Dear Milne,

I got your paper from Finney, and of course I am very glad for you to make use of the quotation from my letter.

About the blanket test, there is quite a simple formulation which you might find applicable to your experience. Suppose that, in dragging the blanket, there is an accretion of ticks per yard on the average, and a loss dependent upon the number of ticks carried at the moment.

On this basis one has the differential equation

\[ \frac{dy}{dx} = a - ky \]

where \( x \) is the distance traversed, \( y \) the number of ticks at any stage, \( a \) the rate of accretion measuring the tick population of the pasture, and \( k \) a factor representing the rate of loss, and probably dependent on the roughness of the pasture and other conditions. Putting in the condition that \( y \) is 0 when \( x \) is 0, the solution of this differential equation is

\[ 1 - \frac{k}{a} y = e^{-kx} \]

so that if one has values \( \frac{73}{36} \) & \( \frac{103}{36} \) for two values of \( x \), of which the second is double the first, one has the equation

\[ (1 - \frac{k}{a} \cdot \frac{73}{36})^2 = 1 - \frac{k}{a} \cdot \frac{103}{36} \]
or simply
\[
\frac{k}{a} = \frac{43 \times 36}{73^a}.
\]

Using now the fact that the average number \( \frac{73}{36} \) was attained after 25 yards drag, one has
\[
e^{-25k} = 1 - \frac{43}{73}
\]
or
\[
k = \frac{1}{25} \log_e \frac{73}{30},
\]
whence \( a \), which measures the number of ticks per yard of pasture, is
\[
\frac{73^a}{43 \times 36 \times 25} \log_e \frac{73}{30}.
\]

This comes to .12245 ticks per yard, or 3.061 per 25 yards, or 6.1225 per 50 yards, and so on.

This seems at least a logical way of dealing with loss of ticks in the course of the drag, and, as the arithmetic to which it leads is easy, I do not see why it should not be used.

Yours sincerely,