### DIRECTOR'S REPORT-1930

becomes zero at about  $40^{\circ}$ . At temperatures above  $40^{\circ}$  the tails contract, and become opaque, the epithelial cells on the surface of the body tend to detach, and recovery docs not take place even if the temperature is decreased.

B. The Effect of Temperature on Photic Reaction Time.

The effect of temperature on photic reaction time was determined for five different temperatures; viz.,  $10^{\circ}$ ,  $12.5^{\circ}$ ,  $15^{\circ}$ ,  $20^{\circ}$ ,  $25^{\circ}$ . The results show that when the reaction time is plotted against temperature, the resulting curve simulates an hyperbola. We may conclude from these results that the reaction time varies inversely with the temperature, i.e., the lower the temperature, the longer the reaction time.

# 3. REPORT ON THE COOPERATIVE OCEANOLOGICAL INVESTIGATIONS

#### By CHARLES J. FISH, Buffalo Museum of Science

The oceanological investigations begun in 1929 were continued during the season of 1930 under the auspices of the following cooperating institutions: Mount Desert Island Biological Laboratory, Buffalo Museum of Science, and Brown University. In order to avoid duplication of effort the resources of the three institutions were pooled in order that the staff might function as a unit.

The staff consisted of the following members:

Dr. Chas. J. Fish, Director, and Zooplanktonologist, Buffalo Museum of Science

Dr. Norris W. Rakestraw, Chemist, Brown University.

- Dr. Chas. B. Wilson, Zoologist, Mt. Desert Island Biological Lab.
- Dr. Paul R. Burkholder, Phytoplanktonologist, Buffalo Museum of Science

Mr. H. Richard Seiwell, Hydrographer, Buffalo Museum of Science

Mrs. Marie P. Fish, Ichthyologist, Buffalo Museum of Science

Mr. Vernon S. L. Pate, Artist, N. Y. State Conservation Dept.

Mr. Ralph F. Shropshire, Hydrographer, (part time), Byrd Antarctic Expedition

Mrs. Gladys Eddy Seiwell, Scientific Asst., Mt. Desert Is. Biol. Lab. Mrs. Lillian M. Burkholder, Scientific Asst., Buffalo Museum of Science Mr. Frank Lutz, Jr., Field and Lab. Asst., Mt. Desert Is. Biol. Lab.

The field work consisted of sixteen cruises in Frenchman's Bay between June 24 and August 20, and one in Penobscot Bay. As results of the previous season's investigations indicated that conditions in neighboring bays vary widely it was decided that the 1930 studies should be concentrated on one area. A modified program was carried on until the completion of the "Dahlgren", a 29 foot motor boat especially equipped for oceanological work.

the production and distribution of pelagic life in the region of Frenchthe production and distribution of pelagic life in the region of Frenchman's Bay in order to determine if possible to what extent the fertility of this area is due to strictly local conditions, or to what extent it may be influenced by the peculiar hydrographic conditions at the mouth of the Bay of Fundy.

It is possible that local sources of food supply are not sufficient to maintain the rich animal and plant communities of the bays along the Maine coast, and instead of contributing to the fertility of offshore waters they may really be consumers, depending to a certain extent for their support upon the food stuffs transported by the westerly drift about the margin of the Gulf. If such a condition is found to exist, any alteration of the vital areas to the eastward, such as the proposed damming of Passamaquoddy Bay, might exert more than a purely local influence.

Investigations in areas of considerable river outwash, such as Penobscot or Casco Bays, would not yield results applicable to the coast line as a whole. Frenchman's Bay with its negligible land drainage offered a more favorable location in which to begin.

In major marine biological problems there are so many unknown factors to contend with that all possible physical, chemical, and biological aspects must be considered. Only through a correlation of the many known controlling factors can one hope to understand production and distribution of life in the sea.

Following are the individual summaries on the different subjects considered:

## 4. PHYSICAL OCEANOGRAPHY

## By H. R. SEIWELL, Buffalo Muscum of Science

Observations on temperature and salinity of Frenchman's Bay and adjacent waters were conducted throughout the three months period June to September. Detailed observations were conducted at two stations, one in the mouth and the other near the center of Frenchman's Bay. Hourly series of temperatures and salinities extending over periods of eight to fourteen hours were made at these two stations and attempts were made to characterize the water masses and study their tidal movements. Four eight hour hydrographic stations were established throughout the length of Penobscot Bay. Temperatures and water samples for various major and minor constituents were obtained.

The temperature observations of last summer together with those of