

Toxopneustes variegatus, a common form of sea-urchin found in this area. The organism is evidently a species of the genus *Cryptochilum*, first described by Maupas,² but differs in some minor details of structure from *Cryptochilum echini* described in the paper of Maupas cited. These differences may indicate a new species, but since the life history of the European form has been carefully investigated by Russo³ (see also Russo⁴ and Russo e di Mauro^{5, 6, 7}) it seems better to reserve judgment on this matter until the life history of the Bermuda species has been more fully worked out.

Maupas first described the species as occurring in the intestines of several *Echini* from the coast of Algiers. A little later he opened a large number of *Echinus* (*Strongylocentrotus*) *lividus* and *E. melo* at Rosecoff, on the coast of Brittany, without encountering a single individual infected with *Cryptochilum*; but four years later he found it again in *E. lividus* at Banyuls-sur-Mer. He says: "It appears, then, confined to the Mediterranean."

Schewiakoff⁸ does not mention this species under the genus *Cryptochilum*, but all the species that he discusses in his paper are described as occurring in European or African waters.

In a paper by Jacobs,⁹ there are briefly described several parasites from the intestinal tract of *Diadema setosa*, from the coral reefs to the west of the Tortugas. The specimen "D" described in this paper seemed so like those found at Bermuda that I submitted a prepared slide of a specimen to Dr. Jacobs, and he says: "So far as I can tell from the slide which you sent me, the form is at least very similar to the one which I designated as 'D' in my 1914 paper."

Since 1919 I have examined large numbers of different species of sea-urchin at Woods Hole, Mass., and at Beaufort, N. C., but found no infection with *Cryptochilum* until the summer of 1924, when I had the opportunity of examining a number of *Toxopneustes* (*Lytechinus*) *variegatus* brought up by the dredge of the U. S. Fisheries boat in Core Sound, Beaufort, N. C. All but one of the

twenty-two individuals examined were infected with *Cryptochilum echini*.

Thus, the distribution of this species is far wider than suspected by Maupas. It is not confined to the Mediterranean, being common at Bermuda and at Beaufort, N. C. In all probability it will also be found in the sea-urchins of the West Indian area.

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THE LOSSES IN TROUT FRY AFTER DISTRIBUTION

MAY I ask the cooperation of your readers, fish culturists and anglers in testing the reliability of some experiments which were designed to ascertain the numbers of trout fry which survived out of a given number distributed in depleted trout streams? The importance of the experiments can hardly be overestimated, because if corroboration of the board's results is obtained in different parts of Canada and in the United States, then if economic results are aimed at, fry will have to be rigidly excluded from all waters excepting those which are known to be suitable.

Three public bodies in Canada cooperated in carrying out the experiments during the summers of 1923 and 1924: (1) The Ontario Department of Fisheries, which furnished the fry and fingerlings and in most cases distributed them; (2) the Department of Fisheries, Ottawa, which appointed an experienced hatchery officer to check the determination of losses; and (3) the Biological Board of Canada, which appointed a Mr. H. C. White to carry out the operations in the field.

In seven streams and two ponds, a total of 97,500 fry or fingerlings were planted, some in June of 1923 and some again in June of 1924. In six of the streams the losses were apparently total at the end of three months. In streams and ponds combined, apparently only 1,375 survived, being less than one and one half per cent. of the total fry planted.

The method of determining the losses was that of seining the streams or ponds and counting the survivors. A net fine enough to catch the smallest fry, and long enough to stretch across a brook is used. A stout brail or stick, about three or four feet long, is attached to each end of the net. Heavy leads are fixed to the lower side of the net, so that fry may not escape at the bottom. The upper side is held above the water by the two men who operate the net, one on each side of the stream.

The seining should be done over and over again—a dozen or more times if necessary; in fact, often

² Maupas, E., 1883, Arch. zool. exp. et gen., (2), I, 427.

³ Russo, A., 1916, Monit. Zool. Ital., Firenze, VII, 74.

⁴ Russo, A., 1914, Atti Accad. Gioenia Sci. Nat. Catania, (5), VII, Mem. 19.

⁵ Russo, A., e Di Mauro, S., 1905a, Boll. Accad. Gioenia Sci. Nat. Catania, ser. nov., fasc. 84, 3.

⁶ *Id.*, 1905b. *Ib.* fasc. 84, 9.

⁷ *Id.*, 1905c. *Ib.* fasc. 85, 10.

⁸ Schewiakoff, W. T., 1896, Mem. Imp. Acad. Sci., St. Pétersbourg, (7), IV, No. 1.

⁹ Jacobs, M. H., 1914, Carnegie Instn. Publ., 183, 147.

enough to ensure that almost every survivor is caught. Towards the end of the seining, it may be necessary to have a third man rile the water thoroughly by stirring up the bottom of the stream in advance of the two seiners. This, in order to prevent the fry from seeing and avoiding the net. Some practice is necessary in seining, otherwise the results will be unreliable.

In one of the brooks seined by the board it was found that the fry ascended the stream about forty rods above and ninety rods below the point of distribution. If it is desired to shorten the distance to be seined and catch all ascending and descending fry, then two fine wire screens should be placed across the stream, one, say twenty to fifty rods above, and the other twenty to fifty rods below the point of distribution. In each of these screens there should be inserted a cylindrical wire fish-trap, funnel-shaped at one end and joined by a smaller cylindrical wire tube or sleeve to an opening in the central part of the screen, so that the trap can be removed and cleaned at pleasure. The screen and the trap should be carefully constructed so as to catch all ascending or descending fry, and thus discover how many fry migrate up or down stream.

The outstanding causes for the high mortality which was found in southwest Ontario seemed (1) warm, stagnant or peaty water; (2) enemy fish eating the fry as shown by finding fry or fingerlings in their stomachs; and (3) lack of sufficient natural food.

The results of the board's experiment thus far are a severe condemnation, not of fish culture as a whole, but of the prevailing method of distributing fry in streams, namely, dumping them at any point most convenient to a highway or traveled road. They should be distributed with fair uniformity along the upper stretches of streams or along the margin of ponds where trout naturally lay their eggs, if they can find suitable spawning beds.

The experiments demonstrate, or at least indicate:

(1) A loss of 98 per cent. of the fry (for the method of planting used and the streams investigated) during the first three months after distribution.

(2) Consequently a greatly increased cost of production per fry.

(3) The necessity of a thorough examination as to the suitability of every stream or pond in which it is proposed to plant fry.

At present we are planting fry in the dark, and in some cases we are feeding them to coarse or useless fish.

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SCIENTIFIC BOOKS

The New England-Acadian Shore Line. By DOUGLAS JOHNSON, professor of physiography, Columbia University. xx + 608 pages. John Wiley and Sons, New York. 1925.

PROFESSOR JOHNSON'S scholarly volume describing the Atlantic shores between the mouth of the Hudson River and the Gulf of St. Lawrence is the most notable American contribution to the science of physiography of the year if not of the decade. It is the first of a series of "Studies of American Physiography" which are designed to treat in systematic fashion the origin and evolution of the surface features of the continent. In this volume is set forth in most readable style a multitude of facts from which the history of this complex shore line may be deduced. The work is largely based on field studies by its author, but Professor Johnson has drawn widely from all available sources so that the book is a complete treatise on the subject.

A part of the expense of the author's field work was met by a grant from the Shaler Memorial Fund of Harvard University and the book is therefore one of the "Shaler Memorial Series." It is peculiarly fitting that the name of the geologist who devoted no small share of his energies to the elucidation of our coastal phenomena should thus be linked with this monographic study of a region which he loved. It is also appropriate that the volume should be dedicated to William Morris Davis, whose creative work in the study of land forms has done so much to make physiography a science.

There is space here merely to call attention to a few of the many outstanding contributions to physiographic knowledge, which the reader will find in this book. The author reaches the general conclusion that the latest movement of the New England-Acadian coast was a gradual submergence of the land which culminated only a few thousand (perhaps between three thousand and five thousand) years ago. So recent was the movement which brought the sea surface against the land at the present level that the salient features of the initial shore line have not been fully destroyed. The shore line to-day clearly displays a remarkable dependence upon geologic structure. It is in an extremely youthful stage of development, befitting the short interval of time since the present relative position of land and sea was fixed. "The rocky cliffs bordering parts of the Maine and Nova Scotia coasts, the picturesque crags towering high above the waves in the Percé region, and the still loftier scarp along the northeastern side of Cape Gaspé,