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Letters

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the bond in which loan proceeds may have been invested, in these days of drastic interest rate fluctuations? (4) Then there's the broker's commission to buy a bond, and again to sell it. (5) If the policy has been assigned irrevocably to your spouse, beware of these transactions becoming intermingled with your funds, with unhappy consequences for you as executor. (6) Lastly, for trusts under the 1976 Estate Tax laws, the simpler your asset portfolio, the easier it is to make your plans and to have them carried out after your death.

T. Arnol Crowther

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A — Minus

Sir:

In his column, "Mainly For Seniors," John T. Watts of the Copley News Service writes, "A major new acturial study does show surprising gains in life expectancy for men, as well as women." I'd like to think that misspelling was a typo, but fear the problem is one of identity.

Robert R. Lynch

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A 1494 PROBABILITY PROBLEM

Ed. Note: This is adapted from a few paragraphs in a paper by Prof. Hans Bühlmann, the leading Swiss actuary, that was presented at the 1978 *Tel Aviv Insurance Seminar. The paper appears in the seminar booklet,* New Frontiers In Insurance, *Yehuda Kahane, Ph. D., Editor.*

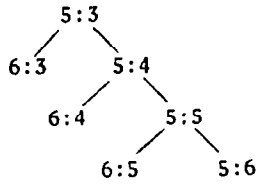
The scientific form of insurance was made possible by the emergence of probability in the 15th century. The first probability problem appeared in a book entitled *Summa de Arithmetica, Geometria, Proportioni et Probabilta* (1494), written by Fra Luca Paccioli, a Franciscan monk.

> Ques.: A and B play a fair game called "gioci de Balla." They agree to continue until one has won six rounds. But the game stops when A has won five and B three. How should the stakes be divided?

Fra Luca's answer, 5:3, is, of course, wrong, but interesting. He apparently argued by use of proportionality, without even recognizing the probabilistic character of the problem. But still, it is fair to say that probabilistic thinking began with this problem. Many learned men tried their luck with it and only missed by very little to break through to the correct basic thinking.

We now believe that two Frenchmen, Pierre de Fermat, lawyer and judge in Toulouse, and Blaise Pascal, physicist in Paris and later religious thinker in Port Royal, were the first to solve the problem—150 years later! The solution proposed by Fermat is based on the realiization that, in order to determine who gets the stakes, the maximum number of games which still need to be played is three. So simply by listing the eight possible outcomes of three games, Fermat arrived at the answer 7:1.

In his enthusiasm about his solution, Fermat wrote to Pascal. It is not clear whether Pascal believed Fermat's solution. In any case, he tried another approach, what would be called the tree method:



Now Pascal, too, was excited, and he wrote back to Fermat, "N'est-ce pas merveilleux que la verité à Paris est la même qu'à Toulouse?"

E.J.M.

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Deaths

Eloise K. Goodrich, FSA 1926
Geoffrey F. N. Smith, FSA 1952
Charles A. Taylor, FSA 1928

AHEAD OF HIS TIME

In January 1936, William Phillips, a London actuary, presented a paper to the Institute in which, after paying his respects to the Rhind papyrus of the second millenium B.C., he recommended that (a) life insurance companies proceed to convert all their internal figures for premiums, reserves and face amounts from the denary scale of notation (s.n.10) to s.n.8, (b) a simple machine be designed to convert those s.n.8 figures to the binary scale, s.n.2, (c) a light-ray machine, capable of using only the digits zero and one, do the arithmetic then customarily performed by desk calculators and Hollerith cards, and (d) clerks be taught to convert the results mentally from s.n.2 back to s.n.8. He had thus set himself two tasks, both formidable: first, to convey an understanding of why all this would be worthwhile; second, to arouse enthusiasm among those who grasped the idea.

To illustrate his step (c), Mr. Phillips had brought to the meeting the essential parts of a mechanism of his own invention which, although not a light-ray machine, served to demonstrate the process of using figures in binary form.

The actuaries present on that historic occasion were witnessing no less than the precursor of today's computer, whose prototype was then less than a decade away. Today, when actuaries can be classified into (i) a minority of us capable of getting maximum value from automation,* (ii) most of the rest of us, who have at least a working knowledge of computers, and (iii) dinosaurs, it's worth reflecting on the reception accorded in 1936 to Mr. Phillips' paper entitled Binary Calculation.

To begin with our own *Transactions*: that paper was routinely listed in *T.A.S.A. XXXVII*, but, subject to rebuttal from readers' recollections, it seems fair to assert that the paper created no stir on this side of the Atlantic.

In London, discussers of the paper gave some intriguing accounts of past and current aids to arithmetic, but, understandably, Mr. Phillips' proposal sparked more scoffing than support. One speaker (not an actuary) questioned whether a machine that could work so

*See L. J. Lohmann's letter, Masters or Dabblers, in our June 1980 issue.

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