds pressure, where it was maintained, by regulating the stop valve, until the thermometer registered 220° F. The



Lacquer room.

temperature was kept at this point for thirty minutes, when the retorts were opened and the cans removed.

The second cooking at this cannery is as follows: After the cans are placed and the doors secured, steam is admitted until the independent gauge shows a pressure of 12 pounds. It is then maintained at that pressure until the thermometer registers 240°, when the temperature is regulated to 240° for 45 minutes when cooking redfish, or 60 minutes when cooking cohoes. The latter fish are quite large at this cannery, and presumably the longer period is given so that the large bones may be thoroughly cooked. In both cases of cooking, after the desired temperature is reached the pressure falls, while the temperature is held at the proper point.

After the cans are taken from the second retort the grease and dirt on them are removed by a lye bath, the lye is next removed by a fresh-water bath, and the cans

are ready for the cooling room. After cooling they are lacquered by placing them on a tray in an inclined position, which is lowered into the lacquer contained in a rectangular wooden tank, lifted, drained, and removed. When the lacquer is dry the cans are labeled and cased.

After the second cooking they are twice tapped for leaks. Certain Chinese are very expert at this test. With a tenpenny nail they pass rapidly over the cans, striking the top of each, and judge by the sound whether there are any defects.

During the process of canning imperfect cans are found by inspection and testing, and if repaired before the first cooking and immediately processed they are naturally in the same condition as if there had been no defects. If the leaks are discovered after cooking and are repaired at once and the contents recooked, they are still very good, the only difficulty being that by blowing them a second time they lose weight. The above goods usually go in with the regular pack of their kind and are not classed as regular "do-overs."

When a cannery is running to its full capacity defective cans can not be repaired and recooked at once, and are set aside sometimes for days before they are recooked, the result being that decomposition follows, the same as with any other meat that is exposed to the air, and the fish becomes unfit for food. When recooked the fish is mushy, and the blowing makes the cans very light, which is frequently corrected by adding salt water. This, the "do-over," is the lowest grade of goods, and is fit only for chicken food. Such cans are frequently sold to brokers without labels, or else labeled with the name of some fictitious cannery, and find their way into country, lumber, mining, or negro districts, or are sent to the South Seas and semibarbarous localities. Defective cans run from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  per cent of the output, and those intended to go with the regular pack are usually vented by opening one of the first vents, or the seam at the top, so that additional vent marks may not lead to suspecting the goods.

#### WEIGHT OF FISH.

Cannery people, in referring to the weight of salmon, always speak of so many to the case. They never weigh the fish, but estimate them by the case, and sometimes make fishing contracts in that manner. This naturally involves another subject: How many live fish are required to make a case of 48 one-pound cans? Much depends upon how the fish are cut. The largest company doing business in Alaska cuts off a considerable portion of the tail and the head well back as waste. Another cannery saves these end pieces and packs them under special labels. A liberal estimate of the loss in cleaning and preparing the fish for the cans is one-third, which would be about 75 pounds of live fish to a case, or 72 pounds if each can contained exactly 1 pound; but as the cream of the pack goes to foreign markets, the cans are always slightly overweight, about an ounce, to prevent a rebate on short weights. My own observation and inquiry among cannery men seemed to have given the subject some attention lead me to believe that 65 to 68 pounds of live fish will make a liberal case, depending somewhat on the size of the fish. Fish that run 10 to 12 to the case can be gauged very closely on a 65-pound basis, but for smaller fish this must be increased.

The waste of redfish and cohoes at the canneries is not large, but with humpbacks many are culled out, either on account of being very small or in bad condition. This species, late in the season, when the hump commences to be marked, becomes watery, and it is then difficult to properly fill a can, as much of the weight is in liquor, which

blows off in testing, causing light weight. Under average conditions from 10 to 15 per cent of humpbacks are wasted, and in a season when they are as plentiful as in 1897 as many or more are wasted than are packed. Some years ago, when only a few humpbacks were packed, they were so numerous in Naha Bay that tens of thousands were hauled on the banks and left to decay in order to thin them out.

#### LABELS AND BRANDS.

Every cannery in Alaska has its own labels and brands, and the same fish are packed in each cannery under various brands. One cannery that was visited had seventeen. The reason for employing so many is briefly as follows: When the canneries were first operated independently each adopted various brands for the same species of fish, and they were introduced into different sections, ultimately creating demand for particular goods.

In spite of these various brands, the highest-grade goods in all, or nearly all, the Alaska pack has some word which conveys to the consumer what is in the tin, if he knows the key. The few cans of king salmon that are packed have the words "king" or "Alaska king" somewhere on the label, but these fish form so small a part of the Alaska pack that they can hardly be considered. The labels for redfish, which forms the great bulk of the pack, as a rule have the word "red" in some connection, such as "red salmon," "choice red salmon," "Alaska red salmon," etc. In some canneries a few of the early cohoes find themselves under a redfish label, but usually a can marked "red salmon" contains that fish.

The cohoes, and frequently the white king salmon, are usually packed under a label that somewhere has the words "spring salmon" on it, and the humpback is covered by the term "pink salmon." The few dog salmon packed are covered either under "pink salmon" or else go in with that heterogeneous mass of tips-and-tails, light-weights, "do-overs," etc. Some of the canneries have not adopted this system of labeling, but with about three-fourths of the Alaska pack the words "king," "red," "spring," and "pink," are used, as just mentioned.

The names of companies which have never had any real existence are sometimes found on labels. Some of these are the Prince of Wales Packing Company, Tolstoi Packing Company, Clarence Straits Packing Company, Moira Packing Company, Coal Bay Packing Company. These are simply names that some years ago were placed on labels of which a few are still in use. They are supposed to represent fish taken at the several localities, but no canneries were ever located at those places or operated under the company titles.

As elsewhere noted, fictitious cannery names are also used to cover "do-overs."

#### MARKETS.

The larger part of the canned redfish goes abroad, principally to England. These are the choicest of the pack, and more than usual care is observed in preparing them, as the European market demands a high grade of goods. The cans are carefully weighed, and contain about 1 ounce more than a pound, so as to be sure to avoid light weights. The cans are carefully inspected for dents or defects, and the fish are the very best. It is usual on European orders to open a certain number of cases and average the order from an inspection of these cans. If they are defective, reclamation is made. The remainder of the pack of redfish, together with the cohoes, humpbacks, dog salmon, tips-and-tails, and do-overs remain in the home market, and some are shipped to Australia, South America, and the South Seas.

## PRICES OF CANNED SALMON.

The prices vary with the demand. On account of the large output in 1897 canned salmon that year sold very low. A good average price for the 1896 output was, for king salmon, \$1.15; redfish, 90 cents; cohoes, 80 cents, and humpbacks, 65 cents per dozen cans. The prices paid during the winter of 1897-98 were, king, \$1.10; redfish, 85 cents; cohoes, 75 cents, and humpbacks, 55 cents per dozen. These are simply averages from first hands in large quantities. One large organization, it is reported, sold 300,000 cases of the best redfish on foreign-order, before the pack was made, at 83 cents per dozen. The other grades are sold for what they will bring.

## CANS AND BOXES.

It is difficult, without seeing, to appreciate the enormous number of cans used in a cannery. From the time of the arrival of the employees at the cannery, six or eight weeks before the salmon run commences, the Chinese who do the packing are employed in making cans, as their contract calls for the packing work complete, from the making of the cans to the stowing of the labeled, filled cans into the cases.\* The body of nearly all cans is made by hand, but there are a few machines in use that solder the long body seams. In nearly, if not quite, all the canneries, after the cans are filled the bottoms and tops are soldered by machinery. To pack 50,000 cases requires 2,400,000 cans, and the Alaska pack in 1897 took about 43,600,000 cans. This requires about 100,000 boxes of tin plate, weighing 10,000,000 pounds (5,000 tons roughly) and costing about \$400,000. The tin plate used at present is what is known as 100-pound tin for the body of the can, and 95-pound tin for the tops. It takes about 110 boxes of tin plate for 1,000 cases. Domestic tin is largely used for the pack sold for home use, but imported tin for the export pack. Formerly all tin plate was imported, and what is known in the trade as 110-pound and 112-pound tin was used.

One box of 100-pound tin, 14 inches by 20 inches, English plate, contains 112 sheets of tin plate, weighing 100 pounds, or with the box 5 pounds additional. One box of 95-pound tin of the same dimensions contains 112 sheets of tin plate, weighing 95 pounds net, or with the box 5 pounds additional. The quotations in December, 1897, in San Francisco, on lots of 500 boxes or more, duty paid, were \$4.20 per box for 100-pound tin and \$4.10 for 95-pound tin. American plate is the same except in price, which at the time the imported tin quotations were made was for 100-pound tin \$3.425, and for 95-pound tin 10 cents less per box, delivered f. o. b. San Francisco in large lots. One-fourth of 1 per cent is said by dealers to cover all deterioration due to rusting, sweating, etc.

For the season's pack it is usual to allow 110 boxes of tin to 1,000 cases of cans. This makes an allowance of  $2\frac{1}{2}$  to 3 per cent for rusty plates, losses due to imperfectly cut sheets, and for other cannery uses, as the following will show: One sheet 14 inches by 20 inches will cut 6 bodies or 24 tops of 1-pound tall cans; 1,000 cases, or 48,000 cans, contain 96,000 tops (4,000 sheets) plus 48,000 bodies (8,000 sheets) equal to 12,000 sheets, which is  $107\frac{1}{2}$  boxes, or 107 boxes and 16 sheets. Hence 112 sheets, 14 inches by 20 inches, will make 448 tall 1-pound salmon cans, or 1 box of tin plate will make  $9\frac{1}{2}$  cases of cans. In canneries generally it is said that actual experience shows that

\* In Bering Sea packing commences soon after the ice permits the vessels to enter the estuaries. As a rule, empty cans are carried from San Francisco to these canneries.

1 box of tin will make only  $9\frac{1}{8}$  cases, at which rate it will take  $109\frac{1}{10}$  boxes of tin to 1,000 cases.

There is a rebate of 99 per cent of the duty on imported tin used on the export pack, but under the present ruling every box must be accounted for, and it is said that under these conditions only about 75 per cent is realized on account of the inability to account for the disposition of every box.

The boxes in which the canned salmon is packed in Alaska are mostly made in Puget Sound and carried up in shooks. The cannery at Metlakahkla turns out its own boxes, and the sawmill in Tongass Narrows, operated by Metlakahkla Indians, supplies Loring and Wrangell. As lumber can not legally be exported from Alaska, there is only a small local demand for the product of the sawmills.