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## THE MEANING OF GOLD YIELDS OF BONDS PAYABLE PRINCIPAL AND INTEREST IN CURRENCY

(See Table 19 and Charts 25, 26 and 28)

1. THE meaning of bond yields in a year such as 1925 in the United States when there was no problem of currency depreciation in terms of gold.

If a 5 per cent \$1000 face value bond, with interest payable semi-annually, four years to run, sells for \$1036.63, it is said to yield 4 per cent per annum to the purchaser.<sup>1</sup>

Or, if the present value of each interest payment and of the principal payment be obtained by discounting at 2 per cent per half-year true discount each future payment, the sum of these present values will be \$1036.63. For example, there are eight interest payments of \$25, the first payable six months hence, the second one year hence, etc. There is also the principal payment of \$1000 payable four years hence. Now the present value of the first interest payment of \$25 is  $\$25 \div 1.02$  or \$24.51; the present value of the second interest payment of \$25 is  $\$25 \div (1.02)^2$  or \$24.03; etc. The use of 1.02 as a divisor instead of  $\sqrt{1.04}$  is, as mentioned in note 1, a convention of the bond tables. Now, the present values of the eight interest payments of \$25 each and the principal payment of \$1000 are: \$24.51; \$24.03; \$23.56; \$23.10; \$22.64; \$22.20; \$21.76; \$21.34, and \$853.49. The total of these present values is \$1036.63, the price paid for the bond.

2. The meaning of a *gold yield* of a bond in a period of depreciated currency, when the interest and principal of the bond are both payable in currency.

Bond No. 5 in Appendix A, Table 3 is a New York and Harlem Railroad 7 per cent bond which matured May 1, 1873. The interest was payable May 1 and November 1.

The average greenback price of this bond in January 1865 was \$1038.75. The average gold price of greenbacks in January 1865 was \$46.3 in gold for \$100 in greenbacks. Multiplying \$1038.75 by .463, we obtain \$480.94 as the gold price of this Harlem bond in January 1865. The gold yield to maturity of this bond at this gold price was calculated and found to be 16.43 per cent per annum.

The meaning of this yield may be illustrated as follows: The gold

<sup>1</sup>Really 2 per cent semi-annually under the convention on which the ordinary bond tables are constructed.

values of the seventeen future interest payments of \$35 each and the principal payment of \$1000 were, on the day on which each payment was made, \$24.32; \$23.99; \$27.77; \$23.81; \$25.83; \$24.86; \$25.11; \$26.26; \$25.96; \$27.30; \$30.39; \$31.44; \$31.44; \$31.20; \$31.15; \$31.18; \$29.90; \$854.25. Dividing the first interest payment by  $1.04713^{(\text{note } 2)}$  the second interest payment by  $(1.04713)$   $(1.08215)$ ; the third interest payment by  $(1.04713)$   $(1.08215)^2$ , etc., we obtain a set of present values in gold of the future gold values of the future currency interest payments of \$35 each and the currency principal payment of \$1000. These present values (in gold) were \$23.23; \$21.21; \$22.68; \$17.97; \$18.02; \$16.02; \$14.96; \$14.45; \$13.20; \$12.83; \$13.20; \$12.62; \$11.66; \$10.69; \$9.87; \$9.13; \$8.09; \$231.06. The total of these present values (in gold) is \$480.89—five cents less than the gold price of the bond in January 1865. The gold yield of the bond was therefore a trifle less than 16.43 per cent per annum.

The yield (4 per cent) referred to in the first section of this Appendix is a 'promised' yield. If all payments are made on time, it will also be a 'realized' yield. The yield (16.43 per cent) referred to in the second section is a 'realized' yield—if the payments are made on time. It, of course, cannot be a 'promised' yield as the future cannot be known.

<sup>2</sup> $1.04713 = (1.08215)^{\frac{7}{12}}$ . Assuming the purchase as on the 15th of the month, there are only three and one-half months from date of purchase (January 15, 1865) to the first interest payment (May 1, 1865).