must be equal to the amount of liquid ABCO missing from above. This condition leads immediately to the relationship

$$b = \frac{ax}{1-x} \tag{2}$$

Our schematic wave profile is then characterized by the two parameters a, x. The problem is to determine how they vary with time.

In principle the problem so simplified could be solved by expressing the kinetic energy T and the potential energy U of the liquid contained between the two boundaries OA, O'E as functions of a, x, $\dot{a}$, $\dot{x}$.

$$T = T(a, x, \dot{a}, \dot{x})$$
$$U = U(a,x)$$

One can then write the Lagrange equations

$$\frac{d}{dt}\frac{\partial T}{\partial \dot{x}} - \frac{\partial T}{\partial x} = -\frac{\partial U}{\partial x}; \quad \frac{d}{dt}\frac{\partial T}{\partial \dot{a}} - \frac{\partial T}{\partial a} = -\frac{\partial U}{\partial a} \tag{3}$$

which describe the law of variation of the two wave parameters a, x.

The potential energy U can be written down immediately. It is due to having moved the liquid originally contained in ABOC (weight per unit length perpendicular to the plane of the drawing = $\rho g \frac{\lambda}{2} b (1-x)$, height of the center of gravity = b/2) to the lower position CDEO' with the center of gravity at a height -a/2.

In what follows the following units will be used: Unit of length, $\frac{\lambda}{2}$; unit of acceleration, g; unit of density, ρ.

One finds, then, the potential energy

$$U = -\frac{1}{2}\frac{a^2 x}{1-x} \tag{4}$$

The calculation of the kinetic energy is more difficult. In principle it could be carried out for a prescribed motion of the profile of the liquid by solving a Dirichlet problem. Instead of doing this, a much cruder method was followed in keeping with the crude approximation chosen for the profile of the wave.