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AN INVESTIGATION OF INTRACELLULAR
ISOSMOTIC REGULATION
IN THE MOLLUSC

MELANOPSIS TRIFASCIATA (GRAY 1843.)

thesis presented for the
degree of Doctor of Philosophy
at the University of Auckland,
September, 1970.

by Jennifer J. Bedford.

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ABSTRACT.

An estuarine mollusc Melanopsis trifasciata was studied with respect to its osmoregulatory capacity. Analysis of the environment, body fluids, and cell constituents was carried out and the results indicated that Melanopsis was able to regulate its cellular amino compounds in response to salinity changes. However it is isosmotic and more or less isotonic with the environment as far as the haemocoelic fluid is concerned. An attempt was made to find out how or why this response of the cells to changing external osmotic pressure comes about. Various techniques were used : puromycin to block protein synthesis, labelled amino acids, time experiments, enzyme assays, and so on. Finally in the light of present day work the results were interpreted and a system of control put forward for Melanopsis which was later extended in general terms to all euryhaline poikilosmotic invertebrates.

"The term homeostasis was first introduced by Cannon (1932) following the ideas of Claude Bernard for the maintenance of internal environment to attain a steady state.

Although sanctified by years of tradition, the phrase is somewhat disturbing. It is derived from "homeo" - similar, or alike, and "stasis."

From "Pituitary Cybernetics and Neoplasia."
J. Furth, pp. 47-71. The Harvey Lectures,
ser. 63, 1969. Academic Press.