Article From:

The Actuary

LETTERS

Exams
Sir:

In the June issue E & E Committeemen Murphy and Huntington have proven that history again repeats itself. Given the opportunity to conduct certain exams on a joint basis with other actuarial organizations, the E & E Committee, in the questionable wisdom of continuing the disproved 'body count' theory and reflecting the myopic vision of an earlier transition period (during which the same result occurred), has elected to ignore the reality of governmental credential licensing and a competing actuarial organization (ASPA) and chosen to *dilute* the meaning of FSA.

By establishing its pass mark *below* that set for the EA exam, the Society has made it necessary for any aspiring EAs among the unfortunate 48 who were passed by SOA but failed by JBEA to take yet another exam. Becoming an FSA no longer suffices.

Is it not time for the SOA to realize that the federal government and ASPA are realities? Is it not time for the SOA to work in the real world? What the E & E Committee has done is to play into the hands of ASPA, who can claim that its exams are the more difficult. Now, this is true for at least one exam.

It would seem that E & E has just failed the most important test of all — reality. On the other hand, is this result so surprising?

Peter N. Campbell

* * * *

Sir:

I would like to voice my opinion on what I feel to be an unfairness in the current Associate exam transition. Under the current setup a student who passed the old Part 4 must now sit for another separate exam 4C to receive full credit for the new Part 4.

A student with no previous credit takes the new Part 4. This student has the material from the 4A and 4B portions to aid in passing. Foreseeably a student could score high on these two portions, score only the minimum standard on 4C, and receive a passing grade.

A SEQUEL TO "MOVING ON"

by Beda Chan

Recall the model in *Moving On* (January, 1984) which describes a strategy for multiple choice examinations. The assumptions: Each question needs to be seriously screened for S minutes. After screening, the working time W needed to work out the question is then known. Total time T for the question is thus $T = S + W$. The ability of a candidate, measured by the average time per question $E(T)$, is considered fixed. The strategy: After spending S with a question and W is then known, move on to the next question if W is too large, i.e., if $W > \tau$. The problem is to find the best τ. The following result covering cases more general than that in *Moving On* is proved in "Fixed Points and Exam Taking Strategy" by Thomas O'Brien, a professor at Bowling Green State University, to appear in the American Mathematical Monthly.

THEOREM: Let $E(S) = \gamma$ and the probability density function for W be g.
(i) With strategy "move on if $W > \tau$", the total time per worked question is

$$\phi(\tau) = \frac{\gamma + \int_0^\tau w\,g(w)\,dw}{\int_0^\tau g(w)\,dw}$$

(ii) The τ that would minimize $\phi(\tau)$ is determined by $\frac{d\phi}{d\tau} = 0$, which simplifies to

$$\phi(\tau) = \tau$$

In the case presented in *Moving On* where

$$E(S) = \frac{1}{\tau} \text{ and } g(w) = \beta e^{-\beta w}, \quad \phi(\tau) = \tau$$

simplifies to $\quad \dfrac{1}{\lambda} + \dfrac{1}{\beta} = \tau + \dfrac{e^{-\beta\tau}}{\beta}$.

In *Moving On*, the term $/\beta$ was missing from the right side of the equation. The table presented there should thus be corrected as follows:

$1/\lambda$	$1/\beta$	$\phi(\tau)=\tau$	Answers	Screens
1	5	3.53380	50.94	100.51
1.76373	4.23627	4.55426	39.52	60.00
2	4	4.79316	37.55	53.78
2	5	5.25048	34.28	52.73
2.12479	4.87521	5.38437	33.43	50.00
3	4	6.13768	29.33	37.39
3	8	8.08982	29.67	46.63
3.57249	7.42751	8.69680	27.60	40.00
4	7	9.08938	26.40	36.32
2	8	6.40974	46.80	84.91
2.93955	7.06045	7.59044	39.52	60.00
3	7	7.65481	39.19	58.94

The first three blocks are as explained in *Moving On*. The fourth block says a part 4 or 5 candidate with speed of 10 minutes per question (answering 30 out of 60 in 5 hours) can improve to answering 40 questions by screening a question for 2.9 minutes and drop it if it takes more than 7.6 additional minutes to finish.

A Sequel To "Moving On"

Now some brief explanation on how the table is prepared. For example, in the case of part 1 where time given per question is 3 minutes and the candidate's speed is 6 minutes per question, the optimal strategy is determined by

$$\phi(\tau) = \frac{\gamma + \int_0^\tau wg(w)dw}{\int_0^\tau g(w)dw} = \tau$$

$$3 = \tau \cdot \int_0^\tau g(w)dw$$

$$6 = \gamma + \int_0^\infty wg(w)dw$$

When g is a one parameter density function such as the exponential of mean $1/\beta$ considered above, the three unknowns β, τ, and γ are determined uniquely by the three equations. The proof of the above equations and the theorem is straightforward following the reasoning in *Moving On*. □

STARGAZERS

Our enquiry (Jan. issue) about actuaries who, like several of our professional forebears, have an interest in astronomy, has yielded these responses:

Alfred L. Buckman taught astronomy from 1933 to 1949 (coincident with practicing as an actuary) in the Extension Division of University of California. In his senior year at UCLA he had worked weekends on Mount Wilson taking spectra of stars and nebulae in a research program conducted by Caltech's Prof. Ira Sprague Bowen.

Norma J. Coufal is "very much a beginning astronomer, having just got an 8-inch Schmidt-Cassegrain".

Charles G. Groeschell entered into an audit program which he enjoyed, but, alas, ran out of time. He has a dozen good astronomy textbooks at his elbow.

Gordon G. Myer has a lifelong interest after taking courses in his university days, and is a member of the Royal Astronomical Society of Canada. He looks through his small telescope occasionally.

Harry Ploss says that his English Literature professor suggested he become an astronomer; he did study astrophysics in graduate school, but fortunately discovered in time that the actuarial profession has the characteristics that his professor attributed to astronomy.

Frederick W. Sawyer III had three articles published in American and British astronomical journals while he was taking actuarial exams, but after that his time for astronomy ran out.

Keith P. Sharp said: "This seems to be a well-trodden path, especially among actuaries in or from the British Isles. Geoff Chaplin FIA has a Ph.D. in cosmology and still peers through a small telescope in his Surrey garden. Nicholas J. Hudson AIA used to be secretary of the Cambridge University Astronomical Society, a post that I held after him. I have a master's degree in astronomy from University of California. Phelim P. Boyle FIA has a Ph.D. in General Relativity from Trinity College, Dublin; he suggests that the link between the two professions is related to the resemblance, where flow of money is concerned, between pension plans and black holes."

Ed. Note: We welcome all the above evidence that the link between matters actuarial and those astronomical hasn't been severed. But surely there are other amateur astronomers among our members who will let us hear from them.

The student who passed the old Part 4 has already demonstrated proficiency on the 4A and 4B portions; but he must score much higher on the separate 4C to receive credit for the new 4. I fail to see the equity. A student is penalized for *passing*. I ask you, is that fair?

Brian N. Rees

* * * *

Sir:

I am finally finding time to reply to the letter from Peter Fox, Jr. questioning our exam system. (December, 1983)

1. If I were just starting out, I *would* undertake the exams. Starting out implies both a naivete about the effort required and a high energy level. *Everybody* starting the process expects to pass each exam on the first attempt (because they have never failed anything).

2. I do unreservedly recommend our process. I occasionally speak to college math groups and *do* explain how tough it is. I encourage sophomores and juniors to try an exam or two; we know how helpful an exam credit is in getting a job.

3. I haven't been involved enough to consider whether the low number of Part 1 takers is temporary. I encourage any of us to meet with college math students, if only to let them know we are here. A lot of my colleagues started out as teachers — because they didn't know how to spell actuary.

I do agree the syllabus is far from perfect. I recognize that I had no real fear about the exams until I was beyond them. But the actuary remains *the* insurance/pension professional; and it is *necessary* that we be forced to learn a lot of material.

Steven C. Frechtling

* * * *

Paradigms

Sir:

There has been lots of talk of actuarial paradigms and actuarial-scientific revolutions. At the recent New York regional meeting of the Society, a new paradigm may actually have been emerging. In the midst of discussing