

The Actuary

Society announces election results

Barnet (Bob) N. Berin has been elected President-Elect of the Society of Actuaries for 1993-94.

Berin retired in 1991 from William M. Mercer, Inc., in New York, where he was managing director and chief actuary. He resides in Dix Hills, New York. Since retirement, he taught mathematics for several semesters at Polytechnic University and was a volunteer tutor in mathematics at Apple Drug Rehabilitation Center.

He served on the SOA Board of Governors from 1985-88 and as Vice President from 1988-90. He has served on several SOA education and examination, continuing education, and publications committees since 1963.

New Vice Presidents

Vice Presidents elected were Cecil D. Bykerk, Shane A. Chalke, and Arnold

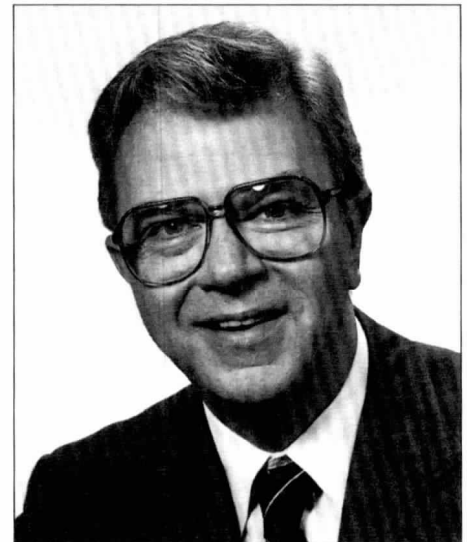
A. Dicke. Bykerk, senior executive vice president and chief actuary, Mutual/United of Omaha Insurance Company, served previously on the SOA Board from 1984-87. Chalke, president and CEO of Chalke, Inc., Chantilly, Virginia, has been an SOA Board member since 1990. Dicke, executive vice president and product actuary at USLIFE Corporation, New York, served on the Board from 1988-91.

New Board members

Elected to Board seats were Donna R. Claire, president of Claire Thinking, Inc., Dix Hills, New York; Douglas C. Doll, at Tillinghast/Towers Perrin, Atlanta; W. Paul McCrossan, partner, Eckler Partners Ltd., Don Mills, Ontario; Esther H. Milnes, senior vice president and chief actuary, Prudential Insurance and Financial Services, The Prudential, Newark; Anna Maria Rappaport, managing director, William M. Mercer, Inc., Chicago; and Alice Rosenblatt, senior vice president and chief actuary, Blue Cross/Blue Shield of Massachusetts, Boston.

Membership reaffirms motto

With 11 other mottos to choose from, SOA members returning the motto contest ballot voted to retain the current Society of Actuaries' motto. The Ruskin quote from *The Stones of Venice*, "The work of science is to substitute facts for appearances and demonstrations for impressions," was clearly the winner, with 1,408 of the 2,651 voting members marking it as their first, second, or third choices.



Barnet N. Berin

The motto garnered 29% of first choice votes.

The timeless appeal of this motto selected by a forerunner organization, the Actuarial Society, in 1892 was not lost on the person who nominated it. Jonathan Abraham, FSA 1991, assistant actuary in the Group Pension Department of John Hancock Mutual Life in Boston, said, "I remember seeing this quote for the first time at the beginning of a textbook in college, and it struck me as being appropriate. It really relates to what I do and how I communicate what I do to other people. It really sums it up."

Abraham will receive the award of a fee waiver to the October annual meeting in New York.

Featured this issue:

Capital projects	3
<i>by James Ylvisaker</i>	
Pension plan windups	5
<i>by John Brophy</i>	
Nankai program	7
<i>by Dr. Kailin Tuan</i>	
New task force on banks	8
<i>by J. Lynn Peabody</i>	
That's your opinion	10
<i>by Charles Habeck</i>	
Research corner	12
Dear editor	15
Actucrossword	16

The Actuary

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EDITORIAL

Exploring wider fields

by Michael B. McGuinness

This is the first issue of *The Actuary* with its changed look. As Editor Mike Cowell wrote in last month's issue, "Nothing radical, just a design that's in keeping with the times." We hope that you, the reader, find the new design attractive and easy to read.

In keeping with the new look, the issue contains articles on activities that build on the core strengths of our education but seek to apply them to wider fields. Their common theme is that the expertise that actuaries possess can be applied successfully to these wider fields. There is no reason why we and our skills should be restricted to our traditional spheres of work.

James Ylvisaker describes the work of the task force he heads that is examining capital projects and the possible role actuaries might play in their evalu-

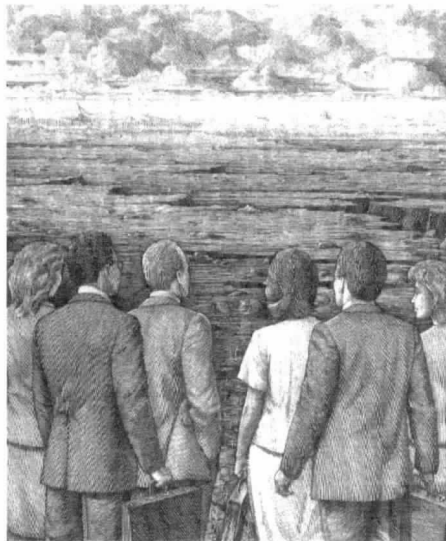
ation. I echo his plea to any actuary who believes he or she has something to contribute to the task force to come forward.

Lynn Peabody writes about the Task Force on Banks and Financial Institutions that is examining ways in which actuaries could work with them on non-insurance matters. The task force will run a panel discussion on the topic at the New York annual meeting. Incidentally, actuaries in Canada are working with banks on insurance matters. Several major Canadian banks now have one or more actuaries on staff and make frequent use of consulting actuaries.

While John Brophy's article on the responsibility of the actuary in connection with the winding up of a defined-benefit pension plan is in a traditional actuarial field, it stresses the importance of that actuary's work in relation to the asset side of the balance sheet. Brophy chairs the Committee on Investment Practice of the Canadian Institute of Actuaries.

Charles Habeck appeals in his article to actuaries to examine the role they might play in helping resolve public policy issues. I strongly urge you to respond to his request for a dialogue.

In considering whether to involve ourselves in discussing a public policy issue, I suggest we should not confine ourselves to the narrower question, "Is this strictly an actuarial matter?" Instead, we should consider the broader question, "Is this a matter to which I, an actuary, can contribute insight that a non-actuary is unlikely to?"



Capital projects could be new area for actuaries

by James W. Ylvisaker

In his inaugural address last October, President Walter Rugland used the theme, "Ask an Actuary." The implication was that actuaries could and should become a resource in a wide variety of fields.

We live in a world in which the pace of change accelerates each year. Such change rarely brings simplification, particularly in financial affairs.

However, the actuarial profession's expertise can bring order to complex questions. Through our training and practice, we have become well versed in applying the concepts of compound interest and probability theory to complex problems. These techniques can be easily applied to many issues outside the insurance industry, particularly where financial matters and forward planning are involved. We can build on the good reputation we have developed in the insurance industry to expand our area of practice.

We could be on the leading edge of a trend that may run for the next 25 to 50 years.

Actuaries have developed complex computer models that can project the future development of multi-billion dollar insurance funds. We have gained substantial experience in the reliability of such projections.

The Society of Actuaries is encouraging exploration into how these skills might be applied in new areas. To do so would benefit a broad segment of the public, as well as contribute to the development of the actuarial profession.

SOA task force to study capital projects

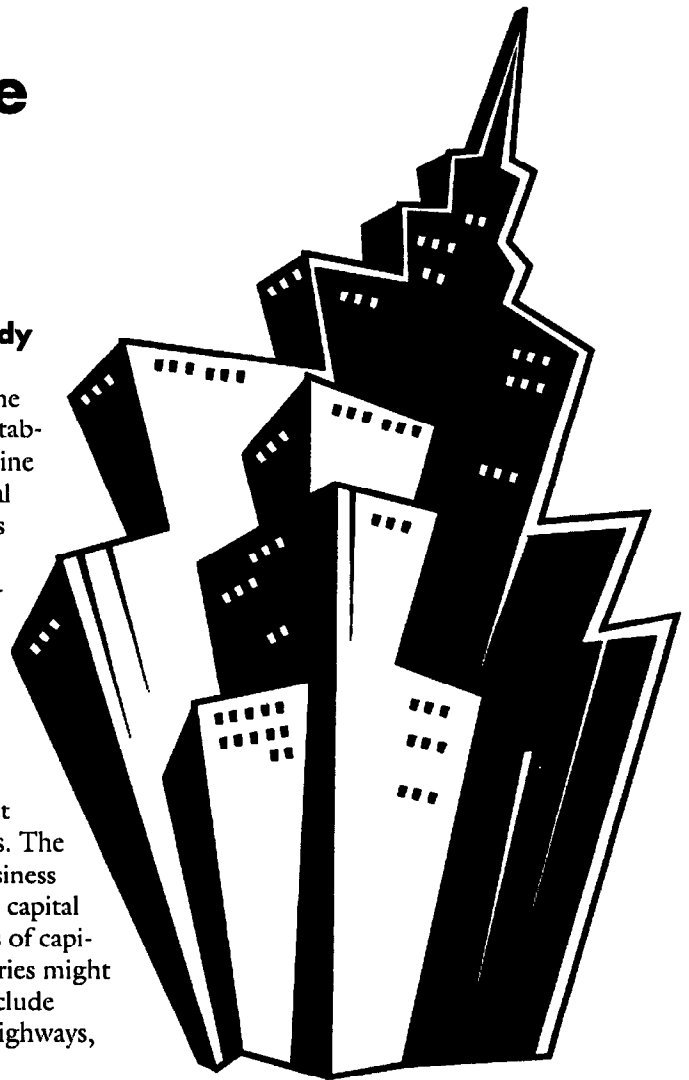
Among other initiatives, the Society of Actuaries has established a task force to examine "capital projects." A capital project can be described as one that involves the investment of resources — human, physical, or financial — that would result in a long-term rather than an immediate return. The planting of trees is more likely to be considered a capital project than is the sowing of seeds. The purchase or transfer of business also could be considered a capital project. Practical examples of capital projects in which actuaries might become involved could include projects such as bridges, highways, airports, and skyscrapers.

Actuarial skills that are relevant to assessing capital projects include:

- Probability techniques
- Discounted cash-flow techniques
- Sensitivity and risk analysis
- Application of mathematical techniques
- Long-term view, including experience in the choice of financial assumptions
- Optimization techniques
- Modern portfolio theory
- Ability to present complex calculations simply.

Inadequate models

Many believe that good models of the economic impact of such big capital ventures currently are not available. Some form of superior model is needed that will link the financial plan to the physical construction model and



allow planners to examine all the interrelationships before making decisions (a virtual project).

Assessments of returns for backers are needed, either in the form of social benefits or financial returns. Projects of this scope will have a variety of constituencies, each with a different perspective. For example, a complex but necessary exercise for a governmental body is measuring the total return, allowing for social benefits. An equity investor is concerned primarily with the risk/reward relationship but also must consider taxes. A banker would be more concerned with preserving capital than maximizing returns.

If President Clinton is serious about rebuilding the infrastructure, we could

(continued on page 4)

Capital projects (continued)

be entering a period of renewal in the United States. This may be a particularly opportune time to develop practices, methodologies, and skills to better understand the economic impact and benefit of such structures over their lifetime, or at least a substantial time horizon. Actuaries may be able to help allocate resources and establish better priorities. We could be on the leading edge of a trend that may run for the next 25 to 50 years.

U.K. at work on issue for a year

We are not alone in this effort. Actuaries in the United Kingdom already have begun work. Under their "wider fields" initiative, a working party of six members has met bi-monthly since September 1992. Its charge was "to consider how members of the actuarial profession can, by virtue of their professional training or experience, contribute usefully to the appraisal of proposed capital projects in the U.K. or abroad and, if so, to make recommendations on how the profession should carry the matter forward with a view to insuring that the specific contribution which actuaries could make is drawn to the attention of those who could benefit from their services."

One of their first initiatives was to hold a top-level conference to promote the profession's potential contribution in appraising capital projects. The conference in London on May 25, 1993, was attended by 200-300 people and was well received and widely covered in the press.

The conference coincided with the government's new "fall initiative" on private financing for public projects. The following day (May 26), a conference sponsored by the Confederation

of British Industry addressed the British government's desire to get the private sector involved in almost every conceivable public project from leasing kidney dialysis machines to hospitals, to building prisons, schools and roads. The government hopes to kick off with a high profile, trailblazing project such as the Channel tunnel rail link.

The U.K. working party produced an interim report in July, concluding that the actuarial profession could make useful contributions in the following areas:

- Financial model building
- Choice of appropriate and consistent financial assumptions
- Risk assessment, including the use of simulation techniques where practical
- Design of financing packages.

The working party concluded that the best marketing tool would be successful involvement in early tasks. The best way to proceed might be through consulting firms, which already have contacts with potential clients through their work on employee benefit plans. The Institute of Actuaries would establish a learning structure to assist the consulting actuaries in developing new practices and methodologies. With credibility established, normal business development could proceed.

The working party's final conclusion, however, was that the project would require much effort, and that it was uncertain how much demand there would be for their services.

SOA task force's work begins

The Society of Actuaries Task Force on Capital Projects will research the current models and methods of evaluating capital projects. We will try to discover who makes these decisions

now and what information they use to arrive at their decisions. We then will try to determine whether there is a meaningful role for actuaries and what methodologies or standards of practice might be established to guide future practitioners.

Capital projects will require multidisciplinary teams including economists, accountants, MBAs, management consultants, engineers, and property consultants. Actuaries would seek to cooperate with these professionals, not to supplant them.

The task force intends to produce periodic reports to stimulate discussion throughout the Society. We also will coordinate our discussion with the discussions being carried on simultaneously in the United Kingdom. By spring 1994, the SOA task force plans to make a recommendation on whether there seems enough promise in this venture to proceed.

We are a small group and can use all the help we can get. Volunteers can help in many ways — by serving on the task force or on a subcommittee or by commenting on our work product. Anyone interested may contact me at 40 Prides Crossing, New Canaan, CT 06840; telephone: 203/966-5154.

James W. Ylvisaker is a consulting actuary and chairperson of the Task Force on Capital Projects.

Pension plan wind-ups

Employee options can complicate investment policy decisions

by John Brophy

Pension legislation usually is drafted to protect pension plan members or to restrict tax deferral opportunities. Some pieces of legislation, however, provide plan members with additional benefits or options that, if exercised, can be detrimental to the pension plan. This calls for addressing some interesting asset/liability management issues to avoid unexpected results.

One of these issues is entitlements of plan members in a Canadian defined-benefit pension plan that is being wound up.

The actuary is responsible for making the plan sponsor... aware of the risks and sensitivities of the underlying liabilities.

When a pension plan is terminated, plan members have the choice of transferring the value of their deferred pension benefit to another registered vehicle or electing an immediate or deferred annuity. The Pension Benefits Acts and Regulations that govern pension plans registered in various provinces in Canada require the transfer value be calculated at the plan's wind-up date and then be brought forward with interest at the discount rate inherent in the commuted value calculation, from the wind-up date to the month of payout.

Valuing the liabilities

determining how to manage the asset/liability position from the

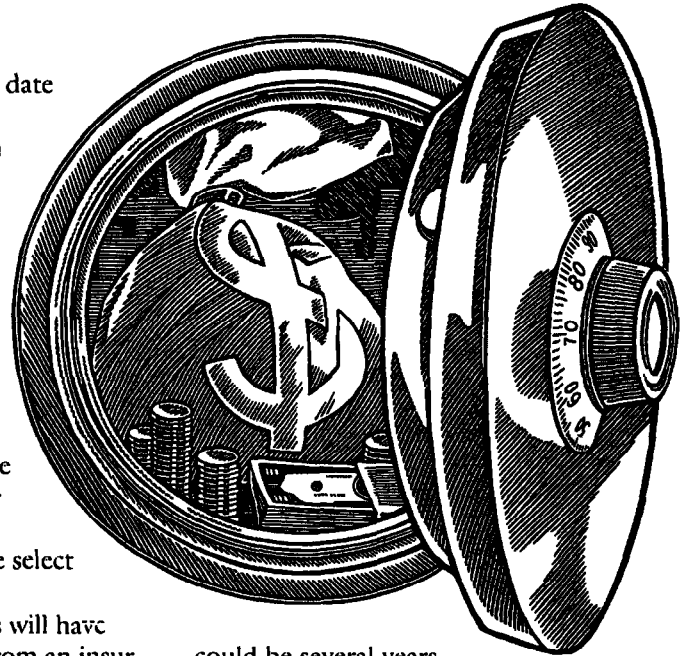
wind-up date to the actual date of the settlement (the date payments are made to plan members or annuities are purchased), the following two options lead to two distinct types of liabilities:

- Option 1 — Active members may select the transfer option and will be entitled to the commuted value determined using an interest rate basis that is appropriate for the wind-up date, brought forward with interest at the select period discount rate.

- Option 2 — Members will have their pensions purchased from an insurance company when approval is granted by the appropriate pension authority.

The liabilities under Option 1, namely the transfer value, act similarly to short-term investments, since the principal sum cannot change as a result of movements in interest rate levels. Thus, a minimum risk portfolio would be one investing the assets backing these liabilities in short-term securities or a money market fund. The downside to this investment strategy is that the return on short-term investments usually will be less than the return required to be credited to the commuted values.

The liabilities under Option 2 will vary depending on the level of long-term interest rates. These rates dictate the purchase price that will be quoted by insurance companies when the annuities are actually being purchased. Because of the long regulatory approval process, the annuity purchase



could be several years after the wind-up date. A minimum risk portfolio for this liability would be one that is invested primarily in mid-term and long-term bonds. Because the portfolio must be liquidated at the purchase date, these bonds should be limited to highly marketable and liquid securities.

One of the problems facing the actuary and the plan sponsor is not knowing which members should have their liabilities determined under Option 1 and which under Option 2 (current retirees will always have Option 2) until members have been given their options and have elected either a transfer or annuity.

We therefore have a group of members consisting of active and terminated vested members who have the option of selecting a commuted value, plus interest at the discount rate. These individuals may be as likely to select an annuity on either an immediate or deferred basis. This option may

(continued on page 6)

Pension plan wind-ups (continued)

be exercised passively, since the deferred annuity option is typically the default option for members who do not return their election forms. The option can have significant value to the individual — at potential cost to the plan — if interest rates have declined materially from the discount rate basis used in determining commuted values at the wind-up date. In this scenario, the value of the deferred or immediate pension may exceed the original commuted value plus interest. The delay before regulatory approval can be significant, enhancing the value of the option.

This option is difficult to price, because it depends on the expected volatility of long-term interest rates over a time period that is not fixed, as well as the probability of the option being exercised. The liabilities mentioned should be kept in mind when reviewing the actuarial balance sheet of a pension plan after the wind-up date. For example, the plan sponsor may ask you to update the financial position of the plan following the wind-up to clarify any change in the surplus/deficit position.

This will involve estimating the market value of both the liabilities and assets. Therefore, retirees should be valued based on current estimates of annuity purchase rates. Active members should be valued using the original commuted value rolled forward with the select discount rate, with an additional allowance to reflect the value of their embedded options. A conservative approach to this calculation could be to hold the greater of the commuted value plus interest and the discounted value of the individual's deferred or immediate pension on a current interest rate basis. However, this would ignore the future time value of any option that is still outstanding.

Investment policy

When a decision is made to wind up a pension plan, the liabilities of the plan usually change dramatically. The investment policy should be reviewed

to determine what, if any, asset mix adjustments should be made. For example, final average earnings plans will base benefits on current salaries, rather than projected salary levels, and so the inflation component of the liabilities has been eliminated.

Where the decision to wind up the pension plan is made some time before the actual wind-up date, the liabilities of the plan are sensitive to movement in long-term interest rates. In particular, they are sensitive to the level of interest rates that will be used to determine lump-sum entitlements at the wind-up date.

If the commuted values are based on the Canadian Institute of Actuaries' (CIA) transfer value basis, which lags the level of long-term interest rates by about two months, the real risk for members selecting Option 1 lies in the level of long-term interest rates that will be in effect about two months before the wind-up date.

Consideration should be given to determining a minimum risk portfolio that reflects the level of interest rates on the date the CIA rate basis takes effect. For example, for a December 31, 1993, wind-up, the transfer value basis may be determined by the level of interest rates at the end of October 1993.

After the wind-up date, assets should be managed taking into consideration the revision to the liabilities as a result of the wind-up. These liabilities are dictated by the options available and the plan's unique demographics and characteristics, and the investment strategy should be adopted accordingly.

If the plan sponsor decides not to adopt a minimum risk portfolio, certain questions should be answered:

- If the assets are mismatched, how will the potential gain or loss due to this mismatch affect the company's income statement and balance sheet?
- If the assets and liabilities are mismatched and a loss occurs, resulting in reduced surplus or increased deficit, how will this financial deterioration

affect the various parties who may be disputing ownership of the surplus/responsibility for the deficit? Could the mismatch be considered an abrogation of fiduciary responsibilities?

- If the plan currently is in a deficit and is registered in Ontario, and Ontario's Pension Benefit Guarantee Fund (PBGF) is expected to make up any shortfall, how will the pension regulators view any unwarranted mismatch of assets and liabilities?

- Since the ownership of surplus may change when the plan changes from a going-concern basis to a wind-up basis, who should decide the fund's future investment policy?

Role of the actuary

The actuary is responsible for making the plan sponsor or pension committee aware of the risks and sensitivities of the underlying liabilities.

The actuary will need to determine in consultation with the plan sponsor how many individuals could elect Option 1 or Option 2. The actuary then can provide the plan sponsor/committee with an appropriate breakdown of liabilities to enhance the asset/liability management process.

In addition, if the investments are structured so the liabilities for those expected to select Option 1 are backed by short-term investments expected to yield less than the discount rate, then the actuary needs to determine whether an additional reserve needs to be held, or accounted for, to reflect this expected loss.

The actuary also can assist in minimizing the value of the option available to plan members by accelerating the time frame for getting election forms sent to the plan members and obtaining their election of the form of benefit payments.

John J. Brophy is partner at Peat Marwick Thorne Actuarial & Benefits Inc., Toronto.

INTERNATIONAL NEWS

Impact of SOA-Nankai actuarial program is far-reaching

by Dr. Kailin Tuan

Just five years ago, actuarial science education and the actuarial profession in China did not exist. Today, the profession and an education program have emerged, largely due to the Society of Actuaries' support of the graduate program in actuarial science begun at Nankai University in 1988.

Development and progress

Several U.S. and Canadian SOA members were recruited to serve as faculty at Nankai to train qualified actuaries and to help prepare individuals to become teachers. The SOA suspended its participation in June 1989 because of turmoil in China, but resumed it in April 1990. The first Nankai class graduated 15 with master's degrees in 1991. It included seven individuals now engaged in actuarial practice, with five working for China's three insurance companies and two with the Social Insurance Bureau of the Shenzhen Municipal Government. One is teaching at Nankai University, and the other seven graduates are teaching in other Chinese colleges and universities. The second class, with 21 master's students, began its third and last year in September 1993.

Nankai University will be ready to take over full teaching responsibilities at the end of this second three-year cycle. It will introduce an undergraduate actuarial program in the 1994-95 academic year.

SOA exam center established

The professional achievement and standing of these pioneering Chinese actuarial students are now being tested by an international standard — the SOA examinations. With financial

support for administration from Manulife of Canada, an SOA examination center was established in September 1992 at Nankai University. The SOA also provides support by waiving examination fees for current and former Nankai students.

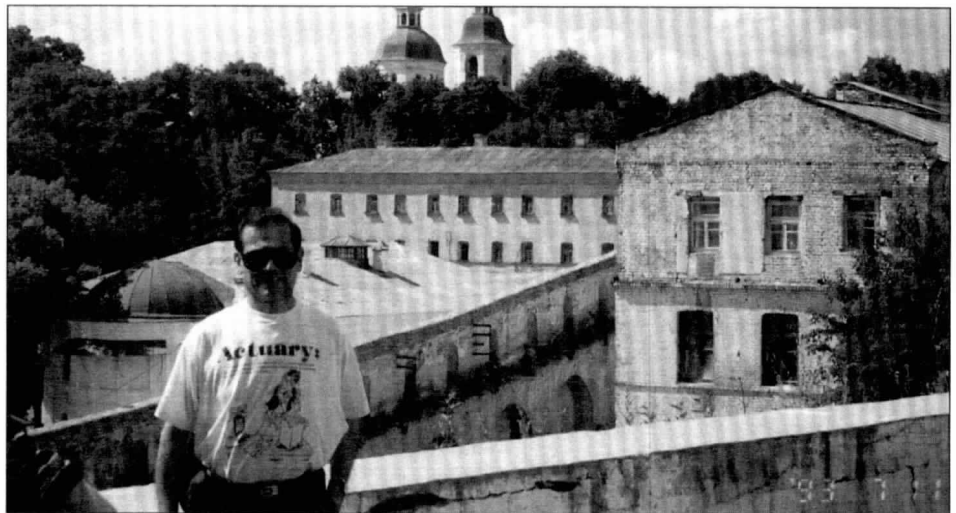
Timing was right

The introduction of the SOA-sponsored Nankai actuarial program in China in 1988 was very timely. Since then, China's insurance business has entered a new stage of expansion, and the People's Insurance Company of China (PICC) monopoly has been broken. Two new Chinese insurance companies have been established (the Ping An and the China-Pacific), and

several others are in the planning stage. Meanwhile, amid feverish economic reform, the central government in Beijing, as well as provincial and local governments, have recognized the urgency of reforming their social security programs, especially the retirement-income program for employees of Chinese enterprises.

The combined commercial and public forces have prompted Chinese leaders, in both public and private sectors, to recognize the great need for competent actuaries. This has led to a push for actuarial study and education in China beyond the Nankai campus in Tianjin.

(continued on page 10)



Kiran Desai's "I'm Nontraditional" T-shirt from the Nontraditional Marketing Section and his "Ask an Actuary" button solicited many questions from insurance executives in Moscow, Kiev, and St. Petersburg. Desai and SOA members Philip J. Barackman, Sylvain Goulet, Edwin Hightower, Henri Joli-Coeur, Frederick Kilbourne, Edwin Lancaster, Robert J. Myers, William Porter, Michael Ristau, and Jack Turnquist were among the Citizen Ambassador Program's Insurance Management Delegation to Russia and Ukraine in July, led by Dr. Jean Lemaire.

New task force on banks and financial institutions explores opportunities

by J. Lynn Peabody

The Society of Actuaries has formed a new Task Force on Banks and Financial Institutions. The task force was established, in part, to work with a working party of the Institute of Actuaries, whose goal is to "consider how best to extend the actuarial role into banks, building societies and other financial institutions."

Actuaries in the United States and Canada historically have played some role with banks, directly or indirectly, through their insurance operations. However, expanding this role is not the goal of the task force. Rather, our focus is more on new areas of involvement, concentrating especially on risk measurement and management techniques that reflect similarities in the business environment between the banking and insurance industries.

Banking representatives

The task force includes actuaries and members from the banking industry. One of the banking representatives is Barbara Oppen, chief officer, Financial Policy and Projections, Risk Management and Financial Policy, the World Bank in Washington, D.C. Her experience with banking regulatory agencies is very useful for the task force to understand banking industry issues. Dennis Uyemura, chief financial officer of the Federal Home Loan Bank of San Francisco, also is on the task force. He is co-author of the book, *Financial Risk Management in Banking*, which discusses the theory and application of asset and liability management in the banking industry. His expertise

provides a direct link to evaluating common issues being addressed by our two industries.

Initial activities

Immediately after its formation in 1993, the task force began review of a joint regulatory proposal by the Federal Reserve Board, the FDIC, and the Office of the Comptroller of the Currency. The proposal concerned the modification of current risk-based standards in the banking industry to specifically account for interest rate risk. The new proposal would extend the requirements to reflect unusual risk from interest rate swings. Although most large banks already have sophisticated risk assessment techniques, banking regulators believe a wider range of safety can be achieved by helping all banks focus on what is likely to happen in the future.

The task force reviewed the proposal in light of our experience with similar concepts in the insurance industry and sent a response to each of the financial organizations involved in its development. Our response included some comments on the technical aspects of the proposal. More importantly, our response stated: "The banking and insurance industries face similar challenges in evaluating the risks inherent in their products and adequately protecting themselves and their publics from the negative impact of those risks. Actuaries have led the way in developing a greater understanding of the insurance industry's risks related to pricing, capital management, interest

rate fluctuations, etc. . . . We hope to inform the (Federal Reserve) Board of the experience and expertise of actuaries in the analysis and monitoring of interest rate risk and its use in risk-based capital and to open the doors for the sharing of information and experience in these areas."

Future activities

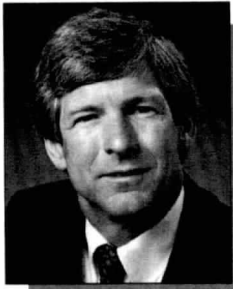
A panel session at the Society's annual meeting in New York was not formed in time for the preliminary program booklet. It will be on Wednesday morning, October 20. Included on the panel will be representatives from the Federal Reserve Board and from banking organizations in Canada and Europe.

The task force is considering other avenues for exposure to the banking industry. Articles in banking trade publications, presentations at seminars, and continued interaction with regulators are possibilities.

Throughout the last year, SOA President Walter Rugland has encouraged actuaries to explore new horizons and help others "ask us to be part of their problem-solving team." The Task Force on Banks and Financial Institutions is an outgrowth of that philosophy, and we're excited about the opportunities it provides to share our talents with the banking industry.

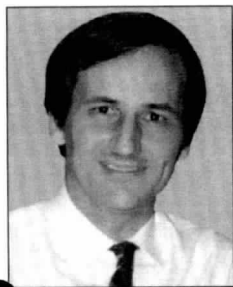
J. Lynn Peabody is consulting actuary at Milliman & Robertson, Inc., in Seattle and chairperson of the Task Force on Banks and Financial Institutions.

New task force (continued)



J. Lynn Peabody
Task Force Chairperson

"I feel there are many commonalities in the issues insurance companies deal with and issues banks deal with. Actuaries are uniquely trained to quantify these risks and to deal with them in real-life business situations."



Michel Perreault
Task Force Member

"Actuaries have a great opportunity to make inroads in the banking industry. It's fairly easy to find out what challenges and opportunities lie there — read banking publications, go to conferences on asset/liability matters and meet those in the field."



Irwin Vanderhoof
Task Force Member

"The banking system needs the services of actuaries. Unfortunately, they don't know it yet, and it's up to us to tell them."



Neville Henderson
Task Force Member

"Canada is somewhat ahead of the United States in having actuaries directly involved in the banking system. A number of insurance companies have entered the trust business and made actuaries responsible for their trust operation management. Our company has started its own bank and placed an actuary in charge. Conversely, several large banks have hired actuaries to help the bank enter the insurance business."

SECTION CORNER

As result of Section elections, 10 special interest Sections have added new Council members with three-year terms:

Computer Science

Carol A. Marler, Gregory M. Mateja, and James F. Toole*

Education & Research

Samuel H. Cox, Dick London, and Virginia R. Young

Financial Reporting

Robert M. Beuerlein, Charles D. Friedstat, and Douglas C. Kolsrud

Health

William F. Bluhm, Allan B. Roby, Jr., and Jean M. Wodarczyk

International

Robert L. Collett*, Kevin Law**, Yves Guerard, and Catherine Prime

Investment

David N. Becker, Dennis Carr, and Allan M. Fen

Nontraditional Marketing

Paul C. Butler, H. Neil Lund, and Don N. Patterson

Pension

James G. Durfee, Donald J. Segal, and Michael M. C. Sze

Product Development

James D. Atkins, Timothy F. Harris, and Michael J. Roscoe

Reinsurance

Monica Hainer, James W. Pilgrim, and Jeremy Starr

* Continuing on Council, re-elected after serving for less than 3-year term

** Completing term for Council member elected to the SOA Board

THAT'S YOUR OPINION

Actuaries and the public: What role do you see?

by Charles Habeck

An advertisement for Scotch whisky in *The Wall Street Journal* last year caught my eye. The purport of the copy was that the purveyors of this whisky suffered a substantial loss of revenue because of evaporation during the aging process. Based on the facts of the wine cask problem (old Part 3), it was at once evident to me that the ad was wrong. The wine cask problem (D.W.A. Donald, page 72) teaches us that such evaporation is accounted for in the final pricing of the product.

My first thought was to write a letter to the *Journal*, taking issue publicly with this clear misrepresentation. On second thought, it seemed more effective to notify the ad agency. On further reflection, perhaps the manufacturer should be asked to withdraw the offending statement, since it would have suggested or at least approved of the copy for this ad.

At this point I recalled that a

legendary professor of actuarial science at the University of Wisconsin in Madison used to offer a prize to any student who could solve the wine cask problem on his feet at the chalk board and without error on the first attempt. (I believe the award was a martini; former students, please correct me if I'm wrong). So I thought, why not send the whisky ad to Madison to be used as the basis for a graduate thesis?

This course of action would provide a much greater educational impact than going straight to the distiller. Actuarial students could ponder the whisky ad for years and years, while the only possible result of contacting the distiller would be a change in the ad. Another factor — nobody outside the actuarial profession probably has ever heard of the wine cask problem, and it wouldn't take an actuarial education to point out the flaw in the ad.

The above exaggerated example is meant to illustrate some of the

problems facing the actuarial profession when its members try to communicate directly with the general public as actuaries. Among the questions that arise are:

- For whom does the member speak? What are the implications of identifying oneself as an actuary?
- Is the problem strictly "actuarial" in nature?
- If not, what makes the actuary distinctly qualified to solve it?
- And of course, what is the desired result?

What are your thoughts on the proposition that actuaries should communicate more directly with the general public whenever the opportunity arises? Which actuaries and which publics may benefit from more dialogue, keeping in mind that "general public" means persons unfamiliar with insurance principles.

If you have given talks to the general
(continued on page 11)

Impact of Nankai program (continued)

First official recognition

In September 1991, the Hunan College of Finance and Economics introduced an actuarial program at the undergraduate level and admitted its first class of students. These students will take actuarial courses in their junior year beginning September 1993.

The Hunan College is supported by, and under the jurisdiction of, the Education Bureau of the People's Bank of China (PBOC). PBOC is China's central bank and is the

national authority in regulating China's financial institutions including insurance companies. Thus, this may be considered the first official recognition of the actuarial profession and study in China and a major impact of the SOA-Nankai program.

Other schools starting programs

Since the early 1990s, several other Chinese colleges and universities have been exploring the feasibility of establishing actuarial study programs. Two major Chinese schools, the People's

University of China in Beijing and the Fudan University in Shanghai, are beginning actuarial programs in the 1993-94 academic year at the undergraduate level. Northeast University's undergraduate program in Shen Yang is in the planning stage.

A third program, a joint venture between the Central Institute of Finance and Economics in Beijing and the Institute of Actuaries (England), will be established soon. The Central

(continued on page 12)

Actuaries and the public (continued)

public while identified as an actuary, I would like to hear about them. (This includes experiences such as talks to grade school pupils to show them how insurance works.) Please send an account either to me at my *Directory* address or to *The Actuary* at the Society office. If an upcoming issue editor agrees the responses warrant seeing ink, your responses will be published.

Another, more forward-looking, aspect of the same question is encapsulated in the slogan, "Ask an Actuary." What should be our stance? Should actuaries adopt a proactive position, or should they wait until asked before speaking, as now seems to be the case? Following is a list of several areas of public concern getting headlines in the United States. Can actuaries define for themselves a greater role, or any role at all, in resolving these issues?

- Health care financing reform, especially at the state level, where push soon will come to shove.
- Proposition 103 rolling back auto insurance rates in California; it could happen elsewhere.
- Reapportionment of Congressional districts based on new

census data and given political objectives; will we be ready next time?

- Simplification of property tax methodology, for instance, as in Cook County, Illinois, so the public understands and accepts it as equitable.
- School financing outside the property tax, as it seems to be moving forward in Michigan, a recurring issue in many states.
- Development of revenue-sharing formulas among major-league baseball teams (a joint Canadian/U.S. problem) to address the small market problem; can actuaries contribute here?

Health care financing reform and auto insurance rating are obviously within the purview of the actuary. Reapportionment, property tax rules, baseball revenue-sharing — these issues involve data and methodology familiar to actuaries, such as population demographics, valuation methods, and optimization of returns. It seems that actuaries could be part of many solutions that the public needs. Thus, your experiences, thoughts, and comments on the past and continuing role of the actuary would be much appreciated by your fellow actuaries.

I have been told not to be overly

optimistic about getting responses to such a request: "You'll be lucky if you get even one!"

I took this statement to imply a Poisson distribution, and I was about to share this random thought when I caught myself and asked instead: "What if we award a martini to anyone who sends in a significant response?"

"Well, you might get two," was the guarded reply.

Before the editors can make such an offer, of course, they need to determine what reserve should be set up to provide for it adequately. My guess is \$32; can anyone confirm this amount?

A final note: Copies of the whisky ad and the wine cask problem are available from *The Actuary* staff editors at the Society office. From the combined information in each item, it seems that these folks are working with a very large batch of Scotch whisky, which "lies, in aureate slumbers, maturing," as the ad states. Resembles the actuarial profession, some would say.

Charles Habeck is a consultant at EM-BAR-EX International, Milwaukee, Wisconsin, and an assistant editor of *The Actuary*.

IN MEMORIAM

James C.H. Anderson
ASA 1954, MAAA 1966, FCA 1975

James O. Challenger
FSA 1944, MAAA 1965

Lynn T. Hansen
ASA 1987, EA 1986

John S. Pearson, Jr.
FSA 1966, MAAA 1969

G. Emerson Reilly
ASA 1930, MAAA 1966

Jacques Roy
FSA 1968, FCIA 1968

Samuel C. Tatum
ASA 1932, MAAA 1966, EA 1976

James "Jim" C.H. Anderson will be remembered within the actuarial profession as an innovative thinker and a pioneer in new products and practices. In 1975, he introduced a new concept, which he called "the universal life insurance policy." His 1959 paper (TSA XI), "Gross Premium Calculations and Profit Measurement for Nonparticipating Insurance," which won the Society of Actuaries Triennial Prize, still serves as the basis for most of today's insurance pricing and appraisal work. He shared his insights with the insurance industry in his column, "The Last Word," in *Emphasis*, the quarterly

magazine for Tillinghast, where he was president, managing principal, and chief executive officer until 1986. Contributions in his memory can be directed to the Thomas P. Bowles Jr. Chair of Actuarial Science at Georgia State University, c/o Steven W. Strickland, Dean's Office, College of Business Administration, University Plaza, Georgia State University, Atlanta, GA 30303.

RESEARCH CORNER

Research activities are growing in number, scope and size.

Status of current research projects

The **Credit Risk** study has completed the pilot phase of this major undertaking and now is moving ahead with data collection for the years 1990 through 1992 for private placement bonds and commercial mortgages.

The **Catastrophic Health Claims** project is in the process of validating and analyzing data from 25 companies involving hundreds of millions of dollars in payments.

The **Universal Life Persistency** study has attracted 37 potential data contributors to whom the data specifications have been sent.

The **Long-Term Bond Yields** study has almost completed collecting data on 136 companies. This

study compares the long-term bond yields of insurers with relatively larger percentages of high-yield (junk) bonds in their portfolios to a control group with very small holdings of such investments.

Status of current experience studies

Reinsurance mortality data for 18 companies have been collected for analysis.

Group annuity mortality and a companion **new valuation standard table** are proceeding on schedule. A draft 1994 GAM Table may be ready for exposure by year-end.

The **1982-84-89 National Long Term Care** survey analysis for incidence rates and continuance tables by age groupings and activities of daily living are being prepared.

A report on **structured settlements for 1983 to 1989** has been published, and plans are in process for subsequent studies.

New research projects

Health benefit systems practice area — Efforts on risk adjusters, managed care, health insurer

solvency, medical effectiveness, and lifestyles are in the planning stages.

Retirement systems practice area — Studies on turnover and retirement rates, postretirement research, and the adequacy of defined-contribution plans as a retirement vehicle are being planned.

Financial and investment management practice area

— Research has expanded into boundaries of risks, diversification of risks, fair value of liabilities, economic assumptions guidance, and studying insolvencies to determine what impact dynamic solvency testing might have had. Additional research activities on actuarial modeling are being framed to consider short- and long-term instabilities in the economy and to take advantage of a contingency planning approach to prevent insolvency.

Volunteers are needed to staff project oversight groups (POG) and to take part in some of these efforts. Contact Mark Doherty, director of research, at the Society office for more information or to serve on a POG.

Impact of Nankai program (continued)

Institute is under the jurisdiction of the Education Bureau of the Ministry of Finance of People's Republic of China.

These Chinese schools, struggling to get their programs established, face a common critical problem — the shortage of qualified actuarial science teachers. The schools are searching for various approaches and solutions. For example, the Hunan College has sent its teachers to study actuarial courses at Nankai University. It also sent a teacher to study at Temple University in Philadelphia. The Central Institute in Beijing is pursuing the

SOA-Nankai pattern by seeking support from the British actuarial community.

U.S. company helps with internships

CIGNA International Financial Services (CIFS) of Philadelphia helps support the Nankai program with a new internship program in CIGNA's Hong Kong office. It covers all traveling and living expenses during the summer months for three Nankai graduates to receive training from CIGNA's actuarial and professional staffs.

Actuaries and actuarial science

education should have a bright future in China. The SOA can be very proud of its role in establishing the pioneering program at Nankai and in nurturing this phenomenon on the other side of the Pacific.

Kailin Tuan, Ph.D., is professor of risk management and insurance at Temple University, Philadelphia, and is program coordinator of the SOA-Nankai Program in Actuarial Science.

U. of Minnesota announces position

The Industrial Relations Center, Carlson School of Management, University of Minnesota, has a tenured associate/full professor position as the C. Arthur Williams, Jr., Insurance Industry Chair.

Duties: Teaching and curriculum development for graduate and undergraduate courses in employee and social benefits, insurance, and risk management. Advise and supervise graduate students' research in industrial relations and management and conduct a program of recognized scholarly research. Service and outreach commitment necessary.

Qualifications: Ph.D. in economics, industrial relations, insurance or finance. National/international reputation as a senior scholar in benefits, insurance or risk management. Evidence of service in the academic community. Experience in building working relationships among business, labor, government and academic communities.

Application: Send curriculum vitae, names of three references, and recent written work to Professor Dennis A. Ahlburg, Chair of Search Committee, Industrial Relations Center, 537 Management/Economics, University of Minnesota, 271 19th Avenue S., Minneapolis, MN 55455, no later than January 15, 1994.



on the lighter side

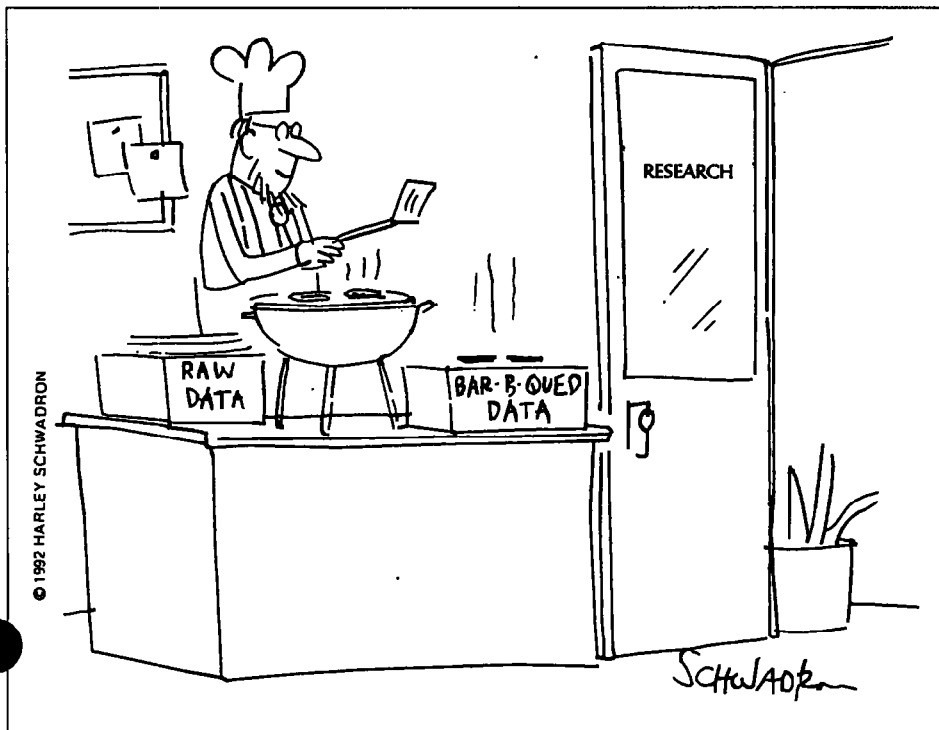
Pearl puzzle

R.K. Barnwal from the Department of Actuarial and Management Sciences at the University of Manitoba in Winnipeg sends this puzzle, which he says can be reformulated as a life contingency problem. "The solution," he points out, "requires retrospective reasoning (as used in calculating reserves) and some results in basic number theory."

Problem

One evening, a father brings home some pearls for his k children and leaves the pearls in the kitchen. Late at night, one child goes to the kitchen and discovers he can divide the pearls into k equal parts with one pearl left over. He takes one of the (equal) parts and the leftover pearl, then leaves the kitchen. The remaining $(k-1)$ children then go to the kitchen one by one. Each child discovers that the pearls left by the previous child can be divided into k parts with one pearl left over. Each child takes one part and the leftover pearl and leaves the rest in the kitchen. After each child has had a turn, the mother goes to the kitchen and divides the remaining pearls into k equal parts and removes them from the kitchen. How many pearls did the father bring?

Please turn to page 14 for the solution.



Actuary joins Society staff

Judy L. Strachan, FSA 1983, has joined the Society of Actuaries staff as the education actuary working in the Financial and Investment Management Practice area. She was formerly the general director of finance for John Hancock Mutual Life Insurance Company's Career Agency Distribution System.

"Judy Strachan's experience in a nontraditional function will be an asset as the Society continues to define techniques and extend knowledge of our students in emerging financial and investment areas," Marta Holmberg, education executive, said.

Strachan worked with senior management of John Hancock's sales department to control expenses and to analyze the future effect of suggested policy changes on the department's competitive position and its Profit (Loss) statements.

"I look forward to working with the E&E committees," Strachen said. "It's



Judy L. Strachan
SOA Education Actuary

important that our educational plans and exams include the skills upcoming actuaries need to be successful in these non-insurance areas."

Explanation of Canadian mail delay

By trying an alternative mail service, the Society's mailing of ASA and FSA grades to our Canadian students this July was delayed. We recognize the frustration and inconvenience experienced by those affected. We apologize and believe we owe our Canadian members and candidates an explanation.

In the past three years, the Society's use of an alternative to the usual first class mail to Canada had resulted in enhanced delivery times at reduced cost. However, when we tried it for the ASA and FSA grades mailed on

July 9 and 16, respectively, the service jammed on us. As a result, Canadian students experienced an unacceptable delay of approximately two weeks in receiving their grades. Although it does not replace written confirmation, fortunately the exam hotline was operative during this time, so candidates were not kept in suspense as to whether they had passed or failed.

We wish to assure our Canadian members and candidates that we will resume using the regular Canadian postal system for exam results.

Pearl puzzle solution:

Let

Υ_i = Number of pearls found by the i th person.

Clearly, the number of pearls found by the mother denoted by

Υ_{k+1} is given by

$\Upsilon_{k+1} = km$, (m is unknown), and Υ_i 's satisfy the recurrence relation given by

$$\Upsilon_{k-t} = a \Upsilon_{k-t+1} + 1,$$

$$t = 0, 1, \dots, k-1,$$

where $a = k/(k-1)$.

Hence, the number of pearls brought by the father is,

$$\Upsilon_1 = a^k km + (a^k - 1)(k-1),$$

$$= k^k \frac{km + k - 1}{(k-1)^k} - (k-1).$$

The number Υ_1 will be an integer if $(km+k-1)$ is a multiple of $(k-1)^k$ i.e.,

$$km+k-1 = P(k-1)^k.$$

Thus,

$$m = \frac{(k-1) \{P(k-1)^{k-1} - 1\}}{k}.$$

The number m will be an integer if $P(k-1)^{k-1} - 1$ is a multiple of k .

Two cases arise:

i) when k is odd,

$$P(k-1)^{k-1} - 1 = P-1 - Pk(1 - \dots + k^{k-2}).$$

Thus m will be an integer if

$$P = kl+1, 1 \in \mathbb{N} \setminus \{0\}$$

ii) when k is even,

$$P(k-1)^{k-1} - 1 = Pk((k-1) + \dots + k^{k-2}) - (P+1).$$

Thus m will be an integer if

$$P = kl-1, 1 \in \mathbb{N}.$$

Thus the number of pearls brought by the father is given by

$$\Upsilon_1 = Pk^k k+1,$$

where

$$P = k(l-1)+1 \text{ when } k \text{ is odd}$$

$$= kl-1 \text{ when } k \text{ is even}$$

in both the cases $1 \in \mathbb{N}$.

DEAR EDITOR

World population of concern

We are indebted to Cathy Lindman ("Dear Editor" May 1993) for reminding us of the enormous inequities in the world and our roles in solving them. Actuaries working on programs designed to bring people economic security need to ask ourselves what we can do to help bring some of that security to those in the world who are struggling just to survive.

One aspect of the problem actuaries are particularly qualified to deal with is demography. If, as expected, the world population doubles again in the next 40 years, this will exacerbate the world problems of hunger, poverty, and the environment of which Lindman writes. Anyone who wants more information on the world population problem is invited to contact me at my *Directory* address.

Donald S. Grubbs, Jr.

Privacy could become an issue

The Alice Rosenblatt article on community rating (June 1993) was well done and very informative. I would like to expand on her comments on the trade-off for risk adjustment methods between accuracy and simplicity.

When we go further than age, sex, and geographic area, we begin to get into some major privacy issues. While many items could improve the accuracy of risk adjustments, they may not be socially acceptable. Differentiation based on smoking habits may be socially acceptable today, but sexual preference is probably not. It is difficult to obtain reliable data on alcohol consumption and might compromise some constitutional rights to ask questions concerning illegal drug use.

Ultimately, genetic testing probably could lead to very accurate risk adjusters, but at great expense both from a financial standpoint and from a social standpoint.

In spite of these comments, I believe the actuarial profession needs to continue to do research related to risk adjusters.

Robert H. Dobson

Support math education

In the June issue of *The Actuary*, Jerome Tuttle recommends reading the landmark 1989 document, "Curriculum and Evaluation Standards for School Mathematics," published by the National Council of Teachers of Mathematics (NCTM). Despite this formidable title, I'd wager that anyone who looks through this 258-page publication will come away awestruck at the revolution in math instruction contemplated by the NCTM and the bold thinking that led to its vision.

Achievement of the NCTM's goals (e.g., that all students become confident in their ability to use mathematics in the world around them) will require significant shifts in the environment of U.S. classrooms. One such shift dear to actuaries' hearts is a focus on real-world problems, along with a de-emphasis of manipulation and memorization. The standards call for a redirection of math instruction from a focus on teacher lecture and student passivity to a focus on student involvement (discussion, writing, working in groups, making conjectures) and the teacher as interlocutor.

The NCTM has responded admirably to the National Research Council's wake-up call sounded in its 1989 publication *Everybody Counts*:

Only in the United States do people believe that learning mathematics depends on special ability. In other countries, students,

parents, and teachers all expect that most students can master mathematics if only they work hard enough.

The NCTM itself paints a stark picture of one possible scenario:

If all students do not have the opportunity to learn mathematics, we face the danger of creating an intellectual elite and a polarized society...not consistent either with the values of a just democratic system or with its economic needs.

The mathematics teaching profession has a formidable task ahead of it. Tuttle's encouragement that actuaries contact their state math coalitions to discover how they might contribute is hereby seconded.

Philip J. Feuer

NY state official corrects June article

The description of New York's community rating law and regulations appearing in the June 1993 issue ("Reform and re-reform") is inaccurate.

The statement is made that "New York . . . requires products to satisfy an anticipated loss ratio of 75%." More accurately, New York will deem a rate filing to be approved, effective October 1, 1994, if a loss ratio of 75% is anticipated. However, a group health insurance filing submission can be made with a loss ratio as low as 60% (65% for cases larger than 50 lives) and still receive approval. The 60%/65% loss ratios are the New York minimum loss ratios for group health insurance.

Individual health insurance has different minimum loss ratio requirements, some as high as 75%.

Robert C. Benedict
Chief of the Accident and
Health Rating Section,
State of New York
Insurance Department

ACTUCROSSWORD

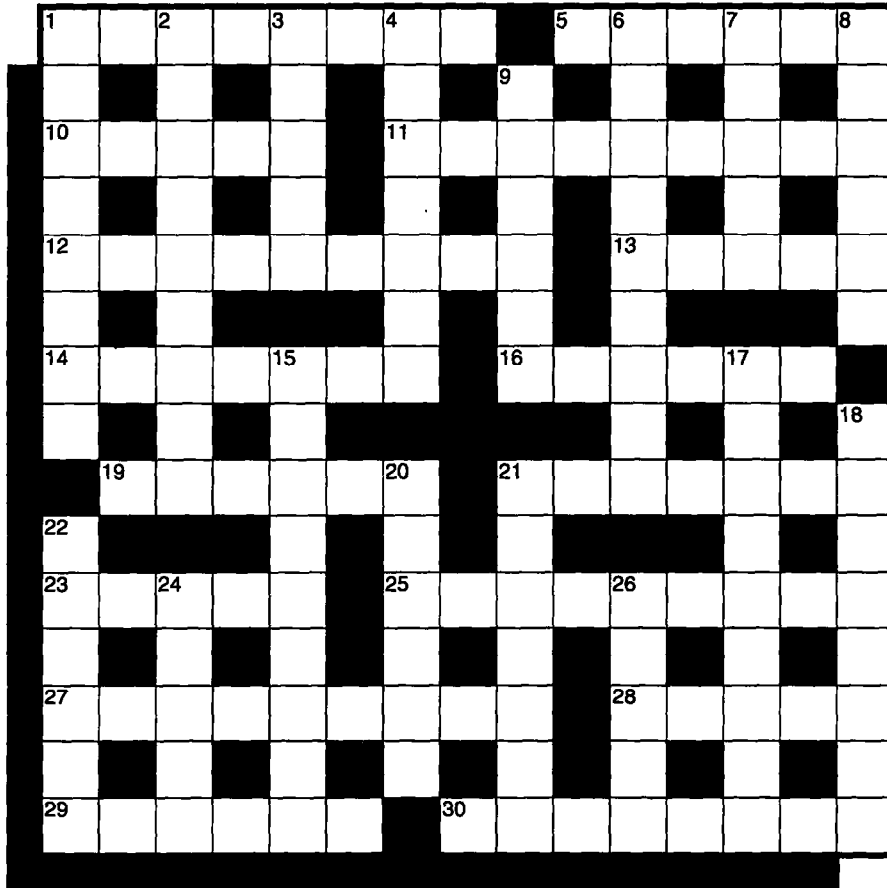
by Bob Hohertz

Across

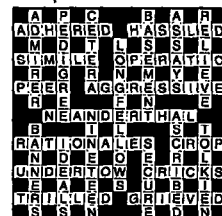
1. Heavy drinker returned to places for heavy drinkers (8)
5. Up-tempo melody: "Carrying a Grapefruit" (6)
10. Parthenope tangled reins (5)
11. Disgusting quarter of lowlifes, at home, swallowing fifth of moonshine (9)
12. Dice as returning lava craft (9)
13. Rogers and Gore becoming extreme (5)
14. He's not appreciative of fashionable bars (7)
16. Turn toward a singing voice (6)
19. Repaired ineam in city in northern France (6)
21. Grand tipper, one who picks up here and there (7)
23. Cover left in desert (5)
25. Go seining Saturday for a pair of snappers? (9)
27. Gold, rocky trails, and a big country (9)
28. Jacob or Wilhelm is gruesome to the audience (5)
29. Burnett character to warm up after start of evening (6)
30. A way to encourage fish (8)

Down

1. It's below Victoria to have sat up with persistent enthusiasm (8)
2. Plan for layers of precious mineral (9)
3. Measure a famous vessel (5)
4. Cultivation up to the time of a particular period (7)
6. Different, new-fangled theories about tungsten (9)
7. Resin is a plague within the frontiers of ecology (5)
8. The Ring: a Rossini hero comes to naught (Verdi set it) (6)
9. A truss damaged ankle (6)
15. Depending on luck borne by azalea, to Richelieu (9)
17. Fruit fly up and in, in before (9)
18. Reporter quietly, surprisingly smears head of Nairobi (8)
20. Setting of Verdi's vespers: south, like Antarctica? (6)
21. Maybe get last of a school of psychology (7)
22. Hostess qua realtor houses one who's not trendy (6)
24. Is linked with playwright Jonson, author of *The Master Builder* (5)
26. Foretell something which bores, by the sound of it (5)



September's Solution



100% Solvers - June: W Allison, HG Anderson, B Birns & N Rubin, T Boehmer, A Brosseau, J Brownlee, R&M Buck, G Cameron, P&E Danyo, M Eckman, R Fink & D Birnstihl, R Fleckenstein & P McEvoy, C Galloway, P Gollance, J Grantier, P Hepokoski, R&J Koch, D Leapman, K Leiden et al., M Lykins & J O'Connor, M MacKinnon, R Martin, G&D Mazaitis, R Miller III, F Rathgeber, J Roszkowski & M Neumeier, G Sherritt, E Thompson, M Thompson & D Elbaum, D Weill, M&D Williams, V Young, F Zaret

Send solutions to: Puzzle Editor, 35 Smithfield Court, Basking Ridge, NJ 07920