We compare

$$j_{H_2O} = - c_w L_p \Delta p \quad \text{with}$$

$$j = \frac{q E c}{\zeta} - D \frac{dc}{dx}$$

and see that $c_w L_p$ plays the role of $1/\zeta$.

So we guess that

$$D\zeta = kT \quad \text{becomes}$$

$$P_w (c_w L_p)^{-1} = kT$$

which makes sense in that we expect

$$P_w \Delta C = c_w L_p \Delta p$$

$$\frac{P_w}{c_w L_p} \frac{N}{V} = \Delta p$$

$$\frac{P_w N}{c_w L_p} = \Delta p V = N \Delta kT$$

or

$$P_w (c_w L_p)^{-1} \approx kT.$$

(d)

$$L_p = \frac{P_w}{c_w kT}$$

find $L_p$.