[illegible]

Transmission Method

w_T = Width of film in inches

l_T = Length of film in inches

With N black lines/mm in each direction

Number of Lines in l_T direction = $N l_T \times 25.4$

Number of Lines in w_T direction = $N w_T \times 25.4$

t = Time in seconds for one scan line = $N l_T \cdot 25.4 / f_m$

f_m = highest frequency transmitted = [illegible] bandwidth

T_f = Time to transmit one frame = $N \cdot [illegible] \cdot 25.4$

ϕ = Factor greater 1 to indicate excess of scan lines to transmit N lines

So T_f

$$T_f = \frac{N w_T \cdot 25.4 \cdot N l_T \cdot 25.4 \phi}{f_m}$$

ϕ is a number between 2 & 3 and comes about because the detail is positioned arbitrarily with respect to the scan lines

3 (Typical Problem)

$$T_f = \frac{(25.4)^2 \times \frac{1}{2} N^2 \cdot \Delta T \cdot l_T^2}{\Delta f}$$

$$T_f = \frac{1935\, N^2 \cdot W_T \cdot l_T^2}{\Delta f} \quad (1)$$

or

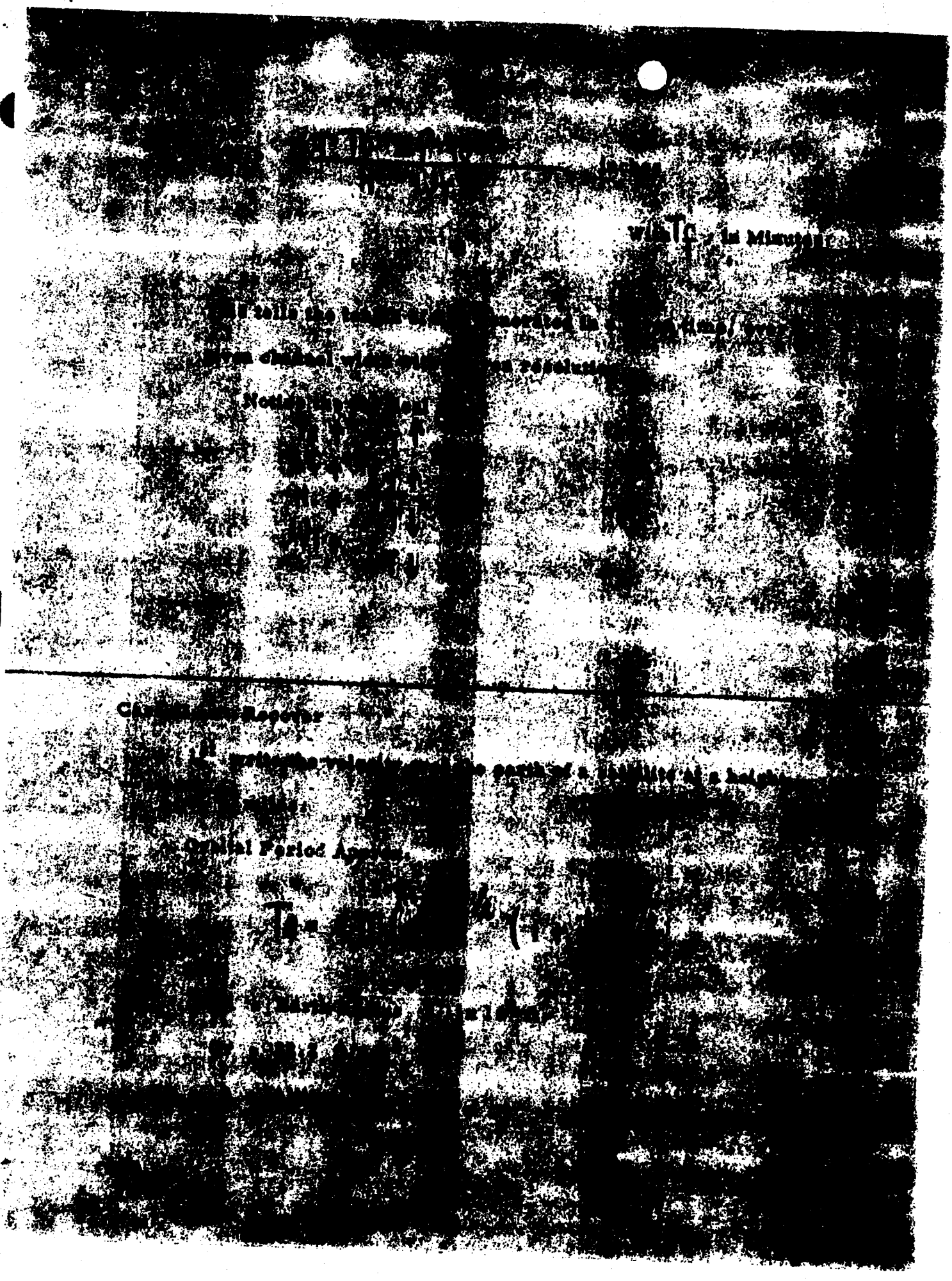
$$l_T = \frac{T_f \cdot \Delta f}{1935\, N^2 \cdot W_T} \quad \text{inches} \quad (2)$$

T_f = Frame time in seconds

Δf = in cycles/seconds

W_T = in inches

N = lines/mm



V_e = Velocity over the earth

$$V_e = \sqrt{\frac{2gR^2}{R+h}} = \sqrt{\frac{2 \times 32.2 \times 3960^2}{3960+h}} = \left(\frac{2 \times 32.2 \times 3960^2}{3960+h}\right)^{1/2} \text{ ft/sec}$$

For h in Miles

$$V_e = 2 \times 32.2 \times 3960 \left(1 + \frac{h}{3960}\right)^{-1/2} \text{ ft/sec}$$

Now the velocity of a point on the [illegible]

$$V_1 = \frac{V_e f}{h} \text{ ft/sec} \qquad f = \text{focal length in Miles}$$

$$V_1 = \frac{V_e f}{12 \times 5000\, h} \text{ ft/sec} \qquad f \text{ in inches}$$

$$V_1 = \frac{V_e f}{5000\, h} \text{ in/sec} = \frac{V_e f}{100\, h} \text{ in/Mile}$$

l_1 = length of recovered film = $\frac{f T_e}{100\, h}$ inches

c

$$R = \frac{K 2.2 \times 10^{-2} \left[1 + \frac{h}{4000}\right]^{3/2}}{h} \sqrt{f T_f}$$ Inches

h in Miles

R in Inches

T_f in Min.

Note: $\frac{R_r}{R_T}$ when ≥ 1 Received Signal

when < 1 Transmitted Signal

$$a = \frac{2.22 \times 10^{-2} \sqrt{T_f}\, 10^{R} N^2 W_T}{\left[1 + \frac{h}{4000}\right]^{3/2} h\, 5.1\, T_f \Delta f} Q^{4}$$

where Q indicates losses in reproducing the transmitted image

(A number between 2 & 5)

$$G = \frac{8450 f N^2 W_T Q^2}{h \Delta f \left[1 + \frac{h}{4000}\right]^{3/2}}$$

f in [illegible]

N in [illegible]

W_T in Inches

h in Miles

Δf in cycles/sec