Oyster Investigations

Early Studies

Excerpts from Agricultural Experiment Station, N.J.
Woodward and Waller, 1880-1930.

When Dr. Julius Nelson first came to the Experiment Station, the director was especially interested in the conditions and possibilities of the fishing industry of the state. The biologist, therefore, at once began studying the inhabitants of the state's waters. Because of its economic importance, the oyster naturally came first.

In his report for 1898, Dr. Nelson noted that the water area of the state was about one tenth of the land area, or 454,423 acres, and that of this total water area, 361, 967 acres were tidal waters.

He estimated that about 200,000 acres were adapted to oyster growing, but that less than 15,000 acres were held by planters. These plantings yielded an annual revenue of $2,250,000, an average of about $150 per acre. He pointed out that if the entire 200,000 acres were cultivated scientifically, even if producing only $100 per acre, the revenue would be $20,000,000, and he estimated that more than 100,000 persons were dependent for their support on the yields of oysters from New Jersey waters."There is plenty of room for improvement in the culture of oysters," Dr. Nelson noted. "The Experiment Station has been established for the purpose of ascertaining just how such improvements can be effected. The real labors of the biologist lie in this direction."

It will broaden a farmer's sympathies to learn that off on the coast there are men who call themselves "oyster-farmers," who "cultivate" oysters on "farms," who "sow" oyster "seed" and "plant" and "transplant" oyster "plants." They let their "ground" lie "fallow" to "rest" now and then because it has raised so many "crops" as to be exhausted. They have to "survey" their "land" and find the "corners" and "fence" it, though it be under water. They hold such and so many "acres," and, after having "harvested" a "crop," have to "drag" the "field" to "clean" it, preparatory to receiving the new "seed," and even have to "mow" it with a genuine submarine "mowing machine." And so we might go through the vocabulary of oyster operations and show that the cultivation of oysters is more like the cultivation of potatoes than of animals, for the oyster can no more "locomote" than can a potato. If it could, it would never become private property, any more than can a clam or a fish, except when in confined and private waters.

But isn't the oyster business a fishery, the oyster a fish, and the taking thereof oyster-fishing? Don't people fish for oysters? No sir, usually they use "rakes" and "bushel" baskets, though they are compelled to use boats instead of wagons on their farms. But there is one part of this industry that is "fishing" and can properly be dealt with legally, only by fish and game laws and principles, that is, viz., the taking of oysters on what are called "natural beds," which are like nature's flower-beds in public fields and highways, where the products belong to anyone who chooses to pick. This part of the business is being diminished. It would be well if the various state laws could be revised in accordance with a recognition of all these analogies or rather identities, between oyster culture and other farming.

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From the beginning there was ready and eager cooperation on the part of the more progressive planters. They were consulted on all points, and like the progressive farmers of the state, loaned their land, time and "plantings" for experimental use.

World's Fair Exhibit

Among the exhibits at the Columbian Exposition, or World's Fair, at Chicago in 1893, was a "cooperative exhibit of experiment stations," to which various departments of the New Jersey Station were asked to contribute. As the New Jersey Station was the only one dealing with ostreiculture at the time, and as it was felt that many other states bordering on the ocean might benefit from such investigations, oysters were chosen as the exhibit material from the Department of Biology.

In order to get the best possible material, Dr. Nelson sent out a circular letter of the oystermen of the state, but "did not succeed in greatly stirring up the proverbially conservative oystermen." Personal collecting, however, brought in enough material to make a very respectable exhibit. It included natural oysters, natural seed, cultivated oysters, artificially raised seed, enemies and friends of oysters ("oyster enemies, parasites and messmates of all kinds")— seasonal variations, collectors or "cultch" such as wood, rubber, glass, iron, tin, earthenware, mussel shells and the numerous objects to which free-swimming oyster larvae will cling, instruments and methods, oyster literature and materials showing the natural history of oysters. This exhibit was destroyed in the New Jersey hall fire of 1903 and it was not until 1915 that a new one was begun.

Green Clams

In September, 1892, there was great alarm at Tuckerton over what was thought to be a serious infection of clams. Something had turned them an unpleasant green color suggestive of copper or Paris green poisoning, and ruined them for trade. As Tuckerton was practically dependent on the clamming industry, 300 men would have been thrown out of work if anything happened to it, and the clam interests of that town alone were worth about $100,000. The situation, therefore, was acute. A call was sent to the Experiment Station. Dr. Nelson investigated and soon reassured the Tuckerton clammers. The color was only a pigment, the clams having eaten large quantities of vegetable matter. It was entirely harmless, in fact, clams colored in this or similar ways were considered a special delicacy in European countries.

The Mott Station

During the 1901 session of the New Jersey Legislature, acts were passed appropriating more than $25,000 for the

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protection of the oyster industry in the state and for increasing natural oyster seed. Another act provided for the leasing of certain planting grounds in Delaware Bay at a minimum of 25 cents an acre. But from the scientific standpoint, the most important legislation of the year provided for $200 to be used to establish and maintain one or more stations for scientific investigations of the oyster. Accordingly the first oyster experiment station, located at the mouth of Stopwater Creek, four miles south of Tuckerton, was built. It was named for George A. Mott of Tuckerton, on whose land it was erected. Quoting the biologist in his annual report for that year, we get a picture of what could be done with $200 in 1901. "The situation so far as

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conditions necessary to foster growth are concerned is unexcelled, if not unequaled, by any other site within the state known to the biologist. But microscopical studies cannot be prosecuted without the aid of a practical oysterman, who not only secures the right sorts of oysters, but who gives the practical data which theory must deal with. The aid extended the investigator, through Mr. Mott's enthusiastic faith in the ultimate success and value of these researches, and his untiring, skillful and self-sacrificing labors in preparing the field apparatus, have been invaluable."

This small appropriation asked for did not contemplate any wages for the cook and necessary helper, who must be present at this station whenever the scientist is at work, much less any salary for the investigator himself. As Mr. Mott offered his services free, and these investigations being brought under the regular work of the biologist of the Agriculture Experiment Station, the limited appropriation was available for paying traveling expenses of the investigator, wages of laborers for digging and construction, expenses for lumber and other materials, and cost of provisions and utensils. The microscopical apparatus was supplied from the Biological Department of New Brunswick.

This appropriation, economically spent,

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served to pay for the maintenance of the Mott Station for six weeks of occupancy, and in addition, but repairing a dilapidated oyster-house and utilizing the top of a yacht's cabin, there have been "established" two buildings, one used for an oyster laboratory and the other for combined kitchen, dining room and dormitory called "Hotel Bivalve."

It was here, surrounded by a broad expanse of salt marshes, with mosquitoes so thick that one dared not venture out after nightfall, that some of the most important scientific work ever undertaken on oyster culture was accomplished. In 1902, the nature of oyster propagation was studied to learn the laws that govern development, the growth of claire culture was considered, and special attention was paid to the development of the embryo, food, the comparative viability of different varieties of oyster seed, their parasites, and enemies of the oyster fry. When in 1903 the appropriation was increased to $300, the biologist began to hope that his dream of a houseboat laboratory and of a motor launch to take him from one experimental plot to another, might be fulfilled. Unfortunately, although the appropriation was increased, the old law granting $200 was not amended, so the extra $100 was not available.

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Progress and Recognition

The work was now progressing by leaps and bounds. In 1905, comparisons of oyster problems in different localities were begun. There were four stations then, two at Tuckerton, one at Barnegat and one at Keyport. In 1906, a laboratory 9 feet by 14 feet by 12 feet, was erected on Barnegat Creek on property owned by an oysterman, Capt. Joseph K. Ridgway. The bulk of the biologist's work was centered here, although some was still located at Tuckerton, and visits were made to the plantations of the Messrs. Sooy on the mouth of the Mullica. Here, one of the

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large ditches, 20 feet wide, 6 feet deep and 1,000 feet long, used by them for intensive oyster growing, was dammed up for experimental work. There was a big industry here — no fewer than 100 boats tonging oysters were observed one day in October.

As the work enlarged, the need for an assistant, a floating laboratory and a motor boat became imperative. In 1907, through the efforts of Senator Hand, who introduced a bill that received the cordial support of Governor Stokes, $1,200 was appropriated for oyster work. The motor boat was built and encouraging progress made. In this year, Dr. Nelson discovered that it was "feasible to predict with great accuracy the proper date at which shells should be planted to secure the best results."

In the summer of 1908, Dr. Nelson's son, Thurlow C. Nelson, who had been helping him unofficially for several years, was appointed as his assistant. In this and the following year, studies were made of the length of time between spawning and spatting. This was all very important, for if

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the exact time for putting down shells to get the best set could be determined, much could be saved by the oysterman.

In 1909, the long desired houseboat was built at a cost of $800 and christened "Cynthia." It was compact, comfortable, contained a very adequate laboratory, and could easily be towed from one experimental area to another, in Barnegat or Tuckerton Bay, or the Mullica River. Naturally, the work of the biologist was greatly facilitated by having it. In the fall, Dr. Nelson was called to Maurice River Cove to investigate the causes of mortality among oysters there. Shifting sands were found to be responsible.

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The houseboat was used for the first time in 1910. The principal investigations were more detailed studies of the relation between climatological conditions and the numbers and growth of larvae. We find Dr. Nelson giving testimony to the National Board of Food and Drug Inspection in connection with the "floating" of oysters (swelling by soaking in fresh water). Partially through his efforts, Food Inspection Decision 121 was issued by the Department of Agriculture; this decision satisfied the growers, and at the same time guaranteed a measure of safety to the consumers.

In 1913, stations were maintained in Barnegat, Tuckerton and Scullville, the last in cooperation with the State Bureau of Shellfisheries. The Tuckerton station for that year was located at Edge Cove on Tuckerton Bay and was in charge of Thurlow C. Nelson. Raymond B. Searle was located at Scullville and Arthur C. Metcalf at Barnegat.

The year 1914 marked an expansion in the interest both of the biologist and his assistant. Dr. Nelson, at the invitation of the Biological Board of Canada, gave a series of lectures at points in the oyster-producing regions of Prince Edward Island, Canada. The lectures were both popular and educational and were received with enthusiasm by the Canadians. Thurlow C. Nelson, who had graduated from Rutgers in 1913, was called by the United States Fish Commission to investigate the causes of great mortality among the oysters on the Alabama Coast. Peter C. Cameron had charge of the Tuckerton station during their absence.

In 1915, after a month of profitable research on the reactions of the oyster larvae under natural conditions, Dr. Nelson went to Prince Edward Island to undertake a survey for the Biological Board. There the remainder of the summer was spent studying the distribution of the oyster larvae in Richmond Bay.

This, the last work of Dr. Nelson, formed a fitting climax to a long and useful career in scientific research. Not only were his services valued by the oysterman, but he made many personal friends among them. He died Feb. 15, 1916.