



The Actuary

NOV 14 1983

The Newsletter of the Society of Actuaries

VOL 17, No. 9

NOVEMBER, 1983

1984 EDUCATION AND RESEARCH GRANTS IN ACTUARIAL SCIENCE

Sponsor

This competition is again sponsored by the Actuarial Education and Research Fund (AERF).

Who May Enter

You are eligible if you are either:

1. A member of the Society, the Academy, the Casualty Actuarial Society, the Canadian Institute or the Conference, these being the five actuarial bodies that support the AERF; or,
2. A full time faculty member of a U.S. or Canadian college or university, having teaching and research responsibilities in a field related to actuarial science (mathematics, statistics, computer science, economics, demography, insurance, law, business), and holding a terminal academic degree such as Ph.D., D.B.A. or a law degree.

Grants are not available to support dissertations or other student research projects.

Education and Research Alternative

A new feature is that proposals for innovative developments in actuarial education, as well as proposals for actuarial research, are invited. An educational project should lead to a study note or to other materials that would assist teachers and students engaged in actuarial education. AERF reserves the right to participate in distributing such materials.

Those considering entering this competition are invited to discuss their planned entry with the AERF Research Director.

Grant Amounts

Grants up to \$10,000 are available. Funds may be used to compensate grant recipients or for computer programming and time, secretarial services and data collection activity. Money will be distributed periodically throughout the project, and will be contingent on progress thereon.

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ELECTIONS 1983

The results announced at our Annual Meeting in Florida are:

<i>President-Elect</i>	Preston C. Bassett
<i>Vice Presidents</i>	James A. Attwood Anna Maria Rappaport
<i>Secretary</i>	Donald S. Grubbs, Jr.
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<i>Board of Governors</i>	Charles M. Beardsley Edwin F. Boynton Robert M. Hammond James A. Tilley Irwin T. Vanderhoof Robert C. Winters

The number of votes cast, from among 5,013 eligible voters was 2,556 (51%).

In 1982 and 1981, these percentages were 54% and 52%.

COMPETITION RESULTS

by Charles C. Groeschell,
Competition Editor

Our rules for picking prizewinners among Actucrossword solvers were changed in September 1982: the time taken to submit a solution ceased to be counted, and winners were to be determined by fiscal year instead of monthly. Here are the results for the past year (Sept. '82 through June '83):

In all, 273 solutions came in from 80 members or wives or associates; 228, about 5 out of 6, were correct. Three stalwarts—Robert D. Hohertz, John W. Keller and Noreen Shapiro (wife of California Insurance Department's Chief Insurance Examiner)—had all ten puzzles correct. Esther Portnoy and Betsy K. Uzzell submitted nine solutions and scored 9-for-9. Sheryl V. Cuba and Christopher Doyle both scored 9-for-10. If these seven winners will send along the names and addresses of their nominees, said nominees will get free copies of *The Actuary* through June 1985.

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ACTUARIES AND WELLNESS

by David S. Williams

The fine parody contributed by A. H. Johnson (April issue) on race-track betting à la The Life Insurance Fair Practices Act perspective brings to mind an allegory given by Dr. Don Ardell in his dissertation "High Level Wellness", given at the 1980 Future of Life Expectancy symposium. This allegory served to demonstrate the focus of our health care system on treating sickness rather than promoting a wellness outlook and lifestyle.

Upstream/Downstream

"It was many years ago that villagers in Downstream recall spotting the first body in the river. Some old timers remember how spartan were the facilities and procedures for managing that sort of thing. Sometimes, they say, it would take hours to pull 10 people from the river and even then only a few would survive.

"Though the number of victims in the river has increased greatly in recent years, the good folks of Downstream have responded admirably to the challenge. Their rescue system is clearly second to none: most people discovered in the swirling waters are reached within 10 minutes—many in less than 10. Only a small number drown each day before help arrives—a big improvement from the way it used to be.

"Talk to the people of Downstream and they'll speak with pride about the new hospital by the edge of the waters, the flotilla of rescue boats ready for service at a moment's notice, the comprehensive health plans for coordinating all the manpower involved, and the large number of highly trained and dedicated swimmers always ready to risk their lives to save victims from the raging currents. Sure it costs a lot but, say the Downstreamers, what else can decent people do except to provide whatever is necessary when human lives are at stake.

"Oh, a few people in Downstream have raised the question now and again, but most folks show little interest in what's happening Upstream. It seems there's so much to do to help those in the river that nobody's got time to check how all those bodies are getting there in the first place. That's the way things are, sometimes."

Actuaries have been exposed to the concept of wellness before, via analysis of the shortcomings of our health delivery system. There is general agreement, I think, within our profession that the responsibility for one's well-being rests basically with oneself.

(Continued on page 8)

DEATHS

Don F. Fackler, F.S.A. 1959

Jack T. Kvernland, F.S.A. 1947

Letters*(Continued from page 2)*

control. The company, though, does control its assumptions and the disposition of their fruits. (The repayment might well be based on preliminary term rather than net level reserves.)

Another aspect of the reasonableness of an inflation assumption is the interest assumption since high investment earnings are associated with inflation. An argument might be made for an inflation rate assumption equal to the excess of the assumed interest rate over the risk-free rate, whatever that may be.

Calculating level premiums from original issue is a massive job, as also is calculating their periodic increases. The need for net level and preliminary term reserves based on all the necessary assumptions, perhaps including inflation, does indeed aggravate the health actuary's brain fatigue, yet is appropriate, not absurd, and provides sound value to policyholders.

Peter M. Thexton

* * * *

Sir:

John Gilchrist's objection to applying the level premium system to guaranteed renewable A. & H. policies seems on the point.

Use of good life insurance techniques in fields where they clearly don't work reminds one of the adage, "When all you have is a hammer, everything looks like a nail".

To price a medical care benefit for a single year is hard enough. To pre-fund health care inflation and utilization soundly by true level premiums is technically infeasible even if it were acceptable in the marketplace. Furthermore, older individual health insurance programs often need to be replaced because of either product obsolescence or changes in insurance needs; in such cases lack of a surrender value makes the level premium feature even less appealing.

Attained age pricing avoids these problems by enabling the insured to get current benefits from current dollars.

Peter L. Hutchings

Sir:

Mr. Gilchrist suggests that the level premium system for guaranteed renewable accident and health policies is obsolete, due to continually rising medical care costs. I disagree. For an individual, A&H claim costs generally increase because of increased attained age as well as inflation. The level premium system eliminates the attained age increase factor, allowing later premium increases to be smaller than otherwise.

It is not fair to compare individual policies to group contracts. Group policyholders have the luxury of bringing in new young lives to prevent the entire group from aging as quickly as an individual.

Douglas C. Doll

* * * *

Responses to Robin Leckie

Sir:

I agree with Mr. Leckie's assertion (May issue) that the "gang of eight's" brief in the Norris case makes certain generalizations. Such a brief could hardly detail the annuity pricing policies of every company. But these generalizations do not make the brief inaccurate.

Mr. Leckie and others in our profession have, I think, missed the point. The issue isn't whether companies price annuities with or without substantial safety margins; nor is it whether factors other than sex and age can plausibly enter into pricing. Ability to identify factors that permit more accurate prediction of longevity will always be our profession's hallmark. The Norris decision has not altered all this.

The issue is how to interpret a law that Congress passed in 1964. Is or is not an annuity option that costs females more than males a violation of that law?

Mr. Leckie's concern about public perception of this debate is an obfuscation.

Rolf Trautmann

* * * *

Sir:

The last I heard, actuaries should recognize that there is substantial room for honest differences of opinion on many matters. Mr. Leckie doesn't seem to think that this applies to sex-distinct annuity pricing. He appears to want to stifle public debate on matters actuarial. If the only way to retain sex-distinct pricing would be to silence dissenters, the victory would not be worth the price.

David E. Olsho

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Final Word on L.A.

Sir:

Frank H. David (Sept. issue) and Ardian C. Gill (Oct.) ask about studies that support my assertion that the analytically minded are usually not good at language. I have read some in the past 10 years or so. The simplest example is that boys have been found usually better at math than at language, and girls the reverse.

In more scientific terms, a human brain is known to consist of two hemispheres, one associated with analytic ability, the other with language. In each person one hemisphere is more developed than the other, accounting for his or her relative strength in math or language. I recall that Ornstein is the pioneer researcher and leading authority on these matters.

Personal observation, offered by Mr. David to disprove published scientific results, has limited value. He may have assumed that Society members are necessarily analytically minded, which isn't true. The mathematical requirement in our exams is essentially elementary calculus; those who are better at language, e.g., law or business school graduates, can pass our math tests, perhaps with difficulty, and then complete Fellowship exams smoothly. There must be many Society members who are better at language than at mathematics.

Chiu C. Chang

* * * *

Sir:

Uncle Sam, let it be known, holds that the analytically minded *are* good at language. At least he did in 1968 when, interrupting my early actuarial career, he directed me into language school after math/logic testing. I know not whether to thank him for keeping me off the battlefield, or to malign him for placing me in a war zone.

Stephen C. Frechtling

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Our Exciting Profession

Sir:

Your call for ideas on depicting our profession in glamorous terms on television (Query for Actuaries, June issue) brings to mind a letter I sent to the *Wall Street Journal*, which their editor chose, probably with good reason, not to publish.

Richard S. Robertson

(Continued on page 4)

Letters

(Continued from page 3)

Ed. Note: Mr. Robertson offered three television competition ideas:

1. Two actuaries might compete to show at what time and how dramatically the Social Security system runs out of funds.
2. Or, the contesting actuaries might say how much the premium charged by the Pension Benefit Guarantee Corporation must be increased to provide for the Corporation's future obligations, and how many plan terminations that increased premium might induce, setting off a vicious cycle.
3. The actuaries might compete in identifying the silliest consequence of the unisex legislation under federal and state consideration.

The major barrier to staging such a TV program, Mr. Robertson predicted, might be not its content, but finding two unemployed actuaries seeking employment.

* * * *

Better Meetings

Sir:

May I second Richard G. Schreitmueller's sentiments (Sept. issue). The results of the Enrolled Actuaries Survey should come as no surprise to pension actuaries who have attended both E.A. and Society meetings; the former address problems of all types of pension plans, the latter cater solely to pension actuaries who work with large plans.

At the Society Meeting last fall, just a few months after passage of TEFRA, not a single session was devoted to pension aspects of TEFRA. The moderator of the "Current Developments in Pensions" Panel Discussions said there would be no TEFRA discussion because everyone by then was "TEFRAed out". But the 1,000 actuaries at the E.A. meeting three months later clearly were not "TEFRAed out".

As long as the low pension content of Society meetings continues, virtually to the point of ignoring the interests of actuaries of small pension plans, the Society will continue to lose this segment of the actuarial community to the E.A. meetings and to ASPA.

Robert E. Dougan, Jr.

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The Statistical Genie

Sir:

A difficult problem in education is bridging the gap between our learning and its uses. Charles V. Schaller-Kelly expresses disdain for statistics and risk theory (May issue), yet poses an important problem that may be approached via these disciplines.

You are given deaths and exposures separately for lives subject to and not subject to a specified hazard. You seek the probability that the hazard affects mortality.

Solution: First calculate the crude mortality rate for the Lives Not Subject to Hazard, and treat this as the expected mortality for the underlying population. Apply this expected mortality to the Lives Subject to Hazard to calculate expected (mean) deaths, and their variance and standard deviation.

Age	— Lives Not Subject to Hazard —				— Lives Subject to Hazard —			Actual Deaths
	Deaths	Exposure	q	q*(1-q)	Exposure n	E (Deaths) n*q	Variance n*q*(1-q)	
60	1	100	.01	.0099	10	.1	.099	1
61	1	200	.005	.004975	20	.1	.0995	0
62	6	400	.015	.014775	50	.75	.73875	2
63	8	500	.016	.015744	60	.96	.94464	0
64	11	600	.0183333	.0179972	70	1.283333	1.259806	2
65	17	800	.02125	.0207984	80	1.7	1.663875	1
66	20	900	.0222222	.0217284	80	1.777778	1.738272	3
67	24	900	.0266667	.0259556	80	2.133333	2.076444	2
68	21	800	.02625	.0255609	60	1.575	1.533656	3
69	25	700	.0357143	.0344388	50	1.785714	1.721939	1
70	20	600	.0333333	.0322222	40	1.333333	1.288889	2
Total	154	6500			600			17
					Mean	13.49849		
					Variance		13.16477	
					Standard Deviation		3.628329	

Because of the similarity of the mean and the variance, the poisson approximation to the number of deaths seems appropriate. The following table gives the probability of n or more deaths assuming the poisson distribution:

n	Pr (Deaths ≥ n)
17	0.202
18	0.139
19	0.092
20	0.058
21	0.035
22	0.020
23	0.011
24	0.006
25	0.003

Personal judgment is needed to determine whether to accept or reject the hypothesis of identical underlying mortality based on the 17 claims in this hazard group; 21 or more claims would have been more statistically significant.

Assumptions are implicit here, and the scope of the response has been limited to the specific case and question. The interested reader should see the Society's text, *Actuarial Mathematics*, by Nesbitt et al, Chapter 2, pp. 17-20, and Chapter 11, pp. 2 and 10.

David M. Holland

Page Six to the Rescue

Sir:

The demise of New South Life (Editorial, June issue) probably could have been prevented or at least postponed if the actuary had done a conscientious job on page 6, "Analysis of Increase in Reserves". We consulting actuaries often

regard page 6 as a nuisance. But that nuisance once put me on the scent of a egregious computer goof-up in recording terminations, to the tune of a quarter of a million dollars.

Robert C. Tookey

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ANDERSON OPTIMISM INDEX IS UP

Gracing FIASCO's September front page is an interview of our own James C. H. Anderson, conducted in London last summer by this newsletter's London Correspondent, Gary Chamberlin. Here are excerpts, edited into Q. & A. format.

FIASCO (recalling Mr. Anderson's past papers to the Pacific Insurance Conference that presented forecasts for the industry's future in the U.S.A. that "do not make cozy reading for the armchair actuary who is content with the status quo"): Have recent events supported your thesis that drastic changes are necessary if the U.S. industry is to enjoy a fruitful survival into the next century?

JCHA: Yes, I still feel that way, but I have become mildly optimistic in the last year or two. We've had some big changes which affect each of the basic problems that have concerned me and others—taxation, expense, replacements, and inflation. The tax equation is still up in the air, but is unlikely to get as bad as in pre-1982. The industry has reloaded with new products and new approaches to distribution which I think in the end will mitigate its expense problems.

FIASCO: How does the replacement threat stand these days?

JCHA (citing a study of 100 companies' experience that showed a 50% increase in voluntary lapse rates between 1980 and 1982): Replacement activity is afoot. The biggest aspect is not surrender activity, but probably is policy loan activity.

FIASCO: Would you please comment on the profit-testing method you introduced in your 1959 Society paper, "Gross Premium Calculations and Profit Measurement for Nonparticipating Insurance" (TSA XI, 357). That was not just a clever technique, but a radical new departure in our way of thinking about life business.

JCHA: At the time I was working on this, there was a rapid rise in U.S. investor interest in the life insurance industry. Consequently, I tended to look at products from the viewpoint of a potential investor in the business, and that led to pricing on a basis of return on capital. . . . Yes, the method also casts doubt on one of the theorems you will find in a lot of actuarial textbooks, that the reserve basis has no ultimate effect on profita-

"IT'S THE LAW"

*A column by William D. Hager, Des Moines, Iowa,
an attorney now in private practice*

Three 1983 U.S. Supreme Court pension-and-welfare-related opinions, viz. (a) *Shaw*, (b) *Construction Laborers*, and (c) *Morrison-Knudsen*, merit at least passing attention by actuaries even though their impact upon the actuary's work may vary from slight to significant.

Shaw v. Delta Air Lines (no. 81-1578) considered the relationship between New York's Human Rights Law (HRL), its Disability Benefits Law (DBL) and ERISA. New York's HRL forbids any employee benefit plan which treats pregnancy differently from other occupational disabilities. In addition New York's DBL requires employers to provide the same benefits for pregnancy as for any other disability. Both the HRL and DBL "relate to" employee benefit plans, and §514(a) of ERISA pre-empts state laws which "relate to" ERISA regulated plans. However, §514(d) of ERISA provides that §514(a) shall not "be construed to . . . supersede any law of the U.S." and thus permits any state law that is necessary to enforce (among others) Title VII of the 1964 Civil Rights Act. Given these provisions, the Supreme Court held that: (1) New York's HRL can apply to an ERISA-regulated plan, except to the extent that it requires employers to adhere to provisions more extensive than those required by Title VII; (2) ERISA does not pre-empt the DBL, to the extent that it requires employers to maintain separate disability plans providing benefits required by the DBL. To gain this exemption, however, such "DBL compliance plans" must be set up as separate plans, not merely as "portions" of multi-benefit plans.

In *Franchise Tax Board v. Construction Laborers Vacation Trust for Southern California* (no. 82-695), the State of California brought suit to collect unpaid state income taxes levied against funds held in trust for taxpayers under an ERISA-covered vacation benefit plan. At issue was whether the state levy was pre-empted by §514(a) of ERISA (again, pre-empting any state law "relating to" such plans).

Without deciding the central issue, the Court remanded the case, determining that the federal court did not have jurisdiction as the case was then constituted. As a result, we may have to wait several more years for a definitive answer to the underlying question of the extent to which non-federal tax collection systems may levy against funds held on behalf of taxpayers by trusts formed in connection with ERISA plans.

In *Morrison-Knudsen Construction Company v. Director, Office of Workers Compensation Programs*, the widow of an employee killed in a construction accident raised a question as to the definition of "wages" under the Longshoremen's and Harbor Workers Compensation Act. Under the Act, the widow was entitled to $\frac{2}{3}$ of the deceased employee's "average weekly wage" in death benefit.

The spouse claimed that this wage included not only the deceased's pay, but also the 68¢ per hour in contributions the employer was required to make to the union trust fund (for health and welfare benefits) under the terms of the related collective bargaining agreement.

The Supreme Court held that the employer contributions to the union trust fund are not included under the term "wages" under the act, and thus were not required to be factored into the formula for determining the death benefit. According to the Court, the legislative history of the Act shows Congress did not encompass such contributions within the term "wages". □

bility. If one considers timing, it has perhaps the greatest effect of all.

FIASCO: The way we train actuaries in the U.K. is dominated by the principle of caution in every aspect of the work; some might agree that a slightly more adventurous approach would be desirable. Is caution also the keynote of your training programs in the U.S.A.?

JCHA: I think there is the same bias towards caution on both sides of the Atlantic, and I don't see anything wrong

with that. An actuary still has as his primary responsibility what is essentially a fiduciary role. There have been a couple of instances in our country where this responsibility has been shirked, with unhappy consequences. I still think caution should be the basis, or bias, in actuarial training. At the same time, I think one can be entrepreneurial without abandoning conservative principles as related to issues like solvency, for example.

AN ACTUARIAL GUIDE TO JAI-ALAI

By David M. Lipkin

One of Hartford's more neglected assets is its jai-alai "fronton", or arena. Jai-alai is a fast-paced Basque sport, on which betting is legalized in several states. Its scoring system presents a fascinating actuarial puzzle, in pursuit of which many area students have invested significant time, effort and computer expense.

As in other betting endeavors, the most fruitful choices, assuming that the odds are equal, are the players with greatest skill and motivation. But, unlike most other sports, each player's "post position" has a direct impact on his chances of winning. This article discusses the relative advantages of the various post positions.

Introduction to Jai-Alai

The object of the game is for a team to score seven points, a point being scored by hurling the ball against the front wall with such speed and spin that the opponent cannot return it. To make a legal return, the ball must be caught on either the fly or the first bounce. The ball is thrown and caught with a "cesta", a long, curved wicker basket worn on a player's arm. This allows for sweeping, dramatic catches, and imparts spin to many shots.

An evening's program consists of thirteen separate games, bet upon individually. Each game may last ten to twenty minutes, and there are ten minutes for betting between games. Eight teams compete in each game, although only two are on the court at any one time. Various games during the evening feature teams of one, two or three men.

The betting system of "win, place, show" is identical to that at race tracks. In addition, exotic bets are encouraged, wherein the bettor must select, e.g., the first three teams in a game in order. The state skims 18% from the betting pool, requiring the bettor to overcome this additional assault on his expected values.

How can first, second and third places be determined from an eight-team field, when only two teams are on the court at any one time? The answer lies in the game's round-robin scoring system.

Scoring System

Initially, Teams 1 and 2 play a point against each other. Teams 3 through 8 sit on benches outside the court. Importantly, they sit in post-position order, i.e.,

Team 3 on the "front" end of the bench, followed by Teams 4, 5, 6, 7 and 8.

Let's assume that Team 2 wins the initial point. Three things then occur:

- 1) Team 2 has one point credited to it on the scoreboard, and stays on the court to meet its next opponent.
- 2) Team 3 takes the court against Team 2, as Teams 4 to 8 advance by one position on the bench, and
- 3) Team 1 goes to the end of the bench, and probably will play again later in that same game.

This process continues until Team 8 has played one point, whether it wins or loses.

Now the "first round" has been completed, each team having played at least once. For the remainder of the game, the winner of each point is credited with two points on the scoreboard. (To avoid confusion, we will identify points contested on the court as "plays", and points on the scoreboard as "points". The value of a "play", then, is either one or two "points".)

The rotation continues, and the game ends when one team scores seven or more points; that team is declared the winner, the team with the next highest point total is awarded second place, and the next after that third. Ties for second or third place are settled by play-offs among the tied teams (adding to the complication).

Is It Fair?

This system has two salient features affecting the game's outcome. First, the point value of all plays after the first round is doubled, placing greater emphasis on the game's later plays. Second, when the game ends, some teams may have had two or more chances on the court, but others only one.

Certain elementary observations can be made. First the low-numbered teams enjoy significant advantage over the high-numbered, with respect to both the above features. If, for example, Team 1 loses the first play, it sits next to Team 8, guaranteeing that Team 1 will be the first to participate in the second round, where plays are worth two points each.

If Team 1 wins its first play, it earns a point and the right to try for further points, until it loses. If Team 1 wins the first seven plays, it wins the game, leaving a seven-way tie for second and third places to be resolved.

In contrast, the high-numbered team face seemingly unfair obstacles. Although every team is guaranteed at least one (first round) chance, Team 6, for example, may well not get another chance, the game having already ended before it can return.

Surprisingly, Team 8 is not as seriously disadvantaged as are Teams 5 through 7. If Team 8 wins its first play, it then has an immediate entry into the second round and can win the game by winning its first four consecutive plays. Team 1, on the other hand must win its first seven plays to win the game immediately. In actuarial jargon, Team 8 begins the game with a higher "present value" of its (more valuable) second round points than Team 1, but with a lower present value of its sole first-round point.

Can This Be Quantified?

The game can be simulated fairly easily on a computer. Can a team's chances be analytically determined? I will share my results with you in a later article.

ACTUARIAL SOFTWARE CATALOG

The second edition of this classified list of vendors can now be had for \$3.00 US per copy from Society headquarters. Compiled by our Committee on Computer Science, this is an enlarged sequel to the original which ran to 300 circulation.

THIS MONTH'S QUERY FOR ACTUARIES

For more than a year, Prof. Joseph M. Belth has been offering in *The Insurance Forum* a set of "Benchmarks" aimed at helping policyholders and prospective policyholders measure comparative values in whole life and other policies for making purchase and replacement decisions. These benchmarks are identified as yearly prices per \$1,000 of protection.

Surely some of our readers have undertaken to analyse the effectiveness of these benchmarks for their announced purpose, and would be willing to give others their verdict.

This month's query, then, is: How suitable are the Belth Benchmarks in separating attractively priced cash-value

(Continued on page 8)

E. & E. CORNER

Ques.: What are the E. & E. Committee's plans for bringing the topic Computers onto the syllabus?

Ans.: There are no plans to make Computers a separate syllabus topic, but computer applications, applied to appropriate existing topics, will be phased into our exams as new materials develop. Students thus will be tested on how the computer would be used to solve actuarial, insurance, business, mathematical and statistical problems, and to describe potential applications, but will not be tested on how a computer is constructed, or how it works, or how to program in any particular language. The Education Committee will gradually put this plan into operation.

Ques.: How many of the students taking and passing the Part 7 Enrolled Actuary exam are Associates? Is the excessively low pass rate attributable to many non-Society "types" taking this exam?

Ans.: By comparing the pass list for the November 1982 EA-2 examination with the 1983 Yearbook, we find that of the 201 who passed, 166 are Associates. Of the remaining 35, 33 requested Society credit, but of course we don't know how many of these firmly intend to complete the Society examinations. We believe that EA-2 candidates who are A.S.A.'s scored neither significantly better nor worse than other candidates, but to prove this would require a laborious check of individual records.

Ques.: Why doesn't the Society allow calculators to be used in its exams?

Ans.: We believe that calculators should be permitted in all Society exams, and are working on guidelines to be effective in May 1984.

The most difficult guideline to draft is that which defines acceptable calculators and bars from the examination room those with features such as financial and statistical functions, alpha-numeric storage and programming capabilities, that would prevent us from knowing whether students have learned the material. To ensure that such a ban works, we must enable examination supervisors to identify acceptable calculators; we may issue to students a list of the specific permissible models. An announcement to students will be made when guidelines have been set. □

INDEX-LINKED SECURITIES IN THE U.K.

by Alistair Neill,
Edinburgh Correspondent

Two-and-a-half years ago the British Government started to issue index-linked securities—the redemption value and coupon both increase with the UK Consumer Price Index, but the value before redemption is determined by the stock market. Initially this was done in a small way and offered to a restricted group of investors (pension funds), but now anybody can hold these securities.

I have been trying to keep actuaries across the water in touch with this interesting development. In my last report (Jan. 1983 issue) I mentioned the changes in yields that had occurred; at that time our CPI increase had fallen into single digits. Now that it has declined even further, to about 4%, it is noteworthy that the yield on index-linked securities has risen, but only enough to regain the 3% level. Presumably the ex-

pectation is that the price index won't stay down at its present level for long, noting for comparison that normal Government securities yield about 11%.

There are now nine index-linked stocks, forming a gradually increasing proportion (now about 6%) of the total UK Government securities market; maturity dates are spread between 1988 and 2016. When these were first offered, actuaries had the idea of issuing annuities that would increase with the price index, but it was recognized that there would have to be a reasonable spread in maturity dates of the stocks before even rough investment matching would be possible; until then the risks to the insurance company would be excessive. Now that there is more of a spread, there are some tentative entries into the market for these price-index-guaranteed annuities. But, as one might expect, people seem to prefer the "bird in the hand" after looking at the decrease in the initial payment under the indexed annuity (this being perhaps 50% to 60% of the corresponding level annuity). □

COLLEGES THAT PRODUCED 19TH CENTURY ACTUARIES

Who were the earliest graduates of various of our universities and colleges who became actuaries? We think we know some of them (listed below), and will be glad to be notified of corrections and additions.

<i>University or College</i>	<i>Earliest Graduate (and Some Second Earliest)</i>
Amherst	Emerson W. Peet, 1856. Henry W. Smith, 1859.
College of City of NY	James W. Mason, 1855. David P. Fackler & Oscar B. Ireland, 1859.
Columbia	William Bard, 1797.
Columbia of New Jersey	Emory McClintock, 1859.
Gettysburg	John J. Brinkerhoff, 1869.
Hamilton	Ezekiel B. Elliott, 1844.
Harvard	T. Russell Jencks, 1821. Sears C. Walker, 1825.
Indiana	George W. Sanders, 1869.
Jefferson	Charles F. McCay, 1829.
Lafayette	James C. Crawford, 1871.
Michigan	John E. Clark, 1856.
New York University	Israel C. Pierson, 1865.
Princeton	Amzi Dodd, 1841. Walter S. Nichols, 1863.
Rutgers	Joseph P. Bradley, 1836.
Toronto	William McCabe, 1863. Alfred K. Blackadar, 1876.
Union College	John S. Paterson, 1865.
Virginia	Edward B. Smith, 1854.
Waynesburg	Jesse J. Barker, c. 1870.
West Point	William H. C. Bartlett, 1826. Lewis Merrill, 1855.
Williams	William S. Smith, 1860. Joseph H. Nitchie, 1870.
Yale	Guy R. Phelps, 1825. Elizur Wright, 1826.

Competition Results

(Continued from page 1)

Although most of our readers never tackle either the Actucrosswords or the Actucrostics, many, we know, do get pleasure from them. For example, after last year's announcement that all 100% solvers would be recognized, perfect solutions for the next puzzle came from 19 members who had never submitted solutions previously, and 33 more new solvers were heard from as the year went on. Because of this increased interest, the contest will be continued until further notice on the same 10-issue system, recognizing 100% solvers monthly.

Numerous comments and other displays of puzzle-addiction came in during the year, most of them correctly addressed to Milwaukee. After the C.E. told one of our winners, Noreen Shapiro, that R. Graham Deas (F.F.A., A.S.A., now in England) constructs our Actucrosswords, she wrote, "Mr. Deas is another matter! (We) suspected his fine 'British' hand. I am from England, and cut my crossword teeth on British puzzles. So I have a little insight into his wonderfully fiendish mind!" Another 100% solver, believing in tit-for-tat, identified his solution as "The avid old shoe solved the Actucrossword in just under 24 hours (5, 1, 5)"—see Yearbook, p. A-123.

Your C.E. would welcome comments from solvers of either Actucrosswords or Actucrostics that would make them more fun or of greater interest. Yours for more enjoyment!!

Ed. Note: And thanks to C.G.C., C.E. for his devotion and witty clues. □

MAIL ALERT

During October, or later in remote places, you should have received three issues of the *Record*, viz. 9-1 (Philadelphia, April 1983); 9-2 (Chicago, April); 9-3 (Vancouver, May). If you haven't, notify the Society's office.

Query

(Continued from page 6)

policies from their higher priced competitors?

As is customary, responses will be summarized in a future issue, with recognition of, but not attribution to, individuals. *E.J.M.* □

NEW STUDY NOTES OF GENERAL INTEREST

9LB-414-83	Universal Life: A Product Analysis	\$3.00
9LB-509-83	Individual Life Insurance Cost Comparison and Disclosure Activity, U.S. and Canada	3.00
9LB-619-83	The Underwriter's Approach to Medically Impaired Risks	4.00
9PC-812-83	Human Rights Legislation in Canada	3.00
9PU-813-83	Actuarial Aspects of Sex Discrimination Legislation	3.00
9PC-911-83	Multi-Employer Pension Plans in Canada	3.00
9PC-912-83	The Impact of Inflation on Pension Plan Design	3.00

Orders must be prepaid, in U.S. funds. Send request, with check or money order payable to Society of Actuaries, to the Society at Box 98474, Chicago, IL 60693.

Education and Research

(Continued from page 1)

How to Apply

Information, application forms and requirements may be obtained from C. J. Nesbitt, Research Director, AERF, Dept. of Mathematics, University of Michigan, Ann Arbor, MI 48104.

Awards Committee

The Awards Committee members are:

Arthur W. Anderson, A.S.A., F.C.A., M.A.A.A.
Charles A. Hachemeister, F.C.A.S., M.A.A.A.
James C. Hickman, F.S.A., A.C.A.S.,
M.A.A.A., Ph.D.
Robert V. Hogg, Ph.D., University of Iowa
John A. Mercu, F.S.A., F.C.I.A.

This Committee, coordinated by the Research Director, will evaluate proposals and make recommendations to the AERF Board.

Deadlines

Proposals must be submitted to the AERF Research Director by February 1, 1984. Proposal submission has been designed to be relatively simple. Grants will be awarded by April 1, 1984.

Distribution Rights

Since the competition's goal is to advance actuarial science, the result of each research project should be a manuscript suitable for publication in a scholarly journal. AERF reserves the right to publish the results of any project it has funded; if this right is not exercised, suitable credit should be given AERF at time of publication. □

Actuaries and Wellness

(Continued from page 1)

One indication of this is that at our meetings, the left half of the meeting room reserved for smokers is now largely occupied by non-smokers who can't find a seat on the other side. A note to meeting planners: Isn't it time to reduce the allotment of seats for inveterate smokers to a small (well-ventilated) corner of the meeting room?

Some actuaries are actively promoting wellness in their own professional and personal environment. Not surprisingly, many of these are futurists, for the positive state of wellness is a "preferred future" alternative towards which we should be striving. Inspection of these actuaries reveals that they do not suffer from "furniture disease", e.g. where the chest sinks into the drawers. It has already been clearly demonstrated that actuaries practicing wellness produce more accurate valuations and earnings forecasts, are more skillful in product pricing and design, and are more popular with government examiners, accountants and even agents. Further studies suggest that they tend to be stronger and better looking, have higher morale, superior bowel movements and more antibodies to resist illness, and get better gas mileage.

Dr. Ardell recited a poem in the course of his speech, which reads in part:

"If I had my life to live over, I would relax more,
I wouldn't take so many things so seriously.
I would take more chances, I would climb more mountains and swim more rivers.
Next time, I'd start barefooted earlier in the spring and stay that way later in the fall.
I wouldn't make such good grades unless I enjoyed working for them."

While some of these sentiments may not be valid for actuaries, the general approach is. I challenge our older, wiser and more literate actuaries to develop an actuarially-oriented poem along these lines. Prizes should be awarded for the best submissions.

Ed. Note: If there are prizes, they are likely to be higher in sentimental than in material value. □