of the Laboratory with the amount and kind of work accomplished. After the publication of two volumes of Contributions, however, it was decided on account of expense and the difficulty of securing complete series of reprints to publish annually brief summaries of the work accomplished by individual workers. This custom is begun with the present issue of the Annual Announcement. Provision is thus made for the prompt publication of the more important results of researches carried on in the Laboratory.

1. REPORT OF SUMMER WORK AT THE MT. DESERT ISLAND BIOLOGICAL LABORATORY

By Ulric Dahlgren, *Princeton University*

The summer work consisted of collecting and mapping new collecting grounds; of studying the fresh water Bryozoa in the streams and ponds of Mount Desert Island, and of the adjacent main land within a radius of about one hundred miles; and of working out the life histories and ecology of a number of marine larval forms found in the plankton of Frenchman Bay. These larvae were traced to their adult species by successive day and night towing, and also by keeping them in tanks of running sea water in the Laboratory, a method which was found to be more successful than was anticipated before it had been tried. In some of this work the writer was assisted by his pupils from Princeton, Mr. C. Olcott and Mr. Heinz Specht.

In one of the most interesting cases an unknown worm larva was followed up with great success. On June 15th (1930) the water of Laboratory Cove was found to be full of what were evidently Chaetopod worm eggs and trochophores: also a few older larvae. At first it was attempted to find a sufficient number of breeding worms in the near surroundings to account for this large appearance of eggs and early larvae. This proving impractical, it was decided to work from the other end and try to follow the larvae in their life development. These eggs and young larvae were found in large numbers, only near the shore, and for about 100 yards out, occurring sparingly outside of that limit all over Frenchman Bay. In several days the number of eggs increased and the previous lots laid several days before had become trochophores and larvae with the "lappets" characteristic of the plankton young of so many chaetopoda. The larvae seemed to appear on the surface only at night being nearer the bottom in the daytime. By June 20th the mass of older larvae was enormous while eggs and trochophore larvae were decreasing in numbers. From June 25th to July 20th the larvae

fell off gradually in numbers until by that time they were only occasional.

These larvae spend a number of days afloat, swimming about near the surface at night and near the bottom by day. The differences in size, development of segments and other signs of age showed this fact plainly. Then before any adult characters, by which they could be identified, appeared they were gone and it was assumed that they had gone into the bottom mud.

This mud was collected and sifted and studied in several ways, but our larvae could not be positively identified among the various annelids found here.

Before this time, however, and at the time of greatest abundance of larvae, a few tows containing almost pure masses of these familiar larvae were caught and liberated in round glass jars about 15 inches high and 12 inches in diameter. These jars were placed on the water table and a small stream of salt water, fresh from the pump, was allowed to run into it from the top. The surplus water ran off over the edge of the jar and of course some of the larvae were lost in this way. But many remained and at the end of a week or so it was noticed that they occupied a zone of water very near the bottom and only a few days after that it was seen that they were adhering to the glass sides of the jar in its lower third.

It must be explained here that these larvae were now feeding on the detritus and nanoplankton constantly brought in by the stream of pump water from the sea. Such water, while appearing almost clear, is in reality charged with a burden of fine material, some living, some dead organic material and some a fine mineral silt, all of which is caught by the ciliated surfaces of the worms used in feeding, ingested and finally expelled in masses that are bound together in characteristic form and rapidly sink, forming a deposit on the bottom that accumulates very rapidly.

Some of the larvae burrowed into this mud, building their parchment-like tubes, others crawled onto the lower glass sides and there built the same kind of tubes fastened to the glass.

The worms, now fixed to the substrate, fed and grew and increased the size of their tubes all summer. On September 15th they were killed and preserved and there was no difficulty at all in identifying them as *Spio* of a species not yet positively determined, possibly *setosum*.

An examination of the mud, gravel and stone bottom exposed at low water during latter July and August showed thousands of tubes of these young Spios, in the mud, on the rocks, and gathered in large masses between the smaller rocks that lay on the mud and the sand. Adults, presumably over one year old, were found in the mud here and at a number of other locations.

This makes one more form from this region whose habits and life his-

tory are known to such an extent that any one desiring to work with them could get any stage from ripe egg to fully grown adults during a summer at Mt. Desert.

Many very rich collecting grounds were found and sampled. Rich beds of the large razor clam; new beds of brachiopods in deeper water; and the large, branched-arm ophiuran, *Gorgonocephalus,* was found for the first time by the writer in fair numbers.

Studies pursued on the fresh water bryozoa finally resulted in the discovery of a new species and genus, belonging to the family *Cristatellidae.* This the writer will soon publish an account of in another journal and name it *Lophodella Nealii,* the specific name in honor of Dr. H. V. Neal, the present Director of the Laboratory who first brought specimens to the writer in a collection of material from Witches Hole and Lake Wood, on Mt. Desert Island, Maine.

2. THE BEHAVIOR OF THE CERCARIAE OF BUCEPHULUS ELEGANS WITH SPECIAL REFERENCE TO THE EFFECT OF LIGHT AND TEMPERATURE

By GERRIT BEVELANDER, *The Johns Hopkins University*

Although the effect of light and temperature on many organisms is well known, little attention has been paid to the behavior of larval trematodes, generally known as cercariae. This investigation was designed to throw some light on the behavior of the larval trematode, Bucephulus elegans.

The life history of Bucephulus elegans is complicated. According to Woodhead ('29) the egg develops into a miricidium, the miricidium into a cercaria, and the cercaria into an adult, thus completing the life cycle.

EXPERIMENTAL RESULTS

A. Response To Temperature Changes.

The most striking effect on cercariae of a change in temperature, is the change produced in the rate of its rhythmical swimming movements. Between 0° and 27.5° a rise in temperature is almost immediately followed by an increase in the rate of rhythmical movement of the tails, and a decrease in temperature by a decrease in the rate. The relation between this change in rate and change in temperature is fairly accurately expressed by the Arrhenius equation. Between 27.5° and 40° the rate of movement decreases with a rise in temperature and