not far from the one computed from the correct hydrodynamical theory of small amplitude waves

$$T = \sqrt{\frac{\Delta}{2\pi g}} = \frac{1}{\sqrt{\pi}} = .56 \quad \text{(in our units)} \tag{13}$$

Already, at t = 1, an appreciable asymmetry of the wave has developed. This becomes more and more noticeable for later times. At t = 3, for example, b is less than 1/10th of a.

The asymptotic behavior of a, b, and x for large values of the time is obtained from a discussion of the equations (9). One finds that a increases proportionally to the square of the time, b increases proportionally to the square root of the time, and x is inversely proportional to the 3/2 power of the time. More precisely, one finds the following limiting expressions

$$a \rightarrow \frac{4}{7}(t - 1.04)^2 \tag{14}$$

$$b \rightarrow .12(t - 1.04)^{1/2} \tag{15}$$

$$x \rightarrow .21(t - 1.04)^{-3/2} \tag{16}$$

In other words, the lower tip of the wave falls with uniformly accelerated motion and with acceleration equal to 8/7 g. The upper half wave grows much more slowly and its velocity decreases with time.

It is interesting to compare the results of this crude approximation with the experimental results obtained by D. J. Lewis[1], as well as with the results of G. I. Taylor[2] and of Taylor and Davis[3]. The present theory seems to represent correctly one feature of experimental results, namely the fact that the half wave of the heavy liquid into the vacuum becomes rapidly narrower, whereas the half wave pushing into the heavy liquid becomes more and more blunt. On the other hand, the present theory fails to account for the experimental results according to which the front of the wave pushing into the heavy liquid moves with constant velocity. According to the present theory the displacement is expected instead to be proportional to the square root of the time.

1. PRS 202A 81, 1950
2. PRS 201A 192, 1950
3. PRS 200A 375, 1950