mental rather than material equipment—unlike the businessman, there is allowed no deduction for "depreciation."

Yet consider how definitely for some—though less perceptibly but still as surely for others—often how suddenly, the economic returns on the scholar's mental equipment terminate when his professional life becomes "depreciated" on retirement! Directly or indirectly, after a lifetime of study, of labor, of devotion to work, of repeated expenditures for scholarly "education"—the tools of the scholar's trade—the economic returns stop! Yet there is no allowance for him on page 2 under "depreciation"! Match this with the consideration given the nonacademic businessman just around the corner or down the street!

I am therefore adding this note to the current comments: Let mathematically inclined men like Dr. Bauer continue to work out a formula for a fair return on a man's professional and scientific investment, but let them also work out another formula, one that will enable the scholar's big educational investment to get recognition on the federal and state income tax returns in terms of deductions from the total capital outlay!

And then have the AAAS present the formula, with the full backing of all American scientists, to the Department of Internal Revenue, or to the legislators who make the laws controlling the workings of the Department of Internal Revenue, and have some effort made to get for scholars a break similar to that given businessmen.

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Observations on Purine Metabolism

IT IS possible that investigators in the past have placed undue emphasis on the integrity of the purine ring once it is formed. This consideration applies both to the utilization of exogenous purines and to the conversion of adenine and 2,6-diaminopurine to guanine. The evidence that has been put forth to support the retention of the intact ring system (*1, 2*) shows, on closer inspection, that ring opening may have taken place. Indeed in one case the latter hypothesis is supported by the very evidence cited to disprove ring opening (*2*).

In the first case (*1*) the guanine isolated from the rat viscera after feeding 1,3-N^{15}-adenine was degraded to xanthine and guanidine, and it was shown that all the isotope was retained in the 1- and 3-positions. These results do not rule out the possibility of ring opening between the 1- and 3-positions, or in the imidazole ring. In the second case cited (*2*), 2,6-diaminopurine was fed to rats in two different experiments and the guanine isolated from the rat nucleic acids. In the first diaminopurine experiment the purine was labeled in the 1- and 3-positions and in the 2-amino group with N^{15}, and of the guanine isolated 4.0% had been synthesized from dietary 2.6-diaminopurine. (At this point a degradation of the isolated guanine to xanthine would have been of interest.) In the second diaminopurine experiment, the purine was labeled with C^{13} in the 2-position, and the guanine isolated contained only 1.5% of isotopically labeled molecules (based on the administered diaminopurine as 100). No explanation for this difference was given, but the C^{13}-guanine was degraded to guanidine, which was shown to contain 85% of the isotope present in the guanine. This result was cited to show extensive retention of the ring system. Actually it shows, first, that the 2-carbon of 2,6-diaminopurine is biologically labile, and the pyrimidine ring must therefore open, and, second, that an appreciable amount of isotope seems to be reincorporated. This reincorporation may well be at the 8-position, and if this is the case the imidazole ring as well must be opened and recyclized during the interconversions, possibly during riboside formation. Feeding experiments with 8-labeled adenine are under way to test the possibility of the imidazole ring being opened and recyclized during incorporation of the purine.

There is a great deal of other scattered evidence in the literature which points to the possibility of a complex path for the incorporation of exogenous purines, as well as for the *in vivo* interconversions among the purines. The limited incorporation of guanine (*1, 3*), hypoxanthine (*4*), xanthine (*4*), and uric acid (*5*) into mammalian nucleic acids is illustrative of the poor utilization of preformed purines. Further, the participation of a ring-opened intermediate in microbial metabolism, as well as in mammalian, is indicated by the fact that the inhibition of growth by antifolics is reversed only by large amounts of preformed purines, if at all, even though folic acid is certain to be importantly involved in purine metabolism (*6, 7*).

These matters are of importance since the design of suitable purine antagonists as tumor-inhibiting agents has been the goal of a number of investigators (*8–10*). If our hypothesis is correct, the synthesis of purine analogs containing intact rings may be a less fruitful line of research than the preparation of suitable open chain or monocyclic compounds, perhaps conjugated with formylfolic acid (as a Schiff base), with ribose, or with both.

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