Comparing (9) and (12), we notice the fields $E_\alpha$ and $E'_\alpha$ are very similar. In fact, they will be equal if

$$\frac{\Delta E_\alpha}{\Delta} = \frac{\eta_0 q^2 \omega}{2 m \varepsilon_0} < \frac{1}{(\omega_0^2 - \omega^2) + i \left( \frac{b}{m} \right) \omega}$$

$$\frac{\eta_0 q^2}{2 m \varepsilon_0} \frac{1}{(\omega_0^2 - \omega^2) + i \left( \frac{b}{m} \right) \omega}$$
Since \( \eta_0 \) is the \# of changes per unit area,
\[ \frac{\eta_0}{d} \]
will be the \# of changes per unit volume.
Let's call \( \frac{\eta_0}{d} = N \)

thus, we obtain an expression for the index of refraction \( n \)

\[
\eta = 1 + \frac{N q^2}{2 m \epsilon_0} \left( \frac{1}{(\omega_0^2 - \omega^2) + i \left( \frac{q}{m} \right) \omega} \right)
\] (13)
The lesson is the following.

In expression (12) the electric field $E_a'$ does not involve at all that the speed of waves has changed. $E_a'$ is simply the contribution to the electric field at $P$ coming from all the charges oscillating in the thin glass. All these contributions are waves that travel at speed $c$.

We have found that $E_a'$ is identical to $E_a$ given in expression (9) where it is assumed that the wave slows down while traveling inside the glass of thickness $d$. 