

## OBSERVATION OF JAPANESE HIGH-SEAS SALMON GILL-NET FISHERY OFF HOKKAIDO

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The salmon runs along the North American Pacific Coast have been exploited for almost a century by the fishermen of Japan, Russia, Canada, and the United States. Originally the fisheries were confined to the coastal waters and the rivers through which the adult salmon must pass during spawning migration. But in recent years, exploitation of the salmon resources on the high seas has been increasing.

On the other hand, in Japan only a limited number of salmon ascend the streams of Hokkaido and northern Honshu and for many years their industry depended upon the lease of shore stations in Soviet Russia.

In 1936 Japanese interests found it difficult to obtain desirable fishing sites in Kamchatka and the Kurile Islands and turned to the high seas in order to sustain their salmon fisheries (Anonymous 1937). The salmon fisheries on the high seas have been described in part by Fukuhara and others (1953), and observations recently made off Hokkaido at the invitation of the Japanese Government provided additional information on the high-seas salmon fishing method developed by the Japanese, especially the importance of water temperatures.

Tonnage	36.4 gross tons
Length	64.0 feet
Width	14.1 feet
Draft	6.4 feet
Engine (Diesel)	120 N. P.
Maximum speed	13½ knots
Crew	13

The author on May 31 and June 1, 1954, accompanied the research vessel Oyasio Maru, comparable in size to the commercial fishing boats now operating far offshore. The specifications of the Oyasio Maru are given in table 1. As a research boat the Oyasio Maru devotes almost its entire effort to determining where fish may be found in abundance and in perfecting means of catching those fish most efficiently. The fish caught are sold to the local mar-

kets to help defray the operating costs.

All fishing is done by gill nets made up of a number of single nets, each 80 meters (262.4 feet) long and 6 meters (19.5 feet) deep with a mesh size of 4½ inches stretched. The individual nets are fastened together to form a single gill net which in this case totaled 94 units or about 4¾ miles in length. Only 10 nets were of ramie (a Japanese grass similar in texture to linen) while 84 were of nylon. The nets were hung in a manner similar to that described by Fukuhara.

Drawing on years of experience, the Japanese have concluded that salmon in the ocean are most abundant in areas of rapid temperature change, and prefer temperatures of from 7° to 8° C. (44° to 47° F.). The cruise of the Oyasio Maru demonstrates well the importance of temperature to the fishing operation. Beginning at the time of leaving Kushiro, surface water temperatures were taken every half hour, indicating first the location of the cold northern current, then the warmer waters of the "Kuroshio" (fig. 1).

A suitable surface water temperature was found at 4:30 p.m. about 120 miles southeast of Kechiro. The main fishing area was reported by radio to be about 100 miles further offshore (as indicated in fig. 1) in waters of similar temperature conditions.

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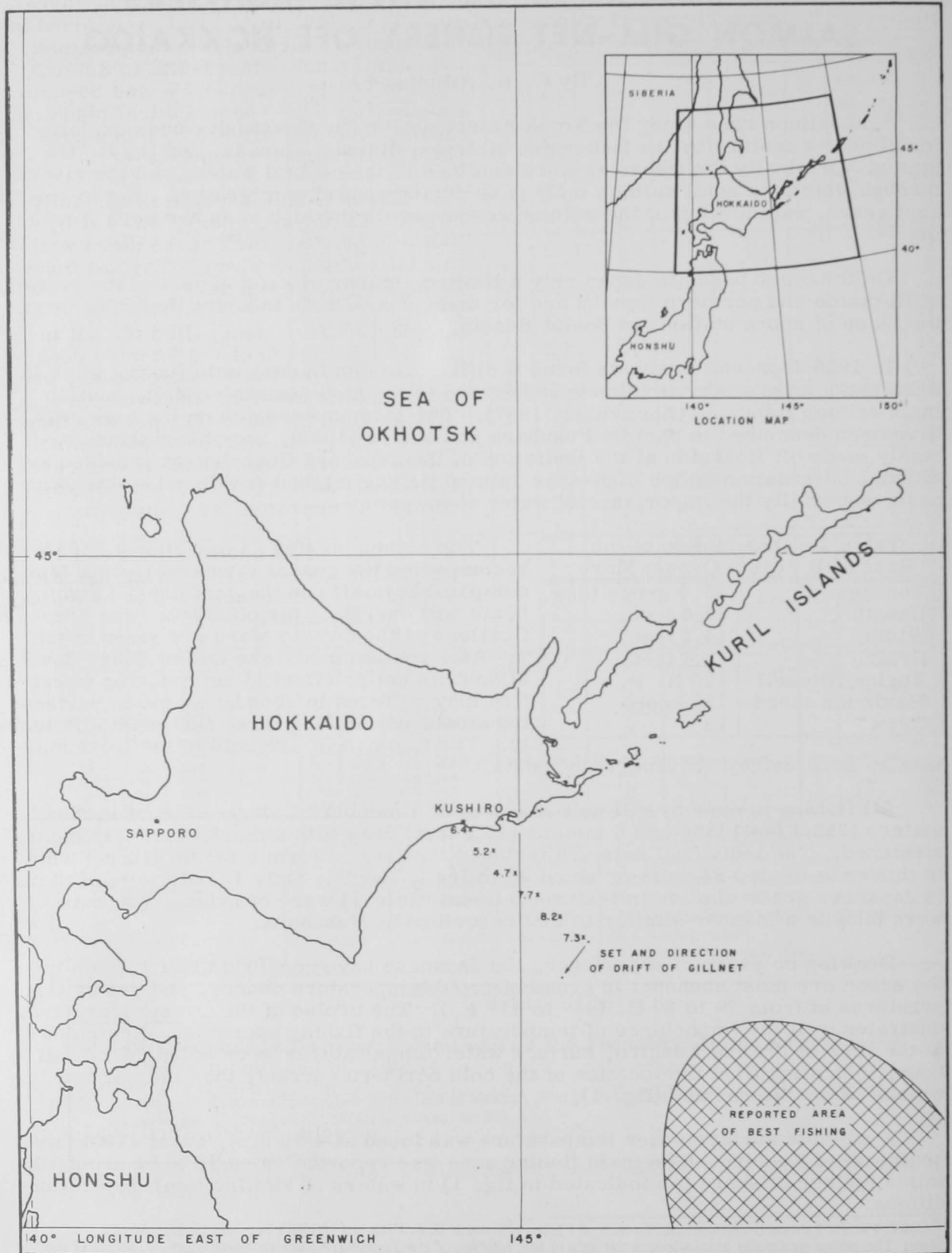


Fig. 1 - Map of Hokkaido showing fishing site and relation to surface water temperature.

Vertical temperatures at the fishing site were determined by reversing thermometers. Relatively warm water--6.2° to 7.3° C. (43° to 45° F.)--was found in the upper 15 meters, the temperature becoming much colder--3.2° to 3.6° C. (37° to 38° F.)--at the 25- and 50-meter levels (fig. 2). From vertical plankton hauls, food appeared to be more abundant in the upper warmer layer.

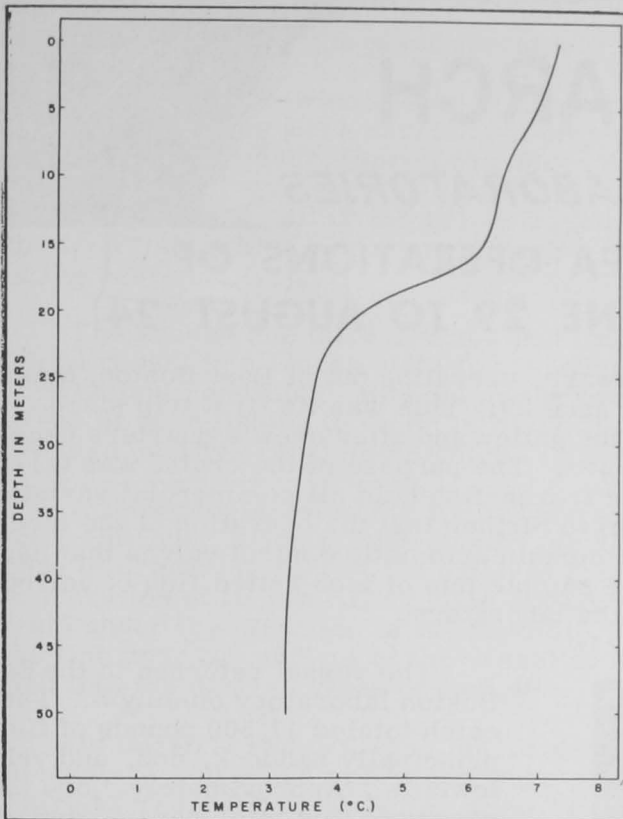


Fig. 2 - Vertical water temperatures at salmon fishing site off Kushiro.

The net, which had been carefully stacked on the rear deck, was set by passing over a roller at the stern while the boat was under way. The net fished from 6 p.m. to 1 a.m.

To lift, two men pulled the net in over the port side of the forward deck immediately below the wheelhouse, one man took out the fish, and two men straightened the net. The net was then passed along the starboard side on rollers to the rear deck where it was carefully restacked. It was nearly 4 a.m. before the operation was complete.

A total of 76 chum salmon and 10 pink salmon were taken during the night's fishing--a catch considered to be quite satisfactory commercially.

#### LITERATURE CITED

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1953. Japanese 1952 North Pacific Salmon Fishery Expedition. Commercial Fisheries Review, vol. 15, no. 2 (Feb. 1953), pp. 1-17.



#### TRANSPARENT PLASTIC CAN

A new plastic transparent can has been developed in Germany which can be sealed hermetically. This can withstands heating up to 180° C. (356° F.), and is expected to revolutionize the canning industry.

--World Fisheries Abstracts, March-April 1953