

177.—NOTES UPON OYSTER EXPERIMENTS IN 1883.

By Lieut. FRANCIS WINSLOW, U. S. N.

[From letters to Prof. S. F. Baird.]

I have delayed from day to day to inform you of the progress of my experiments at Hampton, hoping that I would be able to announce some definite result, but we have had such bad luck since the middle of June that as yet we have been unsuccessful in securing the attachment of the spat. Our first experiments were full of promise. I found, as I wrote you, a number of young oysters fastened to the glass collectors in my apparatus and at about the same time Dr. Brooks found them in his troughs; but no subsequent experiments have brought about like results. We found, however, that there was no difficulty in keeping the young in the troughs after the shell had formed, and after experimenting with my apparatus (an arrangement of glass tubes) for a month I concluded to have a number of wooden troughs made, and after depositing oysters in them, keeping up a constant current of water until the oysters had either disappeared or attached. The troughs, four in number, are 4 inches wide, and 2 inches deep, with a total length of 64 feet. Partitions are placed at an angle with the sides, so as to intercept the water and increase the length of the current and form as many eddies as possible. The bottom and sides we have covered with glass and shells for "cultch." The length of the current is 110 feet and over four hundred eddies are formed in it. The young oysters, after the shells have developed, are placed in the head of the troughs, and though exposed to a strong, steady current of water, which is constantly changed by means of a steam pump which is kept going night and day, very few escape from the lower end, the majority remaining in the eddies. Those at present in the troughs have been there over two weeks and though we have not of late found any on the glass slides, we have washed them off the shells and so far as I can judge a considerable number are still living. Our greatest trouble, an unaccountable one, has been in securing the artificial impregnation of the eggs successfully. Not once in twenty times do the eggs advance as far as the first stages of segmentation and during the last two weeks we have been successful but once in carrying the eggs to the swimming stage. Neither Dr. Brooks nor myself can explain the failure; the difficulty is one we never experienced before. We have varied every influencing condition and have used oysters from every locality in this vicinity without effect. Since the middle of June we have not succeeded ten times, though we have fertilized eggs nearly every day. The oysters are now nearly through spawning, and but little more can be done this season. I have written to New Haven to find out the condition of oysters in the sound and

should the report be favorable and the next examination of the troughs indicate a continuance of the experiments as advisable, I will, with your approval, move up to Long Island Sound and make this attempt. Should the Fish Hawk come in before I leave I will try and arrange for the transportation of the troughs by her.

FORT MONROE, VA., *August 4, 1883.*

After I wrote you last from Fort Monroe I made several examinations of the glass slides in the oyster apparatus with fairly satisfactory results. Though the young oysters had not fastened themselves to the glass, yet they had grown somewhat and were vigorous and healthy, with plenty of food in their stomachs. The slides examined had from one to four oysters on each, and fully four hundred slides were in the apparatus. It is hardly possible to find, with the microscope, so small an embryo as that of the oyster on an opaque body such as an oyster shell, but I have no doubt that many more embryos were caught by the shells and partitions in the troughs than we detected on the glass slides. As the animals were doing so well I thought best to continue the experiment until some result was reached, which end would be attained shortly, as the oysters at the last examination were over three weeks old and are now nearly five. Finding it impossible to fertilize the eggs successfully, and as I was advised by Mr. Rowe, of this place, that the oysters here were doing well and still spawning, I concluded, in the absence of instructions from you, that I would make an attempt at New Haven. I accordingly left the apparatus at Hampton in charge of Dr. Brooks, with instructions to continue it in operation until the oysters either attached or disappeared. Any results obtained are to be made public through the Fish Commission, but I do not anticipate anything of value from a biological point of view. I hope, however, that the young oysters have fastened by this time, and I regret that I cannot give you definite information upon that point. I find the oysters here pretty well out of spawn, not more than one in twenty being fit for fertilization. I have made some experiments, but not with sufficient success to justify setting up an apparatus at all similar to the one at Hampton. I am sorry that I did not get up here sooner, as the season has been very favorable and a large attachment of spat is expected by the oyster growers; but so far as my labors are concerned, the season is about finished.

NEW HAVEN, CONN., *August 22, 1883.*

I have lately received a letter from Dr. Brooks reporting the result of the final examination of the water troughs containing the artificially raised oysters. The examination was made on the 21st and 22d of August, but I regret to say without success, the young oysters having disappeared. Dr. Brooks writes that he went over all the shells and slides very carefully without success, but as he subsequently examined all the oyster ground in the vicinity of Hampton,

the piles of the wharves, shells along the beach and on the beds, and oysters, without finding any young of this year's growth, he thinks it possible that the failure of the experiment was due to conditions and influences beyond our control rather than to any inherent defect in the apparatus. Coupling the absence of any "set" about Hampton Roads, with the difficulty we experienced all summer in securing the fertilization of the eggs, it is possible that Dr. Brooks is correct in his opinion. Certainly the oysters did not die for want of food, as when from four to five weeks old they were in a healthy condition, with full stomachs and receiving an abundant supply of water.

I much regret that we should again have failed both in producing young oysters and in gaining additional information of biological interest. We have, however, discovered a method by which food can be supplied the oysters in unlimited quantities, which is a considerable advance, and may lead to the solution of the problem in the future.

At my request Dr. Brooks has stored the troughs with the apparatus and furniture of the Johns Hopkins laboratory at Hampton, so that they may be readily available for next summer should you consider it advisable to continue experimenting.

NORTH DUNBARTON, N. H., *September 13, 1883.*

178.—THE OYSTER AS A POPULAR ARTICLE OF FOOD IN NORTH AMERICA.*

By **CARL RUMPF**,

Member of the German Parliament.

[Read at the meeting of the German Fishery Association, March 8, 1884.]

Accidentally I learned last year, partly from the president of the association and partly from the published reports of the association, that after all attempts to transplant the North Sea oysters to the coasts of the Baltic had failed, the same failure had to be chronicled as regards the efforts to transplant to the Baltic the North American oyster (*Ostrea virginica*). The reasons why none of these oysters have propagated in the Baltic have been thoroughly investigated by Professor Möbius, of Kiel; and it has been ascertained that the failure was owing to two causes, viz., the smaller degree of saltness of the water (in the North Sea and on the coasts of the United States, 2½ to 3 per cent; in the Baltic only 1.3 to 1.5 per cent), and the colder temperature generally prevailing during a considerable part of the winter.

Further investigations of the German Fishery Association directed attention to more northerly districts of the American continent; and

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