

COMMERCIAL FISHERIES SESSION

MONDAY—NOVEMBER 17

Chairman—WAYNE M. WALLER, National Fisheries Institute
Washington, D.C.

The Outlook for the Menhaden Industry of the Atlantic Coast

EXTEN CORBETT

Nassau Fertilizer and Oil Co., Fernandina Beach, Fla.

The Menhaden industry is one of America's oldest, yet very little was known about it until the last decade. Its origin dates back to the days of the American Indian. The word "menhaden" itself originated with the Indians and meant "to fertilize" or "make things grow." In the early days, the Indians planted a menhaden under each hill of corn to make the good earth produce better. The early Colonists were quick to realize the benefit of this fertilizer and adopted its use as early as 1621. Later many farmers of Connecticut, Rhode Island and along Long Island Sound spread the raw fish over their farm to condition the soil.

It has been reported that the first serious effort to separate oil from menhaden was made by Barker and Tillman in 1811 at Black Point Wharf, Portsmouth, R. I. The fish were boiled in large iron pots until the flesh tissues were broken down. This mass of material was weighted down by means of rocks on boards. When the oil came to the surface it was either skimmed or drained off and barrelled. This was the crude beginning of the menhaden oil industry.

From 1865 to 1870, factories were developed in Maine where steam was used for cooking and power for pressing. By 1878 as many as 60 factories had been built and were operating in New York and New England, processing annually around 500 million fish. Factories then sprang up southward in Delaware, New Jersey, Chesapeake Bay Area, the Carolinas and later in Florida. Only in the last decade have plants been established in the Gulf of Mexico area.

From 1870 to 1875, the bulk of the menhaden were concentrated off the coast of New England. Today menhaden are rarely found in these waters, although they came back in sizeable schools in 1949, as well as in the summer of 1952. The majority of these fish are found south of the northern tip of Long Island—that is, off the coast of New York, New Jersey, Delaware, Chesapeake Bay Area, the Carolinas and Florida. The Gulf menhaden is a different sub-species from the East Coast variety.

It was during World War II, when there was a great shortage of protein that the menhaden industry came to the forefront. Many manufacturers of poultry feed were seeking new sources of protein, and they tried fish meal. To their amazement, they found that they were not only getting a good natural "animal" protein, but were getting remarkable results from some unknown growth factor. This growth factor, which became known as APF or "Animal Protein Factor", was concentrated, and in a short time a substance, which was named vitamin B₁₂, was isolated. However, later research proved vitamin B₁₂ was not the sole active substance and there still remains to be solved the identities of all the growth factors in menhaden fish meal which so accelerate chicken growth of poultry and improve the hatchability of eggs.

Unlike the situation in the sardine fishery, there has been an almost continual upward trend in the catch of menhaden, with no sign of decline in abundance. Usually, where there is a small catch in one area, there will be a good catch in another area that will continue to push the catch upward.

This does not mean that the industry may not fail in the future, but it appears that the large catches are so far not affecting the abundance of fish. The industry would certainly like to know more about the biology of this fish so that necessary conservation methods could be adopted, if they proved necessary. Operations today should not be allowed to cause the extinction of this fish tomorrow.

Publicity about the menhaden through radio broadcasts, popular magazine articles, and the excellent and ever-popular Fish and Wildlife Service film "The Story of Menhaden" have done much to enlighten the public about this industry. Today the menhaden is landed in larger quantities than any other in the U. S. and Alaska. The total catch of menhaden last year was one billion one hundred and four million lbs. The value of the fishmeal and oil exceeded \$23,500,000.

The pork packers are proud of the fact that they can get everything out of a pig but the squeal. If a fish had a squeal, modern menhaden processors would get that too. The fish are unloaded from boats with large suction pumps. Water is removed by passing the fish through a large rotary screen or over a shaker. The catch is either weighed or measured. The menhaden pass now by conveyor to the cooker or to storage bins, called "raw boxes", for later transfer to the cookers as needed. The cooker is a long narrow chamber filled with steam jets and it is here the fish tissue are broken down by the steam. In the steam cookers the fish move by means of a screw conveyor. Huge screw presses separate the press liquor from the press cake. Most plants allow the press liquor to pass over shaker screens to remove the "fines," or suspended particles. This also can be done by running through a decanter. The oil is separated from the press water by centrifuging. The "stick water" (liquor after oil and fines are removed) is concentrated to a 50 per cent solid. This soluble solution is known as "menhaden condensed fish solubles", and is used primarily in chicken feeds. It contains important amounts of the water soluble vitamins.

The press cake is carried from presses by means of conveyors to a large rotary steam dryers or direct heat dryers. Here the press cake is dried from approximately 50 per cent moisture to about 9 or 10 per cent. The dry scrap is now cooled and "cured" by dropping it from overhead conveyors and by turning it with small bulldozers. This further lowers the moisture content of the scrap to approximately 8 per cent. The scrap is now ground into fishmeal, or it may be bagged as fish scrap. Special sewing machines and electric conveyors and power lifts are used in the sacking and loading operations.

Even though many menhaden plants have adopted modern methods there are still many phases of the menhaden industry today that require additional study and research. Some of these problems are the following.

The abundance of fish fluctuates greatly from year to year in each locality. The most modern equipment cannot produce fish when there are none in the area. From 1943 to 1945, menhaden were found in large schools off Florida; these years of abundance were followed by poor years from 1946 to 1950. Then during the past two seasons, 1951 and 1952 menhaden have again been appearing in larger quantities. It is impossible to predict what the catch will

be off the Florida coast for the next season. Some companies have plants in several areas and move their boats to the area where fish are abundant. However, this is expensive and the fish may disappear again before good catches can be made. Information is obviously needed on methods of predicting abundance and on the behavior of the menhaden.

The high cost and shortage of labor has handicapped many menhaden plants and boat owners. Many former fishermen are taking steady jobs on shore where pay checks are more. To offset this some companies have installed suction pumps aboard the menhaden vessel for loading the fish aboard the ship from the nets. This operation, in addition to reducing the number of fishermen, enables the crew to make more sets, since fish can be loaded faster. In addition it reduces wear on the nets. More technological research is necessary to improve gear and fishing methods to reduce further the labor requirements on the vessels.

Lack of knowledge of how to preserve the fish until the boat arrives at the plant results in losses, especially to the plant owners located in warm climates. Stale or decomposed fish yield poorer quality products. Chemicals have been tried but to date none has proven successful. Much research is required in this question.

A thorough study of the food of the menhaden would be of tremendous value. The relationship of food to oil production has received no attention from scientists. Herring fishermen recognize that the food of the herring directly effects the quantity and quality of herring oil and this matter requires study in the menhaden fishery.

The past few years has seen the use of fishmeal change from that of a fertilizer to almost exclusively that of a high protein supplement in animal and poultry feeds. Expansion and modernization of plants is going forward in an effort to increase their capacity, and as a result the menhaden catch for the past four years has exceeded one billion pounds. Despite this importance little is known about the biology of the menhaden. Certainly knowledge of this fish's range, its spawning, factors effecting its abundance and its migrations are desirable.

Research has a big job to do for the menhaden industry, and it should start soon.

An Outline of the Manhaden Industry

ROBERT G. LOWE, JR.

Wallace Menhaden Products, Inc., Morehead City, N. C.

Considering that it is the most prolific fish in the waters of all the seas, and that it supports the biggest fishery in the United States in point of tonnage landed, the menhaden, or pogy, is as little known as a fish could be. Last year one billion one hundred million pounds of menhaden were caught in the nets of the purse-seiners. This figure is more than twice that of the next most numerous species of fish landed and accounts for about one quarter of all fish brought to the dock.

Of his love life and spawning habits we know nothing. From "whence he cometh and whither he goeth" is likewise a mystery. We know that he has been recognized in seven different species, namely, *Brevoortia tyrannus*, *B. brevicaudata*, *B. patronus*, *B. pectinata*, *B. aurea*, *B. smithi* and *B. gunteri*.