



# THE Actuary

The Newsletter of the Society of Actuaries

VOL. 23, NO. 10  
NOVEMBER 1989

## Forecast 2000 forum generates substantial media coverage

by Robert L. Brown

The recent Forecast 2000 forum on the environment held in Toronto dealt with such issues as increased taxes and higher insurance premiums to cover costs of natural disasters. The forum generated a lot of positive worldwide media coverage and brought more focus on the actuarial profession, despite the somewhat negative tone the survey projected.

In discussing the results, based on a survey of casualty actuaries, a positive pro-active stance was emphasized with the media.

In particular, it was our contention that through insurance premiums, the business sector will see real economic incentives and rewards for being responsible corporate citizens with respect to pollution control (e.g. reduced premiums for safe, inspected storage facilities). Furthermore, we stressed that actuaries have an essential role to play in assessing the economic value of the pollution liability risk, both in setting equitable premiums and also in assisting the courts in adjudicating penalties in cases of damage or injury.

Before the July 11 Forecast 2000 seminar, actuaries with a particular interest in the topic were polled on a series of relevant questions. In this case, the response was from 332 property/casualty actuaries (out of 1200 polled). Questions varied from the effects of a catastrophic natural disaster to concerns about environmental pollution. The results of the survey, which acted as the focal point

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## Continuing education: The debate goes on and on

by Burton Jay

Should actuaries have a formal program for continuing education? This question has been asked, studied and debated at least since the early part of the decade. For many years, accountants, physicians and lawyers of many states have had continuing education requirements to retain their license to practice. Many other professions, including some groups of life insurance agents, require their members to participate in continuing education activities or in some way recognize those who do. Where are the actuaries?

The topic was on the agenda of the Society's Services to Members Policy Committee as early as 1983.

In 1984, a joint task force representing the actuarial bodies in North America was formed to consider the question. In a September 1985 report to the Council of Presidents (COP) the task force recommended that each founding organization of the Academy

adopt a similar continuing education recognition program. The Conference of Actuaries in Public Practice (CAPP) was already in the process of adopting a program similar to the one envisioned by the joint task force. That program would have recognized - with an asterisk or other designations in the organization's yearbook - those individuals who fulfill the required hours of continuing education and submit documentation to the organization's administrative offices. The American Society of Pension Actuaries has also had such a program for a number of years.

Another type of program involves specified continuing education requirements to retain one's professional designation. The Joint Board for Enrolled Actuaries recently implemented a program that members must fulfill to retain their Enrolled Actuary designations. The COP deferred action

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### Continuing education cont'd

on the 1985 task force report. The topic was then brought up to the SOA Board of Governors for consideration. After debating the question for about two years, the Board concluded that the Society is in the business of providing continuing education but should not require or formally recognize it.

Near the end of the period of SOA Board debate, the Academy formed a task force to consider a recognition program for its members. The ball had been passed to yet another group; however, it should be remembered that some individuals participated in the deliberation and development work for more than one group. The Academy's task force designed a continuing education recognition program, similar to the CAPP program, and distributed a discussion memorandum describing the program to its membership in September 1987.

With the memorandum, the Academy mailed a questionnaire to determine the membership attitude toward such a program. Although 76% of the respondents supported the general idea, the task force concluded that there was substantial resistance because 95% of those who were opposed provided additional comments elaborating on their opposition. Only 66% of those in favor provided comments. In response to the questionnaire results, the Academy's task force took a new direction and developed a proposed continuing education requirements program to accompany initial qualification standards for those performing public functions requiring a statement of actuarial opinion. The document describing this program, which has been approved by the Academy Board, was mailed to the Academy membership in June 1989. It states, "Guidelines for minimum acceptable continuing education activities will be published in the *Yearbook* accompanying the section on qualification standards."

This spring, SOA Board members noted that the Academy's program applies only to a small percentage of actuaries, those performing public functions where an opinion is required by law. The Board asked its Continuing Education Policy Committee to reconsider whether the Society should develop a program applying to all SOA members. This Committee returned to the Board at its May meeting with an affirmative recommendation. However,

Academy representatives present asked that the Academy's Board first be given another opportunity to consider a more global program for the profession under the premise that the Academy is the more logical body to implement and administer a continuing education recognition program for U.S. actuaries. (The Canadian Institute of Actuaries has recently committed to developing a program for Canadian actuaries.) The Society Board agreed, and the Academy is forming a new task force, with representatives from all U.S. actuarial bodies, to consider such action.

Those of you who have had the patience and endurance to complete this article will undoubtedly share a sense of confusion and frustration. You may wonder where the merry-go-round will stop, or if it will. As one who has been close to these activities for nearly a decade, I share those feelings much of the time. However, this is clearly an important issue for many of our members, and opinions vary widely and are often strongly held. Maybe the next trip around the circle will bring us a program. Then again, it may be only the next in a continuing series of episodes. The only prediction that I would make is that the issue will not go away until or unless a program applying to most or all actuaries is in place. Can you imagine reading an article twice this long 10 years from now?

Burton Jay, an SOA Vice President, is Executive Vice President and Chief Actuary, United of Omaha Life Insurance Company.

## Election Committee invitation

The Committee on Elections is beginning the preparation of the first ballot for the 1990 election. On that ballot, Fellows are asked to nominate up to six FSAs for Board of Governors' positions. To aid them, a list is provided of those who are eligible for election and have met specific criteria for committee and other service to the profession. Fellows who have the experience, interest, and time to serve on the Board of Governors may submit their names for consideration. They are cordially invited to summarize their accomplishments and background in a letter to Gary Corbett, Chairperson of the Committee on Elections, at his *Yearbook* address before December 15.

**Forecast 2000 cont'd**

for the media event, can be summarized as follows.

According to the survey, actuaries believe that insurers would be unable to cover the costs of a catastrophic natural disaster, like an earthquake, in the year 2000. Eighty-one percent of respondents believe this given current premiums and coverage. Such costs could only be borne by higher insurance premiums, according to 50%; or increased taxes, according to 30%.

For example, if a major earthquake like the San Francisco earthquake of 1906 were to occur again in southern California, claims could total more than \$40 billion. If the insurance industry there tried to set aside \$50 billion for claims, the government would insist on taxing that money. It's just not possible to keep that kind of money around. (*Ed. note: This article was written before the San Francisco earthquake of October 17th.*)

Fifty percent of actuaries who responded believe that chemical wastes are the environmental risk

which will pose the greatest health hazard to the general public by the year 2000.

These hazardous chemical wastes will also be the environmental risk most costly to society, according to 64%. Federal, provincial, and state governments would bear the clean-up costs, say 55%. Ninety percent said, however, that federal regulatory systems, such as the United States' Superfund program, are inadequate as they exist today to pay for clean-up costs. Most respondents, 64%, think additional taxes would be necessary to cover these costs.

Employers will protect themselves from potential environmental hazards in the work place, such as office automation, sealed buildings and lead in water, through Workers' Compensation/Health Insurance, according to 63%.

Sixty-four percent of those surveyed believe that health claims resulting from nuclear exposure would increase by the year 2000.

Broad court interpretations of insurance contractors were blamed by 64% for the insurance industry's reluctance to provide pollution coverage.

Presentations at the forum were also made by Margaret Tiller, F.C.A.S., A.S.A., M.A.A.A. (The Cost of Environmental Risks), by her husband and business partner, environmentalist Michael Tiller (Global Risk Assessment) and Martin Theriault, of the National Coordinator of the Canadian Environmental Network.

This forum met with wide and enthusiastic response from both the print and broadcast media. (Follow-up calls came from as far away as London, England; the Soviet News Agency, Tass, even called to ask, "What is an actuary? We have none in the Soviet Union.") I hope that the remaining seminar in the series can be as successful.

Robert L. Brown is Associate Professor, Department of Statistics and Actuarial Science, at the University of Waterloo and President-Elect of the Canadian Institute of Actuaries. He presented the survey results at the Forecast 2000 forum.

## First Intensive Seminar draws 66 students

by Robert C. Campbell

Sixty-six actuarial students participated in the Society's first two Intensive Seminars for examination credit during the weeks of August 14 and 21. The seminars were held on the University of Wisconsin-Madison campus. A total of 65 students completed the course, with 62 passing.

The two identical five-day sessions in Applied Statistical Methods were sponsored by the Education and Examination Committee as part of the implementation of the Future Education Methods (FEM) programs approved by the SOA Board in 1987. Successful candidates earned 10 elective credits toward Associateship.

The intensive seminar concept supplements the self-study approach by providing students with an opportunity to use the mathematical knowledge obtained through self-study to analyze realistic problems. Successful completion of an intensive seminar is intended to enhance the student's education by moving beyond formulas to a deeper understanding of central concepts and their specific application to the work of actuaries.

The seminar combined lectures with case studies. Students' desks were equipped with terminals connected to a minicomputer running statistical software. Students learned to apply analysis of variance; regression; and time series analysis to a variety of economic, financial, and actuarial data.

Applied Statistical Methods was chosen as the topic for the first Intensive Seminar because data-intensive techniques are particularly well-suited to the interactive approach that a seminar environment affords. The seminar setting enables students to experiment with techniques to learn how and when to apply them.

Academic background was provided by Dr. Edward W. (Jed) Frees, Associate Professor of Business and Statistics at the University of Wisconsin. Dr. Donald F. Behan of Deloitte, Haskins & Sells served as the business faculty member, providing specific examples of applications of statistical techniques to real actuarial assignments.

Students were evaluated on the basis of a written examination and a class project. The written examination

was comparable in form and content to other Society examinations. The class project was the analysis of a complex data set. Students worked in small teams to decide what statistical techniques to apply and to perform the analysis. Each student then prepared a written report to communicate the findings and interpretations to a nontechnical managerial audience.

The seminar pass mark was set by the Society, through its E&E committee structure, to maintain appropriate standards for earning examination credit.

Both faculty members commented on the high level of student enthusiasm and preparedness, and student reaction to the course has been strongly supportive. Student suggestions for improvements will be considered as future intensive seminars are developed.

We plan to offer another Intensive Seminar in Applied Statistical Methods next summer and to expand the concept to other appropriate topics in the future.

Robert C. Campbell is an Actuarial Consultant with Hewitt Associates. He is an Education Vice Chairperson on the E&E Committee.

## Editorial

# Being an actuary is risky business

by R. Stephen Radcliffe

A simple mission statement for the actuarial profession could be "We do insurance risk." Maybe in the future we could expand our horizons and just say, "We do risk." With either statement, the main word is risk. We analyze it, quantify it, manage it, monitor it, model it and project it.

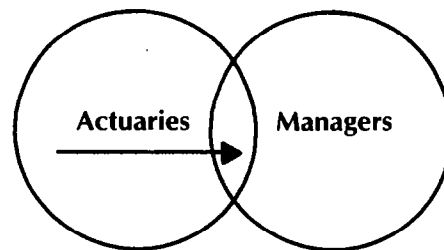
We are the experts in insurance risk. We are the "engineers" of the financial security systems that have developed in free economies. Because of the nature of risk, the actuary's job is very technical and intellectually demanding. There aren't many people who can do what we do – or maybe there aren't a lot of people who want to do what we do. The work is difficult and involves a lot of messy details. As the economies we work in become more volatile, the work becomes more difficult and messier.

Because of this trend, the actuary's work in the future is sure to be more technical and more complex, and it probably will be more mathematical. This idea of needing actuaries who are more technical seems on the surface to run counter to the proposals in the report on *The Future of the Actuary*. In that report, the main theme focuses on the need for actuaries to be better communicators and better managers. To be more generalists, if you will, and less specialists, more managers and less technicians.

The report presents an important issue for actuaries to face. A professional with a good idea or a good solution to a problem will not be effective unless he or she can communicate it. However, that does not mean that actuaries have to be good communicators as a primary skill. As long as they can communicate their ideas in the language of actuaries, usually mathematics, they can be effective. As long as they contribute to the advancement of actuarial principles, their contributions will be important and valuable. After all, I am sure not all the space engineers in Houston are good communicators, but they are launching spaceships again.

The concern about actuaries' not being good managers stems from a worry that not enough actuaries are migrating into the ranks of managers in today's organizations. There are plenty of counter examples to offset this worry. Many actuaries are presidents or in senior management of companies all across the country. I think a case could be made that actuaries today are migrating into the management ranks just as fast as they have in the past. Of course, there are no guarantees of the migration from actuary to manager, but there never were and never will be.

We should recognize that being an actuary and being a manager involve two entirely different sets of skills. Actuaries manage risk, and managers manage people. Actuaries solve technical problems, and managers get projects done. Actuaries build models, and managers build organizations. Actuaries project financial results, and managers plan growth. These are two distinct groups of people. They may intersect, but they are separate as shown in the diagram below:



The main job of our profession is to train actuaries, not managers. It is up to individual actuaries who want to migrate into the ranks of management to train themselves to be managers. We should also recognize that not all actuaries may want to migrate. Sure, that's where all the bucks are, but it is not where all the good actuarial work is done. Those who migrate to the ranks of management will probably shed some actuarial skills as they accumulate management skills. They will then

miss the feeling of "Eureka" when they solve a really tough problem and make the final turn of the key that snaps the lock open on a treasure chest of new ideas and thoughts. Who knows, maybe in the future the big bucks will go to the good technicians and not the managers.

Nothing said here is meant to denigrate the idea that actuaries should strive to be better communicators and better managers and to be more involved in shaping the future of financial security systems. The only caution suggested is that in our anxiety to be great communicators and managers we not forget the core of our profession – an expert understanding of risk.

Instead of adding more courses on communication and management to our syllabus, let's add more statistics and more mathematics of finance. As Jim Tilley mentioned in his address at the Centennial Celebration, maybe we need to learn more about the theory of chaos – a relatively new mathematical discipline that helps explain observed random, chaotic phenomena that may not be random or chaotic after all. These and other mathematical skills need to be added to the actuary's toolkit.

The challenges facing actuaries in the future will require more, not less, technical work. So let's prepare our profession to solve these problems by adding more mathematics, and then let the individual members in our profession who wish to migrate into management accumulate the skills they need to make the migration successful. The report on *The Future of the Actuary* reminds us that we do need to hone our skills in many areas. But, let's not take our eye off the ball and forget our heritage as the keepers of the actuarial fundamentals that provide the foundations for our financial security systems.

R. Stephen Radcliffe, a Vice President of the SOA, is Senior Vice President and Chief Actuary at American United Life Insurance Company. He is an Associate Editor of *The Actuary*.

# Pricing on a GAAP basis

by Bradley M. Smith

Life insurance companies find themselves in a significantly more complicated environment than that of just a few years ago. Managements face an uncertain investment environment, the real possibility of deteriorating future mortality due to the spread of AIDS, and alternative and competing distribution systems. They also are challenged by increasing government involvement at the state and federal levels, competition for the consumers' life insurance dollars from external industries, the increasing presence of non-U.S. companies within the U.S. marketplace, as well as the specter of a consolidating industry where poor performers are absorbed by their competitors.

All these developments have contributed to innovative product offerings as well as a shortened product cycle. The product development function has likewise evolved from primarily premium determination to include product design, market identification and penetration estimation, producer compensation determination, contemplation of investment strategy, and determination of appropriate statutory and GAAP financial statement methodologies.

The introduction of a new product is a tactic used by the management of a company attempting to fulfill the objectives defined by its underlying corporate strategy. The product will be successful, and should be judged so, only to the extent that it is consistent with and enhances the company's ability to attain those objectives. The emergence of earnings (on a GAAP and statutory basis) as well as the level of earnings must be consistent with these objectives.

Typically, the pricing process, which is appropriately a subset of the product development function, has addressed the level of earnings and not the emergence of earnings of a product. Thus, the pricing process has attempted to ensure that the return on invested capital anticipated from a new product exceeds, by an appropriate margin, the cost of that capital. It has not attempted to ensure that the emergence of that return is consistent with the company's needs. The teaching session on "Pricing on a

GAAP Basis" conducted at the SOA Annual Meeting in New York in October addressed forces affecting the emergence of GAAP earnings on products sold in today's insurance marketplace and how they affect the product development process.

The last thing that an actuary involved in product development wants is to explain to an unsuspecting CEO why increased sales from a new product have not resulted in the GAAP earnings growth anticipated by the CEO. The level of GAAP earnings, which determines the company's return on equity (ROE), will affect outsiders' perceptions of the company, thus affecting a publicly-traded life insurance company's stock price. This directly affects the company's ability to raise capital that may be needed to implement its long-term corporate strategy. Thus, differences in the emergence of earnings anticipated by the CEO and those occurring solely to the application of differing accounting methodologies can have disastrous ramifications for the company's plan. Yet, this occurs with increasing frequency within life insurance companies due to ever-evolving accounting standards that have resulted in an emergence of earnings on products offered today that differ substantially from the emergence of earnings using FAS No. 60 methodologies.

In short, there is a difference between the CEO's expectations and the actuality presented by these new accounting standards. It will be the actuary's responsibility to close this expectation gap. Clearly, this will be less painful before a new product is introduced than after, if initial earnings emergence proves disappointing. Most CEOs hate surprises, and a major aspect of an actuary's job is avoiding these surprises.

Thus, the following issues must be addressed by an actuary involved in the product development process.

- FAS No. 97: This pronouncement promulgates the appropriate accounting methodologies for universal life products, investment contracts (SPDAs, FPDAs, GICs, structured settlements), limited payment contracts, and policy replacement situ-

ations. It has definite implications as to desirable product design.

- FAS No. 96: Although, as of this writing, the methodologies and the final date of adoption of this standard have not been set, adoption in its current form will have major effects on the after-tax GAAP earnings emergence of various life insurance products.

- Use of company-wide projections in the product development process: To avoid surprises, company-wide projections using differing production assumptions must be used to illustrate the incremental effect of a new product on company-wide results. These projections also provide a valuable map useful in identification of reasons for deviations from expected in the actual results.

- Relationship between GAAP and statutory profitability measures: The relationship must be understood between GAAP ROE and statutory return on invested capital (ROI), as well as GAAP profit margin, the effect of required (target) surplus and pre-tax and after-tax results.

- Increased communication required: Again, to avoid surprises, the financial reporting methodologies (as well as the investment strategy, target market, underwriting guidelines, profitability objective, state submission requirements, etc.) must be understood by all those involved. Financial reporting methodologies, as well as the other elements listed above, should be determined/identified during the product development process, thus allowing for the possible alteration of product design when needed to meet company expectations. Variables in the accounting methodologies can be used (i.e., DAC amortization period), and these should be understood and set so as to meet company objectives within the boundaries of acceptable accounting practice.

It must be remembered that new product introduction is merely a tactic to attain company objectives. Thus, success or failure of a particular product introduction should be judged on this basis.

Bradley M. Smith is a Consulting Actuary with Milliman & Robertson, Inc.

# Responsibilities of mutual company management discussed

by Arnold A. Dicke

Stockholder rights emerged as a major business issue in the last decade. Management's right to a compliant, often hand-picked, board of directors was challenged by stockholders' groups and corporate raiders. The result was a wave of takeovers and break-ups, as well as the dramatically increased use of leverage to squeeze out extra return on invested capital.

Mutual life insurers, lacking stockholders, seemed immune to these developments. But several recent transactions, in addition to the adoption of a demutualization law in New York, have raised issues similar to those faced by stock companies in the early 1980s. The demutualization and recapitalization of Union Mutual, the conversion of the participating branch of Northwestern National, and the sponsored demutualization and simultaneous sale of Maccabees Mutual all required a determination of the value due to participating policyholders and the basis for its allocation. In every case, the value distributed went beyond the current statutory surplus, recognizing a right of some sort of the value represented by future cash flows.

The manner in which these rights were developed was discussed by three panelists at this year's October annual meeting of the Society. Bill Britton looked at the Union Mutual demutualization from an actuary's point of view, while Patrick Delaney of Lindquist and Vennum, a Minneapolis law firm, described the legal considerations taken into account by

the State of Minnesota in approving the Northwestern National conversion. The internal process that resulted in Maccabees Mutual's eventual acquisition by the Royal Group was summarized by Jules Pallone, Maccabee's Chief Executive Officer. In each transaction, the rights of participating policyholders were a major issue.

Even if demutualization is not foreseen, many mutual company boards have been asserting their role as policyholder advocates. Diversification plans come under special scrutiny. Boards are asking not only if a new venture is likely to be successful, but also whether it is an appropriate use of policyholder funds. Furthermore, the board often demands that the return on such investments be tracked over the years to assure that the promised value is realized. Jim Morton, CEO of the John Hancock, rounded out the panel discussion by covering the impact of these new attitudes on the ongoing management of a mutual life insurance company.

The panel concluded that the situation is developing. Future developments are a matter of speculation. Will the comfortable relationship that has been typical between the managements and boards of mutuals become more strained? What is the future of strategic diversification? Will policyholders ever be able to demand the conversion of a mutual to tap its hidden value?

The fact that these questions are being asked is, perhaps, an interesting development in its own light.

Arnold A. Dicke is with Tillinghast/Towers Perrin. He is a member of the SOA Board of Governors.

## Coming in November: New area code for Society

Beginning November 11, callers should dial area code 708 to reach the Society office in Schaumburg, Illinois. This new code covers the Chicago suburbs. The current area code, 312, will remain in effect for Chicago numbers only.

A three-month transition period, from November 11 through February 9 will be provided to help callers adjust to the new area code. During the transition period, both the old and new ways of dialing calls will work.

## Book review

### Megamistakes provides guide for futurists

by J. Bruce MacDonald

*Megamistakes: Forecasting and the Myth of Technological Change* by Steven P. Schnaars. Published by Free Press, 1988, 224 pages.

While the purpose of this delightful and stimulating book is the identification of new products for the marketplace, anyone interested in predicting the future should read it.

The book surveys the batting average of futurists, which is amazingly low. About 20 years ago, Herman Kahn predicted 100 changes that would occur by the end of the century. Of these, 15 have occurred, and 10 others were vague enough that, if you are charitable, can be considered to have happened. Other futurists have not been as successful.

Predictions are a function of their times. In the heyday of the Apollo missions, colonization of the solar system was predicted. Such predictions vanished with the end of the manned space program. Another frequent mistake is to assume that because the technology exists, it will be used whether or not the end product is useful, wanted, or cost-effective. An example of this is a proposal to replace the rearview mirror on cars with a combination of a backward-aiming video camera and a TV screen on the dash. While it makes sense for fighter planes, does it make sense for automobiles?

Many case histories are examined. Although they existed for many years, microwave ovens and VCRs were not successful until social changes evolved or the right marketing ploy was developed. For microwaves, the dramatic increase in the number of the two-income families was the key. For VCRs, the key to success was the shift in emphasis from looking at videos, then few in number, to recording TV programs for later viewing. Even then, the design had to be changed from a VCR built into the TV set (the original concept) to an independent VCR. And

*Continued on page 7 column 1*

**Book review cont'd**

then the market for videos developed exponentially!

Another case history examined is the market for CB radios, which suddenly went flat and then declined. Will the demand for cellular telephones follow suit or keep expanding? Schnaars thinks a significant difference exists between the social image of these two products.

Actuaries should be pleased that Schnaars believes demographic forecasts, and deductions made from them, have been very good — as long as we limit them to people already born. Predictions about the birthrate have not been successful. I wonder if changing immigration patterns will have an effect? Up to now, we have pretty well been able to ignore them. Schnaars does not, however, mention the debate about OASDI projections.

He suggests a common-sense approach to evaluating predictions. First, the basic underlying assumptions should be evaluated; this should appeal to actuaries. Futurists should ask, is the new product really an improvement on existing products, and will anybody want it? Assuming the answer is "yes," they should ask, can it be produced at a price that will make it marketable? Schnaars does not believe in elaborate mathematical models and suggests they often distract from a hard-headed analysis of erroneous underlying assumptions.

A long time has passed since I recommended a book so enthusiastically to my friends and colleagues.

J. Bruce MacDonald is a Principal with William M. Mercer Ltd.

**Mail Alert**

Volume 40 of the Society of Actuaries *Transactions* (Parts I and II) was mailed to members in late September. If you have not received your copy, please call Donna D'Agostino at the Society office, 312-706-3526 (after November 11, 708-706-3526).

**In memoriam**

Ralph D. Maguire FSA 1962  
B.J. Patrizi FSA 1966

# FACTUARIES

by Deborah Poppel

*This is another in a series of profiles of members of the Society's Board of Governors.*



**Name:** Nicholas (Nick) Bauer.

**Birthday:** September 22, 1941.

**Birthplace:** Budapest, Hungary.

**Current hometown:** Montreal.

**Current employer:** Eckler Partners.

**Marital status:** Married to Julie.

**Children:** Audrey, 19; Sandra, 16; Jennifer, 13.

**My first job was:** Gofer without portfolio in the actuarial department of Montreal Life.

**I'd give anything to meet:** Paul Bocuse — the father of Nouvelle Cuisine and a true gastronomic genius.

**The number of exams I flunked:** 2.

**The books I recommend most often:** The *Dune* Series by Frank Herbert; *Chaos* by James Gleick.

**The last movie I saw:** *Dangerous Liaisons*.

**Nobody would believe it if they saw me:** Sitting calmly in traffic.

**The TV shows I stay home to watch:** "Yes Minister" and any Stanley Cup playoff.

**If I could change one thing about myself, I'd:** Sit calmly in traffic.

**When I'm feeling sorry for myself, I:** Go to sleep (it usually works!).

**My fantasy is:** An uninterrupted two-month family holiday traveling in the Pacific Islands.

**The silliest thing I've ever done:** Is watch an airplane at O'Hare back away from the gate after having waited for it for an hour. (I was so deep in conversation, I missed all the announcements.)

**If I could do it over I'd:** Do it over again.

**My proudest actuarial moment was:** Being elected as one of the first two vice presidents of the Canadian Institute of Actuaries.

**The best times of my life are:** The private moments spent with my family.

# Effects on agent compensation of New York State insurance law

by Armand de Palo

The New York State Insurance Department has appointed a committee to redraft and modernize its agent compensation law to account for new forms of insurance. The New York law, which has had a major effect on agent compensation since the early 1900s, protects consumers from excessive expenses and generally has worked well.

Unlike most state laws, the New York law has an extraterritorial effect on the expenses of all companies licensed in New York State, which can occur only if all business written is regulated. The law also has indirectly affected companies not licensed in New York State. With the recent introduction of new forms of insurance, some companies are having problems with certain limits. I have been appointed by the New York State Insurance Department to draft a modernized law that would better handle current problems and have increased flexibility to better address future needs.

**History of agent compensation law**  
Most actuaries know the New York State Law as Section 213 (includes 212, 213a). It was recently recodified and is now called Section 4228 (includes 4227, 4229). In addition to the law itself, a series of Regulations have the force of law: Regulations 49 (Expense Allowances), 50 (Agent Training Allowances), and 93 (Conventions, Bonuses and Prizes). Also, a series of Circular Letters, Guidelines and Letters of Opinion interpret this law.

Clearly an insurer cannot understand or conform to this law by reading just the law. Any company doing business in New York State must have access to actuaries knowledgeable in the application of this law. Companies are monitored through the submission of plans of compliance and annual statement Schedule Q.

The law, which was last rewritten in the early 1950s, historically has needed revision every three decades. The current law was created when most policies were fixed level-premium whole life sold by a captive career field force

managed by either branch office or general agency field management.

Today, not only have products changed, but so have distribution systems. Additional changes will occur as competitors outside the insurance industry enter this business and insurance companies move into new markets.

The work of the committee to modernize Section 4228 began a year ago. A draft law may take two or three years to develop and would still need wide industry support. Because the key purpose of this law is to protect the consumer, any revision will not result in an overall increase in agent compensation.

The industry attempted to rewrite this law in the early 1980s by eliminating most of the law's limitations but the insurance department did not support the effort. This attempt is different because it is a joint effort of the insurance department and the industry to modernize the law.

It will be difficult to get industry agreement, since an advantage to one company is a disadvantage to another. If the industry is not willing to work together to produce a workable, long-term solution, the result would be an inflexible law benefiting only its competitors.

## Organization of subcommittees

To determine what issues need to be addressed, about 60 company representatives attended a two-day meeting where they defined over 70 questions. In February 1989 the core group was formed to address these questions. In addition to myself it consists of representatives from both the ACLI and LICONY and eight industry members, split among stock/mutual, general agency/branch office and domestic/foreign companies. To get wider industry input, this core group formed four subcommittees, each chaired by one domestic and one foreign company representative. We divided the questions into four major categories: How much can you pay; To whom can you pay it; How can it be paid; and How can it be monitored. In July 1989 a meeting was held to summarize the project's current status for subcommittee volunteers.

## Major issues of subcommittees

Some major issues that need to be addressed follow:

- Current law was designed to handle high-level fixed-premium insurance plans. How should it be changed to better handle flexible premium plans? Current law requires that compensation be paid only when an actual premium payment occurs. This makes it impossible to pay asset-based compensation or service fees if no premium payment occurs.

- Compensation plans need preapproval of the insurance department, causing major delays for many companies. Part of the problem is that many companies do not understand what the law requires, and the insurance department lacks adequate staff to address all submissions promptly.

- Who is the company's agent? Many companies are only manufacturing products. Can a small insurance company force a national stock brokerage distribution system to comply with this law? Where does the company's responsibility end?

- Many corporate products sold on an individual policy form pay low compensation, making current limitations that assume whole life type of compensation less effective.

- Some companies have tried to use group policy forms to avoid this law, but the insurance department interprets the law to apply if the policy is sold to an individual.

- The law is company by company, so the use of non-New York subsidiaries to avoid the law is allowed. If all companies' production is later combined for any compensation purpose, all the companies may become affected, and margins from one company may not be used to support excesses in the other.

- Most of the law applies to all individually sold life and annuity products, but some sections also extend to all products of the company when the law has to do with bonuses and any retroactive features for the compensation, bonus, or expense reimbursement plans.

Armand de Palo is Vice President and Life Actuary at The Guardian. He also is the chairperson, appointed by the New York State Insurance Department, of the Committee for the Modernization of Section 4228.



# Why small-group medical insurance has failed

by Richard L. Vaughan

September's *Actuary* contained an excellent summary by Drew Davidoff of renewal rating for small-group medical business. Among the techniques he describes are age, sex, and area rating, experience rating using credibility, experience rating using tiers, examination of the diagnoses in the claim file, and initial and reentry medical underwriting. Related techniques include industry rating, durational rating, more refined dependent classifications, and the periodic closing of old risk pools and opening of new ones.

Those of us who work with small groups alone or in trusts and associations have seen these strategies evolve in response to market pressures. We consider them necessary refinements in the management of this line of business and have convinced program sponsors and insured employers of their necessity. Armed with these techniques, some of our trusts have flourished, and some of their underwriters have profited.

Yet small-group medical insurance has failed.

- It has failed those employers who cannot obtain insurance because some known medical condition promises near-certain future losses.
- It has failed those employees of such employers who started work in good health and for whom group insurance is the only practical protection against ruinous medical expenses.
- It has failed those group insurers who, through mismanagement, bad luck, or a commendable reluctance to abandon their policyholders, have suffered heavily from cumulative adverse selection.
- It has failed those employers whose groups are still good risks but who cannot obtain coverage at reasonable rates because of the thinness of the market.
- It has failed those sponsors whose association group programs have entered a spiral, lost their carriers, and been forced to terminate.
- It has even failed those employers—and their employees—fortunate enough to have insurance. Their insurance will pay claims incurred through

the end of the policy term. But it gives no peace of mind, the purported benefit of any insurance. A single medical condition, arising within the group, could at any moment make it uninsurable to a new underwriter and only acceptable to the present underwriter through forbearance or inattention.

Small-group medical insurance has failed because insurers have wasted their time refining its superstructure while its foundation is built upon sand. They have misapplied a product designed for large groups with stable employment. They have ignored principles long understood to underlie any voluntary insurance mechanism. They have refused to innovate and they have lost the pride they once had in earning an honest profit while satisfying real individual, and thereby social, needs.

## Fatal flaw

The contract insurers offer has a fatal technical flaw. It tries to insure the consequences of events that happened before the policy term, and it avoids insuring the consequences, beyond that term, of events that actually occurred within it. It defines coverage in terms of when a medical service is performed rather than when an accident occurs or an illness first becomes manifest. It is an "expense-incurred" policy form rather than a "true occurrence" form.

Our rating techniques, which are age, sex, dependent status, industry, and area, distinguish among groups according to claims potential even before any accidents or illnesses produce a stream of medical expenses. These would be reasonable predictive variables for a true occurrence form of insurance. Their use neither contributes to, nor reflects, the defects in the small-group market.

The remaining techniques are more pernicious. Some have the overt objective of rewarding and attracting "good risks;" others, of surcharging and avoiding "bad risks;" but all separate those small groups still in good health from those with predictable future medical expenses. The resulting large rate differentials make coverage unaffordable for the highest-rated groups and deny the expectations of many employers, on joining a trust or

association, that their rates would be "pooled" and that they would somehow "follow the fortunes" of the entire trust.

Insurers should not be blamed for following these "pernicious" rating strategies. Given an expense-incurred policy form, they are rational responses in a voluntary market. If an insurance contract promises benefits based on the future performance of medical services, and some readily available information helps predict the extent of such services, then a reasonably fluid competitive market will force an insurer to use such information or risk ruin.

A technical problem—contractual in this case—suggests a technical solution, requiring marketing, legal, and regulatory adjustments and the rethinking of many established procedures. But the effort is necessary. We in the brokerage and consulting community, who by training and experience are "of" the insurance industry but not entirely "in" it, are extremely disappointed that the leading national insurers have made no effort to solve this problem and have in many cases abandoned the small-group market.

## What form could a solution take?

One possibility is social insurance, whether it be "National Health Insurance" or the "mandated employee benefit." Because it is coercive, social insurance can be made to work, to a point. But social insurance tends to freeze relationships and methods at one moment, deciding any further innovation through political rather than market processes. It distorts economic decisions and may require coercive intervention at other places in the economy, such as controls on prices charged by providers and suppliers.

Social insurance has an important role in making medical care available to persons unable to purchase it themselves, and no humane civilization would want otherwise. Such a social floor of coverage is not intended to protect accumulated assets and is therefore conditioned on need. Those with assets or income to protect their insurance would greatly prefer the

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### **Small group insurance cont'd**

private market, if it can be creative and flexible enough to do the job.

If someone fails to protect his or her assets with insurance, no one expects the public to replace any lost assets. But what if there is no insurance available for events that have already happened, or for the full costs of new occurrences? What if there is no insurer venturesome enough even to attempt to act as an insurer? Then who can blame small employers, and the politicians who represent them, for trying to devise social solutions? In such circumstances, does not our professional objectivity compel us to acknowledge, not that socialized insurance is efficient, creative, or desirable, but at least that it is feasible?

We must seek a private solution if we do not want this market or the large-employer market to be socialized.

#### **A proposal**

For example, imagine a revised group insurance contract providing full extended benefits for conditions arising during the term of coverage; no benefits for preexisting conditions; all benefits determined by a schedule in effect on the date the condition arises; extended benefits applying only to a list of treatment and/or secondary conditions explicitly stated in the EOB at the time the initial condition arises; and preexisting exclusions applying only to a similar list explicitly stated at time of underwriting.

The full extended benefits would make this policy a true occurrence form, providing meaningful coverage of all consequences of medical conditions arising during the policy term.

The complete exclusion of preexisting conditions — complementary to the extended benefits — would make nearly all groups insurable.

The schedule would make extended benefits feasible to the underwriter by factoring out the risk of inflation from the runoff of any particular medical condition. In compensation, the schedule could be as generous as desired, certainly more so than the common 80% U&C plan. It would normally be updated annually by each employer, applicable to new conditions only. Partial inflation-indexing could be offered for an additional premium. A schedule would make each insured a more interested participant in the medical marketplace, since his or her marginal savings from a less expensive provider

would be 100%, not 20%, of the difference in charges.

#### **Extended benefits**

Determining extended benefits and preexisting exclusions by explicit lists would avoid disputes over the cause of the medical condition giving rise to any given expense.

Together, the provisions would create a group contract with some features of the old "per cause" major medical plans and scheduled base plans. Its new administrative requirements would be largely an adjustment to, rather than a replacement of, the procedures already required for small-group medical business. Among its more interesting actuarial consequences would be the following:

- Nearly all groups would be acceptable risks, and at standard rates.
- Rates would still vary by age, sex, dependent status, industry, and area, though with different relativities than at present.
- Rates for a given benefit schedule would not change with trends in unit costs but would continue to change with trends in incidence and utilization.
- Technological trends would be accommodated by adding new procedures to the benefit schedules, with corresponding increases or decreases in rates.
- The credibility of claims experience would decrease. For a single small group, it would be essentially zero. Neither credibility nor tier rating would be useful in rating individual groups.
- Examination of the claim file would yield little information of any predictive value for the following policy year.
- Prospective experience rating would still be appropriate for entire trusts, though with reduced credibility. It would still help capture the effects on claim costs of variables not recognized elsewhere in the rating process.
- Renewal rates would change by the product of three factors: trends in incidence and utilization; adjustments to estimated expected claim costs based on additional experience; and changes in the benefit schedule controlled by the employer.
- Dividend and retrospective experience-rating structures would not need to be changed. The detailed formulas would need adjustment only to reduce the credibility of experience, adjust expense and risk charges, and estimate incurred claims in accordance with the new contract form.

◦ Reserves for annual statement purposes could be calculated in aggregate in the same present manner, except for assigning incurral dates in accordance with the new contract form.

◦ Reserves for experience-rating could be calculated as at present except for a change in incurral dates, or could be calculated seriatim using a table of estimated expected runoff expenses for each outstanding medical condition. When enough data had collected, the aggregate of these seriatim reserves could be adjusted to its probable ultimate value using "incurred loss development," as is common for casualty lines.

◦ When an employer changes from a conventional plan to the proposed plan, he will almost certainly be obligated to pay the runoff of any preexisting conditions not covered by the new plan — though he probably could pay them on the new schedule. A reserve table would allow the new insurer to assume this liability for a fixed extra premium, or offer to pay the runoff claims on the new schedule on an ASO basis.

◦ In principle, the pure premium component of pricing for the proposal plan would resemble the average claim cost for a large mature conventional group plan with the same age distribution and the same benefit schedule, discounted to reflect a longer payment tail. Expense and risk loadings would need adjustment.

◦ Employers could no longer expect select-period discounts. Rates would start and remain at essentially mature levels. Promotional literature would need to acknowledge this but emphasize the value of the extended benefits, to educate those employers in good health accustomed to moving from carrier to carrier at low first-year rates. For any employer who had been through a difficult renewal or rejected for or dropped from coverage, the value of the plan would be self-explanatory.

The foregoing is just one possibility! The headline over Davidoff's article stated "Small-group renewal rating — companies must become more active." True! U.S. insurance companies need to experiment, to accept business as well as insurance risks, to negotiate with regulators, to give new products a real try in the marketplace, to persevere until the problem is solved. Otherwise, the problem will no longer be theirs to solve.

Richard L. Vaughan is Vice President, Marsh & McLennan Group Associates.

# Transactions authors profiled

A total of 13 papers have been accepted for publication in Volume 41 of the *Transactions*. These profiles will be a periodic feature in *The Actuary*. The following biographical sketches briefly describe authors of eight of the papers. The remaining authors will be profiled in the December *Actuary*.

**"The Effect of Variation in Prospective Mortality on Life Insurance Cash Values"** by Albert E. Easton



ALBERT E. EASTON, FSA 1966, is Consulting Actuary, Milliman & Robertson. He received a bachelor's degree in mathematics from Brown University. He has been an actuarial student and an Assistant Actuary with the Equitable Life Assurance Society, Vice President and Actuary with Berkshire Life Insurance Company, and Director of Examinations for the Society of Actuaries. He has served on the Society's Education & Examination Committee as chairperson for Part 5 and for Part 7 and is currently chairperson of the Publications Index Committee. Easton, an Enrolled Actuary, is also a member of the American Academy of Actuaries.

**"Mortality Trends of Males and Females over the Ages"** by Barnet N. Berin, George J. Stolnitz, and Aaron Tenenbein



BARNET N. BERIN, FSA 1960, is Managing Director-Chief Actuary.

William M. Mercer Meidinger Hansen, Inc. He graduated magna cum laude from the City College of New York, where he received highest second-year honors and was elected to Phi Beta Kappa. He has a Master of Arts degree from Columbia University. A member of seven national and international actuarial organizations, Berin has lectured and written extensively on pensions and employee benefits. He has been an instructor for the New York Actuaries Club, where he pioneered a course in pension mathematics. Berin has authored two books, *The Fundamentals of Pension Mathematics* and *Pensions: A Guide to the Technical Side*, and has published articles in business, trade and professional publications in the employee benefits field. For the Society, he has served as Chairperson of the Committee on Retirement Plans and of the Pension Section Council; on the Board of Governors; and as Associate Editor of *The Actuary*. He is currently a Vice President.



GEORGE J. STOLNITZ, not a member of the Society, is Professor of Economics and Director of the Population Institute for Research and Training at Indiana University. He was president of the Population Association of America in 1983. He has served as a consultant to the United Nations and U.S. Department of State.



AARON TENENBEIN, ASA 1965, is Professor of Statistics and Actuarial Science and Chairman of the Statistics

and Operations Research Department at the Stern School of Business of New York University. He received a Ph.D. in statistics from Harvard University. He has published papers in such journals as the *Transactions*, *Actuarial Research Clearing House*, *The Actuary*, *The Journal of the American Statistical Association*, and *Biometrics and Technometrics*. Dr. Tenenbein's research has involved the applications of statistics to graduation of life tables, the determination of surplus reserves for a life insurance company, and determination of loss development factors for casualty insurance. He has consulted for such corporations as Equitable Life, Municipal Bond Insurance Association, Chemical Bank, IBM, and Morgan Stanley.

**"The New Voluntary Annuity Program in the Soviet Union"** by Robert J. Myers



ROBERT J. MYERS, FSA 1940, served in various actuarial positions with the U.S. Social Security Administration from 1934 until 1970, including chief actuary (1947-70). Since then he has been a member of the National Commission on Social Security (1978-81), executive director of the National Commission on Social Security Reform (1982-1983), chairperson of the Railroad Unemployment Compensation Committee (1983-1985), and Deputy Commissioner of Social Security (1981-82). He is currently chairperson of the Commission on Railroad Retirement Reform. He also has been an actuarial consultant to various Congressional Committees and the Federal Judiciary, and a member of missions of technical assistance in connection with Social Security or pension programs in many foreign countries. He was President of the Society of Actuaries in 1971-72 and President of the American Academy of Actuaries, also in 1971-

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1972. He is a Fellow of the Casualty Actuarial Society, the Conference of Actuaries in Public Practice, the American Statistical Association, the American Association for the Advancement of Science, and the Royal Statistical Society. His numerous awards include the Triennial Prize from the Actuarial Society of America and the Distinguished Service Award from the U.S. Department of Health, Education, and Welfare. Myers is the author of several books, including *Social Insurance and Allied Government Programs* (Richard D. Irwin, Inc., 1965); *Medicare* (Irwin, 1970), *Social Security* (Irwin, 1st ed., 1975; 2nd ed., 1981, 3rd ed., 1985), and *Indexation of Pension and Other Benefits* (Irwin, 1978). He has published 738 papers in technical and scientific journals, of which many have appeared in the *Transactions*, the *Transactions of the Actuarial Society of America*, and the *Record of the American Institute of Actuaries*; numerous discussions, book reviews, letters to the editor, and testimonies before Congressional committees and advisory groups.

### "A Modified Development Method for Deriving Health Claim Reserves"

by Mark E. Litow



MARK E. LITOW, FSA 1981, is Consulting Actuary, Milliman & Robertson, Inc. His primary consulting activities are in the areas of individual health insurance, group health insurance, and risk analysis. Specific areas of expertise include valuation of reserves and liabilities, projection of health costs, new product development, and appraisals of accident and health business as part of life insurance company appraisals. Litow, who received a bachelor's degree from the University of Wisconsin-Oshkosh, has a master's degree from Ball State University. For the Society, Litow has served as co-chairperson of the workshop on Analysis of Medicare Supplement

Market, a panelist on Accident and Health Reserve Issues, chairperson of the workshop on Accident and Health Reserve Issues, and a panelist on "Health Insurance Valuation Actuary." He has also been a member of the task force reviewing the individual health insurance syllabus on SOA examinations and a member of the Advisory Committee to Wisconsin Risk Sharing Health Insurance Plan. He is the co-author of chapter 10, "Policy Forms," in the textbook *Individual Health Insurance*.

### "Source of Earnings Analysis under FAS 97 Universal Life Accounting"

by Joseph H. Tan



JOSEPH H. TAN, FSA 1984, is a senior consultant in the New York office of the actuarial, benefits, and compensation consulting division of Coopers & Lybrand. Before joining Coopers & Lybrand, he was the financial planning and control director of the individual insurance products division of CIGNA. Before that, he was associated with Penn Mutual Life Insurance Company. He graduated magna cum laude with a bachelor of science degree in statistics from the University of the Philippines, where he received his master of science degree in mathematics (actuarial science). He has a doctorate in business administration from Temple University, where he received the Conwell Russell Fellowship. He is a Fellow of the Life Management Institute and a member of the American Academy of Actuaries. Dr. Tan spoke at the 1988 and 1989 Society spring meetings on sources of profit analysis. As a member of the Financial Reporting Section, he has published papers on GAAP accounting and return on equity in the *Financial Reporting Section* newsletter. His paper "Source of Earnings Analysis for Flexible Premium and Interest-Sensitive Life and Annuity Products," co-authored with Robert W. Stein, appeared in Volume 40 of the *Transactions*.

### "A Guide to Quantifying C-3 Risk"

by John A. Mereu



JOHN A. MEREU, FSA 1955 and FCIA 1965, was employed by London Life Insurance Company until his retirement in 1989. He has been a lecturer in actuarial science at the University of Western Ontario since 1957. He graduated from the University of Western Ontario. His published papers include "Some Observations on Actuarial Approximations" (*TSA* 1961), "Annuity Values Directly from the Makeham Constants" (*TSA* 1962), "The Mathematical Forces Operating on Reserves" (*TSA* 1963), "An Algorithm for Computing Expected Stop-Loss Claims under a Group Life Contract" (*TSA* 1972), "Analysis of the Deficit Risk in Group Insurance" co-authored with Harry Panjer (*TSA* 1980), "A Projection System for Ordinary Life Business" (*TICA* 1976), and "Provision for Adverse Deviations under PPM" (*CIA* 1988).

### "AIDS: Some Aspects of Modeling the Insurance Risk"

by Harry H. Panjer



HARRY H. PANJER, FSA 1976 and FCIA 1977, is Professor of Actuarial Science at the University of Waterloo, Ontario, and Director of the Institute of Insurance and Pension Research at the university. He received a B.A. in 1969, an M.A. in 1971, and a Ph.D. in 1975, all from the University of Western Ontario. He now serves on the Society's Board of Governors and has served on numerous committees of the Society and the Canadian Insti-

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tute of Actuaries. Dr. Panjer chaired the CIA's Task Force on AIDS subcommittee on modeling, which together with the valuation subcommittee proposed guidelines for valuation of the AIDS risk in life insurance. He is the author of more than 30 papers that have appeared in *Transactions*, *Journal of Risk and Insurance*, *Insurance: Mathematics and Economics*, *Transactions of International Congress of Actuaries*, *ASTIN Bulletin*, and *Journal of Econometrics*.

"Modeling the AIDS Epidemic by Analysis of Sexual and Intravenous Drug Behavior" by Peter W. Plumley



PETER W. PLUMLEY, FSA 1958, is a consulting actuary whose interests include expansion of mortality and morbidity research and modeling of the AIDS epidemic. He was executive director of the Society in 1975-79 and served on the Board of Governors in 1981-84. He has served on various Society committees, including New Recording Means and Computing Devices, Education and Examination, Advisory on Education and Examinations, Alternate Route, To Study Educational Facilities for Actuaries, Public Relations, Research Policy, Life Insurance Company Valuation Principles, Task Force on Expansion of Mortality and Morbidity Research, and Task Force to Review and Revitalize Society of Actuaries Research. Published papers include "The Education of the Actuary in the Future" with Anna Maria Rappaport (*TSA* 1975), "Certain Inequities in the Life Insurance Company Income Tax Act of 1959" (*TSA* 1976), "The Impact of Social and Economic Changes on Financial Security Systems" with Anna Maria Rappaport (*TSA* 1978), and "Federal Income Taxation of Life Insurance Companies in the 1980s" (*TSA* 1981).

# Dear Editor:

**Teaching vs. examining**

In the discussions of the Actuary of the Future at the Centennial Meeting, I was disturbed by the comparative emphasis on teaching versus examining. I have always felt that the primary function of the examination system was to distinguish between those who were qualified to represent themselves — under the Society's aegis — as actuaries and those who were not so qualified.

Teaching the knowledge requirements of actuaries is something the Society should encourage but not necessarily try to do by itself, particularly if bodies who are better equipped to teach can do the job. Taking the extreme case, if other bodies such as universities could do the job to the complete satisfaction of the Society, it would be better for the Society to concentrate its efforts in areas where it has unique expertise. My apprehension arises from the fear that relatively greater emphasis on the teaching aspect would be likely to detract from the examination-for-admission aspect. There are certain conflicts of interest between teachers and examiners, and I fear for the continuance of what Robin Leckie refers to as the intellectual core of the actuary if the resolution of such conflicts results in the examining side being downgraded.

Also, I was shocked to hear that nonactuarial CEOs were questioned as to what characteristics they would like actuaries to have and that the resulting answers were given some credibility. The obvious answer that the typical nonactuarial CEO could be expected to give would be "Actuaries should be more like me!"

Again the question of relative emphasis arises. From the sound of some of the discussions, the Society's overriding objective would appear to be the recruitment and production of people who will be satisfactory as managers and communications experts and who only incidentally have the mathematical skills that are the backbone of the profession.

If the Society wishes to expand its value, and the value of its products, to fields somewhat beyond the ones in which actuaries are currently concentrated, I would suggest that the general theory of valuation should be explored in greater depth. The valuation of insurance liabilities is really

only a special case of a general theory which ought to be universally applicable. (Estey touched on this.)

The discounted cash flows well known to MBAs are different only as to orientation and sophistication from the calculation of a life insurance policy reserve. CPAs could do a much better job if they realized that the assets and liabilities in their balance sheets are distinguished not by the criterion of which ones are nearer the window and which ones are nearer the door; with a general theory they could introduce the concepts of the time value of money and the probability of events happening in the future and the credibility of those probabilities, etc.

Having demonstrated ability to master a general theory and to apply it to special cases (such as insurance), actuaries would be more likely to be accorded the respect that they would like to have in the eyes of the general public.

Robert Grant Espie

**'The Actuarial Profession' booklet**

I recently received my copy of the "Picture Yourself Making a Terrific Choice/The Actuarial Profession" booklet and was proceeding to use it to entice my young daughter into this profession. Then I noticed on the page 18 FYI section that the 200 credits required for Associateship in the Society are worth \$13,000 to \$22,000 while the following 250 credits required for Fellowship are worth \$12,000 to \$9,000. On first glance, this may leave the impression on a young mind that the Fellowship exams are not as valuable to an employer as the earlier Associateship exams. I have thought of one or two explanations for this trend, but perhaps could hardly use them effectively to promote the "number one job." I wonder if the facts presented here are serving the otherwise widely held impressions/appearances well.

Syamal Ghosh

**Psychonacci**

Thanks to Don Sondergeld for the entertaining article on Fibon and other acci numbers. Rather by coincidence, I assume, I read his letter right after an experience that led me to appreciate Psychonacci numbers.

I wandered into my family room one evening and glimpsed a TV show

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**Dear Editor cont'd**

my kids were watching. It featured Uri Geller, as a "psychic" master of ceremonies who presided over the attempts of would-be psychics to demonstrate their powers before a studio audience and nationwide electronic observers. The attempt I saw entailed 12 male volunteers who each provided one ring and one watch – with each ring and each watch distinct and distinguishable from all others – and with a unique "correct pairing" of each watch and ring, based on their owner. The 12 pairs of objects were suitably mixed, and the job of the "psychic" was to pair the object correctly – with a breathtaking prize available if the psychic achieved 10 or more accurate pairings.

Naturally, my actuarial instincts were aroused, and I set out to determine the odds of success.

Clearly (as always say mathematicians who are uncertain of their ground), the watches can be laid out in a row in any order at all, and the problem is to appropriately assign the rings. With a generalization to  $N$  pairs, there are  $N!$  possible ways to assign the rings. But what is the probability of  $T$  incorrectly assigned, and  $N - T$  correctly assigned.

Let's call the answer  $P(N, T)$  and note that the sum of  $P(N, T)$  for all  $T$  ranging from 0 to  $N$  must be 1. Now  $P(N, T)$  is clearly (op cit paren above) equal to:

- a)  $N!$  , the number of ways  
 $T!(N - T)!$  to choose  $T$  objects out of  $N$ ; and
- b)  $W(T)$  , the number of ways to completely "mismatch" the remaining  $T$  objects divided by;
- c)  $N!$  the total number of possible ways to assign pairs, or  $N!$ .

So,  $P(N, T) = \frac{W(T)}{T!(N - T)!}$

Slowly, but surely, we are approaching Psychonacci numbers! However, in the interest of harmony, we need to define an intermediary function  $W'(T)$ , which is the number of ways to completely mismatch  $T$  pairs of objects when one "pair" has no correspondence to start with. A little thought will lead to these relations:

$$W(T) = (T - 1)W'(T - 1)$$

$$W'(T - 1) = W(T - 2) + (T - 2)W'(T - 2)$$

which, when combined, lead to  $W(T) = (T - 1)[W(T - 1) + W(T - 2)]$

This expression is the inspiration for the analogy with the Fibonacci numbers, but with a compounding if not exponential multiplier.

It should be noted that  $W(0) = 1$  and  $W(1) = 0$ .

The solution for  $W(T)$  can more easily be found by defining  $X(T) = W(T)/T!$ , leading to  $TX(T) = (T - 1)X(T - 1) + X(T - 2)$ . This, in turn, (as an exercise for the reader) can be solved to reveal that  $X(T)$  equals the sum over all  $i$  from 0 to  $T$  of  $(-1)^i/i!$

Just for show, these functions are as follows:

T	W(T)	T!	X(T)
0	1	1	1.000 000
1	0	1	0.0
2	1	2	0.500 000
3	2	6	0.333 333
4	9	24	0.375 000
5	44	120	0.366 667
6	265	720	0.368 056
7	1,854	5,040	0.367 857
8	14,833	40,320	0.367 882
9	133,496	362,880	0.367 879
10	1,334,961	3,628,800	0.367 879
11	14,684,570	39,916,800	0.367 879
12	176,214,841	479,001,600	0.367 879

Other exercises left for the reader are to prove that the limit of  $X(T)$  as  $T$  becomes ever larger is  $1/e$ ; and that the sum over all  $T$  from 0 to  $N$  of  $X(T)/(N - T)!$  is unity for any  $N$ .

Finally, we are empowered to compute the probability of correctly pairing any number of the 12 possible pairs.

Correct	Probability
0	$P(12, 12) = x(12)/0! = 36.8\%$
1	$P(12, 11) = x(11)/1! = 36.8\%$
2	$P(12, 10) = x(10)/2! = 18.4\%$
3	$P(12, 9) = x(9)/3! = 6.1\%$
4	$P(12, 8) = x(8)/4! = 1.5\%$
5	$P(12, 7) = x(7)/5! = 0.3\%$

Since these add to 99.9%, we have already covered most of the ground. The odds of 10 or more correct pairings are about one out of seven million.

The pseudo-psychic got two right proving only that actuaries are much more improbable than fiction.

Thomas C. Sutton

**End election guesswork**

Another set of actuarial elections, another ill-informed political decision. Who, exactly are these people? Is he/she the one who...no, that's...

Since a decision must be made, with or without facts, I try to guess

the candidates' positions on the issues of the day from the titles of the papers they wrote or the committees they served on. The Presidential Address eventually tells us what one of the candidates thinks, but we never do learn about the others.

As a new FSA I expected to get to know these people by going to enough meetings and getting sufficiently old. Twenty-one years later, the increase in actuaries and candidates has stayed ahead of the increase in my acquaintances, and it is still rare for me to really know more than a few candidates.

The remedy is as obvious as the problem. A short essay on anything at all could be supplied by each of the candidates for a principal office.

This is our centennial, and the bicentennial of the French Revolution. Why not celebrate both at once by making actuarial democracy more effective?

Peter L. Hutchings

**Centenaries of actuarial associations**

I noticed in the July/August issue of *The Actuary* that you had listed the centenaries of the various actuarial associations and had shown the year of founding of the Institute of Actuaries of Australia (IAA) as 1977. However, we are the lineal descendent of the Actuarial Society of New South Wales, which was founded in 1897, and we will be celebrating our centenary in 1997.

On a personal note, I thought that your Centennial issue was an excellent summary of the various meetings and fully caught the flavor of the different professional meetings and the social events.

Ron Hunter  
President, IAA

**Library notes**

The SOA Library collection includes many foreign actuarial journals. In an effort to expand our holdings, back issues of two publications are needed: *Astin Bulletin*, published by the International Actuarial Association, Volumes 1-9 and *Scandinavian Actuarial Journal*, Volumes 1-34, 36, 37, 44, 45, 46, 48, 49. All issues will be appreciated. Please send to: Society of Actuaries, ATTN: Librarian, 475 North Martingale Road, Suite 800, Schaumburg, IL 60173-2226.

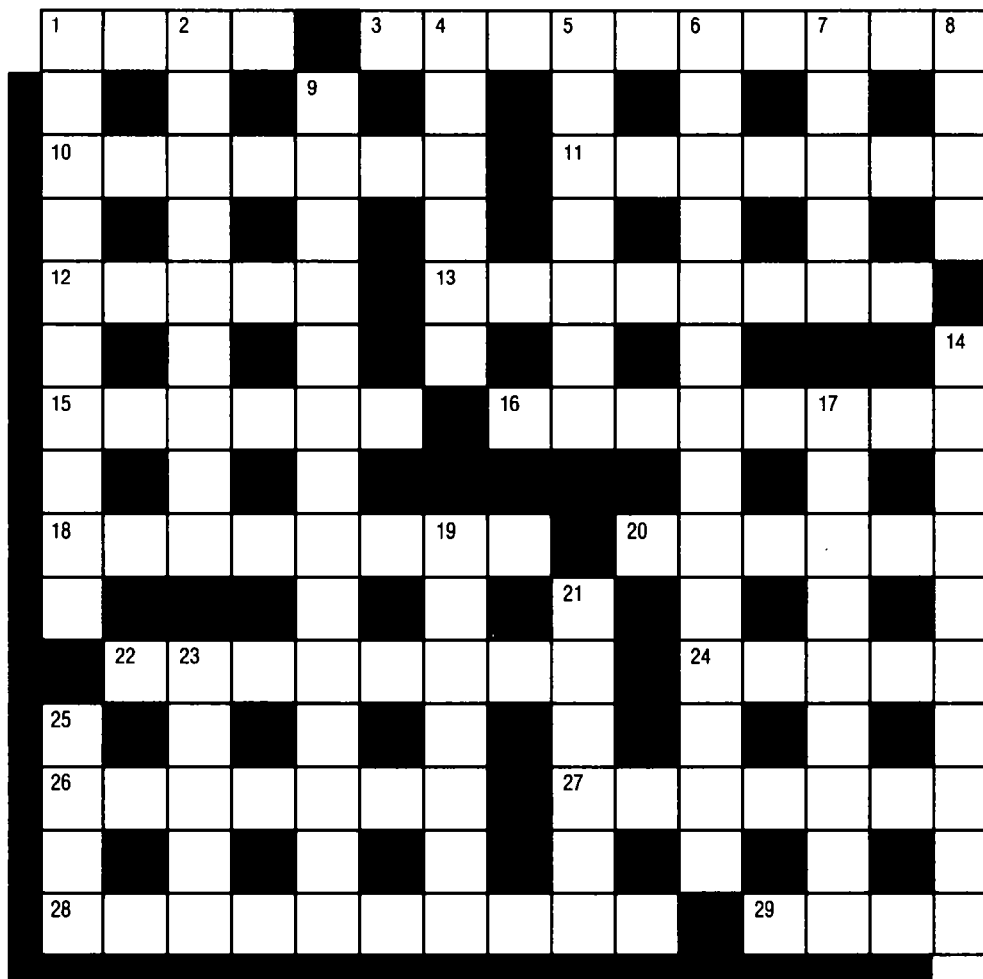
# ACTUCROSSWORD

## Across

1. They can catch fishes or balls or get a gun back (4)
3. Mathematically as well(2,8)
10. He graduated—from curing pork? (7)
11. Any quantity of this is this (7)
12. In space: the rarefied element there (5)
13. Extra premium? too much! (8)
15. Goes—on vacations? (6)
16. How daring to tip diner out (8)
18. Side seat becomes inflexible (3,5)
20. Ascent over—fixed position required (6)
22. Scan iris: maybe other flowers there (8)
24. Blemish from Dakota—in the Black Hills (5)
26. This has a good example in Part Ten (7)
27. He referred to a crushing blow as a blushing crow (7)
28. Riches tend to get called something (10)
29. Greek Cupid with a sore back (4)

## Down

1. How many phone users are unlisted (10)
2. If void of spades do not despair (4,5)
4. Killer of Paynim rodents (6)
5. Vault required but none dug (7)
6. Rendering compound of nitrate and protein (14)
7. Fool around with one and do it (5)
8. Close to a nightshade but not the sad bit (4)
9. Author concocts childrens' cakes (7,7)
14. Experiences of speculations in publicity? (10)
17. One who repines on-inflation? (9)
19. ABC seen as a means of improving relations (7)
21. Its use may be as a fabric (6)
23. Last word of many juvenile stories (5)
25. Great feat but not quite the whole picture (4)



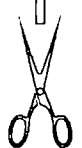
### October's Solution

SWINGMUSIC HOCK  
 A L R M N A F C  
 LOLLARD FIREFLY  
 V T H O I M E B  
 OVERDRIVE CARGO  
 M S N L H A  
 DEPOT GODFATHER  
 I E A G I O D  
 SPRINKLER ROOTS  
 T D A E C D  
 EQUIP TOPDRAWER  
 N N L T L I I A  
 DECIAM ANTONYM  
 E N Y E G I K P  
 DEED BRIEFCASES

100% SOLVERS — **September:** S Alpert, G Cherlin, F Clarke, C Conradi, B Dibben, S Dulley, M Eckman, Mrs C Edwards, R Frasca, E Goldstick, J Grantier, M Grover, R Hertz, G Horrocks, R Jenner, R & J Koch, R Makin, P Marks,

R C Martin, J Mereu, H Migotti, B Mowrey, J Prescott, F Rathgeber, J Roszkowski, J Schwartz, G Sherritt, M Steinhart, Mrs J S Thompson, C Walker, C Walls, C Wasserman, D Weill, A Whiton, and D & M Williams. May: M Lykins & C Mutti.

Send solutions to: Competition Editor, 8620 N. Port Washington Rd (312), Milwaukee, WI 53217



# ACTUCROSTIC

- A. Metaphor that uses "like" or "as".  
 \_\_\_\_\_  
 51 140 110 219 18 161
- B. Loss incident to ordinary use. (3 wds)  
 \_\_\_\_\_  
 178 99 123 160 145 38 14  
 \_\_\_\_\_  
 136 55 230 76
- C. \_\_\_\_\_ Welles.  
 \_\_\_\_\_  
 22 182 85 223 148
- D. Usual performance on the vaudeville circuit. (2 wds, one hyph)  
 \_\_\_\_\_  
 5 171 201 209 83 68 236 28  
 \_\_\_\_\_  
 96 117 47 195 139
- E. Foolish and frivolous actions.  
 \_\_\_\_\_  
 10 135 60 180 207 77 221 100 193
- F. He had quite a life residing in Sing Sing.  
 \_\_\_\_\_  
 6 189 25 88 121
- G. Time to get off, or quit. (4 wds)  
 \_\_\_\_\_  
 50 13 152 118 216 132 98 75  
 \_\_\_\_\_  
 112 179 34 199
- H. City in NE of central China.  
 \_\_\_\_\_  
 210 194 67 39 231
- I. Top secret - if well kept.  
 \_\_\_\_\_  
 97 120 64 17 211 164
- J. Bloodcurdling, like some stories.  
 \_\_\_\_\_  
 70 159 165 46 208 107
- K. With "The", those who have influence and status.  
 \_\_\_\_\_  
 61 44 172 102 203 7 185 72 146  
 \_\_\_\_\_  
 122 217 23 234
- L. Rio \_\_\_\_\_  
 \_\_\_\_\_  
 45 128 29 227 63 156
- M. One who insists upon his conscience being your guide.  
 \_\_\_\_\_  
 65 162 37 113 137 155 15 84
- N. A retiree who advises his successors. (2 wds)  
 \_\_\_\_\_  
 11 206 114 174 42  
 \_\_\_\_\_  
 144 86 233 101 188 27 158 58 130
- O. Fruition; success; grim reality. (2 wds)  
 \_\_\_\_\_  
 8 229 59 106 220 74 205 21 131 169  
 \_\_\_\_\_  
 43 184 82 141 92 153
- P. Flow of ideas; stream of consciousness. (3 wds)  
 \_\_\_\_\_  
 1 103 26 215 48 93 119  
 \_\_\_\_\_  
 192 225 129 73 166 173 200
- Q. Child; descendant.  
 \_\_\_\_\_  
 53 105 197 24 202
- R. International organization commemorated on October 24. (2 wds)  
 \_\_\_\_\_  
 41 177 66 168 115 49  
 \_\_\_\_\_  
 94 186 127 204 36 222 81
- S. Art of guessing correctly how late the other person will be.  
 \_\_\_\_\_  
 9 126 89 56 196 176 183 181  
 \_\_\_\_\_  
 31 69 167
- T. Houdini, for one. (2 wds)  
 \_\_\_\_\_  
 71 104 4 170 54 91  
 \_\_\_\_\_  
 212 134 218 154 116 238
- U. RAPID EYE MOVEMENT.  
 \_\_\_\_\_  
 30 143 232
- V. Without ifs, and, or buts; unqualified. (3 wds)  
 \_\_\_\_\_  
 124 19 175 40 198 109 163 228 32  
 \_\_\_\_\_  
 138 57 187 80 235 2 151 95
- W. Pot-au-feu. (2 wds)  
 \_\_\_\_\_  
 33 16 224 133 191 214 62 78 147 111
- X. A natural, inalienable right. (2 wds)  
 \_\_\_\_\_  
 79 3 157 87 35 149  
 \_\_\_\_\_  
 226 190 52 108 213 125 20 142
- Y. Melodies; something one puts on.  
 \_\_\_\_\_  
 12 237 150 90

1	P	2	V	3	X	4	T	5	D	6	F	7	K	8	O	9	S	10	E	11	N	12	Y	13	G	14	B	15	M	16	W	17	I	18	A	19	V	20	X	21	O																																						
22	C	23	K	24	Q	25	F	26	P	27	N	28	D	29	L	30	U	31	S	32	V	33	W	34	G	35	X	36	R	37	M	38	B	39	H	40	V	41	R	42	N	43	O	44	K	45	L	46	J	47	D	48	P	49	R	50	G	51	A	52	X	53	Q	54	T	55	B	56	S	57	V	58	N	59	O	60	E		
61	K	62	W	63	L	64	I	65	M	66	R	67	H	68	D	69	S	70	J	71	T	72	K	73	P	74	O	75	G	76	B	77	E	78	W	79	X	80	V	81	R	82	O	83	D	84	M	85	C	86	N	87	X	88	F	89	S	90	Y	91	T	92	O	93	P	94	R	95	V	96	O	97	I	98	G	99	B	100	E
101	N	102	K	103	P	104	T	105	Q	106	O	107	J	108	X	109	V	110	A	111	W	112	G	113	M	114	N	115	R	116	T	117	D	118	G	119	P	120	I	121	F	122	K	123	B	124	V	125	X	126	S	127	R	128	L	129	P	130	N	131	O	132	G	133	W	134	T	135	E	136	B	137	M	138	V	139	D		
140	A	141	O	142	X	143	U	144	N	145	B	146	K	147	W	148	C	149	X	150	Y	151	V	152	G	153	O	154	T	155	M	156	L	157	X	158	N	159	J	160	B	161	A	162	M	163	V	164	I	165	J	166	P	167	S	168	R	169	O	170	T	171	D	172	K	173	P	174	N	175	V	176	S	177	R	178	B		
179	G	180	E	181	S	182	C	183	S	184	O	185	K	186	R	187	V	188	N	189	F	190	X	191	W	192	P	193	E	194	H	195	D	196	S	197	O	198	V	199	G	200	P	201	D	202	Q	203	K	204	R	205	O	206	N	207	E	208	J	209	D	210	H	211	I	212	T	213	X	214	W	215	P	216	G	217	K	218	T
219	A	220	O	221	E	222	R	223	C	224	W	225	P	226	X	227	L	228	V	229	O	230	B	231	H	232	U	233	N	234	K	235	V	236	D	237	Y	238	T																																								

LAST MONTH'S SOLUTION: (R M) Cyert (and D C) Mowery, (Technology, Employment and US) Competitiveness - "Training to operate a computer has been drastically reduced. Only a highly trained operator could run the first computers which were developed some forty years ago. Today's personal computers, which surpass those first machines in both memory and computing power, can be operated by a child." SCIENTIFIC AMERICAN, May, 1989.

