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TWO HUNDRED AND NINETY THREE

293

CCXCIII

WE were tempted to run a Competition around this number but were dissuaded by the Competition Editor. The Competition would have been to find the answer to the question:

"What connection has 293 with the Society of Actuaries?" and we wonder how many of our readers would have found the answer. Most of them could (and probably would) have told us that 293 is a prime number. That is obviously not the answer. The Society does not, as far as we know, discriminate between prime numbers, yet the answer is prime in the basic sense.

To take our readers off the tenter hooks, the Society welcomes 293 new Fellows as a result of the November 1976 examinations. Whether this is a record addition for any set of examinations we know not but at least its a goodly company and we offer them our congratulations (perhaps tinged with a little envy on the part of the older generation of Fellows. The newcomers seem to know so much more.)

In the academic world the graduate is recognized at the commencement exercises and nearly always the President of the College in a valedictory address will emphasize that education is more than technology and that the graduates in many instances are now accepted members of a profession which adds to their privileges and to their responsibilities. Our proceedings in recognizing new Fellows are less formal, though just as sincere. Perhaps we do not have the opportunity to emphasize to our graduates that they are now qualified members of our profession, and that the Society is more than a body for setting technical examinations.

Elsewhere in this issue is recorded the death of Edmund M. McConney, a distinguished actuary who was the first President of the Society of Actuaries. As we thought how we might communicate the sense of belonging to a profession to the newcomers, we remembered his Presidential address (*TSA I*). This address extends beyond the short term concerns of the profession and gives the reader a larger view of the past and of the future. We recommend a reading of this Presidential address for both new and old Fellows. Here is recommended reading not mentioned in the Syllabus but reading that we think will convey the personal importance and pride of belonging to our profession.

A.C.W.

HOW ACCURATE ARE APPROXIMATIONS?

by Hermann Edelstein

Actuaries almost always use Jordan's approximation

$$\ddot{a}^{(m)}_{x:\overline{n}|} = \ddot{a}_{x:\overline{n}|} - \frac{m-1}{2m}\left(1 - {}_{n}E_{x}\right),$$

and so does the computer in our company. Once I made an interesting discovery, when I looked at a computer printout of annuity rates at 10% interest. There I saw to my great surprise that at the young ages (20-22), $\ddot{a}^{(12)}_{x:\overline{11}|}$ was greater than $\ddot{a}^{(12)}_{\overline{11}|}$. First, I didn't want to trust the computer anymore, but finally I realized what actually happened.

Using Jordan's approximation above, the following inequality

$$\ddot{a}^{(12)}_{x:\overline{11}|} > \ddot{a}^{(12)}_{\overline{11}|}$$

can be written as

$$\frac{13 + 11\nu^{p_x}}{24} > \frac{d}{d^{(12)}}$$

this reduces to

$$p_x > \frac{24}{11}(1+i)\left(\frac{d}{d^{(12)}} - \frac{13}{24}\right)$$

which further reduces to

$$p_x > \left[\frac{1}{11}\left(\frac{2i}{1-\nu^{\frac{1}{12}}} - 13(1+i)\right)\right]$$

Under high interest rates (8% or higher, and the young ages (22 or younger)

$$p_x > \left[\frac{1}{11}\left(\frac{2i}{1-\nu^{\frac{1}{12}}} - 13(1+i)\right)\right]$$

under most of the recent mortality tables.

The inequality $\ddot{a}^{(12)}_{x:\overline{11}|} > \ddot{a}^{(12)}_{\overline{11}|}$

cannot be true under any circumstances by verbal reasoning. The fallacy obviously lies in the approximation

$$\ddot{a}^{(12)}_{x:\overline{n}|} = \ddot{a}_{x:\overline{n}|} - \frac{m-1}{2m}\left(1 - {}_{n}E_{x}\right)$$

which should be used with caution. □