

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE IN THE PLYMOUTH LABORATORY

MEVES, H., 1974. The effect of holding potential on the asymmetry currents in squid giant axons. *Journal of Physiology, London*, **243**, 847-67.

Asymmetry currents were recorded from intracellularly perfused squid axons subjected to an equal number of exactly equal positive and negative voltage clamp pulses. They consisted of an on-response at the beginning of the pulses and an off-response at the end of the pulses. The asymmetry currents were markedly reduced by 30 mM glutaraldehyde applied internally. Clamp pulses of varying height, superimposed on a holding potential of -80 to -100 mV, were used to study the voltage and time dependence of the asymmetry current. The magnitude of the on- and off-response increased with increasing pulse height along a sigmoid curve. The time constants of the on- and off- response depended on the potential during the depolarizing pulses. Holding the membrane at a potential of -80 to -100 mV for several minutes led to a slow increase of the size of the asymmetry current. Changing the holding potential from -80 or -100 mV to a less negative potential caused a decrease of the asymmetry current. At holding potentials less negative than -65 or -60 mV the asymmetry current reversed its sign. No inactivation of the asymmetry current was seen in the range of holding potentials studied. The results are generally consistent with the idea that the asymmetry currents are in some way related to the opening and closing of the sodium gates; they suggest, however, that the asymmetrical charge movement does not simply reflect the voltage and time dependence of the *m* system.

SOUTHWARD, A. J., BUTLER, E. I. & PENNYCUICK, L., 1975. Recent cyclic changes in climate and in abundance of marine life. *Nature, London*, **253**, 714-17.

Marine biological records now accumulating show signs of secular and short-period fluctuations, which seem to be related in some way to the corresponding cyclic fluctuations in sea temperatures and, through these, to the solar and other cycles. Annual means of sea surface temperature from the English Channel Station E1 show correlation with the 11-year component of the sunspot cycle. The biological data shows either a positive or negative correlation with this 11-year cycle and also with the secular trend. The peak of the secular temperature cycle was reached in the 1940s or 1950s, and it is suggested that the reverse temperature trend now showing should continue until 1990 or later, possibly resulting in further increases in the abundance of cold-water species in the English Channel.

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WHITFIELD, M., 1974. Thermodynamic limitations on the use of the platinum electrode in *Eh* measurements. *Limnology and Oceanography*, **19**, 857-65.

The thermodynamic stability of surface oxide and sulphide coatings on the platinum electrode is considered. In well mixed environments thermodynamic considerations and experimental evidence suggest that the platinum surface acts as an oxide electrode that responds to pH rather than to oxygen partial pressure. In stagnant conditions in the marine or estuarine environment the slow formation of platinum sulphide may push the measured *Eh* values to more negative potentials if permanently employed electrodes are used. These reactions may restrict the operational use of *Eh* measurements.