

among fishermen from as far south as the Bluff to the northern boundaries of Wellington Province. They were offered rs. a pound for what they had previously dumped in the sea. Now the cream-cans come in from all parts of New Zealand, their contents frozen hard, for it is essential to keep the livers fresh for the best-quality oil. An Auckland factory handles the northern trade, but the Island Bay concern gets enough to keep it busy, and hopes for more than enough when the war releases both trawlers and fishermen for the fishing fleets. Half a ton of livers a day is their present maximum, but additions now in progress will treble the weight the factory can handle.

The size of fish livers varies. Hapuka, dogfish, kingfish, and barracouta average from  $\frac{1}{2}$  lb. to 1 lb. The ling liver weighs from 2 lb. to 3 lb., but the shark varies from 5 lb. to 50 lb. One yielded an 84 lb. liver, which is an all-time record and likely to remain so. Other fish livers are accepted, mainly to keep the good will of fisherman; they are treated to produce an oil of high value as a stock or poultry food.

The livers are first sorted, washed, and finally minced into a large pan. Because they contain only 10 per cent. solids, the livers come from the mincer with the consistency of a thick cream. These pans are emptied into vats holding 100 gallons and the heat, direct steam, is turned on. Ling, shark, and the others are heated for two hours at 200 degrees F. Some livers need longer and more specialized treatment, and they are digested by a special process for forty-eight hours at a temperature which must remain between 110 degrees and 120 degrees. All this time an agitator keeps the stew continually moving. After heating, the contents of the vats are pumped up to an agitator pan where they

are thoroughly mixed and from which they gravitate to a super-centrifuge. This machine is like a super-separator and, retaining the solids in its core, throws out the water through one spout and the oil through another. The core revolves at 16,000 revolutions a minute.

To see the small amount of solids that are left in the centrifuge makes you realize the livers are largely liquid. Only a quarter of a kerosene tin from a day's working—it makes good garden manure! The quantity of oil in a liver varies with different fish. Hapuka contains about 10 per cent.; half a ton of liver produces about 10 gallons of oil. Ling contains 25 per cent.; and shark, as well as having the largest liver, provides the highest proportion of oil—50 per cent.

The oils vary also in colour and consistency. Hapuka gives a red-gold oil, the same colour as that of the mixed inferior livers but heavier in consistency. Shark oil is free flowing and a light gold. Ling oil is a pale yellow. But light or heavy, yellow or brown, they are run off into 44-gallon drums and sent to the factory at Melrose to wait for shipment or to be included in little Johnny's "Karil" emulsion. The factory uses plenty of this liver oil—about 600 lb. of oil to every 2,000 lb. of emulsion.



The Mincer