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Baily's paradox

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BAILY'S PARADOX

The following question appeared in Francis Baily's celebrated 1808 text on interest and annuities: "If a *penny* had been put out at 5 percent *compound* interest at the birth of Christ; to what sum would it amount at the end of the year 1810?" . Baily gave this solution :

> By the first theorem . . . it will be seen that its amount in that time would be .004166666 $\times$ $(1.05)^{1810}$ = 938469 000000 000000 000000 000000 000000 pounds. Now the diameter of the earth is about 8000 miles; consequently its solid contents* will be 68 188963 498145 531559 936000 cubic inches: and if it were made of standard gold, each cubic inch being worth 38 *l.* 10 *s.***, the total value of such a globe would be 2625 275094 678602 965057 536000 pounds. But the amount of a penny in 1810 years as above stated, is more than 357 474 600 times the value of such a globe: consequently if one penny had been put out at 5 percent compound interest at the time above mentioned, it would, at this period, have amounted to more money than could be expressed by THREE HUNDRED AND FIFTY-SEVEN MILLIONS of globes, each equal to the Earth in magnitude, and all solid gold!!! Whereas if it had been put out at the same rate of *simple* interest, the amount in the same time would have been only *seven shillings and seven-pence half-penny*.

Baily's calculation is "slightly" different than the 357,426,300 globes determined by my own calculation. Even allowing for a possible error, perhaps someone might want to consider planning for

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*To find the solid contents of a sphere, multiply the decimal .785398 163397 448309 615&c, by the cube of the diameter, and take two-thirds of the product.

**Since a cubic inch of distilled water weighs about 254 grains, and the specific gravities of standard gold and water are to each other as 18.888 to one, it follows that a cubic inch of gold, at the mint price of 3 *l.* 17 *s.* 10½ *d.* per ounce, will amount to 38 *l.* 10 *s.* 1½ *d.*

Utopia by putting a dollar in trust in 1979 for some needy cause in the year 4000!

REFERENCE

Baily, Francis. *The Doctrine of Interest and Annuities* London: John Richardson, 1808.