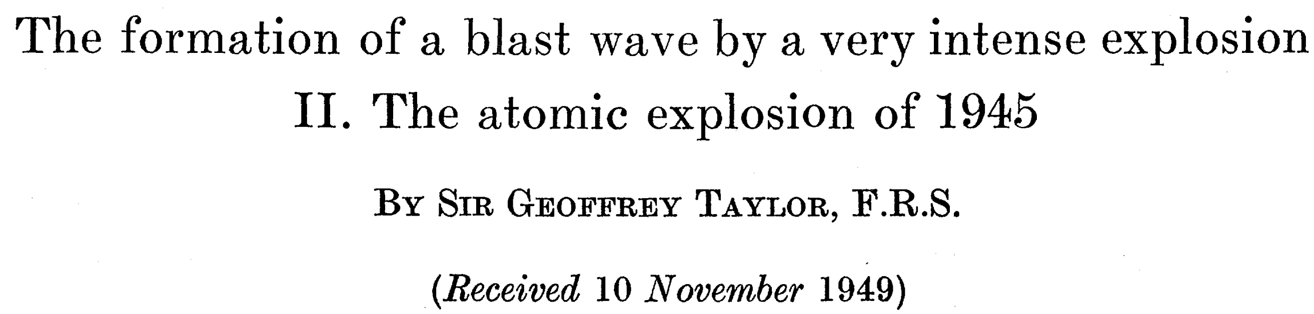
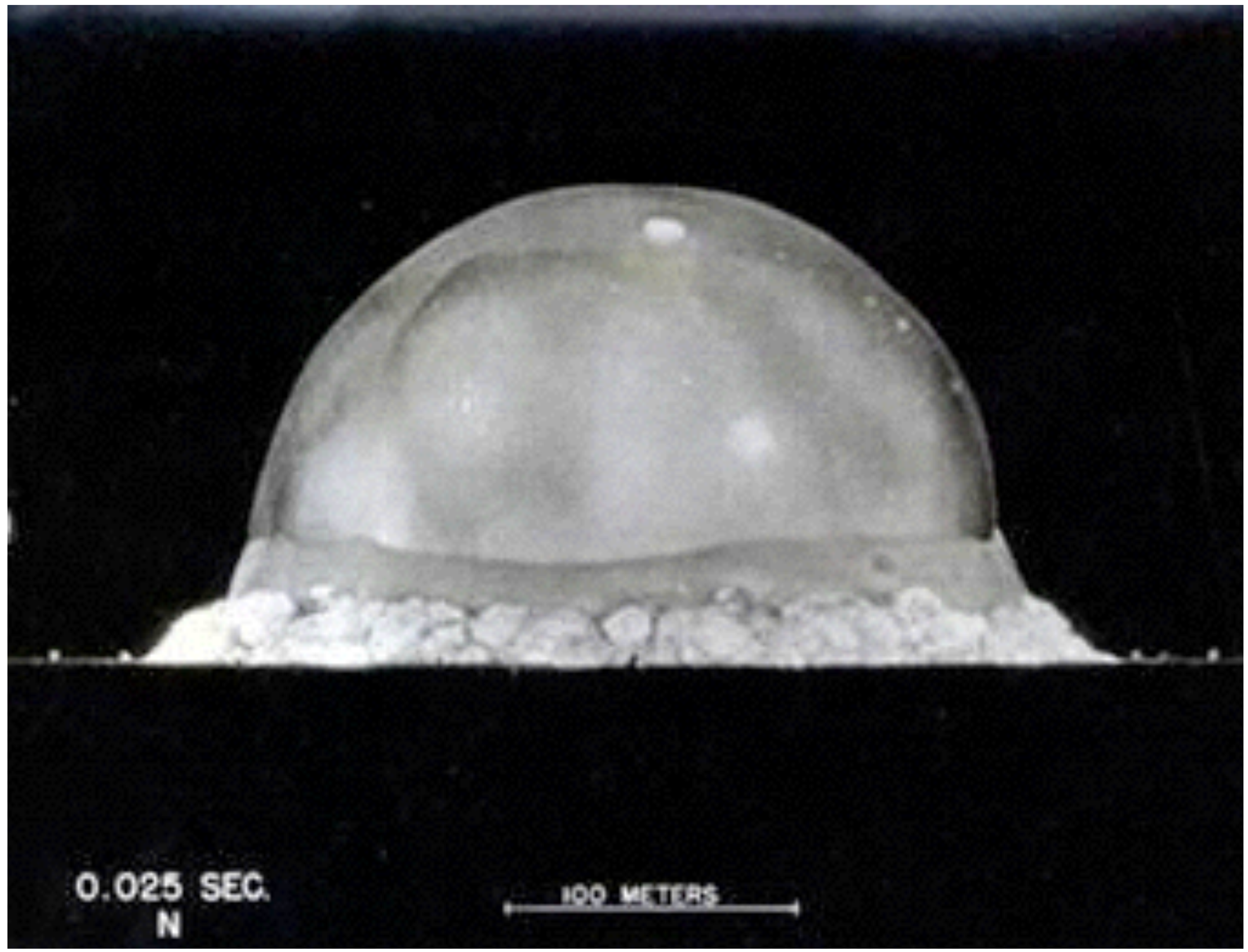
G.I. Taylor
1886-1975





Trinity nuclear test, July 1945

Life Magazine, August 20, 1945

G.I. Taylor
1886-1975

The formation of a blast wave by a very intense explosion.
II. The atomic explosion of 1945

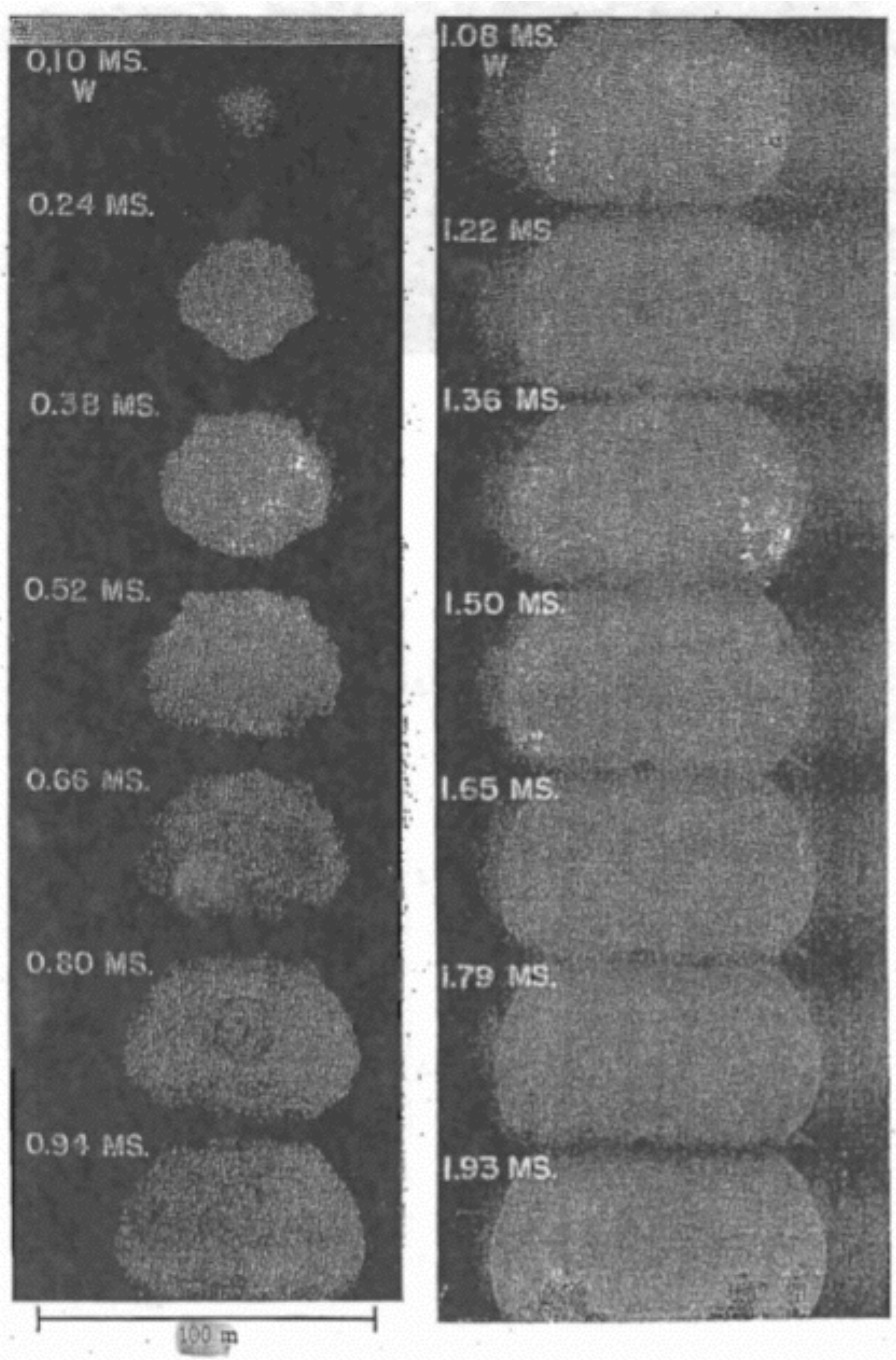
By Sir Geoffrey Taylor, F.R.S.

(*Received* 10 *November* 1949)

Photographs by J. E. Mack of the first atomic explosion in New Mexico were measured, and the radius, R, of the luminous globe or 'ball of fire' which spread out from the centre was determined for a large range of values of t, the time measured from the start of the explosion. The relationship predicted in part I, namely, that $R^{\frac{5}{2}}$ would be proportional to t, is surprisingly accurately verified over a range from $R=20$ to 185 m. The value of $R^{\frac{5}{2}}t^{-1}$ so found was used in conjunction with the formulae of part I to estimate the energy E which was generated in the explosion. The amount of this estimate depends on what value is assumed for γ, the ratio of the specific heats of air.

Two estimates are given in terms of the number of tons of the chemical explosive T.N.T. which would release the same energy. The first is probably the more accurate and is 16,800 tons. The second, which is 23,700 tons, probably overestimates the energy, but is included to show the amount of error which might be expected if the effect of radiation were neglected and that of high temperature on the specific heat of air were taken into account. Reasons are given for believing that these two effects neutralize one another.

Source: *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences*, Vol. 201, No. 1065 (Mar. 22, 1950), pp. 175-186



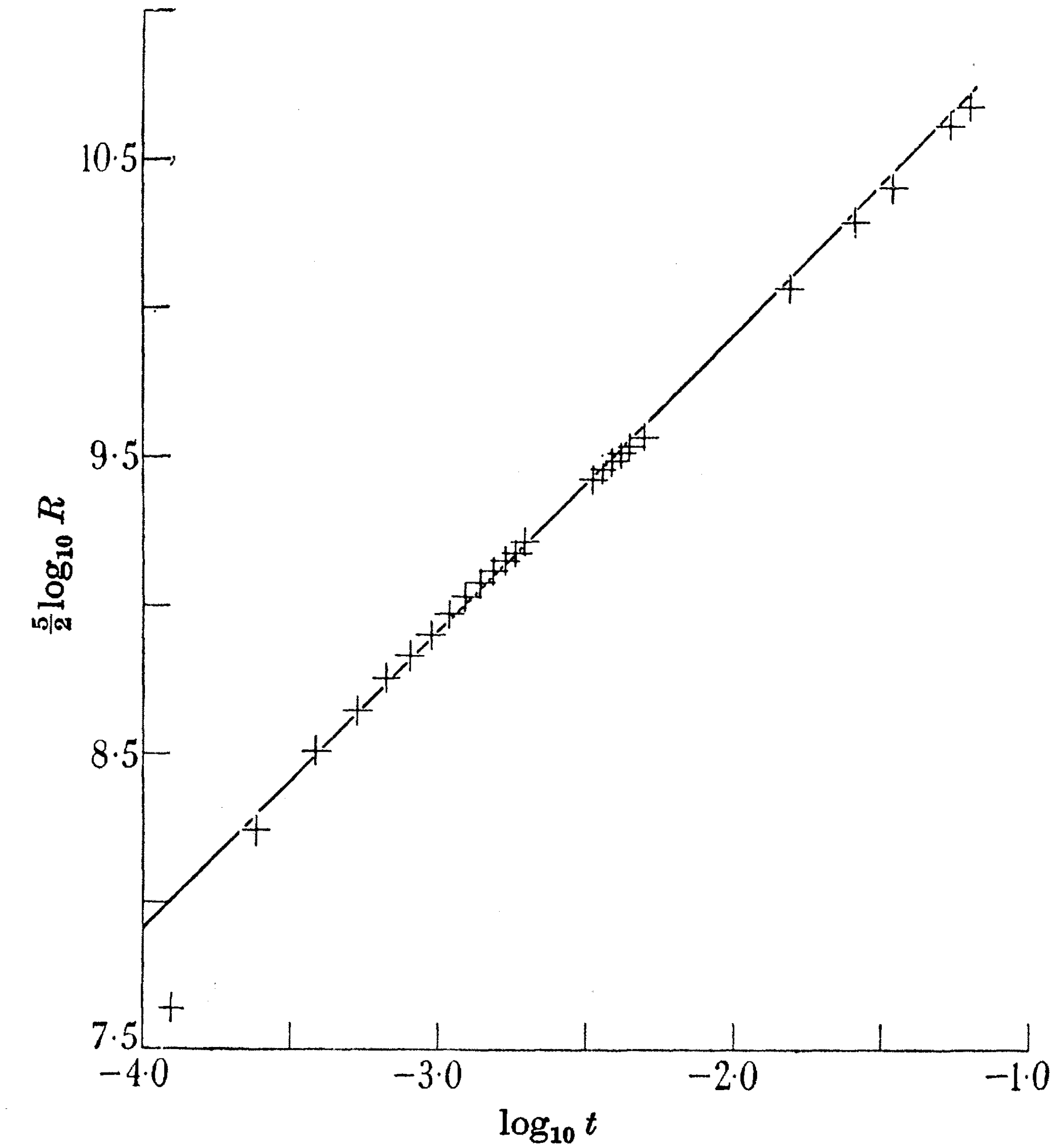


Figure 1. Logarithmic plot showing that $R^{\frac{5}{2}}$ is proportional to t.

$$\ln R = \ln\left[c\left(\frac{E}{\rho}\right)^{1/5}\right] + \frac{2}{5}\ln t$$

Source: *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences*, Vol. 201, No. 1065 (Mar. 22, 1950), pp. 175-186