$\frac{c}{3 \sin 2\theta}$ (found by combining (1) and (2) for r, simplifying and reducing,

$$\left. \begin{aligned} AH \text{ becomes} &= \frac{c}{6} \frac{(2 + \cos 2\theta)}{\cos\theta} \\ \text{and } HO \text{ becomes} &= \frac{c}{6} \frac{(2 - \cos 2\theta)}{\sin\theta} \end{aligned} \right\} = \text{equation (4)}$$

Referring to Fig. (1)

$$AB = AH + HB = AH + OH \tan\frac{I}{2} = \text{equation (5)}$$

To find the length of transition curve itself:—
the formula for a differential of the curve is

$$dL = \sqrt{(dc)^2 + c^2\,(d\theta)^2}$$

$$\text{but by } (b) \quad (d\theta)^2 = \frac{c^2\,dc^2}{m^2 - c^4}$$

$$\therefore\; dL = \frac{m\,dc}{\sqrt{m^2 - c^4}} = m\,(m^2 - c^4)^{-\frac{1}{2}}\,dc = \left(1 - \frac{c^4}{m^2}\right)^{-\frac{1}{2}} dc$$

expanding by the Binomial Theorem

$$dL = \left(1 + \frac{c^4}{2m^2} + \frac{3\,c^8}{8\,m^4} + \right) dc$$

integrating, $\quad L = c + \frac{c^5}{10m^2} + \frac{c^9}{24m^4} = \text{equation (6)}$

when $m = 1031337$, (the number chosen in making up the table); $\frac{c^5}{10m^2}$ the second term in the above series $= \frac{1}{10}$ of a foot when