$r = \left(\frac{l}{a}\right)^{\frac{1}{n-1}}$ (45); multiplying (42) by r and substituting it in (40.)

$S = \frac{rl - a}{r - 1}$ (46); $a = rl - S(r - 1)$ (47); $l = S - \frac{S - a}{r}$ (48); $r = \frac{S - a}{S - l}$ (49). When n is infinite, and r a *proper* fraction, ar^n in (40) becomes $= o$. Hence for an *Infinite Series* $S = \frac{a}{1 - r}$ (50); $a = S(1 - r)$ (51); and $r = \frac{S - a}{S}$ (52).

VII. ANNUITIES AT SIMPLE INTEREST.

Let $A =$ a single payment of the Annuity, $M =$ Amount, $t =$ number of payments, and $r =$ Interest of *one* pound for *one period*. Then when the annuity is forborne any number of payments, the last payment being received at the time it falls due, $= A$; last but one $= A + Ar$, last but two $= A + 2Ar$, last but three $= A + 3Ar$, 1st $= A + (t - 1)Ar$; hence $M = A + (A + Ar) + (A + 2Ar) + (A + 3Ar) + \ldots\ldots\ldots (A + (t - 1)Ar)$. Whence from (28), $M = At\left(1 + \frac{(t - 1)r}{2}\right)$ (53), $A = \frac{2M}{t(2 + r(t - 1))}$ (54); $r = \frac{2(M - At)}{At(t - 1)}$ (55); and $t =$

$\frac{\sqrt{8r\frac{M}{A} + (2 - r)^2} - (2 - r)}{2r}$ (56); Let $v =$ present value of an annuity to continue any number of payments; from (6) $v(1 + rt) = M = At\left(1 + \frac{(t - 1)r}{2}\right)$; hence $v = \frac{2 + (t - 1)r}{2}\left(\frac{At}{1 + rt}\right)$ (57); $r = \frac{2(At - v)}{(2v - (t - 1)A)t}$ (58); $A = \frac{2v(tr + 1)}{(2 + (t - 1)r)}$ (59).