USES OF THE TABLES.

loan of \$128

r = 0021395:

og. r) = 203

has a term s; C has a reversion interest of

or A, n = 9;

v. of per-

= 4599002 = 2.883.37 = 1883.37 = 2749354 = 2 = 13979400 = 15400998 = 32129752 = 4599002 = 27530750 \$566.337

= 2500.00

2199.30

12. Terminable annuities may be considered as being composed of two distinct parts—the Interest and Sinking Fund. The annuity, in order to pay off the principal, must exceed the interest. The difference between the annuity and the interest is termed the Sinking Fund. If S denotes the yearly sum appropriated to the Sinking Fund, the amount of which will produce the principal, we have a = Vt + S and from Form 5 we deduce directly $a = Vt + \frac{a}{r^a}$, so that $S = \frac{a}{r^a}$. But a denotes the annuity and $\frac{a}{r^a}$ the present value of the n^{th} or last annuity, therefore the Sinking Fund is equal to the present value of the last annuity.

Ex. 8.—A loan of 5500,000 is contracted by a corporation at 5%, payable half-yearly, to be reimbursed by means of 90 half yearly annuities. What sum is to be paid as a Sinking Fund, besides the interest, for the purpose of redeeming this loan?

Here V = 500,000; r = 1.025; t = .025; n = 90; log. r = 01072,38654; Vt (interest)=12,500; then

(12) $90 \times \log r = 0.9651479$ $r^{90} = 9.22886$ $r^{90} - 1 = 8.22886$ $\log (r^{90} - 1) = -9153397$	$\log r^{90} = 9651479$ $\log V = 4.0969100$ $\Gamma^{1} \log (r^{90} - 1) = \overline{\Gamma} \cdot 0946603 S$ $\log a = 4.1467182$ $a = 14.010 od	a (annuity) = \$14,019.04 Vt (interest) = $12,500.00$ (sinking fund) = $$1,519.04$ To prove S = p. v. of
$\left(\text{By Table } IV; \begin{array}{c} \frac{500}{31} \\ \end{array}\right)$	0,000 5.666 = \$14,018.97)	log. $a = 4.1467182$ log. $f^{90} = -9651479$ log. $S = 3.1615703$ S = \$1.510.04

The sinking fund is a little over $\frac{1}{2}$ of $\frac{1}{2}$ per annum, consequently an addition annual rate of about 6 mills on the \$ would extinguish the debt in the period of 45 years.

Ex. 9.—How many yearly annuities would be required to repay a loan of 200,000, at $5\frac{12}{3}$ interest, payable yearly, 1% additional being added to form a sinking fund?

 $V = 200,000; r = 1.055; t = .055; \log r = .02325,24596; interest (Vi) = 11,000;$ Sinking Fund (S) = 2,000; a or (Vi + S) = 13,000

(14) log. a = 4.1139434

log. S = 3 3010300

log. $(a \div S) = 3129134$ and $\div 02325$ (log. r) = 34.96 or 35 annuities (nearly).

 $\left(\frac{200\ 000}{13,000} = 15.3846.$ In Table V, 35 years = 15.3905 and 34 years = 15.2370 $\right)$

Ex. 10.—A Corporation issues 2,000 Debentures of 500 each, bearing 5% interest, and to be liquidated by means of 30 annuities. What sum is to be paid annually, and what number of Debentures will be redeemed in each of the first 3 years, and also the 20th year?

 $V = 1,000,000; r = 1.05; t = .05; n = 30; \log r = 0211893; \log t = \overline{2}.6989700;$ Vt = 50,000