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OBSERVATIONS OF RUSSIA'S FAR EASTERN FISHERIES ACTIVITIES

By Charles Butler*

BACKGROUND

The purpose of the visit of the United States delegation to the Far East of the U.S.S.R. was to observe the fisheries and to obtain samples of salmon of known history from Russian sources for the studies under way at the U. S. Bureau of Commercial Fisheries Seattle Biological Laboratory. The studies are related to the high-seas fishing problems of the North Pacific Salmon Commission's activities.

The United States delegation was made up of Clarence Pautzke, of the Washington State Department of Fisheries, an expert on fish hatcheries; W. C. Arnold, of the Canned Salmon Industry; Wm. Barlow, interpreter; Clinton Atkinson, in charge of the Bureau's biological research laboratory in Seattle, Wash.; and Charles Butler, head of the delegation, from the Bureau's Division of Industrial Research, Washington, D. C.

The delegation left Washington, D. C., on August 20, 1959, and arrived in Moscow, via Paris, on August 22. We conferred with the full Soviet State Scientific Committee (sponsors of our visit) regarding details of the projected trip and other fishery matters of mutual interest. After a tour of the permanent Moscow exhibit of Science and Agriculture, we left that evening for the Russian Far East. On the evening of August 23 we arrived at Khabarovsk, having been delayed en route (at Omsk and Irkutsk) by bad weather. After the welcoming banquet, we met the additional members of the Russian party with whom we were to travel.

Early on August 24, 1959, we left Khabarovsk aboard a two-engine propeller plane. The flight was approximately north, along the Amur River Valley, then across the Sea of Okhotsk to the village of Okhotsk.

VISIT TO THE OKHOTSK FISHING COMBINE

A welcoming party, including the Director of fishing activities of the area, escorted us to a nearby house for a breakfast banquet and discussion session. We then went by bus and ferry to the nearby fishing combine headquarters, some two miles from Okhotsk.

This combine was largely inactive as the salmon season was over. We visited the saltery facilities, the principal source of fishery products. No canning is done there. Salmon and herring are salted during a season of about five months. Fixed gear (traps) is used for salmon fishing along the ocean front. Salmon processed annually totals about 1,300 tons, half chum, half pink. The recent decline in salmon catches was blamed on Japanese high-seas fishing activities.

There is no harbor or in-shore moorage. Vessels anchor offshore and lighter cargo to and from shore. There was little evidence of other means of livelihood except fishing. The

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Note: Also see Commercial Fisheries Review, December 1959 p. 71, October 1959 p. 39.

combine operates its own cooperage shop, making tierces and boxes for salt salmon and her- ring, kegs for salmon caviar, and boxes for frozen fish (usually flatfish). The operation was

on a rather large scale, with evidence of recent upgrading of buildings and equipment. Type of construction was planted poles for support members, hewn timbers for the structure proper, and rough-sawed lumber for roof and side walls. Floors were of concrete, with salting vats built into them. Good workmanship was evident despite primitive type of structures. There was some use of mechanical conveyors and flumes for mov-

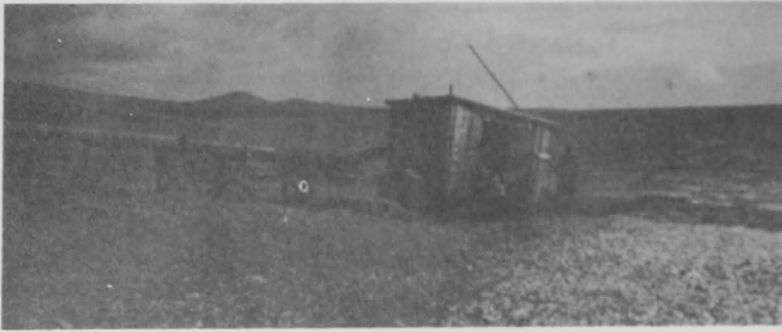


Fig. 1 - Pump house on beach at Ohkotsk delivers salmon to plant.

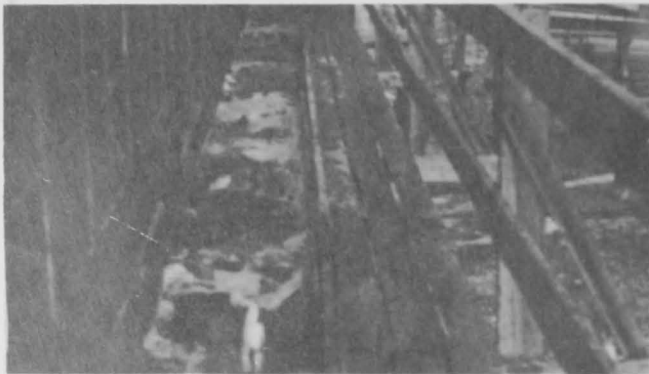


Fig. 2 - Salmon are flumed to dressing plant, Ohkotsk Combine.



Fig. 3 - Close-up of fish conveyor, Ohkotsk combine.

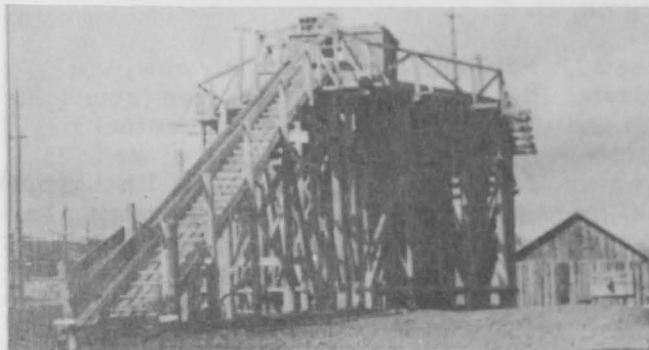


Fig. 4 - Fish conveyor under construction, Ohkotsk Combine.

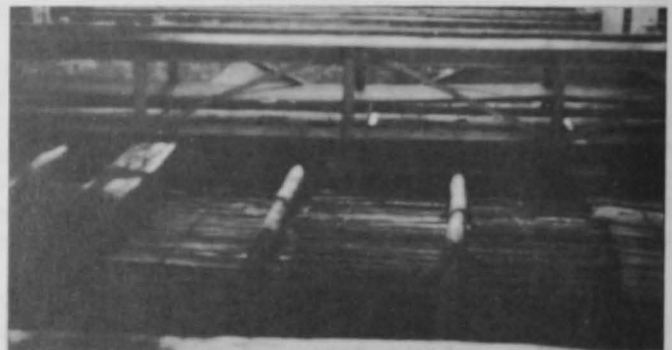


Fig. 5 - Reed mats hold fish under salt brine, Ohkotsk Combine.



Fig. 6 - Workers at fish saltry, Ohkotsk Combine.



Fig. 7 - Woman worker checking trimmed barrel, Ohkotsk Combine.

ing the fish. Plenty of labor was in evidence, with women apparently being used for many of the jobs.

The cold storage was a good one, except for the wood construction, with cork insulation. There must be considerable difficulty with frosting in the freezer and frozen storage areas. Most of the area we visited was for chilled storage of salted fish and salmon caviar.

REFRIGERATED CARRIERS PROVIDE OPERATIONAL BASE AROUND OHKOTSK SEA

Travel between the principal fishing ports around the rim of the Sea of Okhotsk and to the southward into the Sea of Japan was by refrigerated carrier vessel. We first went aboard such a vessel, the M/V Tuloma, on the evening of August 24 in the roadstead off the town of Okhotsk. This vessel, and a sistership, the M/V Kuloy, served as our floating home away from home for the better part of 18 days. They were most enjoyable bases of operations.

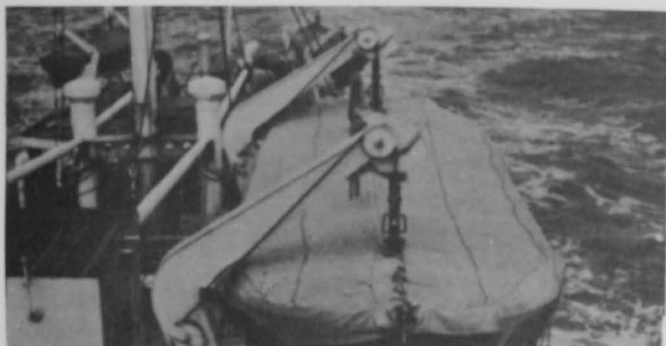


Fig. 8 - View aft from boat deck, M/V Tuloma.



Fig. 9 - View from bridge, showing bow of M/V Tuloma.



Fig. 10 - View of cargo winches and hatch, M/V Tuloma.

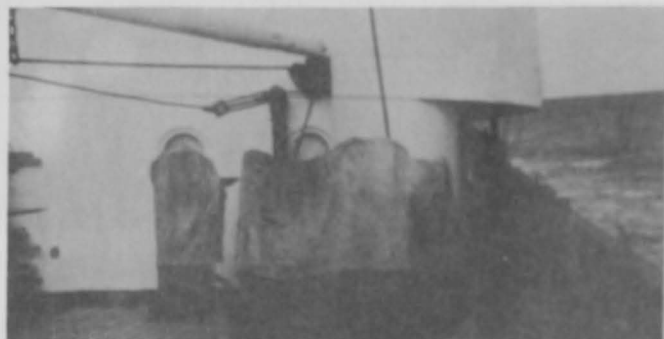


Fig. 11 - View of main deck showing cargo boom and winch, M/V Tuloma.

DESCRIPTION OF REFRIGERATED CARRIERS: There are five refrigerated carriers in the fleet that plies out of Nakhodka-Vladivostok to the many towns and villages, accessible only by this means for much of their inbound supplies and for outbound transport of products prepared for sale. Each vessel makes a swing around an assigned route once a month, including about one week of loading and unloading time at Nakhodka.

Total vessel complement is 58, with a Captain and 5 mates on deck, 5 mates in the engine room (one is a refrigeration engineer), and 3 women in the steward's department. Some of the women crew members did the purchasing of the food supplies for the ship, and others were responsible for checking cargo on and off the vessel.

The vessels have the usual navigational aids--radar, direction finder, radiotelephone and telegraph, visual and recording depth-sounders, fire-warning system, etc.

Refrigeration is by the compression system, with 4,500 cubic meters of refrigerated space. There are five cargo hatches. Main propulsion is by slow-speed Diesel, as are the electric generator auxiliaries. Deck winches and most other powered equipment are electric.

PLACE OF REFRIGERATED CARRIERS IN FISHING INDUSTRY: The season for hauling salmon is May to September. Balance of the year's cargo (inbound) is crab, herring, and flatfish. The cargo is consigned to cold-storage warehouses along the docks, usually at Nakhodka, but Vladivostok and Khabarovsk are alternative ports. Refrigerated trains take shipments, via the Trans-Siberian Railroad, to Moscow in 10 days. A mechanical refrigeration car is put on the line with 10 refrigerator cars on each end of it. Cold air is driven through these cars via connecting ducts. There were said to be individually-equipped mechanical refrigeration cars, but we saw in our visit to Nakhodka only the multiple-car type just described. Dry ice or salt-ice refrigeration was said to be used for shorter-distance shipments.

THE OCTOBER FISHING COMBINE

On August 28 we landed near Ust Bolsheretsk, at the southwest tip of the Kamchatka Peninsula, and conferred with the principal factors of the October Fish Combine. U. C. Kuznetsov, the Director, presided at a discussion of the combine's activities.

Canning was one of the principal activities, with chunk and pink salmon the predominant species taken. Recently those fish have been less abundant. Open-ocean fishing has had to be initiated for salmon, herring, cod, and flatfish to maintain the combine.

Present facilities include:

1. Cannery for salmon and "cambala" (flatfish).
2. Can factory.
3. Freezing and frozen storage plant.
4. Saltery, for salmon and herring.
5. Salmon caviar plant.
6. Floating vessel repair and machine shop.

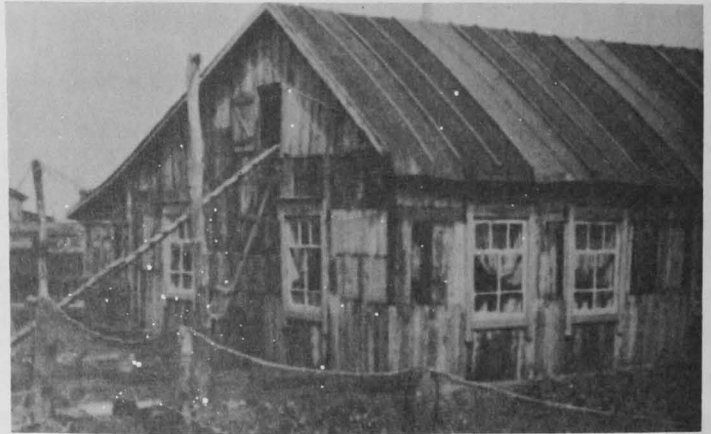


Fig. 12 - Close-up of frame-construction house, October Fish Combine.



Fig. 13 - View of floating vessel repair shop, October Combine.

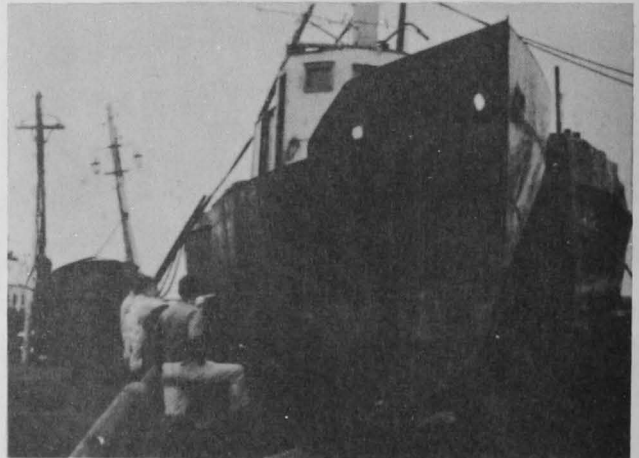


Fig. 14 - Fishing vessel hull repairs under way, October Combine.

Salmon fishing is conducted along the 35 kilometers of ocean beach assigned each combine. Fixed (floating) gear, not unlike the Alaska salmon trap, is used. In some instances, the heart or pot is disconnected and towed to the offshore floating pumping station and the fish are received at the cannery or saltery bins alive. In other instances, the trap is "brailled" by the crew of one small boat pulling the web into this boat, thereby working the fish into the opposite end at which a second boat is moored. The fish are transferred to the second boat and from there are taken to the factory for processing. At some times, during the season,

fishing for salmon is permitted with non-fixed gear in the river. We saw a haul- or beach-seining operation at one point (to supply us with live fish for blood samples). A fisherman, engaged in some form of gill-net operation, was also observed along the river bank. The latter activity was said to be "for personal use."

SALMON CANNING PROCEDURES:

The canning operation here annually resulted in 34,500 cases (48 1-lb. cans) of salmon. Species are not segregated in their pack reports. Silver salmon is now the dominant species whereas pink salmon was formerly the major variety.



Fig. 15 - Natural ice storage pit. October Combine.



Fig. 16 - Ice-crusher, in storage pit, October Combine.

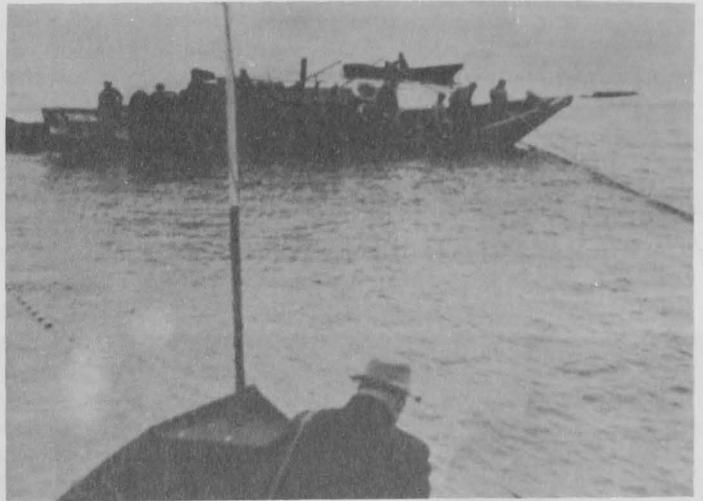


Fig. 17 - Crew working "fixed-gear" for salmon, October Combine.



Fig. 18 - Netting has been hauled aboard and fishermen are "drying up" the "heart," October Combine.

The raw material is not weighed. An estimate is made, based on the "pud" (possibly a vestige of the premetric system period), a volume measure equal to 36 pounds. Once the product is packed, the case count is used. Each regional



Fig. 19 - fish-receiving skiff at "trap," October Combine.



Fig. 20 - Fish (salmon) coming aboard receiving skiff. October Combine.



Fig. 21 - Crew preparing to re-set the "heart" of the trap. October Combine.

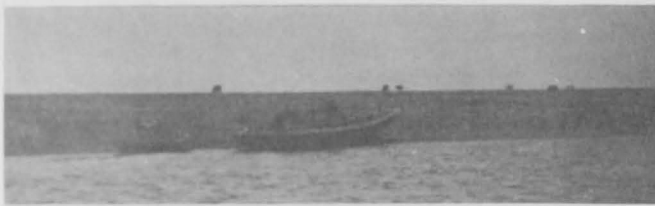


Fig. 22 - Fish barge at river bank near October Combine, Kamchatka.

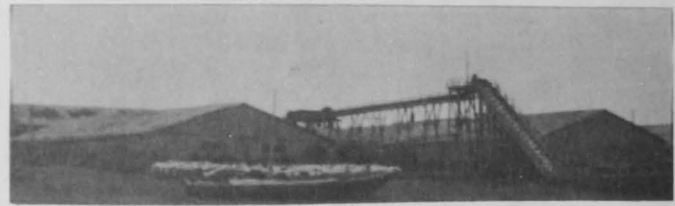


Fig. 23 - Fish-delivery conveyor to processing plant, October Combine, Kamchatka.

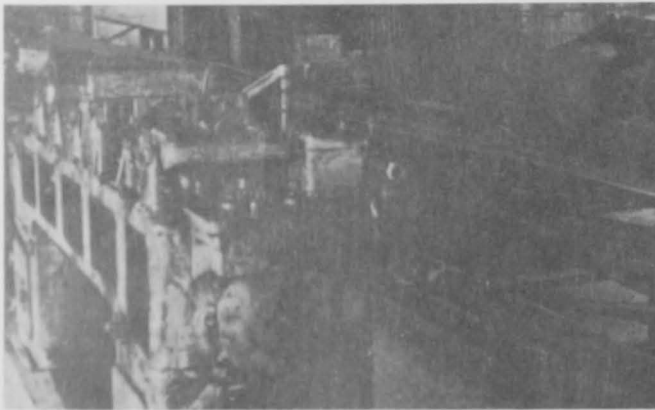


Fig. 24 - Salmon eviscerating machine, October Combine, Kamchatka.

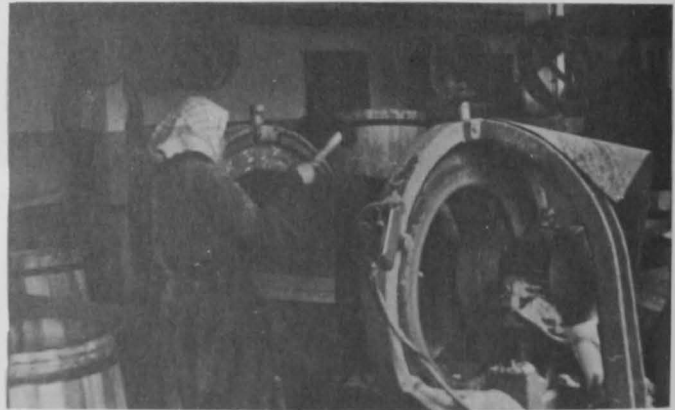


Fig. 25 - Woman worker operating barrel lathe, Ohkotsk Combine.

agency (the People's Economic Council) is responsible for reporting catch and product statistics to the Moscow headquarters. These reports appear in the Russian periodical "Fisheries Industries."

An important part of the Russian salmon-canning operation includes the removal of the roe by hand. Women workers, in "pits" past which the fish are chuted, slit the fish and remove the roe. The fish then go to "iron chinks" for butchering. Hand sliming is used. The fillers seen were Troyer-Fox or Jensen (vintage 1920's) probably installed by United States companies in the early 1930's. Balance of the canning equipment seen was comparable. A large amount of hand labor was evident, even for the slow-speed lines in use. Retort capacity seemed to be the limiting factor for glut processing.

CANNED FLATFISH IS IMPORTANT PRODUCT: Flatfish were being processed here, as elsewhere. The season of major production is October through December. This supplements the salmon and herring fisheries very nicely and extends the use of canning equipment. Four flatfish species are used for canning (or for freezing): (1) Limonda aspera; (2) Bilinata; (3) Pleuronectes quabrituberculatus; and (4) Limonda herzenstein (Jordah-Snyder). Approximately equal amounts of each of these are taken. Other species (of which we noted several), together with "trash" fish and the trimmings from the canning operation, go to the reduction plant. Alaska pollock is one of the species taken, but it is not considered suitable for canning or freezing.

Approximately 32,500 cases of 1-pound flats of cambala (flatfish) are canned annually at this combine. When a fishing vessel arrives with these species, the fish are pumped from the trawler's hold to shore pens for sorting. The selected species are then washed and the head, tail, fins, and the belly cavity area are sawed off in a band-saw operation. The waste joins the discarded fish en route to the fish-meal factory. Flatfish from frozen storage may also be used for canning.

PROCEDURE FOR CANNING FLATFISH: The trimmed portion is again washed, then cut (by a gang band-saw set-up) to fit the 1-pound flat when packed on edge. Breading is applied by hand. The breaded portions are next put in mesh baskets, immersed in a deep-fat-fryer vat for 3 minutes, then cooled for 1 to 2 hours.

Women next pack the portions into the cans. Spiced tomato sauce is ladled into the cans as they pass along the conveyor en route to the seaming machine. Retorting is standard. The product is quite acceptable to the Russian people, especially since this a relatively inexpensive form of permanently-preserved animal protein.

FREEZING FLATFISH: Flatfish are also frozen. The fish are placed two layers deep, by hand, in stainless steel pans about 18" x 30" x 3" high. Blast units maintained at -30° F. are used for fast-freezing. The frozen product is removed from the pans and stacked in frozen storage until shipped or used for canning. No glazing or other protection was observed. The canned flatfish was noted for sale in an inland town at 5 rubles per 1-pound flat, as compared to 11 rubles for 1-pound canned pink salmon (1 ruble equals US\$0.25).

The frozen flatfish and the better-quality mild-salted salmon are boxed for shipment to market. This salmon and the salmon caviar (in kegs of about 60 pounds each) are kept in refrigerated storage until offered for sale. One of the local cold-storage plants had an absorption-type ammonia system. It was considered quite satisfactory, and seemed to be well-designed and maintained. The operator-in-charge was a woman of about 25. Since the combine is chronically short of electric power, but can get, as "fuel" for the absorption system, the waste steam, the system seemed a "natural" for use under these circumstances.

A further canned product was "ragout" from the trimmings of the salmon-canning operation. Sometimes a ground sausage-like product was prepared from salmon trimmings, with seasonings added, then canned.

SALMON CAVIAR: The salmon caviar plant was principally notable for the attempt to be very sanitary. We waded through a pan of "antiseptic" solution before entering the screened plant. White smocks were passed out to each visitor. The processing was the standard hand sieving, brining, and oil-coating usual for salmon caviar. Several "qualities" were prepared, apparently based on species, egg size, and maturity. The final product was placed in kegs, each about 60 pounds net capacity, and held in chilled storage until shipped. It was difficult for us to make the Russians understand that United States practices do not include saving of roe for caviar. They consider this the most valuable product of the salmon fishery.

THERE'S "PROFIT" IN RUSSIA, TOO: Some semblance of the profit motive was observed in the operation of the combine. The fishermen are paid for the raw material. The combine, using this price as its prime cost, adds the processing cost and "a little for profit" and offers

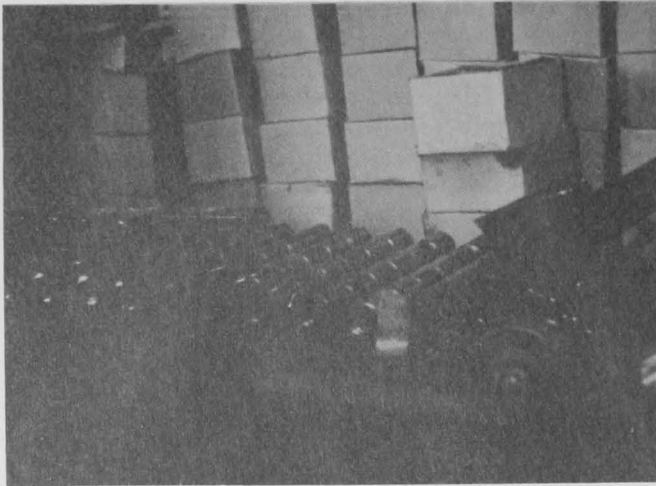


Fig. 26 - October Combine warehouse where filled and processed salmon cans are being outside-lacquered. Here they emerge from dip tank.



Fig. 27 - United States fisheries delegation studies fish-gear types, October Combine, Kamchatka.

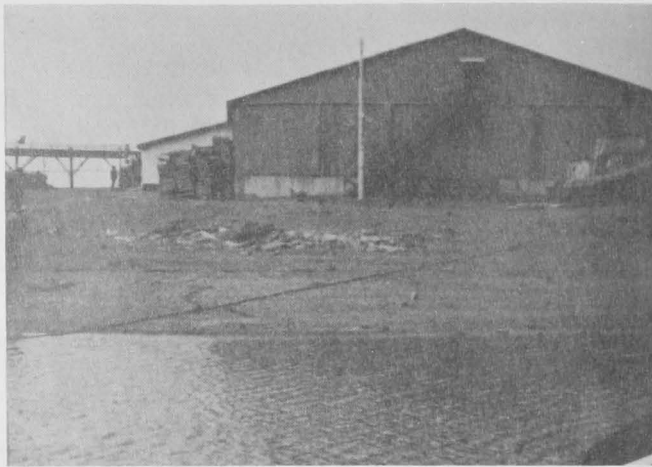


Fig. 28 - Coldstorage at October Combine as seen from the river.

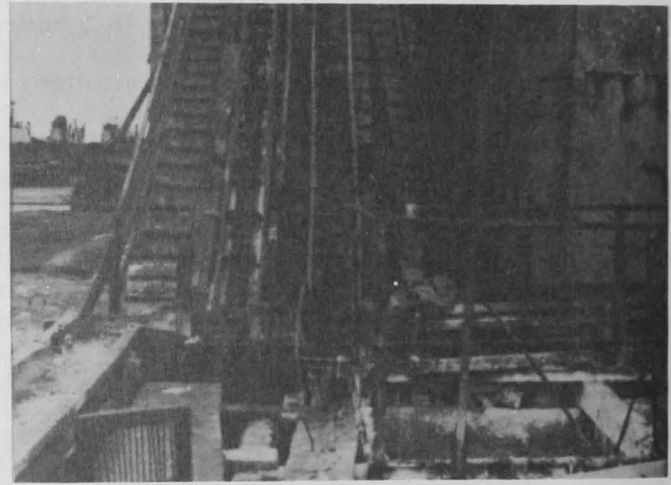


Fig. 29 - Conveyor from raw material pit to grinder in fish-meal plant, October Combine, Kamchatka.



Fig. 30 - Portable coal-fired steam boiler used at October Combine fish-meal plant.

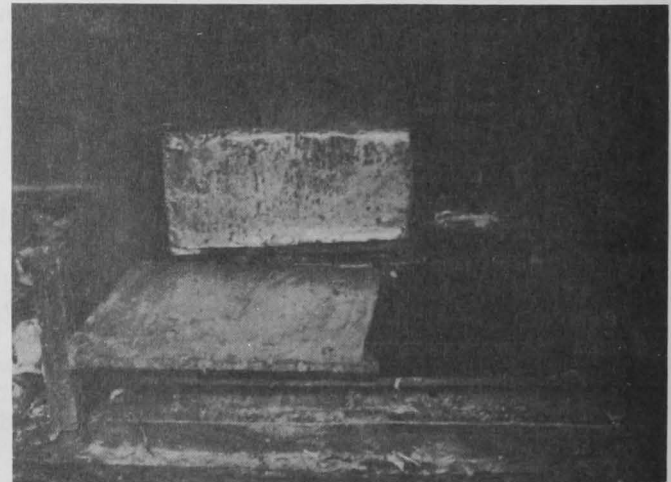


Fig. 31 - Raw material grinder, fish-meal plant, October Combine, Kamchatka.

the product for sale to the State distribution agency. The combine contracts to supply to the transport agency (in this case the refrigerated carrier vessel) a given quality and quantity of products. The carrier, in turn, contracts to pick up and deliver the agreed-upon shipments to railhead storage.

FISH MEAL FROM OFFAL: The reduction plant consisted of a coarse grinder for the raw material, small cooker-press unit, two-pass steam-jacketed dryer, vapor-suction equipment attached to the dryer, and grinding and bagging equipment. Capacity of the plant was about 2,000 tons of fish meal per year. Jute bags (100 pounds) were used. Quality of the meal was good. Since only flatfish raw material was used, there was no attempt made at (nor equipment available for) oil recovery. The meal was shipped into the more populous areas for use as poultry or swine feed supplement. Active interest was displayed as to markets for export of Russian fish meal to the United States. It may well be, as the Bering Sea trawl fishery and that along the Pacific Coast of Russia expands, the United States west coast may become a more economic market outlet than that via vessel carrier and railroad transport 3,000 to 5,000 miles to the west into European Russia. There was mention made of the use of urea as a feed



Fig. 32 - Fish waste destined for fish meal plant, October Combine.

supplement in cattle nutrition, showing that knowledge of alternative supplements to animal protein sources is being disseminated.

SALT FISH PLANT: The saltery consisted of 16-cubic-meter vats of concrete, recessed into the earth. There were 360 of these vats; estimated capacity, 350 metric tons. Annual production consisted of 200 tons of salmon, 150 tons of herring. For salmon, medium-salted grade, a period of 6 to 7 days for salt-curing was necessary. Hard-salt salmon was processed for 14 days. Half-tierces, boxes, or reed sacks were used for packaging of the salted product,



Fig. 33 - Fish meal sacking and storage, October Combine. apparently based on: (1) quality, and (2) distance to market.

VISIT TO THE FISHING VILLAGE AT OZERNAYA: The evening of August 31, the group went ashore from the Tuloma to the fishing combine at Ozernaya, some distance to the south, but on Kamchatka. Facilities were similar there except that, with a good supply of red salmon, the combine had prospered and had, apparently, put back into the town some of the profits of the fishery. The cannery consisted of two lines of the same style equipment as previously mentioned, including exhaust boxes, but with 4 Japanese replicas of the Smith iron chink and two sliming lines. There were being installed two Japanese "high-speed" $\frac{1}{2}$ -pound salmon lines. Two Japanese^{1/} copies of the Smith chink of newer vintage, said to process 120 fish per minute, were also being installed. The cannery was fairly well laid out for efficient production. The walls were tiled up about 5 feet from the floor, but the concrete floors were very rough and poorly-drained.

The fish were removed from the vessel holds by use of a large centrifugal pump, powered with an automobile engine (including the transmission). A second such engine supplied the tangential jet to "prime" the main pump. Capacity of the system was 30 tons per hour.

^{1/} CAN - Tokyo Seikan Kaisha, Ltd.

Flatfish are also canned as the product "cambala," described earlier in this report. Year-round canning of this product is conducted at a daily capacity of 300 cases (1-pound flats).

The large saltery's activities are primarily for processing of herring. Annual production is at a level of 12,000 tons of herring, with an additional 800 tons of line-caught cod. Salted fish are held in -7° to -6° C. (19.4° to 21.2° F.) cold-storage space.

Freezing activities are for flatfish, with the principal species utilized those listed elsewhere in this report. Production is at the annual rate of 800 tons of flatfish, plus 1,000 tons of line-caught cod. Temperature in the frozen storage rooms visited was -12° C. (10.4° F.). No glaze was evident on the piles of frozen fish seen.

A new cold-storage building, of pumice block, was under construction. Capacity--for frozen storage only--was 2,000 tons.

FARM COMBINE COMPLEMENTS FISHING ACTIVITIES: This fishing combine also has, as an adjunct, a farm combine up the river valley a few miles. The advantages of supplementation of food supplies were evident in the dietary variety as contrasted to other Far Eastern localities visited. Natural grass hay was being cut from large areas of the level land; small herds of beef and milk cows were observed, as well as some swine. Some larger plots of vegetable crops were noted, in addition to the "personal" gardens in the town proper. Potatoes, cabbage, cucumbers, tomatoes, turnips or rutabagas, and onions were among the varieties noted.

This fishing combine had a population of 5,500, of which 3,000 were workers. Also, of the 5,500, about 4,000 were permanent residents; 1,500 were transient workers, largely from Central Asia. A sprinkling of North Koreans was evident here, as elsewhere, in the fishing villages visited.

PORT OF NEVELSK, SOUTHERN END OF SAHKALIN ISLAND

Our next stop was Nevelsk, on the West Coast of Sahkalin Island near the south end. We arrived in the roadstead off Nevelsk about 5:00 p.m. on September 7. The usual two tugs, with the principal fisheries officials of the area aboard to welcome us, ferried us ashore by 6:00 p.m. Nevelsk was the first city we had seen since departure from Khabarovsk. We were quartered in the local (trawler) fishing industry hostel, at which vessel crewmen put up during their free time ashore.

We were permitted little opportunity to wander about this town, possibly because of the tight schedule. The town was built along the coast, with a steep hillside only 2 or 3 blocks back from the waterfront. Trawling was the principal activity. We saw possibly 40 trawlers at sea nearby, and another 40 anchored closer inshore, but not fishing. No local fish-processing facilities were visited.

ANTONOVO RESEARCH LABORATORY: On September 8 we journeyed, by single-car Diesel-powered rail car, north along the west coast to the Sahkalin Island headquarters and research center of TINRO (Pacific Institute for Oceanographic and Marine Research) in the town called Antonovo. This laboratory is well-staffed, with 42 professional people out of a total complement of 99. Several types of research are conducted there, and at the four sub-stations in the Sahkalin-Kurile Island area assigned to the Antonovo laboratory for supervision by the People's Economic Council. Leionidov, the Director, is also in charge of the technological research work under way.

Among the projects are:

(1) Hydrobiology

- (a) Plankton distribution in Tatar Straits, the Northern part of the Japan Sea, and the Southern part of the Ohkotsk Sea.

- (b) Seaweed research, especially on *Laminaria*, *Anfestia plicata*.
 - (c) King crab; and other shellfish, including scallops and shrimp.
- (2) Gear studies
- (a) Improvement in gill nets, purse seines, trawls, fixed nets, and drift nets.
- (3) Technology
- (a) Problems of salting and canning herring and salmon, and the recovery byproducts from them.
 - (b) Storage and transport of fresh fish. (They had found chilled sea water not much good after 5 days.
 - (c) Uses of seaweed.

SAHKALIN ISLAND HATCHERY: Next morning we drove, by auto, along the same route for about one hour, then turned inland to a hatchery installation. The facility was said to have been initially built by the Japanese about 1927. The Russians, since about 1951, had razed the disused facilities and begun a more extensive program. At the time of our visit the annual level of production was said to be about 26 million eggs; ultimate annual capacity sought--33 million. Fish are largely chums, with a few pinks, and some sima (a sixth member of *Oncorhynchus* family found on the Asiatic side of the Pacific). Outstanding accomplishments cited were mortalities down to 1.3 percent since new water-filtering facilities have been installed. They are able to keep chums for five months before releasing them.



Fig. 34 - Living quarters of salmon hatchery workers, Sakhalin Island.

The staff of the hatchery seemed quite capable. Eleven families were in residence. Much of the manpower utilized was young girls in two categories: 3 engineers in charge of the research and production direction; and groups of technicians (younger, less trained girls) assigned to the egg-picking and related manual chores.

NAKHODKA, THE PRINCIPAL WINDOW ON THE PACIFIC

The evening of September 9 we returned to the *Kuloy* and the vessel departed for Nakhodka (the port about 50 miles from Vladivostok), the only Russian Far East port open to foreign vessels. We arrived off Nakhodka about 10:00 a.m. on September 11. By noon we had tied up at a wharf, unloaded our belongings, and been taken to a hostel. After lunch in a nearby restaurant we were taken on an auto tour of the docks and warehouses and then to the principal points of interest around the town.

HARBOR AND WHARF FACILITIES: Nakhodka is only 10 years old. It has an excellent well-protected harbor, with inner bays available as anchorages. Ocean-going freighters and tankers were moored at the wharf on which were many railroad cranes for swinging cargo from ship to shore and vice versa. Several rail sidings paralleled the wharf front. Next to these were 3-, 4-, and 5-story warehouses, including dry stores and cold-storage installations. The cold storage shown us was modern and reasonably well-operated, except for the lack of packaging or other forms of protection for the many frozen products in storage. Hand labor was evident at all stages.

Nearby we were shown through a multistory warehouse building in which canned fish was stored. Samples of several species and products were opened for an impromptu taste-panel by the group of Russian and United States fishery experts. Some salmon, labeled in English, was said to be for Western European trade. Interest was expressed in the possibility of an export market for salmon in the United States.

TOUR OF PUBLIC BUILDINGS: Our tour next included a drive past various schools, public buildings, and residential areas (largely the garden-court type of apartments). Because of the rugged terrain, any building or road construction was difficult and expensive. Hills of solid rock must be cut down; the narrow, winding valleys filled. Nevertheless there was considerable construction activity for miles along the row of hills just back from the narrow strip of level land along the waterfront.

We were shown the entire inside of one of several houses of culture. This structure had been completed not over two years ago at a cost of about 1 million rubles (US\$250,000). It had a rather large well-equipped stage and seating capacity for possibly 1,000 people. A regular schedule of events is developed each year by the director, including orchestras, ballet, singers, lectures, etc. Other parts of the 3-story building were used for such purposes as: reading and reference library (adults and children), game rooms, child guidance and group activities, and meeting rooms for local people.

We also drove through areas of new apartment development and of individual residences further away from the downtown area. As everywhere we travelled in Russia, the principal problem was lack of any semblance of good roads, or even streets, except on main thoroughfares in the larger cities.

Highlight of our visit to Nakhodka was a dinner on September 11. After about 3 weeks in fishing villages and aboard ship we marveled at a well-decorated, spacious restaurant, complete with a 5-piece orchestra playing an excellent variety of dinner music. The food was of a quality to reflect credit on the management.

TRAIN TRIP TO Khabarovsk: Our departure from Nakhodka, originally scheduled for early on the morning of September 12, was delayed by flood damage along the route of the spur from Vladivostok resulting from the heavy rains of a few days earlier. We went aboard first-class coaches of the Trans-Siberian train at 11:00 a.m. Facilities were comparable to our Pullman compartments. There were two lower and two upper berths athwartships, with a small work table near the window. As we had only two persons per compartment, it was quite a comfortable trip.

The country through which we passed was apparently quite fertile, wooded where wild, and sparsely populated. We were told that certain parts had been set aside as sanctuaries for the Siberian tiger. Wild boar were also reportedly present. Habitations were almost exclusively restricted to sporadic farm villages along the railroad. Some coal-mining activity was evident, especially on the southern end of the trip. Where the soil was in use, and judging from areas of natural hay, the area would be a productive one for agricultural support of Far Eastern needs; this is not to compare it with "the Virgin Lands," or the Ukraine, thousands of miles to the westward.

As we approached Khabarovsk, the towns were larger. Groups, transported from the towns, were observed harvesting crops (largely potatoes) from large fields, apparently as part of a State farm operation. Industrial support activities, observed in the environs, were principally impressive for the vast coal piles seen along sidings. Chemical, furniture, and other wood-working plants, and coal-powered electricity-generator plants, were among those noted.

Khabarovsk, Metropolis of the Far East: We arrived at Khabarovsk at 1:00 p.m. on September 13. Brief talks were held with the local TINRO officials regarding all our observations of Far East activities. Plans were agreed upon for the next day. Our hosts then treated us to the finals of the intercity "football" (soccer) league of the area. The newly-

completed stadium, on filled land along the bank of the Amur River, was impressive. Nearby a pavillion was being constructed. The crowd was enthusiastic; the soccer contest close. All, including the United States fisheries delegation, had a pleasant outing.

KHABAROVSK MANAGEMENT AND RESEARCH CENTERS: The next morning we went first to the headquarters of the suburban enforcement division of TINRO. In the afternoon we moved downtown to the TINRO headquarters for further discussions. The office operates as a branch of TINRO, with main headquarters at Vladivostok, under Dr. Panin. It is one of four such stations in the area. Total local professional personnel was 40, of which 34 had advanced degrees. There are three principal programs of research under way:

1. Salmon, including study of stocks, propagation, and hatchery production expansion.
2. Fresh-water fish biology; study of the resource and the stock.
3. Artificial pond culture for fresh-water fish.

We left Khabarovsk the morning of September 15 in a TU-104 jet and reached Moscow that evening.

MOSCOW RESEARCH CENTERS

In Moscow we conferred with the principals at the VNIRO (All-Union Institute for Oceanographic and Marine Research) headquarters about our trip, items of interest which we wished to follow up, and to discuss background on United States fishery activities of interest to that Institute's staff. My primary interest was in the technological, statistical, and economics areas. In addition to these general (group) discussions, sessions were held on September 16 and 17 with the appropriate staff specialists in these fields. A map was supplied us showing the VNIRO, TINRO, National Academy of Science, and University locations where fisheries (or related subjects) research is in progress. (See map p. 14.)

The total VNIRO staff at the Moscow headquarters now totals 2,500--about half scientists and half technicians; there are 200 Ph.D's. The areas of work include both theoretical and practical research. Projects are planned at the Institute, based on industry needs observed at the field level. Local (field) People's Economic Councils recommend the areas needing research. At present the finances, for approved programs, are supplied by the State. It is expected, soon, that the local units will supply part of the funds.

The statistical responsibilities are vested in the State Statistical Control Agency in Moscow. This group has all aspects of the economy as its responsibility, with the fishing industry a small part of the whole. There seem to be no standardized indices; for example, all flatfish are grouped, as are all salmon. Each combine sends information on daily catch to the Regional People's Economic Council head and to the Central Statistical Agency in Moscow. Other local groups, e.g., cooperatives, must also report, but they are a small part of the industry. The People's Economic Council reports on catch, manpower, vessels, gear, etc., but the detail, or accuracy, is not what the scientific personnel would like for research purposes.

Some concept of the pattern of the industry was obtained. It may be highly inaccurate and incomplete, but is set down as presented to us.

BIRD'S EYE VIEW OF RUSSIAN INDUSTRY AND CONSUMER PREFERENCES

Two systems are in use at the fishermen's level:

- | | |
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| 1. Co-op groups sell catch to processors, based on a contract price. | 2. State fishermen work on a salary basis and their catch goes to the processors. |
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Once the fish is processed, the State processor offers it to the State trade organization for distribution to the State market centers. State-operated stores are the ultimate outlets for all the products. At each stage in this process, to the prime cost is added the handling or processing cost and "a little profit" in arriving at the asking price for the next stage. However, the final or retail price is said to have been fixed (and at a fairly constant figure in recent years) by the State. In time, as efficiency builds up, the fixed price is supposed to decline.

There are regional differences in price: these include three zones, based on distance from the source--Far East, Moscow, and remote areas. Most of the mild-cured salmon and herring is shipped to local centers where it may be smoked before sale. At nearer points frozen fish is used for smoking, or for sale.

Preference of the population, as told to us, was salt fish, canned fish, and frozen fish, in that order. Among the less-expensive and widely used products was "cambala"--breaded flatfish, fried, and canned in tomato sauce. Some preference was evident for fresh flatfish in areas to which it is accessible. Estimates of market patterns were:

60 percent of flatfish, frozen (part for later smoking)
30 percent of flatfish, canned (cambala)
10 percent of flatfish, fresh

Flatfish is mostly sold round, not filleted.

Herring is now, and was predicted to be, continuingly, a salted item of ready acceptance. Canned salmon is only recently becoming a more significant domestic item, perhaps as the standard of living is raised. Salt salmon is still dominant.

Over the long pull, we were advised, especially in Moscow, that fresh and frozen (and even packaged fish) was expected to gradually replace salt fish on the domestic market. Meanwhile interest was expressed in possible export opportunities for canned salmon, frozen flatfish, and fish meal.

OTHER ACTIVITIES IN MOSCOW

Among the other activities of note in Moscow was attendance at the evening performances of the ballet in the Bolshoi Theatre, and of the Russian Circus. Each was without peer, in my experience. We also visited the all-Russian Art Gallery, the Kremlin, and the GUM-State Department Store. Russian ideas of service to customers leave a lot to be desired, even by standards in the United States during the Christmas rush.

Our activities on September 19 consisted of a close-out session at the offices of the State Scientific Committee--our sponsor during the tour. The atmosphere of scientific interest--exhibited during the discussions with the Committee on our outbound visit--was maintained on this occasion. We got the impression that both sides considered such an exchange helpful and worth the considerable effort required to bring it about. I consider our trip constituted a most far-reaching and significant attempt of the U.S.S.R. to show full accord for furthering exchange of scientific personnel in the interest of joint benefit.

On the evening of September 20 we departed Moscow via Air France. Seldom in our experience were the simple comforts of the West so starkly evident as on this flight after so many days within the "Iron Curtain."

