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An Accountant's Adventures in Wonderland

BY HENRY RAND HATFIELD

WONDERLAND was a place of strange conditions. What was unquestioningly accepted as being a baby turned out to be a pig; an old lady knitting was found to be a sheep; a substantial cat faded into thin air leaving only a smile, and even that vanished. It was a place where heated disputes arose over a word, and when some dissented from recognized authority, the woman's last word was "off with their heads." But Alice found her excursion into this realm an adventure not without interest, indeed on the whole pleasant.

I invite you to venture with me into unfamiliar fields and to consider some unusual aspects of accounting. Some of them may seem as strange as a vanishing cat (or a surplus which vanishes without leaving a smile), as superficially absurd as the song of the Walrus and the Carpenter.

But what I have to say, despite the form in which it is presented, may really contain a core of accounting theory, may perhaps present problems which, if one could confidently solve them, would extend to unexpected reaches.

The first adventure is entitled:

*"Hickory Dickory Dock,
The mouse ate up the stock."*

I once owned a \$1,000 bond. It was due in two years, bore 10 per cent interest payable annually, evidenced by two coupons of \$100 each. Just before the end of the first year a mouse ate the second coupon. Accordingly I collected the first coupon, but not the second, which was part of the internal revenue of the mouse. At the end of the second year, I collected the principal of the bond, but the treasurer would not cash the mouse. The hidden reserve was not available.

Did I have \$100 income in the first year, none in the second? Yes, says the Internal Revenue Bureau. To be sure, I received \$100 cash, but the bond originally worth par declined to the discounted value of \$1,000 due in one year, that is, to \$909. Was there more than \$9 income, that is, more than \$100—\$91? And did I not begin the second year with an asset worth \$909 and end it with \$1,000? Undoubtedly my income during the two years was \$100, but was it divided in the ratio of 100 to 0, or of 9 to 91?

"Have you guessed the riddle yet?" the Hatter said. 'No, I give it up,' Alice replied, 'What's the answer?' 'I haven't the slightest idea,' said the Hatter."

The second adventure may, for want of a better title, bear the motto:

"Income, income, who's got the income?"

A testator leaves an estate of \$1,000,000 yielding an annual income of 10 per cent. The income for two years is to go to A; at the end of two years the corpus goes to B. The questions to be considered are: Who gets income during the specified two years, and how much, and why?

I shall use the word "income" in an ordinary accounting sense. We accountants agree that interest accruing on a note and also the increasing value of a discounted non-interest-bearing note constitute income. Economists are sometimes less rational than accountants and use the term "income" in ways which seem peculiar to the verge of weirdness. Thus one of the most distinguished economists has argued that even though a savings bank dividend has been entered in my bank book, no income has as yet come to me. "'It's really dreadful,' Alice muttered to herself, 'the way all

the creatures argue. It's enough to drive me crazy.'"

Such economists are perhaps suffering from what Bacon might have called the "Idol of the dictionary," or Freud the "Etymological complex." Those who assert that income is something which in a material way must have "come in" probably still consider that all Barbarians are dwellers on the Mediterranean Coast; and that our national bird, sacrificed on our high altars each Thanksgiving Day, really came to us from Turkey.

Perhaps even accountants are also sometimes victims of this etymological complex. Some there are who think that a depreciation reserve, because of the derivation of the word, is something kept back, like an army corps; when, instead of being something one keeps, it is something which he hasn't kept, just because he used it up by wear and tear. One might as well think that a sinking fund has something to do with financial shipwreck, instead of being something which may serve to keep the concern afloat.

But to come back to the question, Who is it, in the case cited, who during the two years, receives income? And, as Humpty-Dumpty said, "When I use the word 'income' it means just what I choose it to mean—neither more nor less."

The answer is obvious. The tenant receives \$200,000 during the two years, the remainderman nothing during that period. This answer is perfectly obvious. As obvious as that the sun goes around the earth, as obvious as the fact that interest *is*, and is *not*, a cost of production—both of the latter statements being said by accountants to be obvious.

It is interesting to analyze the situation a little further. On January 1, 1939, A, the tenant, is possessed of an easily recognizable, legally enforceable right, of definitely ascertainable value. This consists of two parts: (1) a right to

receive \$100,000 at the end of the year; and (2) a right to receive a like sum at the end of the second year.

Surely no accountant can question the legitimacy of counting such rights as assets. They are similar to ordinary receivables and are to be valued in a similar manner. Assuming for convenience that 10 per cent is the proper rate of discount, the right to \$100,000 due in one year is worth \$90,909.09, the value of the second right is \$82,644.63, or, for convenience, using very round figures, A is possessed of two things, one worth \$91,000, the other \$83,000, or a total value of \$174,000.

How does he stand one year later? He indeed receives \$100,000 in cash, but his accounts receivable have declined from \$174,000 to \$91,000, a decrease of \$83,000. One asset, cash, has increased \$100,000; another asset, receivables, has decreased \$83,000. By a most simple proposition in bookkeeping, his proprietorship has increased \$17,000. And all of you who count receivables as assets and include the amortization of discount as a part of income, must perforce admit that A's income during the first year is not \$100,000 but \$17,000. A similar analysis will show that A's income during the second year is \$100,000 — \$91,000, or \$9,000.

How is it with the supposedly incomeless remainderman? On January 1, 1939, he owns a definite right to \$1,000,000 due two years hence. The value of that right is \$826,000. Two years later he has property worth \$1,000,000, an increase of \$174,000.

The estate as a whole has unquestionably yielded \$200,000 during the two years. The purpose of the testator is that all of this income should go to the tenant, none to the remainderman, and this is generally supposed to take place. It is an interesting paradox to see that the division, instead of being in the ratio of 200,000:0, is in fact in the ratio of 26:174. If the income-tax officials do not approve of this, they should alter

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the provision that a gift is not taxable income, but that income from the gift is so taxable.

The third adventure is called:

"What's in a name?" or "Things are not what they seem."

I hold a two-year bond with 10 per cent annual interest worth par. It is assumed by all accountants that the payment of each coupon is altogether a payment of interest. Can this be questioned?

The bond is made up of three parts, the main part promising to pay \$1,000 and the two coupons, each for \$100.

The three parts of the bond might have been bought by three different persons. If so, the prices paid would have been:

For the face of the bond (\$826.45).....	\$ 826
For the coupon due in one year (\$90.91).....	91
For the coupon due in two years (\$82.64).....	83
Total.....	\$1,000

At the end of the first year the holder of the first coupon would receive \$100, that is, he would be repaid his investment of \$91 and receive 10 per cent interest, or \$9. Of the \$100 actually received by the holder of the first coupon, only one-eleventh is interest. The holder of the other coupon receives nothing until the end of the second year, when he is paid \$100. But he had paid \$83 for the coupon, and the additional \$17 is compound interest on \$83 for two years at 10 per cent. Not \$100 but only \$17 is income.

Similarly the holder of the main part of the bond receives no cash until two years have elapsed when he is paid \$1,000 for what cost him \$826—an increase due to compound interest of \$174.

The cashing of the two coupons, assuming they were held by different per-

sons, meant only \$26 interest, not \$200. The bulk of the interest was paid to the third person, the holder of the main part of the bond. Does it make any real difference whether the three promissory notes constituting the bond, i.e., the face of the bond and the two coupons, are bought and held by three separate persons or all by one? If I discount two notes, one at the First National Bank, and the other at the Second National Bank, is not the nature of the notes the same as if both were discounted at one bank? "I am afraid I cannot put it any more clearly," Alice replied very politely, "for I can't understand it myself to begin with."

Adventure four:

*"Ten little nigger boys all went out to dine,
One stuffed his little self and then there were nine."*

The tragic poem goes on, in grim sequence, showing reduction to eight, to seven, until the climax:

*"One little nigger boy living all alone,
He got married, and then there was none."*

Through this there is the clear inference that just one tenth disappears in each of ten successive fiscal periods. Is this not clearly symbolic of straight-line depreciation? Almost everything is symbolic in Wonderland. I have no objection to straight-line depreciation, but I am greatly amused at one of the main arguments in its support. It is said that it is superior to curved-line depreciation because the latter introduces the unreal element of interest, that it gives not cost but cost plus, while straight-line depreciation charges off each year the *cost price actually paid* without any frills or additions.

This fallacy can be made clear by taking a case involving time, but not contractual interest. A butcher buys cattle for slaughtering. The proper age for slaughtering is three years. He is willing

to buy a three-year-old steer, ready for slaughter, for \$100. A farmer offers him three steers, one three years old, one two years old, and one a yearling. The butcher will not pay \$100 each for the three steers for one is not available for a whole year, the other not for two years. He might, however, take the three for \$270. He immediately slaughters the oldest steer.

Advocates of straight-line depreciation should say that production should be charged \$90, asserting that this was the actual cost of the unit consumed. By the simple and obvious method of short division, this must be so. Even children in the elementary schools know that much. "Now, children," says the teacher, "if three apples cost twenty-seven cents, how much does one cost?" In glad chorus all reply, "If three apples cost twenty-seven cents, one apple costs one third of twenty-seven cents, or nine cents." "However," said Alice, "the multiplication tables don't signify." When applied to the steers, the error is apparent. It comes from a source prolific of many errors, not all so easily detected. It is the error of assuming that things called for convenience by a common name are identical. If the problem had been stated to the children as follows: "A man pays twenty-seven cents for three pieces of fruit, an orange, a peach, and an apple; how much did the apple cost?" the answer would not be so glibly forthcoming. The three head of cattle, while each called a steer, are no more truly identical than the three fruits, for one is a three-year-old, one a two-year-old, and one a yearling.

Cannot this idea be profitably carried over to the field of depreciating machinery? One pays \$270 for a machine which will last three years. He is really buying three successive years' service to be rendered by that machine. But these three services are not yet identical. Some are not full grown. Only one is immediately available, the next comes along after a year, the third is a wob-

bling little creature, small in size (as seen through the perspective of time) and of relatively little value. Like Alice, it has eaten from the left-hand side of the mushroom and become small. A price paid for the sum of such a series of services does not imply that each one cost an equal percentage of the total price. If keeping the steer a year is worth only \$10, the three cost, respectively, \$100, \$90 and \$80. But if upkeep is figured at \$50 per annum, the prices would be \$140, \$90 and \$40. The mere statement that three steers of varying ages cost \$270 gives no indication of the cost of each. It does give one incontrovertible statement, namely, each did not cost one third of the total. Similarly with the machine. The only thing we know is that the price paid for the service of successive years is not the same. To know just how the total amount paid is to be divided, an additional factor is needed. This is the rate of interest. Without that the problem is insoluble. Of course, if we know the rate is zero, the problem can be solved, just as it can if the rate is taken at 5 per cent or 10 per cent. If the rate is taken as zero, or the time is so short that the amount of interest is presumably zero, it does not affect the calculation. But this cannot be, where time runs into years. No sane businessman, bound to pay \$100 on January 1, 1940, and similar payments in 1941 and 1942, will commute the three payments for \$300. (It is fair to ignore peculiar circumstances, such as the desire to secure the release of a mortgage, or as I have myself done, in prepaying all four quarterly instalments of a small income tax, because the convenience of making a single payment and the insurance against penalties due to professorial forgetfulness more than offset the loss of six months' interest.)

Straight-line depreciation, which charges a uniform sum each year, is popularly supposed to deal with exact cost price of each unit consumed.

“‘Contrariwise,’ continued Tweedle-dee, ‘if it was so it might be, if it were so, it would be, but as it isn’t, it ain’t. That is logic.’”

Adventure five.

“A bird in the hand is worth 1.79 birds in the bush, or, Blessings lessen as they take their flight.”

Every accounting text and, so far as I know, every accountant ⁱⁿ practice, makes much of the depreciable value of a machine, that part of its cost which is consumed, or disappears during its service life. It is this amount which by one or another scheme is to be allocated as an operating expense over the successive periods in which it is of service.

If a machine costs \$10,000, and will have no residual value when no longer serviceable, the entire \$10,000 is to be properly allocated.

But, and this is where the catch lies, if it is reckoned that it will have a residual value of \$1,000, the accepted formula for straight-line depreciation says that the amount to be charged as expense during the useful life of the machine is \$10,000—\$1,000, or only \$9,000. This is demonstrably false.

The matter may be made clear without using many figures. If a given sum represents the value of the services, or if you prefer the cost paid for the services which the machine will yield, it certainly will properly command a higher price, if in addition to the functional services it promises to yield for ten successive years, it will ten years later also furnish some calculable residual value. Surely, again, the extra price above that attributable to its anticipated services will depend on the amount of this residual value. It will depend on the amount but will not equal it.

The price paid for the machine—and I am assuming rational calculation—is made up of two items, present value of a series of services, and the *present* value of the residual sum. Surely no one is go-

ing to pay \$1,000 today for \$1,000 due in ten years. Interest somehow enters into the calculation. Even the Government pays all of one per cent on some of its loans. If, for instance, 6 per cent is taken as the interest rate, then the present value of \$1,000 due in ten years is \$558.40. Hear, then, the conclusion of the whole matter. The formula for straight-line depreciation is *not* to subtract the residual value from the cost and divide by the number of years. The dividend is cost less the *present* not the *future* value of the residual sum. What one pays for the chance of receiving cash ten years hence has nothing to do with the cost of the services rendered by the machine.

In the illustration already used, the total depreciation is not \$9,000 (i.e., \$10,000—\$1,000) but \$9,441.60 (i.e., \$10,000—\$558.40). The annual charge is not \$900, but \$944.16.¹

“‘Oh, don’t bother me,’ said the Duchess, ‘I never could abide figures.’”

Adventure six.

“Opposed equal forces moving in opposite directions do not offset each other.”

The Interstate Commerce Commission provides that premium and discount on bonds shall be credited and debited to the same account. A corporation issuing \$1,000,000 five-per-cent bonds at 105, and an equal amount of identical bonds at 95, by both debiting and crediting \$50,000 to the same offset account, would reduce that account to zero, and neither discount nor premium would appear in its trial balance. The \$50,000 paid each half year would then presumably represent the actual interest expense, there being no premium and no discount to amortize. This is simplicity itself.

¹ This discussion relates only to the ascertainment of the total amount of depreciation, not to its apportionment. The two are distinct. Premium on bonds is based on interest calculation. Its apportionment according to a most eminent accountant, may legitimately be by the straight-line method.

But while the unamortized discount and premium are equal in amount at the beginning, they cease to be so when the first coupons are paid, for the amount by which the \$50,000 discount is decreased is not the same as the amount of premium written off, if the correct interest expense for the period is to be shown.

To illustrate: Assume that \$2,000,000 five-per-cent bonds are issued at par, the actual interest expense each half year is \$50,000 which is the amount paid on coupons. But if \$1,000,000 of the bonds are issued at 95, and \$1,000,000 at 105, the actual interest expense each half year is not \$50,000, but a different amount varying from period to period. Surely this seems an utter absurdity. In either case the borrower receives the same amount, \$2,000,000; in either case the same amount, \$50,000, is paid out by cashing coupons; in either case the same principal, \$2,000,000, is paid at the same time, when the bonds are redeemed, and yet, with this three-

fold identity, the interest charge is not the same for each period.²

I feel sure that most of you are in the same state of mind as Alice, for "The Hatter's remarks seemed to her to have no sort of meaning, and yet it was certainly English."

If you question my thesis, I cannot, like the Queen of Hearts, say, "Off with your heads," but if you retain your heads with the brains in proper working order, you will, in contradicting me, have also to hold that the basis on which all bond tables are prepared is incorrect.

I close with a final quotation from our fount of wisdom: "But Alice couldn't help thinking to herself, 'What dreadful nonsense we *are* talking.' 'Tut, tut, child,' said the Duchess. 'Everything's got a moral if only you can find it.'"

²See my article, "An Accounting Paradox," in *Accounting Review* for December, 1928, where arithmetical illustration and algebraic formula are given.