

ABSTRACT

The haemocyanins of five crabs ranging in habit from aquatic to terrestrial are investigated.

The mean P_{50} 's of the respiratory pigments are determined at 0 mm CO_2 and $28^{\circ}C$, (the average ambient temperature). Comparison of these data adjusted to the individual "Physiological pH's" indicate an increase in P_{50} with terrestrialization, perhaps related to the greater abundance of oxygen in the aerial than in the aquatic habit, and progressive elaboration of "lung" breathing with terrestrialization.

A few in vivo pO_2 , pCO_2 and pH measurements are taken for Callinectes sapidus and Cardisoma guanhumi using paloragraphic and glass electrodes respectively.

Relative pigment concentrations are determined and discussed with reference to increasing QO_2 's (as found by Ayers, 1938), the provision for heightened pO_2 gradient across the gills, and increasing need to counterbalance possibly rising circulatory hydrostatic pressure, with terrestrialization.

The Bohr shifts ($\Delta \log P_{50} / \Delta pH$) are determined, and are found to decrease with terrestrialization, perhaps in adaptation to the associated rise in internal pCO_2 , probably
resulting/

resulting from progressive gill reduction.

The temperature shifts (ΔH Cals./mole) of the haemocyanins are found and it is suggested that they diminish with (a) increasing environmental temperature and temperature fluctuation accompanying terrestrialization, and (b) decreasing body size.

Haemocyanin P_{90} and P_{50} of Goniopsis cruentata are correlated with maximal respiratory rates (at rest) and critical oxygen tension (P_c), and with lethal pO_2 s (P_L) respectively, at different temperatures. Indications are that pigment affinity plays a large part in determining both the P_c and the P_L .

The theory that the P_c represents that point at which the respiratory pigment is no longer fully saturated on leaving the gills, is critically examined with reference to the above data, and found to be inadequate. An alternative hypothesis is tentatively suggested.

An apparent pCO_2 specific increase in haemocyanin affinity is noted for Cardisoma guanhumi and Callinectes sapidus.