“This is in agreement with the hypothesis that the inward current is carried by Na⁺ ions, which as a result of a decrease in RP, are permitted to cross the membrane in both directions under a driving force that is the result of both the concentration difference and the electrical potential difference.”
RP = -55 mV  Change outside Na and see change inward current reversal

% SW  100  10  100

RP = -55 mV  Change outside Na and see change inward current reversal

VClamp = +55 mV  VClamp = 0 mV

Fig. 6. Curves of test current density during voltage change in the neighborhood of sodium potential: a, sea in sea water; b, sea in 10% sodium sea water; c, after replacing sea water. Note that ordinate scale is larger in b than in a and c. Displacement of current reversal in indicating solution for each curve. Arrn no. 12; temperature 8° C.

Predicted NaEq = Observed

Table 1. Comparison of observed and theoretical change in sodium potential when the fluid surrounding the axon is changed from sea water to a low sodium solution. Observed change:

Observed − Theoretical = (PNa − PNa) + (ECl − ECl).

Isolation of currents 1952

Quantification of inward and outward currents 2014
Calculation of conductances

Membrane voltage

How do we get $K_{eq}$ Potential?

Determining reversal potential for $K$ from tail current

Conductance/Voltage relationship

Depolarization

Conductance rate of rise/voltage relationship

Depolarization

$g_{Na}$ $g_{K}$

$V_m$ $a$ $b$

$\frac{\Delta g}{\Delta V}$ vs. $V_m$

$\Delta g_{Na}$ $\Delta g_{K}$

$\Delta V$

$RP = -55 \text{ mV}$

$ICa$ Tail example

$-50 \text{ mV}$
What did they do in this paper??

1) Showed that Na\(^+\) is the inward charge carrier for the AP.
2) Separated \(I_{Na}\) and \(I_k\).
3) Expressed the currents in terms of conductance.
4) Applied this to calculations of the time course of \(g_{Na}\) and \(g_{K}\).
5) Suggested the importance of these currents for the AP.