Electrogenic Pump Potential

Na efflux = 50 p mole/cm² sec = 5×10^{-11} mole/cm² sec
(from tracer flux)

(Avogadro's #) $5 \times 10^{-11} \frac{\text{mole}}{\text{cm}^2\,\text{sec}} \times 6.02 \times 10^{23} \frac{\text{quanta}}{\text{mole}} = 3 \times 10^{13} \frac{\text{Na}}{\text{cm}^2\,\text{sec}}$

($3\,Na^+$ to $2\,K^+$) $1 \times 10^{13} \frac{\text{Na}}{\text{cm}^2\,\text{sec}}$

(elementary charge) $1 \times 10^{13} \frac{\text{Na}}{\text{cm}^2\,\text{sec}} \times 1.6 \times 10^{-19} \frac{\text{coul}}{\text{Na}}$

product = $9.65 \times 10^{4} \frac{\text{coul}}{\text{gm-eq}}$ = Faraday's const

($\frac{\text{coul}}{\text{sec}}$ = amp) $= 1.6 \times 10^{-6} \frac{\text{Amp}}{\text{cm}^2} = 1.6 \frac{\mu\text{Amp}}{\text{cm}^2}$

Resting resistance = 1000 Ω cm²

(ohm's Law) $E = IR$

E (from electrogenic Na pump) = $1.6 \times 10^{-6} \frac{\text{Amp}}{\text{cm}^2} \times 10^{3}\ \Omega \times \text{cm}^2$

$= 1.6 \times 10^{-3}$ V = 1.6 mV

Hodgkin & Keynes 1955 say 1.8