

SHELLFISH AND SANITATION¹

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Historically, shellfish have been important to the economy of many peoples of the world. Since the days of antiquity a significant number of the population of coastal regions have depended upon shellfish to make up a part of their diet. The records of the Roman Legions indicate oysters from Italian waters were relished by epicurians of the day, and a critical comparison was made between native oysters and those from British waters. During early colonial days oysters and clams were harvested in great numbers not only for food but for use as fertilizer and lime to enrich the land.

In modern times molluscan shellfish have been utilized exclusively as food. Oysters, clams and mussels are extremely nutritious, being rich in minerals and glycogen. Oysters, especially, have a high protein value and are rich in all minerals ordinarily required in the human diet. Thus, it may be said that these shellfish in addition to being relished by fastidious diners, fill important requirements of the human diet. As might be expected, the demand for shellfish has increased steadily so that at present the supply barely satisfies the demand.

The molluscan shellfish such as oysters, clams and mussels grow in salt water usually in embayments fairly close to shore. They obtain their food by "pumping" sea water to their gills where microorganisms are filtered out and passed to the mouth for ingestion. The water passes through the gills into water tubes where the oxygen is utilized for respiration. Thus, any objectionable organism may pass into the stomach with the filtered microorganisms or single bacterial cells may pass through the gill openings into the water tubes.

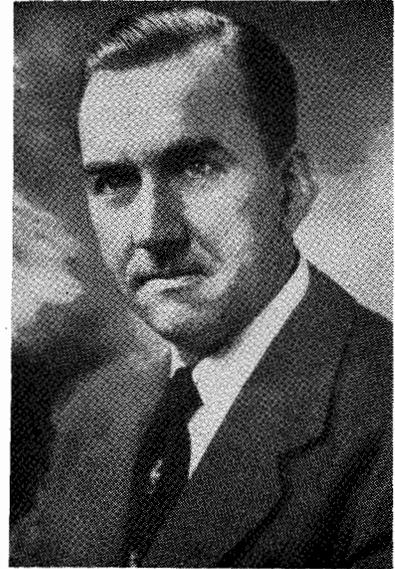
The proximity of the shellfish growing beds to the shore is not accidental. Oysters and some clams

thrive in water having a salinity considerably less than that of the open ocean. Circulation of water is needed as well as an abundant food supply consisting of various microorganisms. Such conditions prevail in bays receiving fresh water flow from rivers.

At this point it becomes obvious that shellfish grown in waters contaminated with sewage are potentially dangerous. Shellfish taken from sewage contaminated waters were suspected of causing illness as early as 1603. However, it was not until about 1890, with the development of knowledge of bacteriology and the connection of bacteria with specific diseases, that water pollution began to be recognized as a health problem. Investigations carried on during the next twenty years indicated some cases of typhoid fever were due to the consumption of polluted shellfish. These findings resulted in the condemnation and abandonment of shellfish beds and oyster floating areas located in polluted creeks and bays.

Typhoid fever of epidemic proportions during 1924 and 1925 in several cities of the United States was attributed to the consumption of polluted shellfish. The incrimination of shellfish as a cause of illness in many people situated in several cities of the country, spelled ruin for the entire shellfish industry.

In order that the extensive shellfish industry might survive adverse publicity resulting from these reported typhoid cases, and regain public confidence, the United States Public Health Service was designated to exercise supervision over the sanitary quality of shellfish shipped in interstate commerce. A system of endorsement of state control measures was developed whereby each shellfish producing state presents a list, to the Public Health Service, of certified dealers in shellfish who it has determined conform to state requirements. Such lists, if the state control measures are acceptable to the Public Health Service, are published semimonthly for the information of the consumer



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states. To establish the degree of state control deemed essential, the Public Health Service utilizes a "Manual of Recommended Practice for Sanitary Control of the Shellfish Industry" which outlines minimum requirements for endorsement of state shellfish control measures and certification of shippers in interstate commerce. It should be noted that the system of endorsement of state control measures by the Public Health Service does not in itself have legal status. The individual states enter into the shellfish certification program supervised by the Public Health Service voluntarily. In entering into this cooperative control the state, the industry and the Public Health Service are each responsible for certain procedures. The state shellfish regulatory authorities enact laws and promulgate rules and regulations which must be followed by the industry. The industry

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carries out the state requirements. The Public Health Service evaluates compliance by the states with the requirements outlined in the "Manual of Recommended Practice for Sanitary Control of the Shellfish Industry" and bases its endorsement or withdrawal of endorsement of state control measures upon the adequacy of this compliance. In as much as only certified shellfish may be handled by dealers in states embracing the shellfish certification program, dealers of states not participating in the program are not considered to be certified and their product will not be acceptable in states receiving Public Health Service endorsement.

Until recent years the theory of control at the source was thought to provide adequate protection to the ultimate consumer. Such reasoning was acceptable because little if any packing or repacking of shellfish was carried on in receiving states. With the expansion of transportation facilities by refrigerated trucks the situation has changed.

Repacking of fresh oysters from gallon size containers received from a shellfish producer-packer by various establishments in inland states has added to the complexity of shell fish sanitation. This repacking whether for producing small containers of fresh shellfish, breaded frozen oysters, frozen oyster stew, frozen clam chowder or other products, when accomplished at the source is under strict supervision of representatives of shellfish regulatory authorities. Processing plants and equipment are constructed and maintained to meet specific sanitary requirements. The products are packed and/or frozen in compliance with certain requirements using proper equipment and approved containers. The most important feature of packing and repacking or processing at the source is that only certified shell-

fish will be handled for interstate shipments. This also will be true of intrastate shipments in states receiving endorsement of their shellfish program by the Public Health Service.

The practice of repacking shellfish especially as breaded frozen oysters is increasing in the inland cities. This operation may be carried on without adequate supervision by state agencies and therefore without adequate sanitary control. In states neither possessing laws nor machinery to prohibit the entrance and sale of non-certified shellfish, there exists a grave danger to the consuming public.

As previously indicated it is absolutely essential that only shellfish grown and harvested from areas approved by state shellfish regulatory authorities are utilized for food purposes. The use of the Public Health Service list of certified shellfish shippers furnishes this information, as every package of shellfish processed by a certified packer must have the certificate number and state abbreviation permanently recorded on the container.

The multiplication of bacteria introduced by multiple handling must be controlled. In breeding oysters the control of bacteria in the finished product is a matter of proper handling, clean equipment, and adequate refrigeration. Experience has shown that adequate inspectional services are necessary to continually produce a finished product that will be safe, wholesome, and free from spoilage. Such inspectional service must be an integral part of a well planned program formulated for the protection of the health of the ultimate consumer.

In New York State all matters pertaining to management, production, harvesting, processing and distribution of shell fish is the responsibility of the State of New

York Conservation Department. The Sanitation Unit of the Department operates a well developed program for the sanitary control of the shellfish industry and management of the shellfisheries. A completely equipped laboratory and a survey boat are utilized for sanitary and bacteriological studies of approximately 315,000 acres of marine waters. The compliance of the industry with sanitary requirements is constantly checked through the State Shellfish Laboratory. Studies and investigations concerned with the microbiology of shellfish and operations of the industry are also carried on in this laboratory. A trained staff of sanitary engineers, bacteriologists, chemists, biologists, and assistants are constantly working to assure the consumer of New York State shellfish products of receiving the ultimate in quality and wholesomeness.

Unless some unforeseen situation arises the shellfish leaving New York State certified establishments are safe and wholesome. If these shellfish are not removed from the original containers and if they are properly refrigerated they should remain in excellent condition for about two weeks. What happens if the conditions are reversed; if adequate and continuous refrigeration is not maintained; if the shellfish are rehandled many times, and in addition to improper handling, are dipped in batter, breaded and frozen? As indicated previously repacking and breeding operations must be carried on under controlled conditions to reduce bacterial multiplication to a minimum. Without control of such operations by a responsible state agency, adequate protection may not be afforded the ultimate consumer.

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milk sheds were detailed to the nth degree. Published only a year ago its influence upon practices naturally can not yet be measured.

As we attempt to gauge some of the things which the future may

unfold, may I express to you an urge that you give every consideration to the fundamentals which came out of this study. They can be used to improve many milk supplies, to reduce the cost of and compliance with inspection, to bring about more uniformity in requirements and, I believe, to

avoid just such misunderstandings as have now brought on another investigation. The latter is significant in the all important role of developing ever greater public confidence in the product and consequent large consumption — so important to public health, good nutrition and farm income.