THE 1970 SALMON RUN

Joan Bergy

- - -

In June and July the run of Sockeye or Red salmon in western Alaska was one of the biggest in history. Fishermen brought in a catch of over 20 million of these fish, the second biggest since 1938. For the consumer it meant a bountiful national supply of the Reds, considered the tastiest of all canned salmon. To FDA's Seattle District and the salmon canning industry it meant weeks of careful planning and extraordinary efforts to bring this bounty quickly to the Nation's tables and assure its wholesomeness.

- - -

Out of nowhere appears the cannery, on a long coastal inlet. Behind is Seattle and the flight from Juneau, over ragged snow-clad peaks, dense coniferous forests, blue water, innumerable islands, and an incredibly gapped coastline.

The float plane lands and taxis to the dock. Here in this remote location, far from any city, an FDA inspection is about to begin. A salmon cannery is near where the fish are. Some are in major coastal cities and towns, and some are completely isolated, like this one in Alaska.

The inspector's job, evaluating how the salmon is canned, is one of the most important consumer protection tasks he will ever perform. This FDA responsibility is one shared with the Alaska Health Department, the Oregon and Washington Departments of Agriculture (in their respective States), the National Canners Association, and the United States Army and Air Force.

The cannery is a self-contained village where all work and live together, from July to mid-September, while the salmon are surging up the inlets. Here fishermen and cannery workers of a dozen nationalities or races mingle in single-purpose activity. Families are housed in the cannery village; singles stay in dormitory-style bunkhouses. Groceries and supplies are sold at cost by the cannery store but prices are high because everything must be brought in by boat or float plane.

Radio is the link with the outside. Through it pass the cannery's communications with suppliers, charter flying services, other canneries, fishermen, headquarters offices, and even physicians. Oldtimers say they used to can salmon without radio communications, but today they wonder how they ever did.

The plant superintendent welcomes the FDA inspection. He remembers the year a team of inspectors came in before the season. Together they went through the cannery and talked about sanitation and improvements that the plant later implemented. Regular FDA inspections identify deficiencies in the operation. Inspectors' reports help the superintendent and cannery do a better job.

During the night tenders have collected the fresh-caught salmon from the fishing boats and delivered the cargo to the canneries. Salmon are unloaded into steps of a vertical conveyor belt from the hold of the tender. The inspector observes the way the fish are unloaded, the sanitation of the conveyors and flumes for transporting them, whether a cannery employee is monitoring the quality of raw salmon received, and whether decomposed fish are disposed of so they will not be processed for human food.

The conveyor moves the salmon into large bins in the fish house. With a little climbing and plank walking, the inspector reaches the rim of the bin to evaluate the quality of the fish lot.

What's a good fish? Condition and appearance of fresh fish are a shiny skin with an iridescent quality, bright clear eyes, bright colored gills, no odor or decomposition or slime, firm flesh, and a firm backbone with "no creaking."

Another indicator related to quality is water markings. Fish on the way to spawning

The author is Consumer Specialist, FDA Seattle District.
Reprinted from 'FDA Papers', Oct. 1970.

grounds develop light-to-heavy water markings, or "mating colors." A Pink salmon flattens out, a hump forms on the back, and the color turns to dark olive. Chums change to a calico color, the jaw hooks, and the teeth stick out. The bodies of Sockeye turn red and the head becomes green. Salmon with moderate to heavy water markings produce a lower quality product that has less flavor.

Fish caught in gill nets have characteristic slash marks caused from swimming into the nets, catching their gills and strangling. Salmon caught in purse nets are not damaged and live until the net is drawn up like a purse string. Today the appearance and condition of the fish is judged to be good quality and the percentage of water-marked fish is low.

It's coffee time. The cannery people gather for coffee, rolls, and conversation, but the inspector stays behind to observe the washdown of equipment and general cleanup that takes place while the crew is on a break.

Medium-sized canneries are equipped to process up to 75,000 fish a day during years of big salmon runs. Larger canneries can handle more, in some cases, as many as 125,000 salmon. Species of salmon vary in size: Kings, Silvers, and Chums may weigh up to 30 pounds; Sockeyes up to 8 pounds; and Pinks up to 6 pounds.

A bonanza run of 38 million Sockeyes in the Bristol Bay area in western Alaska during the seasonal run in June and July of this year produced a catch of over 20 million fish and 1,250,000 cases of canned salmon. The sizes of runs in other salmon-producing areas were average this year. The price cannery fishermen are paid for their catch depends on the world market and where the fish are caught. Prices for whole salmon may vary from ten to twelve cents a pound for Chums and Pinks to 25 to 50 cents or more for Sockeyes.

Back to the fish house. The salmon are lined up in tracks on a conveyor belt to pass through the guillotine, where the heads are removed. The egg sacs are pulled. In a separate operation, the eggs are dipped in a brine solution, salted, and packed in wooden containers for shipment to Japan as prized salmon caviar. Not many years ago the eggs were discarded. But now they are an important part of the operation and might bring as much as $5 a pound at retail in Tokyo. Even though the eggs are for export, FDA inspects some of the operations for sanitation.

The conveyor moves the salmon to the Iron Chink, an ominous machine that butchers the fish by slitting open the belly, removing the intestines and other organs, and lopping off the fins and tail. Before the invention of the Iron Chink in 1905, a fast "slitter" could hand butcher some 2,000 fish in a 10-hour day. Most people said then that a mere machine could not beat such a record, but one Iron Chink succeeded in replacing six slitters. Fish scales are removed by a brush and rinse operation. At the sliming table salmon are sorted into one group ready for canning and another for touch-up butchering and trimming.

When the salmon are butchered, the inspector looks for evidence of decomposition by smelling the insides, noting the firmness of the flesh, and evaluating its color. Decomposed fish become soft, the ribs and backbone separate from the flesh, the body wall turns red (termed "belly burn") and a strong fishy odor is present.

The inspector, whose mission is to protect the consumer, must keep in mind that the product moving through hands and equipment is food that will be eaten. Are aprons, gloves, plastic cuffs, and slickers kept clean by washing off with chlorinated water at intervals? Are workers' heads covered with hairnets, hats, or scarves? If pieces of fish fall on the floor, are they discarded or thoroughly washed before being returned to the processing line? Are cutting boards smooth instead of gouged or worn, and are they sanitized daily?

Wooden equipment is a potential enemy of sanitation, for it can harbor bacterial contamination. Are tables and bins constructed of stainless steel or other nonabsorbent material? Are all surfaces and utensils that come into contact with the product cleaned as frequently as necessary to prevent contamination? The inspector gives extra attention to these points.

It's time to can. But first, reforming machines are shaping the cans that soon will be filled with salmon. The cans are shipped flat, without lids or bottoms. The golden containers, now formed and bottoms fitted, are ready for salmon and file down a conveyor. Salt and perhaps salmon oil is added. The

slicer machine cuts salmon to size and the filler machine places it in the can. At some canneries the cans are weighed automatically and those that are underweight are rejected. At others the weighing is done manually. "Patch girls" add more salmon to the underweights, weigh them again, and send them on. Employees remove any bone or skin hanging over the sides of the cans. The tempo is fast. The lines at this cannery pack 240 to 250 cans per minute.

Clean machinery is one of the inspector's primary concerns. The inspector probes the interior of the filling machine in search of decomposed salmon or other filth. He checks to see if the plant has a written cleanup schedule and whether conveyor belts and machinery are thoroughly scrubbed and sanitized after each day's operation. If he observes decomposed fish, he can collect samples. If he notices unsanitary conditions, he will record it with his camera.

The sealing operation is critical. The can and cover are aligned in the lidder machine where the flared top of the can and the lid are loosely joined in the first step in making the top can seam. These cans are then conveyed into the sealer where the seam is completed under a vacuum. This final seaming operation presses out the seam and forces the sealing compound into the contact areas. The cans emerge from this machine with an internal vacuum and a seam that will maintain the contents commercially sterile. The old method of producing a vacuum was to punch a hole in the hot can after processing. Juice and steam would squirt high in the air. Then before the can cooled a drop of solder was placed over the hole. This primitive method was eliminated by a system of exhaust boxes which heated the open top cans. The invention of vacuum closing machines replaced the exhaust boxes.

Employees are required by the cannery rules to examine can seams at regular intervals and to keep records on their findings. The FDA inspector visually inspects seams on sealed cans by running a finger around the edge to detect roughness, unevenness, or sharpness. He examines different code lots and determines if there are any defective cans.

Gondolas or stacks of trays transport the sealed cans into large retorts for processing under steam pressure. The National Canners Association recommends processing times based on time-temperature studies designed to establish optimum conditions for producing a safe product. Half-pound cans are processed at 240° F. for either 75 or 80 minutes depending on whether they are to be air cooled or water cooled. Processing times are long to destroy any food poisoning organisms that might be present and also to soften the bones.

Each canning retort is equipped with continuous recording time-temperature thermometers and a standardized mercury thermometer. Retorting records and can-seam examination records for code lots are kept on file two years. The FDA inspector carefully reviews retort records because undercooked salmon may result in serious spoilage. Another check point for the FDA inspector is to ascertain if an employee is reviewing and endorsing all records at the end of processing of each code lot.

Cooling of the cans may be done in the retort with cold water or by air cooling outside the retort. All water used for cooling must contain one part per million residual chlorine to prevent possible recontamination of the sterilized cans.

Generally, cans are not labeled but are stored to await shipment from Alaska to ports in the contiguous States via barge or steamship. In cannery lingo, cans are shipped 'bright' (unlabeled). Depending on the cannery and the holding procedures used prior to canning, such as storage in ice, refrigeration, or freezing, it takes eight hours to several days for the salmon to make its way from the water to the inside of a can.

Some canneries generate their own electrical power and provide a water system, and all develop pest control measures and engineer waste disposal. The inspector is concerned with the operation of these systems as they affect the quality of the food produced.

The potability and constancy of the water supply is crucial because water is in contact with the fish throughout processing. The recommended practice is to use fresh water for the entire operation. In areas where water is in short supply, sanitized sea water is permitted during the preliminary operations in the fish house. After fish are butchered, fresh sanitized water must be

used. The inspector reviews the kind of water used, the operations of the chlorinator unit, the daily records on the level of chlorine residual in the water, and the construction of the water system.

Pests are controlled by several means, but screens, closed doors and windows, and buildings in good repair are the best deterrents of all. Inspections include review of the measures taken to exclude pests and a check for evidence of bird and vermin activity both inside and outside the plant.

Sewage disposal is checked for routes of possible contamination. Discarded fish parts, referred to as "gurry," attract pests when disposed of close to the shoreline. To solve this problem one cannery has a barge that collects solid gurry and several times a week the barge tows it out to sea and unloads it. Others grind it up and pump it out into the bay area. This problem of solid waste disposal is a major one the industry must solve before 1972 to meet Federal and State standards for water quality that go into effect at that time.

It's been a long day. The inspector and the plant superintendent sit down to discuss the inspection report. Because FDA's job is to assure that the food is processed under optimal conditions, the discussion focuses on deficiencies in the operation and plant improvements noted since the last inspection and other satisfactory conditions. The inspector supplies a list of his observations to the plant manager and invites discussion on any questions about his findings.

The inspection is over but the effort to provide the consumer with a quality product continues.

The Canned Salmon Control Plan, grandfather of all FDA voluntary compliance programs, made its debut 34 years ago. In the words of the National Canners Association, it is "an expression of a desire on the part of the salmon industry to improve the quality of its product and to restrain from the market any portion of its pack considered unmerchantable from any cause."

The plan represents a cooperative effort on the part of the Food and Drug Administration, the salmon canners, and the National Canners Association whereby the canners agree to submit their product to the scrutiny of the NCA for a determination of its fitness for food and FDA grants an exemption from technical requirements of the law by permitting unlabeled cans to be shipped to facilitate buyer labeling at distribution points.

Under the leadership of Franklin D. Clark, Regional Food and Drug Director, Seattle, and Walter Yonker, Director, Northwest Research Laboratory, National Canners Association, the plan calls for a minimum of one annual inspection of all member plants by FDA and NCA. Plants must meet minimum requirements as described concerning raw materials, plant sanitation, water supply processing, finished product, waste disposal, and sanitary and operational procedures.

If a plant is operating under conditions that do not meet these requirements as reported by the NCA or FDA inspectors, the Regional Food and Drug Director confers with NCA and the packer on the problems and if conditions warrant it the firm is suspended from the plan. A follow-up inspection is made to determine if improvements have been made. A plant may be reinstated if it meets the requirements of the plan; if not, the suspension continues and the product is subject to regulatory action by FDA. The consumer benefits from the twofold protection of the plan and the law.

This year, 78 canneries who produce more than 99 percent of the Nation's canned salmon are participating in this voluntary plan. The FDA's Seattle District expects to expend a total of six man-years of inspectional, analytical, and administrative time in carrying out its responsibilities under the plan and inspecting canneries that are not participating in the program.

Quality is the goal of the Canned Salmon Control Plan. In addition to inspections the Northwest Research Laboratory of the National Canners Association at Seattle examines representative samples of every code lot of canned salmon.

Check points in this evaluation include decomposition, can seams, measurement of vacuum, net weight of contents, ratings on color and amount of oil and liquid, presence of water markings and bruises or other handling marks, and evidence of poor cleaning or filling. The code lot is given a rating which serves as a "report card" to the cannery and to companies buying the product for their labels.

Is the plan working?

Over the years significant improvements have been made in the Canned Salmon Control Plan. Within the past three years the NCA has placed increased emphasis on finished product examination to pick up conditions, such as decomposition, that would make the code lot unmerchantable for any reason.

Statistics on the results of the NCA examination of every code lot demonstrate that the quality of the pack has improved.

FDA inspection reports indicate that the general level of sanitation has risen with the increased emphasis on cleanup schedules and procedures. Inspectors report a change in plant attitude: they say there is more awareness of the need for sanitation in all phases of the operation.

An estimated half-million dollars has been spent by industry on improvements in the past four years. Processing plants, once burdened with worn wooden equipment in years past, have become showplaces of the industry.

The record is still not perfect, but in the words of Mr. Clark, "We have a lot less trouble now than before."

During 1970 some 65 to 75 million salmon are expected to be harvested from the waters of Alaska, Washington, and Oregon. If the catch materializes, 3.75 million cases of canned salmon will be produced to stock the shelves of every grocery store in America.

Results of Northwest Research Laboratory's Examination of Canned Salmon

	Total Pack In Cases	Number of Cans Examined	Number of Cases Reconditioned	Number of Cases Destroyed
1967	3,225,000	167,272	12,448	2,324
1968	4,100,000	303,040	18,642	1,948
1969	3,250,000	167,393	6,395	13