## BREATHING RHYTHM OF *FUNDULUS HETEROCLITUS* AS RELATED TO TEMPERATURE

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The rate of opercular breathing movements was studied at various temperatures between 0 and 29°C. This work was carried on simultaneously with the investigation of chemical stimulation as related to temperature. The experimental set-up was the same for the two experiments. At least one hour adaptation in the reaction chamber was allowed the fish before the time for ten opercular movements was measured. The data from three fish were averaged for the salt water tests, and for fresh water the data from six fish averaged. The data were analyzed in accordance with the Arrhenius equation (see previous abstract). When log opercular rate was plotted against the reciprocal of the absolute temperature for the salt water tests a linear band of points was obtained. The value of µ obtained from the slope of the parallel lines bounding the band of plotted points was found to be 8,400. A similar analysis of the fresh water data revealed a temperature characteristic of 16,400 below 9.5°C., and 11,300 above this temperature. The breathing rhythm of Fundulus in either environment reaches a limiting value above about 24°C.

The temperature characteristics for *Fundulus* breathing rhythm in salt and fresh water are typical of those which have been reported by other workers for respiratory and oxidative biological phenomena. The fact that the  $\mu$  value for opercular rate changes with the environment of the fish indicates that different chemical reactions with different velocity constants are controlling the rate of breathing in the two environments. Assuming the same catenary series of reactions to control opercular rate in the two cases, then the slowest member of the series would be the master reaction controlling that rate. The different  $\mu$  values obtained indicate that the controlling reaction for breathing rhythm of *Fundulus* is different in salt water from fresh water; and in fresh water the controlling reaction is different below 9.5°C., from that above this temperature.

## BEHAVIOR OF THE BARNACLE, BALANUS BALANOIDES, AS CORRELATED WITH THE PLANKTONIC CONTENT OF THE SEA WATER

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In observing the barnacle, *Balanus balanoides*, during the past five years it has been found that on certain days during the summer a large percentage of animals show irregular cirral movements or remain mostly closed, even when sea water freshly pumped from the bay flows over them. Such behavior makes it impossible to use the