By Tables III, IV and V the present value of a quarterly, half-yearly or yearly payment of Rent, or Interest on Mortgages or Debentures, can be determined to pay any of the rates given, and in the case of Mortgages or Debentures the present value of the principal may be found by Table I, and added to that of the interest as in the examples of § 2.

5. Assuming that a Mortgagor has arranged with the Mortgagee to prepay his Mortgage, or a portion of same, in addition to his usual annuity. To find how such a payment would affect equitably the subsequent annuities, as to amount, or as to time.

EXAMPLE 1.—A Mortgage, payable by monthly instalments of $20 each, yields 10½% interest, convertible half-yearly, and has 7 years and 5 months to run. The borrower wishes to pay down $600, and to find how long his instalments of the same amount must continue to pay off the debt.

By Table II, the present value of a monthly instalment of $1 for 89 months
=62.101 × 20 .. .. $1242.02
Deduct 600.00
Balance $642.02

Dividing t is by the amount of the instalment, viz. $20, will give the value of an instalment of $1 for the necessary time—642.02 ÷ 20= 32.10
And p. v. of a monthly instalment of $1 for 37 months= .. .. 31.59 (nearest amt. below)

Difference on $1 instalment= 0.51 × 20=$10.20

The time therefore would be 37 months, and $10.20 additional cash to be paid now; or if postponed till 38 months would be (3) $10.20÷.72320=$14.10, to be paid as a last instalment.

EXAMPLE 2.—A Mortgage, payable by quarterly instalments of $60 each, and yielding 10% half-yearly on investment, has 5 years and 5 months to run before maturity of last instalment. The Borrower wishes to pay $300 on account, and to know how much his instalments are to be reduced for balance of period.

First method.—By Table III, the present value of a quarterly instalment of $1 for 5 years and 5 months=$16.955 × 60= $1017.30
Deduct 300.00
Present value of balance = $717.30

and this amount, divided by the present value of quarterly instalments of $1 for 5 years and 5 months, viz. $\frac{717.30}{16.955}$=$42.31.; or,

Second method.—Divide the amount paid down by the present value of an instalment of $1 for the period to run, and deduct the quotient from the former instalment for the new instalment. Thus, in the above example, amount paid down = $300, present value of instalments of $1 for 5 years and 5 months=$16.955; then 300÷16.955=$17.69; and 60 − 17.69=$42.31.

6. The addition of a percentage to the amount loaned for the whole term, and that amount divided by the number of the instalments to be made during this period, yields a variable rate of interest, according to the time for which the loan is made, and the number of instalments,—monthly yielding a better rate than quarterly, and quarterly than half-yearly.

EXAMPLE 1.—A Borrower receives $1000 cash, at 6% for 10 years, to be repaid by monthly instalments. To the $1000 there is added interest at 6% per annum for 10 years=$600+1000 =1600, and this amount is divided by the number of payments, 1600÷120=13.34. It is required to determine the rate of interest half-yearly which this investment yields.

By Table VI an instalment of $13.11 will repay $1000 in 10 years at 10% half-yearly, while 10½% would require an instalment of $13.37 The rate would therefore be between 10% and 10½%.

EXAMPLE 2.—A Loan of $4000 on same terms is made for 5 years. Required the rate this investment produces. To 4000 add 5 years' interest at 6%=$1200+4000=5200÷60=$86.67 monthly, or per $1000=$\frac{1000}{4000}$ × 86.67=$21.67.

By Table VI, instalment to repay $1000 in 5 years, at 11%, *half yearly*=$21.63, and at 11½%, *yearly*=$21.71, which are therefore approximate rates for such a loan.