Breeding of Oysters (*O. edulis*) at Port Erin

THE success obtained by the Department of the Ministry of Agriculture and Fisheries in breeding oysters (*O. edulis*) in the experimental tanks at Conway and Lympne[1] suggested that a similar use might be made of the large outdoor tanks or ponds at the Port Erin Marine Biological Station. In normal summers the sea temperature in Port Erin Bay rarely rises above 59° F. seawards of the beaches, owing to the steepness of the beaches and the mid-sea position of the Isle of Man; the maximum is reached at about the end of August[2]. The stagnant water in the ponds, however, follows air temperature much more closely than the sea, and this year gave surface readings during July and the first three weeks of August ranging mostly between 62° and 65° F.; a range favourable for oyster breeding.

In February, a hundred Whitstable oysters were imported into the Port Erin tank system and distributed on April 14 experimentally on the bottom in different outdoor tanks. These oysters were examined on July 20. High mortality had occurred in the east tank where about a hundred plaice had been stored for breeding. On the bottom of this tank it was found that there had become deposited a black sludge bearing a luxuriant growth of green weed. Oysters which occurred in places where this sludge had accumulated were suffocated. Somewhat similar conditions obtained in parts of the west tank, though the sludge was less dense and the loss was not so heavy as in the east tank. Only one individual, however, among twenty-five had died in a small clean outside store tank through which a small circulation of water had been maintained.

The oysters from this latter tank (24 in number) were opened on July 20, when two individuals were found black sick, that is, carrying larvæ ready to be voided from the parent into the water. On July 13 the east tank had been refilled with water direct from the sea after the pond had been scrubbed out. In this pond most of the larvæ taken from the two black sick oysters were distributed on July 20. To this tank had also been added about a hundred plaice stored for breeding experiments in the following year.

On November 24 the tank was emptied and examined for oyster spat. A sprinkling only was found. Sixteen were found attached to the north wall of the tank in underhung places along with balanids, mostly remote from direct sunlight. Three occurred in the full glare of daylight on the bottom and near the middle of the tank; one settled on a varnished board and one on a stone, both in deep water near the outlet pipe; two occurred on mussel valves also on the bottom of the tank. The bottom and lower parts of the walls of the tank were covered with a growth of long delicate green weeds, 98 per cent of which were *Cladophora fracta*, Kütz, var. *flavescens* Batt. (*C. flavescens* Harv.), along with a little *Urospora isogona* Batt. and *Percursaria percursa* Rosenv.; there was very little accumulation of black mud. It is probable that a good fall of spat might have been obtained had settlers or a supply of cultch been placed in the pond. The spat varied in size from 6 mm. long by 6 mm. deep to 20 mm. long by 18 mm. deep, and fell into two size groups, suggesting that two periods of settling occurred, possibly a settlement from each brood of larvæ.

Ordinary sea-water of a salinity about 33·5 per thousand[2] pumped into the tank direct from the sea was used in this experiment; the salinity probably varied little during the first month of the experiment, as this was a period of drought and a little fresh sea-water was pumped into the tank from the sea daily. The plaice in the tank were fed on boiled mussels, the remains of which would contribute with the waste products from the plaice themselves towards manuring the water for the growth of those micro-organisms on which the oyster larvæ and spat thrived. A heavy growth of green weed is evidence of considerable production of motile reproductive bodies from these plants. These reproductive bodies may very well have formed a portion of the food of the larvæ and/or spat at some period. Scott's investigations[3] on the plankton of these ponds in 1924–26 indicate that in July and August the phyto-plankton (diatoms and dinoflagellates only) may normally be relatively scarce, or even absent: no plankton observations were made in 1932. A few *Gobius ruthensparri* and about four specimens of various species of small flatfish in the pond may have been inimical to a larger spatfall by feeding on the larvæ, as Dodgson and Sherwood[1] have found. 106 living plaice were recovered from the experimental tank in good condition on November 25.

The experiment is interesting in proving that under such meteorological and other conditions as prevailed in the summer of 1932, (*a*) oysters will spawn in the tanks at Port Erin; (*b*) the tanks are suitable for the production of young oysters; and (*c*) when the method of cultivating oysters in tanks has been improved so as to become a sound economic proposition, it may be possible in favourable summers to produce oyster spat in great numbers at Port Erin. The experiment also encourages the reasonable hope that such tanks as may be built in the future for mussel purification in the north of England may become as useful as those at Conway for oyster breeding.

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J. H. ORTON.
M. W. PARKE.
W. C. SMITH.

Zoology Department,
University, Liverpool.
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[2] J. R. Bruce, *J. Mar. Biol. Assoc.*, Plymouth, **15**, 542; 1928.
[3] A. Scott, *Proc. and Trans. Biol. Soc. Liverpool*, **39** and **41**, 1925–27.

Reversible Stoppage of the Blood Circulation in Sabellids

SABELLIDS are marine polychæte worms, the blood system of which is peculiar, both anatomically and physiologically. Numerous capillaries are present, in the body wall, in the branchial crown, and projecting freely into the body cavity, all of them ending blindly. Most of the blood vessels in the body contract rhythmically. By peristalsis blood is forced along the continuous vessels, and at intervals of 10–20 seconds blood is expelled from the blind capillaries by regularly rhythmic centripetal contractions of their walls, to flow back again into these capillaries almost immediately. There may thus be said to be a true Galenic circulation in the capillaries. The blood contains the respiratory pigment chloro-cruorin.