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Oil from Livers of Sharks and Related Species

(From Aquatic Products in Arts and Industries, by C. H. Stevenson, in the Report of the U. S. Fish Commissioner for 1902, pages 227-231.)

The livers of various species of sharks and allied fish are suitable for oil production, giving rise in some localities to important fisheries. The principal species used are the sleeper shark, otherwise known as the nurse, ground, or gurry shark (Somniosus), taken in northern waters from the Arctic seas southward to Massachusetts, Oregon, and France; the basking or bone shark (Cetorhinus), formerly quite numerous, but now taken to a less extent, north of Europe and on the coast of Peru, Australia, California, etc.; the oil shark (Galeorhinus), on the Pacific coast, especially in California, and the dog-fish (Squalus), distributed throughout both hemispheres. In addition to these, nearly every species of shark yields livers suitable for oil-rendering.

The sleeper shark appears to be the most important species so far as oil-making is concerned. This is a large fish, individuals ranging in length from 12 to 25 feet. The livers yield from 12 to 50 gallons of oil each when taken in the autumn, but in the spring and summer they are almost worthless for oil purposes. On the New England coast this species is much less numerous than formerly, but it is reported in abundance on the Pacific coast of the United States.

During the autumn the taking of the sleeper shark is a somewhat important branch of the minor Icelandic fisheries, and it is also taken by the Russians off the Kola Peninsula. The most important fishery, however, is off the coast of Norway, and especially between Lofoden Islands and Boar Island, in depths of from 150 to 200 fathoms of water. The Norwegians employ small vessels of 20 to 30 tons, carrying about six men each, the season beginning the first of October and ending in February. The fish are taken by means of large, strong hooks baited with fish or salted seal blubber.

The basking shark, probably the largest of all sea fishes, has been taken very extensively for the oil contained in the livers, but owing to decrease of the species the quantity now secured is much reduced. This fish attains an enormous size, the prevailing length of fully-grown individuals being 30 to 35 feet. The liver is proportionally large, yielding ordinarily from 80 to 200 gallons of oil and occasionally as much as 400 gallons.

The basking shark is numerous on the coast of Peru and Ecuador, and its capture gives employment to a large number of small vessels, manned by 6 or 8 men each. The American vessels fishing for humpback whales on that coast have occasionally engaged in its capture when whales were not in sight. Capt. George C. Baker, of New Bedford, reports that on one occasion in two days' fishing he secured 125 barrels of shark oil while on the lookout for humpback whales.

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The basking shark is taken occasionally on the California coast, the individual yield of oil there averaging about 125 gallons. The same species is also said to be taken in the waters of British India, being harpooned in great numbers by the fishermen of Karachi and other coastal districts.

The common dog-fish (Squalus) of the Atlantic coast and a similar species on the Pacific coast are the principal oil-yielding sharks in America. These fish range from 2 to 5 feet in length and from 5 to 15 pounds in weight. They are the great pest of fishermen, destroying nets, robbing fish from trawls and committing other depredations.

Along the Atlantic coast of the United States but little attention is given to the capture of sharks for economic purposes, notwithstanding the many species which occur there in comparatively large numbers. In several localities on the southern coast small fisheries are prosecuted during the winter months, for then the yield of oil is greatest. Among the species taken, other than those above mentioned, are the sand or yellow shark (Carcharias litteralis), which attains a length of 5 feet, and yields from 1 to 2 gallons of oil; the leopard or tiger shark, length from 10 to 25 feet, yielding 10 to 20 gallons of oil; the mackerel shark, also known as perbeagle or blue shark, measuring from 8 to 10 feet in length, and the liver yielding from 2 to 7 gallons of oil; the dusky shark (Carcharhinus obscurus), which attains a length of 10 feet; the hammer-headed shark (Sphyrna zygaena), of 12 or 15 feet in length; the dog shark (mustolus canis), 2 or 3 feet in length; and the thresher shark (Alopias vulpes). Some of the large sand and leopard sharks are difficult to secure and their capture gives considerable trouble. They are taken usually by means of harpoons or stout hooks and lines. When taken from a small boat at sea, immediately after the fish has been secured it is lanced to death, the belly is ripped open with a knife, the boat canted, and the large, slippery liver pulled over the side into the boat, and then the carcass is discarded. Many of the smaller sharks are captured with menhaden, in purse seines, and are utilized at the menhaden factories. Owing to the damage which they do to the twine, the fishermen prefer to not set the seines around the sharks, but it is difficult to avoid taking a few of them with the menhaden. It is estimated that from 7,000 to 10,000 sharks are captured annually by the menhaden steamers, all of which are converted into oil and fertilizer.

On the Pacific coast of the United States, especially in California, the oil shark (Galoorhinus) is utilized. It is 4 to 6 feet in length and weighs from 40 to 70 pounds, the yield of oil from the livers varying from two-thirds of a gallon to 1 gallon each. The fish are taken by means of hooks and lines when they enter the lagoons for reproductive purposes during the summer. The fins of this species are dried and sold for 12 or 15 cents per pound, the Chinese using

them in soup-making. Other species of shark utilized on the Pacific coast are the shovel-nose shark, thresher shark, and the man-eater or white shark. The shovel-nose shark was taken extensively along the coast of Humboldt County, California, from 1858 to 1868, from 50 to 60 men being employed at times in the fishery. It is harpooned in deep water and taken by means of hand lines in shallow water. This species measures from 6 to 10 feet in length, and the liver of each individual yields 3 to 7 gallons of oil.

The liver of the saw-fish (Pristis), numerous on the South Atlantic and Gulf coasts of the United States, yields from 6 to 18 gallons of oil. It is said that in British Guiana this oil is used for illumination and also for anointing the bodies of the inhabitants. The liver of the elephant-fish (Chimaera), which occurs in abundance on the California coast, is large and yields choice oil. This fish has a maximum length of 2 feet and weighs 6 or 7 pounds.

It appears from the above that the yield of oil from individual shark livers ranges from much less than one pint in case of the dog-fish and others to the 400 gallons procured from the basking shark. Other than the livers, the carcasses of sharks are slightly oleaginous, and are rarely ever utilized in oil-rendering, but they are of course useful for conversion into fertilizer. The method of extracting the oil from the livers is much the same in all cases. If they are large, they should first be cut in small pieces or minced, as is done with whale blubber. The pieces are then subjected to heat until the cells are thoroughly broken, when the oil is extracted by pressure or it is permitted to drain therefrom. In case the oil is to be used for medicinal purposes great cleanliness is observed, the livers being washed free from blood and the gall bladder removed. A quantity of water is placed in the kettle with the hepatic tissues and the whole boiled gently for an hour or two. On cooling, the oil floats on the surface and is dipped off and stored. It may be refined in precisely the same manner as cod oil.

Shark oils are largely used in tanneries, in steel-tempering, and in various compounds where it is desired to impart a low specific gravity. They are also valuable as a body for paints for out-of-door objects, as walls, fences, etc. In some localities certain kinds are used by medical practitioners, who consider them quite equal to cod-liver oil. In the drug stores of this country shark oil is occasionally found with a label suggestive of an oriental origin and recommending its use as an embrocation in numerous diseases.