The Actuarial Review

THE NEWSLETTER OF THE CASUALTY ACTUARIAL SOCIETY • VOLUME 36, NUMBER 2 • MAY 2009

Annual Report of CAS Discipline Committee to the Board 2

From the President: How Are We Doing on the Centennial Goal?—John J. Kollar—There is significant activity within the CAS—both by volunteers and our well-qualified CAS office staff—that is designed to move the organization ahead as it approaches and reaches its 100th anniversary. 3

In My Opinion: Now You See It—Paul Lacko—Change has both upsides and downsides. The CAS has introduced many changes over the past few years. Changes, for example, in some CAS publications have generated feedback both positive and negative. 6

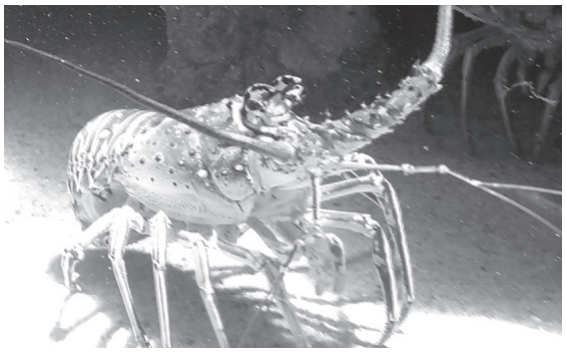
The History of Zero—Steve Glicksman and Paul Glicksman—The number zero is not awarded much glamour in daily life. Most people do not appreciate the importance of zero, other than they want lots of them behind other numbers in the calculation of their net worth. 8

The NAIC Solvency Modernization Initiative—Kris DeFrain—The risk-based regulatory capital (RBC) requirements established minimum capital requirements directly related to the risks undertaken by an insurance company, as opposed to only minimum dollar amounts of capital for any company, regardless of risk. This same risk-based philosophy is also at the core of a recent change adopted by the NAIC. 10

CAS to Pursue an ERM Designation—The CAS Board of Directors decided at its March 19-20, 2009, meeting that the CAS would pursue an Enterprise Risk Management (ERM) designation, in accordance with the recommendation of the CAS Enterprise Risk Management Designation Task Force (Task Force). 18

INSIDE THIS ISSUE

Humor Me 9
Brainstorms 12
Coming Events 15
Nonactuarial Pursuits 16
25 Years Ago in the *AR* 17
It's A Puzzlement 19



Tasty and elusive, the Bermuda Spiny Lobster is the object of one CAS member's nonactuarial pursuit. For more on the story, see page 16.

The Actuarial Review is the quarterly newsletter of the Casualty Actuarial Society.

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The Actuarial Review (ISSN 10465081) is published four times a year by the Casualty Actuarial Society, 4350 Fairfax Drive, Suite 250, Arlington, VA 22203. Telephone: (703) 276-3100; Fax: (703) 276-3108; E-mail: office@casact.org. Third class postage is paid in Lanham, MD. Publications Mail Agreement No. 40035891. Return Undeliverable Canadian Addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B 4R6.

The amount of dues applied toward each subscription of *The Actuarial Review* is $10. Subscriptions to nonmembers are $10 per year. Postmaster: Send address changes to *The Actuarial Review*, 4350 North Fairfax Drive, Suite 250, Arlington, Virginia 22203.

CAS Discipline Committee

Annual Report to the Board

By Janet Fagan, Chairperson of the 2008 Discipline Committee

1. **Background.** The CAS Rules of Procedure for Disciplinary Actions (as amended November 14, 1998, by the Board of Directors) requires an annual report by the Discipline Committee to the Board of Directors and to the membership. This report shall include a description of its activities, including commentary on the types of cases pending, resolved, and dismissed. The annual report is subject to the confidentiality requirements.

2. **2007/08 Activity.** A case involving a candidate for admission to the CAS was referred to the Discipline Committee by the CAS Board of Directors on July 2, 2007. The Investigative Panel of the Discipline Committee completed its review and issued its recommendations on September 26, 2007. The Review Panel of the Discipline Committee met on December 10, 2007, to review the recommendations of the case and decide on a course of action. The candidate was notified of the Discipline Committee's decision and was advised of the right to appeal. The appeal period expired in January 2008 with no appeal being filed.

3. **2008 Activity.** A case involving a member of the CAS was referred to the Discipline Committee by the Actuarial Board for Counseling and Discipline (ABCD) on June 20, 2008. The Discipline Committee Panel of the Discipline Committee met on September 3, 2008. The member was notified of the Discipline Committee's decision and was advised of the right to appeal. The appeals period expired on November 15 without an appeal being made by the subject actuary. The Discipline Panel acting in accordance with the CAS bylaws and under recommendation from the Actuarial Board for Counseling and Discipline has expelled the subject actuary from membership in the Casualty Actuarial Society for violation of the Code of Professional Conduct, PRECEPT 1, ANNOTATION 1-4, notification of which is posted in this edition of the *Actuarial Review.*

There are no other cases or actions to report. AR

An ERM Designation for the CAS

The Strategic Viewpoint

Excerpted from the Report of the CAS Enterprise Risk Management Designation Task Force

In March 2007 the CAS adopted its Centennial Goal, which reads:

> The CAS will be recognized globally as a leading resource in educating casualty actuaries and conducting research in casualty actuarial science. CAS members will advance their expertise in pricing, reserving and capital modeling, and leverage their skills in risk analysis to become recognized as experts in the evaluation of enterprise risks, particularly for the property and casualty insurance industry.

The first sentence speaks to the CAS's aspiration to be recognized globally for the quality of its education and research. The second envisions CAS members

ERM Designation, page 14

How Are We Doing on the Centennial Goal?

This column provides a quick summary on progress toward the CAS Centennial (2014) Goal. In case you have not seen it, here it is:

> The CAS will be recognized globally as a leading resource in educating casualty actuaries and conducting research in casualty actuarial science. CAS members will advance their expertise in pricing, reserving and capital modeling, and leverage their skills in risk analysis to become recognized as experts in the evaluation of enterprise risks, particularly for the property and casualty insurance industry.

I will address efforts in many areas within the CAS intended to move our organization towards achieving our aspirations.

Basic Education

The CAS Board approved adding to the syllabus the recently completed reserving text, "Estimating Unpaid Claims Using Basic Techniques." This text replaces the several papers previously used and provides a more coherent treatment of loss reserving. It removes much of the nation-specific material making it an international treatment of the subject.

The CAS Board has also commissioned a ratemaking text that is scheduled to be completed by the time this edition of the *Actuarial Review* is published. As with the reserving text, it is intended to be a comprehensive and coherent treatment of the subject that will have international applicability. Working with other actuarial organizations and the academic community, the Syllabus Committee may seek to commission additional syllabus material as the need is identified.

The Syllabus Committee will be reviewing international material included in the syllabi of other actuarial organizations around the world in 2009 for possible inclusion in the restructured 2011 syllabus. It is even possible that the committee may eventually extend this review beyond actuarial material that is written in English. The Syllabus Committee has a charge to expand the focus of the material beyond its traditional insurance focus to a much broader risk management perspective.

Members of the CAS and SOA are evaluating the Canadian Institute of Actuaries FEM system (Flexible Education Methods—exam credits for university courses) and other alternative educational and testing methods. The vision is to have the best possible syllabus material delivered in the most effective and efficient fashion.

Research & Development

The research committees have been working with the Strategic Planning Committee and CAS practitioners and interested parties in the ever-expanding area of enterprise risk management (ERM) to identify long-term research needs, including critical new areas for research. They are also promoting relationships within the global actuarial community to conduct international research projects that address issues of interest to all actuaries, risk professionals, academics, and the general public.

Some key issues include climate change and the global financial crisis, which could be characterized as a failed ERM process. Partners in the global actuarial community include the Joint Risk Management Section; Enterprise Risk Management Institute International (ERM-II); Institute of Actuaries in Australia; The Actuarial Profession (U.K.), including their General Insurance (P&C here in the U.S. and Canada) Section known as GIRO; and the ASTIN section within the International Actuarial Association (IAA).

Variance, the CAS's refereed journal, continues to publish a number of very thought-provoking new research papers.

The research and professional education committees are focused on integrating research into actual practice through basic and continuing education offerings.

Continuing Professional Development (CPD)

Because of the increase in hours required to satisfy the qualification standards for practice in the U.S., the CAS Program Planning Committee has added subject tracks to the Spring and Annual meetings to provide more CPD opportunities. The growing interest in predictive modeling, ERM, and various modeling courses have also contributed to this demand.

One concern for the CAS Board involves a possible threat to the reputation of property/casualty actuaries from practicing members who, although having completed their exams, have not kept up-to-date their professional expertise in the traditional practice areas of ratemaking and reserving. The board has formed a task force to focus on technical excellence, and to identify ways to address this challenge. One possibility under consideration is to grant certificates for completing specified work in a particular subject.

As you have seen, the CAS is exploring the idea of requiring continuing professional education for all of our practicing

From the President, page 5

FINANCIAL REPORT
FISCAL YEAR ENDED 9/30/2008

FUNCTION	*REVENUE*		*EXPENSE*		*DIFFERENCE*
Membership Services	$1,830,548		$2,553,230		($722,682)
Seminars	2,359,320		1,929,533		429,787
Meetings	1,151,623		996,697		154,925
Exams	4,775,022	(a)	4,347,227	(a)	427,794
Publications	16,202		48,772		(32,570)
TOTALS FROM OPERATIONS	$10,132,715		$9,875,461		$257,255
Interest and Dividend Revenue					195,545
Realized Gain/(Loss) on Marketable Securities					3,102
Unrealized Gain/(Loss) on Marketable Securities					(650,015)
TOTAL NET INCOME (LOSS)					($194,113)

NOTE: (a) Includes $2,351,828 of Volunteer Services for income and expense (SFAS 116).

BALANCE SHEET

ASSETS	*9/30/2007*	*9/30/2008*	*DIFFERENCE*
Cash and Cash Equivalents	$1,037,219	$1,557,638	$520,419
T-Bill/Notes, Marketable Securities	5,145,292	5,071,478	(73,814)
Accrued Interest	17,978	5,919	(12,059)
Prepaid Expenses / Deposits	228,590	116,546	(112,044)
Prepaid Insurance	33,067	24,759	(8,308)
Accounts Receivable	83,579	122,050	38,471
Textbook Inventory	4,066	1,766	(2,300)
Computers, Furniture, Leasehold Improvements	576,060	909,519	333,459
Less: Accumulated Depreciation	(334,915)	(420,000)	(85,085)
TOTAL ASSETS	$6,790,937	$7,389,675	$598,738

LIABILITIES	*9/30/2007*	*9/30/2008*	*DIFFERENCE*
Exam Fees Deferred	$978,865	$974,669	($4,196)
Seminar and Meeting Fees Deferred	253,350	560,521	307,171
Accounts Payable and Accrued Expenses	499,700	670,914	171,214
Accrued Pension	156,912	478,446	321,534
Deferred Leasehold Improvements Allowance	171,888	150,840	(21,048)
Deferred Rent Obligation	71,285	89,462	18,177
TOTAL LIABILITIES	$2,132,000	$2,924,851	$792,852

MEMBERS' EQUITY

Unrestricted	*9/30/2007*	*9/30/2008*	*DIFFERENCE*
CAS Surplus	$3,996,085	$3,699,285	($296,800)
Michelbacher Fund	147,424	151,771	4,347
CAS Trust - Operating Fund	172,624	181,932	9,308
Centennial Fund	117,683	157,137	39,454
ICA 2014 Fund	12,936	26,090	13,154
ICA 2010 "Cape Town" Fund	25,873	45,027	19,154
Research Fund	93,330	112,373	19,043
Subtotal Unrestricted	$4,565,956	$4,373,616	($192,340)

Temporarily Restricted	*9/30/2007*	*9/30/2008*	*DIFFERENCE*
Scholarship Fund	$4,958	$4,601	(357)
Rodermund Fund	7,338	3,542	(3,796)
CAS Trust - Ronald Bornhuetter Fund	52,006	53,540	1,535
CAS Trust - Reinsurance Prize Fund	28,680	29,526	846
Subtotal Temporarily Restricted	$92,981	$91,208	($1,772)
TOTAL MEMBERS' EQUITY	$4,658,937	$4,464,824	($194,113)

Kenneth Quintilian, Vice President - Administration

AUDITED

CAS Audit Committee: Brian A. Brown, Chairperson;
David Foley, Steve Johnston, and Michael Wacek

Dear Editor:

Thank you for laying out the issue of uncertainty so plainly in the "In My Opinon" column (*Actuarial Review*, February 2009). At the end of the day, you are pointing out that our comfort zone, arising out of the practice of using past experience as the main guide for making decisions about the future, is really no comfort zone at all!

More generally the February 2009 issue of *AR* is filled with interesting pieces and I must salute you and the entire editorial team for taking *AR* to new heights.

—C. K. "Stan" Khury, FCAS

From the President, From page 3

members. Webinars have proven to be an effective alternative vehicle for delivering continuing education, and the CAS is offering more of them in response to increased employer-focus on expense control and greater demand on members' time.

International

Recently CAS meetings and seminars have featured speakers from actuarial organizations outside North America to help us understand how actuaries in other countries address issues such as loss reserving. Other actuarial organizations have reciprocated, and our leaders have made presentations at GIRO and to the general insurance actuaries in Australia. These initiatives benefit CAS members in education, research, and CPD programs by helping the CAS build a leadership role on the international general insurance stage. This new role may also lead to employment opportunities for CAS members who wish to practice in locations other than the U.S. and Canada.

The international committees have identified appropriate training topics and provided more training opportunities, both seminars and Webinars, for our growing number of members outside of North America. They have been working with the Course on Professionalism (COP) Committee to develop cost-effective professionalism courses that include appropriate local material.

In response to Mutual Recognition invitations to the CAS, the Education Policy Committee is exploring the possibility of expanding this program to include members of the actuarial organizations in India and South Africa. Adopting a Mutual Recognition program would allow CAS members to more easily practice in those countries.

An International Leadership Team, which reports to the CAS Board, has been established to address international issues, such as determining the CAS position on important issues arising at the IAA. The team also monitors and manages international-related expenses as fiduciaries of the CAS.

ERM

I wrote about a possible ERM designation for the CAS in my last column. This initiative continues to develop. (Editor's note: See pages 2 and 18 for more on ERM.)

Leadership Development Committee

This board-established committee has begun to develop a program designed to identify and nurture potential volunteer leaders who show promise for taking on increased responsibility. These potential leaders may determine the future success of the CAS, and the committee wants to ensure that the CAS will give these future leaders ample opportunities to develop the skills they will need to continue the prominent global role the CAS plays in casualty actuarial science.

Funding

The current annual budget of the CAS is approximately $8.4 million. In order to control the pressure on our annual dues and registration fees from expanded services and meeting-related costs within the CAS, the board has established a task force to explore alternative ways of raising funds. These funds could also be used for commissioning new syllabus material and conducting research.

The Road Ahead

In summary, there is significant activity within the CAS—both by volunteers and our well-qualified CAS office staff—that is designed to move the organization ahead as it approaches and reaches its 100th anniversary. These initiatives are being recognized by other actuarial organizations within and outside North America. I believe we are heading in the right direction, but we need to continue pursuing these initiatives if we are going to achieve the Centennial Goal. Are you on the team?

The author would like to thank Chris Carlson, CAS Board Chairman, and Roger Hayne, CAS President-Elect, for their valuable input in producing this update.

PAUL E. LACKO

Now You See It

My wife Kathy and my son Ethan brought home a new wide-screen television last night. They had wanted to upgrade for a long time. Compared to his grandmother's monster-sized screen, Ethan's little 19" viewing area simply was an embarrassment to him when his friends came over. Ethan was thrilled when the salesman pointed out that the Sony Play Station 3 has probably the best Blu-Ray DVD player on the market. The added value came at only a modest additional cost, and my wife happily handed over her credit card. She has already made arrangements for the next step in the upgrading process, which is a switch to digital cable.

There is nothing wrong with the television we had. The old TV served the purpose of providing me with illusion and escape: fictional medical dramas, off-color humor, documentaries, cooking instruction, tennis matches, and game shows. The first program I saw on the wide screen last night was a local news report, and close-up shots of the anchors showed amazingly fine visual detail. It surprised me to see how the newest technology makes relatively young faces appear so much older. This is progress? Really, if I want to see every age line and blemish on a face, I can peer at myself in the bathroom mirror. (That works better than coffee to snap me awake every morning!)

On the other hand, nature programs in wide-screen detail are, to quote my son, "Awesome!" Great white sharks are definitely more fearsome in high-definition detail.

So it goes. Change has both upsides and downsides. The CAS has introduced many changes over the past few years. Changes, for example in some CAS publications, have generated feedback both positive and negative. Research papers are now published in *Variance*, not the *Proceedings*. *Variance* is intended to provide peer-reviewed research articles that serve practicing property/casualty actuaries. Professors and students are invited to submit papers, but *Variance* is not intended to be an academic journal. The editors of *Variance* want to provide a balance between theoretical papers and papers that practicing actuaries can apply to their own work, but with more weight on practice than theory. The actual balance between theory and practice in any one issue will depend, of course, on the papers that have been submitted and have successfully passed the peer-review process. If you want to read more practical papers, then please write and submit practical papers. Have you tried to turn a theoretical paper into a practical tool? Write and submit a case study, describe what you did and how well you succeeded.

Another publications change was to convert the hard-copy CAS *Forum* into the electronic *E-Forum*. The electronic publication means faster access and immediate downloading, plus it reduces the cost of printing and mailing, helping to keep CAS dues down. On the other hand, fewer people read the publication now. Apparently, a lot more of us at least flipped through the blue book when it arrived in the mail and we could hold it in our hands. The change to a new publication medium has been slow to induce a corresponding change in the readers' habits. All it takes is a few clicks on the CAS Web Site to check out *E-Forum* contents and download the articles you find worthwhile. The weekly bulletin from the CAS office will alert you. I scan the bulletin every week as I check out the day's e-mails. You should, too.

Another change is the section of the CAS Web Site devoted to Working Papers. The Working Papers site is intended to provide a resource for researchers and writers to communicate with each other about papers that are not yet ready for publication. What is a "Working Paper"? A Working Paper is any unfinished paper that has not been submitted for publication anywhere else.

Have you written a paper but you are not sure that it's good enough to submit to *E-Forum* or *Variance*? Then you have a Working Paper. Do you have an idea for a paper and need help surmounting an obstacle? Do you want to start a discussion thread on a research work-in-progress? Are you interested in collaborating with another actuary on some research that might lead to useful tools or insights for other actuaries who also work in your area of expertise? Write a couple paragraphs or a couple pages to describe what you need and submit that as a Working Paper.

Are you willing to review a paper-in-progress and offer advice or constructive criticism to the author? Then go to the CAS Web Site, click on Research, click on Working Papers, and you will find simple instructions that tell you what to do next.

As Chair of the CAS Publications Management Board, I invite you to send questions and comments to me AR@casact.org. If I can't help you, I will put you in touch with someone who can. AR

More Than One Best Estimate?

Editor's Note: This article is part of a series written by members of the CAS Committee on Professionalism Education (COPE). Its intent is to stimulate discussion among CAS members. Therefore, positions are sometimes stated in such a way as to provoke reactions and thoughtful responses on the part of the readers. Responses are welcomed. The opinions expressed by readers and authors are for discussion purposes only and should not be used to prejudge the disposition of any actual case or modify published professional standards as they may apply in real-life situations.

Rick A. Pointed, FCAS, works for a small actuarial consulting organization. He has been the appointed actuary for Lone State Insurance, a single state commercial liability insurer, for five years. A couple of weeks after he completes his annual reserve opinion, Lone State contacts Rick and asks him to complete a rate analysis. To save time and money, they ask him to use the same year-end data that he used for the reserve analysis. Rick agrees and gets started right away.

Rick begins his analysis with a look at Lone State's loss development factors (LDFs). The LDFs have always been based on Lone State's own loss experience, with consideration given to some industry comparison factors. The experience is somewhat volatile, but still worth considering, in Rick's opinion. As a reserving actuary, Rick has tended to pick on the low end of what he considers a reasonable range of selections. For the rate filing, Rick realizes that Lone State will benefit considerably if he selects higher LDFs, especially since the insurance department is likely to accept only a portion of the requested rate increases.

Is it okay for Rick to vary his LDFs by project for the benefit of his client?

No

Rick cannot change his opinion to produce a more favorable result for his client. His loss development selections should be the same for both analyses. Actuaries are expected to provide an

Ethical Issues, page 9

The Analysis of Risk Is Universal: Part II

By Mark Shapland

Our European colleagues are already facing stochastic modeling issues with respect to their preparations for Solvency II and International Accounting Standards, so this is a hotter topic in Europe than in the United States. However, we shouldn't allow ourselves to get complacent, as momentum related to reserve variability from rating agencies and regulators will continue to build in the United States. Indeed, the development of new models for stating the value of unpaid claims and measuring required capital are well underway and could have a direct parallel in the United States. Contributing to that development process now, rather than later, could keep the U.S. and Europe from going in divegent directions and might strengthen the end result. After all, the analysis of risk is universal; it is only the local cultures that are different.

Following up on a previous "Analysis of Risk Is Universal" article (*Actuarial Review*, May 2008), I am pleased to report on continued cooperation between the CAS and the U.K. actuarial profession. The second Stochastic Reserving and Modelling Seminar occurred December 2-3, 2008, at Staple Inn in London (the seminar was originally scheduled for July 3-4 but was postponed). All indications point to continued cooperation and I encourage everyone to keep an eye on, or better yet, get involved in, research, education, or regulatory efforts outside the United States.

Compared to the first U.K. seminar, the one held in December 2008 was more focused on fundamentals and the more common models, although we spent more time on modeling in R. Recent articles have appeared in the *Actuarial Review* regarding R (for example, the "Brainstorms" article by Glenn Meyers in August 2008), but for anyone interested in learning more, you will find an excellent Web site developed by a U.K. working party at http://toolkit.pbwiki.com/RToolkit that has many useful links to papers, presentations, and open-source code.

The History of Zero

By Steven Glicksman and Paul Glicksman

The number zero is not awarded much glamour in daily life. Most people do not appreciate the importance of zero, other than they want lots of them behind other numbers in the calculation of their net worth.

The etymology of the word zero is complex. Zero comes from the French translation of the Italian word "zefiro," which was coined by Italian mathematician Fibonacci (c.1170-1250). Considering that Fibonacci grew up in Arab North Africa, this is likely the mispronunciation of the Arabic word "safira" meaning empty. Scholars also point to the Sanskrit word "sunya," meaning void, as another possible origin of zero. The significance of these theories is that zero was not invented independently by multiple civilizations, but was brought to Europe by traveling Arab traders from India, and disseminated around the globe. In actuality, zero is thought to have been developed as early as the 6th century by the Gupta Dynasty in India.

The fact that it took so long for humans to realize that zero was a number is both understandable and astonishing. Zero is not mentioned in the Old Testament. It was not understood as a number by the ancient Egyptians. The Greeks, who pioneered geometry and philosophy, did not have the concept of zero. The Roman Empire's achievements in architecture and engineering did not include zero.

To a modern observer, the concept of zero is fairly simple and logical. It seems like it would be quite obvious to any caveman that if he had no berries, then he had zero berries. If he had two rocks, but two were taken away, he now had zero rocks. However, for the bulk of human history there was never any distinction made between nothing and zero. In other words, zero was seen as a lack of number rather than a number by its own right.

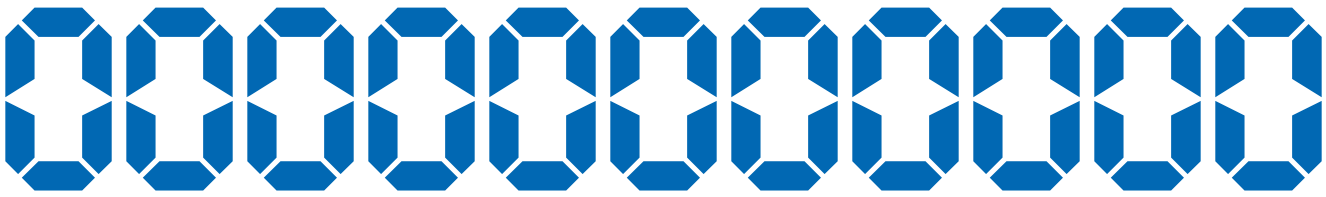
Think of the subtleties. If you have no losses, then your loss ratio is zero. But what is your loss ratio if you have no losses or premiums?

The origins of zero appear to have derived from the necessity of a numerical placeholder rather than inspired mathematical thought. In the earliest systems of numbers the number zero was not required. These schemes were called "additional" number systems because symbols are added. For instance, in the old Roman numbering system I stood for 1, V for 5, X for 10, etc. The symbols were combined, such as XV being 15. There was no need for a zero because, in the Roman mind, what would be the purpose in adding nothing?

The advent of "positional" number systems changed this thinking. Positional systems work on the modern principle of assessing a number's value based on the position of the numbers that compose it. In our system, 456 gets its value from 4 hundreds, 5 tens, and 6 ones. The only problem with this order is that, sans zero, the number 202 would be no different than 22. As a result, several place-holding mechanisms were invented. In China, spaces were used to denote position. In Babylon, a separate symbol was created to serve as the place holder. Some old European systems seem to have used a dot or a decimal point. It was Indian thinkers who were the first to acknowledge that this break was not just a blank space, but an actual number.

History tends to gloss over this invention in favor of more provocative mathematic discoveries such as algebra and calculus. Yet, few of these advances would be possible without the number zero. When you think about it, the understanding of zero as a number is a real human achievement.

Steven Glicksman, FCAS, MAAA, is an actuary with Glicksman Consulting, LLC in Boca Raton, Florida. His son, Paul Glicksman, is a technician with the firm. AR



You Might Be An Actuary

By Bryan Young, Arthur Schwartz, Marty Adler, and Paul Lacko

Everybody has heard comedian Jeff Foxworthy's "You might be a redneck" routines, maybe even bought the books, posters, beer can holders, gun rack decals, Christmas tree ornaments, and all the rest. Might the CAS develop a similar theme to strengthen its marketing and recruiting efforts and enjoy a steady stream of retail income? Think of all the tens of "You might be an actuary" mousepads, screensavers, PDA cases, notebook computer covers, windbreakers, and coffee mugs!

Does "interior decorating" mean putting a designer calculator in every bedroom and bathroom? Then you just *might be an actuary.*

Do you estimate the number of people at an actuarial seminar and, just for fun, put statistically justified upper and lower bounds around your central estimate? Then *you might be an actuary.*

You might be an actuary if you occasionally estimate the time you will spend exercising during your remaining lifetime, and then estimate the increase in your life expectancy from the exercise, and then keep exercising *anyway*.

The checkout clerk at the grocery store says you owe $19.88. You hand the clerk a $20 bill, one dime, and three pennies, which gets you precisely the one quarter you need for the parking meter. If you brag about your clever transaction to your coworkers at lunch the next day, then *you might be an actuary.*

The restaurant charges $18.00 for a large pizza (18 inch) and $12.50 for a medium pizza (12 inch). *You might be an actuary* if you decide how much pizza to order by comparing the ratio of the radii squared to the ratio of the two prices. And *you are almost certainly an actuary* if you remember to subtract one inch (of untopped crust) from each radius before you calculate.

You might be an actuary if you believe that the perfect anniversary present for your spouse is additional life insurance on yourself. *You might be married to an actuary* if your spouse thanks you for the perfect gift!

If your Christmas tree stays up every year until Easter, then you just *might be a consulting actuary.*

You might be an actuary if, while on vacation, you find yourself estimating strange things. Like what? Like the number of Norwegians in Minnesota or the number of points on the crown of the Statue of Liberty.

(Editor's Note: There's obviously some truth to the "actuary" stereotype! Please send us your contributions, and we'll publish a statistically representative sample in an upcoming issue of the *Actuarial Review*). AR

Ethical Issues, From page 7

unbiased analysis based on the data provided. He cannot choose a different set of unbiased "best estimate" selections. This would be a violation of the principles of ratemaking, which state that cost estimates should be reasonable, not excessive, not inadequate and not unfairly discriminatory. By purposely selecting higher loss development factors, Rick's recommended rate changes may be excessive.

Yes

Rick does not know Lone State's true loss development. There are a number of reasonable selections. Certainly, Rick can reconsider them and make changes as long as the selections remain in the reasonable range. In addition, Rick should factor into his selections the historical tendency of the department to reduce the filed change. Rick's client expects him to act in its best interest. By identifying his role as a consulting actuary for Lone State, it is clear that he is an advocate for them. It is justified and prudent for Rick to change his selections based on the prospective nature of the estimated loss provisions required for ratemaking. If Rick reviews his factors and determines that they can reasonably be higher, then he should make that change. As long as the selected factors are reasonable, then the estimated loss costs will not be excessive, and Rick will not be in violation of the actuarial principles.

Yes, but he should restate his reserve estimate.

There is only one best estimate. This is what Rick should be using. He should not select factors that would produce a favorable result for his client. Although there is a range of reasonable selections, Rick's best estimate should tend toward the middle of this range. In order to produce the best rate change estimate and the best reserve estimate, Rick should reselect the loss development factors in the middle of the reasonable range and use the same factors for both analyses. As stated in Precept 1 of the Code of Professional Conduct, actuaries have a responsibility to the public, as well as their client. By providing unbiased estimates for both analyses, Rick is upholding the reputation of the actuarial profession. AR

The NAIC Solvency Modernization Initiative

By Kris DeFrain

U.S. insurance regulators continue to improve upon the financial regulatory system. In the 1990s the U.S. created property and casualty risk-based regulatory capital (RBC) requirements. The RBC requirements established minimum capital requirements directly related to the risks undertaken by an insurance company, as opposed to only minimum dollar amounts of capital for any company, regardless of risk. This same risk-based philosophy is also at the core of a recent change adopted by the NAIC to evaluate prospective risks in a financial examination using an enhanced risk-focused surveillance process.

There are other U.S. financial regulatory changes on the horizon. In June 2008 the NAIC announced the Solvency Modernization Initiative. The initiative encompasses projects already underway at the NAIC and includes study of international solvency regulatory efforts such as Basel II for banking regulation and the European Union's proposed Solvency II for insurance regulation.

The initiative places emphasis on five key focus areas: capital requirements, international accounting, insurance valuation, reinsurance, and group solvency.

Capital Requirements—Regulators are considering whether the action and control levels in the RBC are established at appropriate levels, whether the RBC should be expanded beyond its current determination of a minimum capital requirement, and whether to require regulatory reporting of a company's economic capital level and information about the development of the company's target capital. In doing so, regulators could learn more about the risks faced by a company and how those risks interact and change.

Regulators are also discussing whether additional tools could be useful, such as the use of internal models within or as a replacement to RBC and the requirement of enterprise risk management (ERM) reporting. Partial internal modeling already exists for certain products in the life RBC formula and the use of internal modeling could be expanded to develop an explicit property/casualty catastrophe risk charge. In addition, there is consideration of the use of full internal modeling by a company, with some restrictions and deterministic elements, to replace the RBC calculation. For ERM, regulators might consider requiring insurers to perform their own risk and solvency assessment, including assessment of their risk management and evaluation of the potential impact of risks on their solvency position.

Reinsurance—In 2008, the NAIC adopted a Reinsurance Regulatory Modernization Framework Proposal that includes a design to create a modernized system for the regulation of reinsurance in the U.S. The NAIC has now begun its work to implement the framework. The first step is to draft proposed federal legislation to implement the legal framework. Next will be structural development of a Reinsurance Supervision Review Department that will assess non-U.S. regulatory regimes as well as facilitate the evaluation of states wishing to become home state or port of entry supervisors.

Group Solvency Issues—The Holding Company Model Act includes standards governing material transactions between an insurer and its affiliates and relating to changes in control of an insurer.

The NAIC is creating a Group Solvency Issues Working Group to study potential revisions to the Holding Company Model Act, the use and potential improvement of Supervisory Colleges with regulators from around the world, and group-wide supervision requirements, which may include group-wide capital requirements.

International Accounting—For insurance contract accounting, the U.S. Financial Accounting Standards Board (FASB) entered into a joint project with the International Accounting Standards Board (IASB). The two groups will work to establish International Financial Reporting Standards (IFRS), which then will become U.S. generally accepted accounting principles (GAAP). The insurance regulators' accounting system, statutory accounting, requires regulators to review any changes to GAAP accounting and determine what changes should be made to statutory accounting. U.S. regulators are already reviewing and commenting to the IASB on international accounting proposals.

Insurance Valuation—The valuation aspect of this initiative is mainly focused on life insurance reserves, given that property/casualty reserves are already principles-based. However, the life insurance principles-based reserving project could influence property/casualty regulation, especially relating to governance and actuarial requirements.

If international accounting is implemented, numerous valuation issues would arise for property/casualty insurance,

The NAIC Solvency, page 11

Stochastic Reserving Challenge at the CLRS

By Mark Shapland and Robert Bear

Did you miss your chance to participate in the stochastic reserving challenge? Everyone registered for the 2008 Casualty Loss Reserve Seminar in Washington, DC, was eligible to participate in the first stochastic reserving challenge. Perhaps because stochastic reserving is not yet commonplace, only 11 colleagues rose to the challenge. The results still proved quite useful, however.

The data set used in the challenge was realistic, but it was simulated data. Using the prototype CAS Loss Development Simulator (CASLDS) model created by the CAS Loss Simulation Model Working Party, we created parameters used to simulate individual claims that are then summarized into claim rectangles for 10 complete years. Using the parameters for individual claims, we then ran the model for 1,000 iterations so that we could determine the "actual" distribution of the claims being analyzed. While there were no exposure changes or inflationary trends in the simulations, we also randomly "adjusted" the earned premium around $3 million per quarter in order to create apparent fluctuations in the loss ratios.

Even though there were 1,000 data sets to choose from, we selected a data set for which the paid and incurred chain ladder projections were both close to the mean of the distribution, but the challenge was to estimate the standard error, 75th, 90th and 99th percentiles in addition to the mean. For the 11 sets of results, we did have two outliers (one person estimated ultimates and another estimated only IBNR, instead of the total unpaid) but most were close to the actual mean. Interestingly, all participants underestimated the standard error of the distribution, but the winners tended to get closest to the actual standard error.

The top three contestants were:

1st Place—Jeffory C. Schwandt, Regnier Consulting Group Inc.

2nd Place—Jessica (Weng Kah) Leong, Milliman, Inc.

3rd Place—Spencer M. Gluck, Guy Carpenter & Co. LLC

The winners received nice certificates to memorialize their "victory" and gift certificates for $100, $50, and $25, respectively. We would also like to thank Ian Asplund, David Clark, Dean Dorman, Paul Herzog, Glenn Hiltpold, Glenn Meyers, Alan Putney, and Richard Quitano, who all deserve an honorable mention for participating.

While the simulation model provided the basis for this challenge, it is our goal to use it for future research regarding the strengths and weaknesses of different stochastic models. If you would like more information on the challenge, you can visit the CAS Web Site at www.casact.org/clrs/index.cfm?fa=challenge. The CASLDS model can be downloaded at www.casact.org/volunteer/committees/index.cfm?fa=lsmwp. The working party is in the process of working with a consultant to create a new loss simulation model in an open-source format that should improve our ability to create simulated data sets, conduct research, and improve the model. AR

The NAIC Solvency, From page 10

as well. While the U.S. reports the expected ultimate value of its loss reserves (somewhat equivalent to discounted reserves with implicit risk margins equal to the discount), international accounting utilizes discounted reserves and explicit risk margins.

Now appears to be the time for change, especially as regulators in the U.S. and around the world learn lessons from the current financial crisis. Amidst other countries who are improving their systems of insurance regulation, the U.S. will study and implement change within the U.S. Solvency Modernization Initiative.

The initiative is being led by Commissioner Alfred Gross, Virginia Bureau of Insurance, as chair of the NAIC's Solvency Modernization Initiative Task Force. Additional information can be found on the NAIC Web Site at www.naic.org.

Kris DeFrain, FCAS, MAAA, CPCU, is the Director of Actuarial and Statistical Services for the National Association of Insurance Commissioners. Her article reflects her own personal opinions and do not necessarily reflect the views of the National Association of Insurance Commissioners or its members. AR

Pure Premium Regression with the Tweedie Model

Fitting regression models to insurance loss data has always been problematic. The problem is particularly acute for data from individual insurance policies where most of the losses are zero, and for those policies with a positive loss, the losses are highly skewed. Most of the traditional regression models do not deal with a mixture of discrete losses of zero and continuous positive losses. One way of dealing with this problem is to fit separate models to the frequency and severity, and estimate the pure premium by multiplying the result of each model. One can take issue with assumption of "separate" models.

Gordon Smyth and Bent Jørgensen provide an interesting alternative in their paper "Fitting Tweedie's Compound Poisson Model to Insurance Claims Data," which appeared in the 2002 *ASTIN Bulletin*. They first characterize the Tweedie model as a compound Poisson distribution. This distribution can be viewed as a computer simulation.

1. Select a random claim count, N, from a Poisson distribution with mean λ.
2. If $N > 0$, for $i = 1,..,N$, select a random claim size, Z_i, from a gamma distribution with scale parameter, $\theta > 0$ and shape parameter, $\alpha > 0$
3. If $N > 0$, set the loss, $X = \Sigma Z_i$. If $N = 0$, set $X = 0$.

The usual parameterization of the Tweedie distribution is given by μ, ϕ and p, where the expected value of X is equal to μ and the variance of X is equal to $\mu \cdot \phi^p$. Smyth and Jørgensen translate the parameters of the compound Poisson distribution into the usual Tweedie parameters as follows:

$$\mu = \lambda \cdot \alpha \cdot \theta, \quad p = \frac{\alpha + 2}{\alpha + 1} \text{ and } \phi = \frac{\lambda^{1-p} \cdot (\alpha \cdot \theta)^{2-p}}{2 - p}. \quad (1)$$

One can see from the middle equation that p will be between 1 and 2. It is interesting to note that p depends only on the shape parameter, α, of the claim severity distribution. Also, since the coefficient of variation for a gamma distribution is equal to $1/\sqrt{\alpha}$, a claim severity distribution with losses clustered close to its mean value will have a high value of α, and hence p should be close to one. In my experience I typically find that the coefficient of variation for claim severity is greater than one, so we should expect p to be greater than 1.5.

Figure 1 illustrates the connection between the compound Poisson and the Tweedie distributions. It shows a histogram of a 10,000 simulated losses and the density function of the corresponding Tweedie with a typical α. Figure 2 shows the results of a similar exercise with a large α. Here we see that the coefficient of variation for the claim severity distribution is small and the losses cluster around integral multiples of ϕ corresponding to claim counts of 0, 1, 2, … If we let α continue to increase indefinitely, p approaches 1 and we get an overdispersed Poisson distribution where the only loss amounts with positive probability are integral multiples of ϕ.

Let's now consider the Tweedie distribution in the context of regression modeling. As an illustration, I constructed a simple example with 50,000 observations where the frequency and severity means depend upon two independent variables, x_1 and x_2. In constructing this example, I was thinking of my real-world experience with auto insurance where λ is small (around 0.05) and thus most policies have no losses. With the intent of fitting a GLM model with a log link, I simulated the losses from a compound Poisson distribution with the following parameters.

$$\begin{aligned} \log(\lambda) &= \log(0.05) + x_1 + 0.25 \cdot x_2, \\ \log(\theta) &= \log(10) + 0.25 \cdot x_1 + x_2, \text{ and } \alpha = 0.5 \end{aligned} \quad (2)$$

Putting these equations together we have:

$$\log(\mu) = \log(\alpha) + \log(\lambda) + \log(\theta) = a_0 + a_1 \cdot x_1 + a_2 \cdot x_2 \quad (3)$$

with $$\begin{aligned} a_0 &= \log(0.5) + \log(0.05) + \log(10) = -1.386, \\ a_1 &= 1.25, \text{ and } a_2 = 1.25. \end{aligned}$$

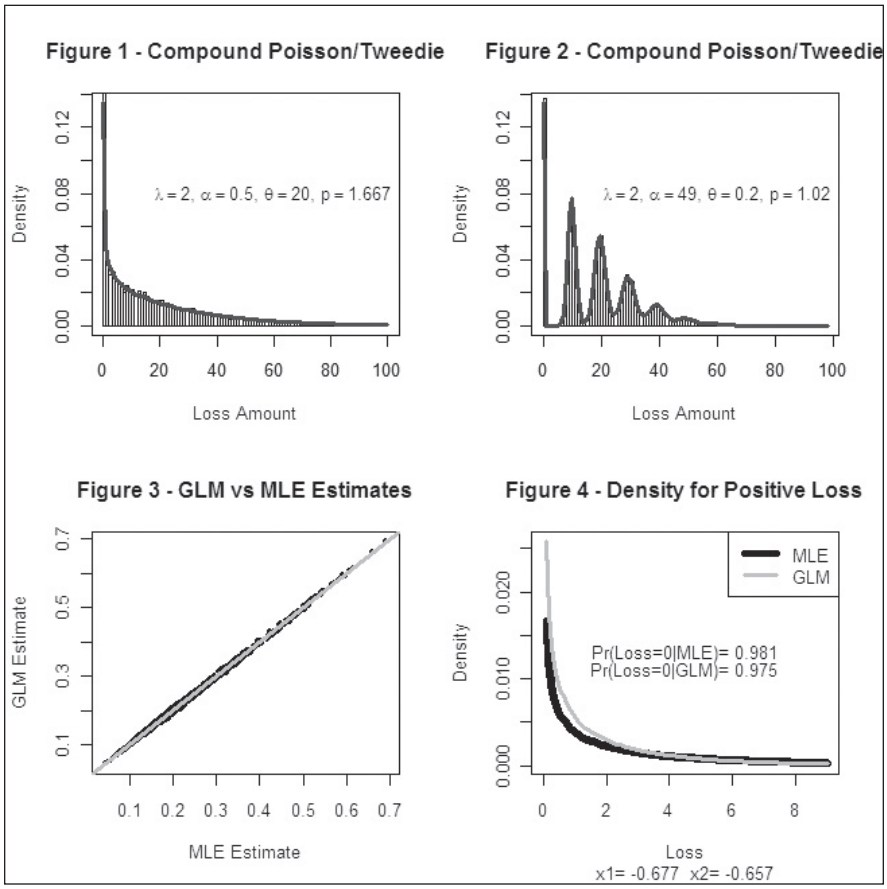
I then proceeded to fit some models to the simulated data observing only the simulated losses and corresponding values of x_1 and x_2.

First I estimated the p parameter for the Tweedie model. Since p depends only on the shape parameter of the gamma distribution, it can be estimated by fitting a GLM with a gamma distribution and a log link to the positive losses as follows[1].

$$Var[Loss] = \frac{\mu^2}{\alpha} = \phi \cdot \mu^2 \Rightarrow \alpha = 1/\phi \Rightarrow p = \frac{2 + 1/\phi}{1 + 1/\phi} \quad (4)$$

The GLM fit to the simulated data with positive losses gave the value, $\phi = 2.135$. Equation 4 then gave an estimate of $p = 1.681$, which is close to the underlying model's parameter value of 1.667.

[1] To be technically correct, one should fit the model to individual claims. But since only 2% of the losses involved multiple claims it is a good approximation to fit the model total losses.



Next I fit a model of the form $\log(\mu) = a_0 + a_1 \cdot x_1 + a_2 \cdot x_2$ with a Tweedie GLM and obtained the following results.

Coefficients	Estimate	Std. Error Error	*t* value	Pr(>|*t*|)
Intercept	-1.41908	0.03786	-37.486	<2*e*-16
x_1	1.21028	0.12639	9.576	<2*e*-16
x_2	1.39392	0.12705	10.972	<2*e*-16

Note that these estimates are well within two standard errors of the corresponding parameter values in the underlying model.

A problem with using a GLM to fit a compound Poisson model is that the GLM assumes that the dispersion parameter, ϕ, is constant. But if we believe our data has a compound Poisson distribution, according to Equation (1), ϕ varies with λ and θ. Smyth and Jørgensen devote a fair amount of efforts to addressing this by using a "Double GLM." I elected to take the conceptually simpler, but more computationally intense, approach of brute force maximum likelihood.[2] I fit a model in the form of Equation (2), fitting the equations for λ and θ simultaneously, with the following results.

[2] For more information on this see my August 2008 "Brainstorms" column in the *Actuarial Review*.

Coefficients	log(λ)	log(θ)	Combined (with log(α))
Intercept	-3.03364	2.38269	-1.40954
x_1	0.34877	0.79284	1.14161
x_2	1.04565	0.38659	1.43224

To compare the results of the two models, I plotted the predictions of μ for a sample of 500 points in Figure 3, which shows close agreement between the two models. In Figure 4, I selected a random observation and plotted the interesting part of the Tweedie density functions implied by the μ, p and ϕ parameters. The difference in densities is small, but noticeable.

Was I lucky to get such close agreement? I think not. Heuristically, my reasoning is that the ϕ parameter is not in the expression for μ, but it is in the expression for the variance, $\phi \cdot \mu^p$. Getting the variance right increases the efficiency of the estimator but has no direct effect on the estimate itself. When we have a large number of observations, in practice often running into the millions, efficiency is not terribly important. So for most applications I feel comfortable using estimates produced using a constant dispersion parameter that can be estimated with GLM software. I would not be comfortable with this practice if μ spanned a wide range.

The R code that I used to produce the figures accompanies the Web version of this article.

Recognize Outstanding CAS Volunteers

Have you recently worked with a CAS volunteer who performed far beyond what was expected of him or her? Do you know someone who has made significant volunteer contributions to the actuarial profession over the course of a career? Of course you do, because one of the core CAS values is volunteerism, and noteworthy CAS volunteers abound. The CAS wants to recognize meaningful volunteer contributions, and we need your help. Nominate a worthy CAS volunteer for the 2009 Above & Beyond Achievement Award (ABAA) or the 2009 Matthew Rodermund Service Award.

The ABAA is made annually to CAS members who have made a recent contribution that is clearly outside of expected volunteer responsibilities and duties. In addition to participation on CAS Committees and Task Forces, consideration is given to contributions to the committees of other actuarial organizations (such as the American Academy of Actuaries) that benefit CAS members.

CAS members serving on committees, especially committee chairs, are encouraged to consider the especially hardworking members of their committees for nomination. Any CAS member who is not a current board member or officer is eligible to receive this award. Keep in mind that an extraordinary effort can be shown in an assignment of limited scope, as well as on a larger task.

While the ABAA recognizes short-term contributions, the Matthew Rodermund Service Award is intended to recognize CAS members who have made significant volunteer contributions to the actuarial profession over the course of a career. The award was established in 1990 in honor of Matt Rodermund's years of volunteer service to the CAS. The funding for this award is provided by The Munich American Reinsurance Company and the amount is currently $1,000.

Volunteer contributions could include committee involvement, participation in CAS meetings and seminars, volunteer efforts for Regional Affiliates or special interest sections, and involvement with other actuarial organizations. Service as an elected CAS officer or director and authorship of papers published by the CAS are not considered. Past presidents are not eligible.

Nominations are due by June 30 for both awards and the winners will be announced at the 2009 CAS Annual Meeting in Boston. AR

ERM Designation, From page 2

becoming ERM experts. A robust ERM credential leveraging expertise in traditional actuarial areas is consistent with the Centennial Goal. Additionally, the CAS has specified that an ERM designation is being pursued for its current and future member actuaries. The successful implementation of a global actuarial ERM designation would be a big step toward the fulfilling the CAS Centennial Goal.

Beyond the Centennial Goal, the current financial crisis illustrates the growing need for ERM and professionals trained to evaluate risk. As markets and risks become increasingly interconnected, marketplace ripples in one area spill into others, sometimes with devastating effects. As risks cascade, such as with the credit and equity markets, the need to understand the risks' interrelated effects—and in turn the impacts on individual companies—becomes increasingly critical. Companies need individuals who understand and are able to explain the underlying dynamics, and then guide their organizations through these turbulent waters.

Being trained to evaluate risk, actuaries can assume a significant leadership role in the ERM arena. The processes of modeling and evaluating risks, which are ingrained in their training and daily work, provides a significant theoretical and practical advantage over others. In addition, actuaries bring to the table the professional structure to help achieve the required quality of work. When actuarial standards of practice that establish minimum standards and a disciplinary process that actively enforces those standards are coupled with continuing education requirements to ensure the latest methodologies are being practiced, the end result is a powerful synergy that should provide confidence that the highest quality work product is being provided.

However, actuarial representation in the area of ERM has lagged behind other organizations. Some believe that actuaries have not promoted themselves as aggressively as those in other organizations. Other organizations have created certifications that help separate their members in the ERM space and give them an entrée into the risk-based career tracks that have begun to emerge with the promulgation of chief risk officers (CROs) across the marketplace. As these new risk designations emerge, the demands of the modern job market require evidence of training in a broad spectrum of risk evaluation and risk management issues.

Casualty actuaries can bring immense value to the ERM space. The CAS now has the opportunity to create its own foothold in the ERM landscape. By offering its members certification in ERM, the CAS would provide an opportunity to compete in this marketplace, opening the door to the chief risk officer and other roles in insurance and beyond. AR

Come to Chicago for CLRS!

Join us in Chicago on September 14-15 for the 2009 Casualty Loss Reserve Seminar (CLRS). The CLRS offers actuaries, analysts, accountants, regulators, and others an engaging opportunity to learn more about loss reserves and estimating unpaid liabilities. The 2009 CLRS will be held at the Chicago Marriott Magnificent Mile Hotel in downtown Chicago.

This year's theme is "Prepared for the Challenge of Increased Scrutiny and Changing Risks." The meeting is designed to help demonstrate actuaries' unique ability to understand, evaluate, and manage risk within the context of the current financial crisis. With an emphasis on a "hands-on" approach, this year's CLRS features practical sessions on both estimating reserve ranges and evaluating the accuracy and effectiveness of various estimation techniques. The 2009 CLRS will give you the tools you need to meet new challenges in the current economy.

Seminar sessions will cover reinsurance reserving, financial reporting, variability and ranges, international issues, catastrophes and mass torts, professional development, emerging issues, and areas specific to individual lines of business. Attendees will be exposed to both basic and advanced topics in finance and financial risk management, including applications for pricing and analyzing property/casualty insurance.

The CLRS is also an occasion to learn about the activities of the sponsoring organizations—the CAS, the Conference of Consulting Actuaries, and the American Academy of Actuaries—and what they are doing to improve the actuarial work product and the Statement of Actuarial Opinion. CLRS attendees are invited to share their own views and concerns on actuarial communication and the reserving process, and participate in a number of interactive sessions.

This meeting is a "must attend" for those looking to learn more about loss reserves and estimating unpaid liabilities. For more information visit the CAS Web Site. AR

Three Summer Limited Attendance Seminars Offered

Rounding out the summer season, the CAS will be hosting three different limited attendance seminars (LAS) in August: "Predictive Modeling," "Testing Loss Reserve Assumptions," and "Reserve Variability." All the seminars will be conveniently located in Chicago, IL, and are guaranteed to give registrants an in-depth look at their respective topics.

With a focus on practical issues involved in creating predictive algorithmic solutions, "Predictive Modeling" will train attendees in areas ranging from data scrubbing to interpreting predictive algorithmic solutions. This two-day session will be held August 12-13.

"Testing Loss Reserve Assumptions" is for actuaries new to statistical/probabilistic reserving and those wanting to look at traditional reserving techniques in a new light. While some review of the theoretical underpinnings will be included, this LAS will emphasize practical aspects of working with loss reserve triangles and using stochastic models. The seminar will be held on August 24.

Addressing an increasingly important skill for actuaries, "Reserve Variability" will help attendees use the results from loss reserve models and communicate them effectively. This LAS will emphasize the process of moving from deterministic methods for estimating a single point to using stochastic models for estimating distribution. Held on August 25-27, this LAS is conveniently back-to-back with the "Testing Loss Reserve Assumptions" LAS.

Because seminar attendance is limited, early registration is recommended. For more information, visit www.casact.org. AR

Underwriting Cycle Seminar Set for Fall

Join us in October for this exciting new Special Interest Seminar! "In Focus: The Underwriting Cycle Seminar" will consider the effects of underwriting cycles on pricing and reserving analysis. A wide range of topics including cycle management, rate adequacy and monitoring, and balance sheet integrity will be covered.

Held October 5-6, the seminar will be at the Westin Alexandria located in Alexandria, VA, in the Washington DC metropolitan area. Visit the CAS Web Site for more information on this new seminar. AR

MARTY ADLER

Diving for Lobsters

After relocating to Bermuda, Barry Zurbuchen learned of an exciting local pastime—diving for lobsters. It sounded interesting and was certainly not something he could do in Chicago. Getting started was not easy. On numerous occasions, he tried to get Bermudians to tell him some of the secrets or take him out diving with them but was never able to get them to open up. He had to learn everything through trial and error.

The Bermuda Spiny Lobster has no claws and is like an overgrown crayfish. It feeds at night and hides in caves under the coral reef during the day, so it is almost never out in the open where it can easily be spotted. In order to catch a lobster, a diver uses a pole with a noose at the end. The object is to slip the noose around the tail and pull it tight. Scuba equipment is not permitted, only snorkel gear, so the length of a dive is limited. One also needs to obtain a license each year. Typically, Bermudians dive in waters that are 15 to 30 feet deep. Some divers will go even deeper, but 30 feet is about Barry's personal limit. He estimates that his dives are about 25-45 seconds long—10-15 seconds to get to the bottom, 10-20 seconds to look for and catch the lobster and 5-10 seconds to get back to the surface. Although he can hold his breath for two minutes if he remains still, diving uses a lot of oxygen.

Bermuda is surrounded by shallow waters that extend for miles beyond the coast. These shallow waters are peppered with coral heads. Barry has stored in his GPS the location of many coral heads that have produced lobsters. In a typical day, he and a friend (he learned quickly that it is better and safer not to go alone) might explore one uncharted coral head along with two or three of their tried-and-true locations. The first step is to find the lobsters by looking inside caves. Often he will see a lobster so far inside a narrow cave that it cannot be caught. This can be very frustrating. The lobsters do not always react the same way upon seeing him. Occasionally, they will actually seem curious and move slowly toward him as if to investigate. This makes them easier to catch. More typically, a lobster backs away as a diver approaches. In some caves, they will have no safe hiding spot, and it is only a matter of time before they are caught, though it might take several dives. However, they normally have an escape route in mind, and the diver will only have one chance to catch the lobster. This is especially true of larger lobsters, who have undoubtedly seen this whole routine before. The lobster is almost always facing the outside of the cave, and the goal is to get the noose behind him without touching his sensitive feeler. Touching it will normally yield a quick retreat on the part of the lobster, which swims quickly by flapping its powerful tail.

The first lobster Barry caught was actually a team effort. The group was all novices. None had ever caught a lobster. Luckily, they found one at the first reef they looked at and the lobster had no good hiding spot—they just didn't know how to catch it. They chased it back and forth from one cave to another for almost two hours. Eventually Barry noosed the lobster, but as he came out of the cave, he lost hold of his noose. Barry rose to the surface and shouted to his friend to go get the lobster, but his friend was already underwater. His friend saw the noose floating in the water and, being a nice guy, decided to get it and bring it back to Barry. The friend was quite surprised when he noticed the lobster on the other end of the noose!

While lobster-hunting is very challenging and the scenery quite beautiful, however, there is some degree of danger involved. Many colorful reef fish and other creatures inhabit the water. Barry has seen sea turtles several times. He once saw a green moray eel, an octopus, and a lionfish, an extremely venomous fish that has become somewhat of a nuisance in Bermuda's waters. He once came too close to one inside a cave he had swum into searching for lobsters.

The greatest danger, however, may be getting stuck inside a cave. There is one cave in particular where Barry has often seen, but

Barry Zurbuchen and the catch of the day.

rarely caught, large lobsters. He nicknamed it the Moby-Dick reef because, for several weeks in a row, he saw the same large lobster living there but was never successful in catching it. The cave's layout is such that you need to swim through a small opening, and then the cave opens to the left, which is where the great beast would hang out. The lobster was smart though and would always back into a small nook—uncatchable—before Barry could get his noose around it. On one occasion, Barry tried to back out of the cave and could not manage to get his feet through the opening. In the process, he had churned up the sandy bottom so much that he could no longer see inside the cave. In desperation, he managed to turn around in the small cave and was able to feel for the opening with his hands. That was scary! Now he won't go into that cave unless his friend waits outside and watches.

For the last month, Barry and his fellow lobster hunters have been seeking a lobster they call "Osama Bin Lobster." It is very large and resides in a spacious cave with sentries (smaller lobsters) near the cave opening. So far, it has eluded capture on a number of occasions.

Barry never saw a lobster the first year he had a license. At the time, he did not own a powerboat and tried going out in his kayak. One day was rather windy, but as he had done a lot of kayaking, that did not faze him. As he shoved off, a woman walking on the beach asked, prophetically as it turned out, if he was really planning to go kayaking in such weather. He shoved off and was instantly capsized by a breaking wave. Still unfazed, he emptied the water out of the kayak and made another go at it. This time, he made it over the initial breaking waves. He kayaked about a mile out to a promising-looking reef. A wave broke over the reef and capsized him once again. However, now out at sea, recovering was not so easy. He had neglected to bring a bilge pump and had no way to get the water out of the kayak. He had to swim back to shore pushing a kayak full of water. That took about an hour, and he was exhausted. To add insult to injury, the police approached and questioned him when he came ashore, ultimately letting him go. He thinks they suspected that he had gone out to receive a drug drop.

Despite these early setbacks, he stuck with it and is now so successful that his wife, who enjoys lobster, begs him not to bring home any more. He has started giving most of them away, but there are still several in his freezer.

Barry Zurbuchen is senior vice president and chief pricing actuary of Allied World Assurance Company in Pembroke, Bermuda. A video of lobster diving in Bermuda may be seen on the link www.youtube.com/watch?v=XjYk-lNNTOk.

25 Years Ago in the *Actuarial Review*

It's a Puzzlement

By Walter Wright

Sometimes, when reviewing past issues of The Actuarial Review to find items that would be interesting for this column, the pickings are slim. But the puzzle column invariably is a good candidate, offering timeless puzzles that are still challenging. Here's Charlie Hewitt's contribution to Wayne H. Fisher's column from 25 years ago. (Note: Although I solved it, I couldn't do so within Charlie's suggested time frame. Maybe I could have 25 years ago. Maybe you can today.)

The Playoffs

This issue's puzzlement is a quickie submitted by Charlie Hewitt. If this were Part 2, you'd have to complete it in under 5 minutes. Any takers?

Reggie Bayes, a rabid sports fan, has to leave the United States on the first day of a championship series. About to board a plane for an actuarial assignment in Bora Bora, Reggie learns that Team A has just won the first game of the "best four-out-of-seven" event.

Upon arrival in Bora Bora, Reggie is disheartened to find that there is no source of U.S. sports news. However, on the last day of Reggie's assignment a "ham" radio operator picks up a garbled announcement to the effect that the series ended with the sixth game; unfortunately, the name of the winning team is lost in the transmission.

If Reggie calculates that Team A and Team B were equally likely to win in a six-game series (given that Team A won the first game), what relative probabilities does Reggie assign to Team A and Team B for winning any one game? Express your answer analytically, i.e., not as a decimal.

CAS to Pursue an ERM Designation

The CAS Board of Directors decided at its March 19-20, 2009, meeting that the CAS would pursue an Enterprise Risk Management (ERM) designation, in accordance with the recommendation of the CAS Enterprise Risk Management Designation Task Force (Task Force).

The Task Force was formed in April 2008 and charged with monitoring developments on an ERM designation, exploring issues and opportunities for the CAS, and recommending a course of action. The CAS has been engaged with a number of actuarial organizations internationally to explore the possibility of creating a global ERM designation. In addition, the CAS and the Society of Actuaries have been discussing a possible expansion of the Chartered Enterprise Risk Analyst (CERA) designation for CAS members.

Consistent with the task force recommendations, the board authorized CAS leadership to continue to pursue multiple possible courses of action in developing an ERM designation for the CAS, including:

- Continuing discussions with international actuarial associations for the development of a global ERM designation, temporarily referred to as "XRX."
- Continuing discussions with the SOA on the appropriateness of CERA as the ERM designation.
- Pursuing efforts to reconcile XRX and CERA such that there would be a single ERM designation for the CAS, SOA, and other actuarial associations in North America and possibly globally.

The board felt that an ERM credential supported by several actuarial associations would be preferable, since the designation likely would carry greater weight in the marketplace and such a partnership would strengthen ties between the actuarial organizations. If the efforts outlined above were to falter, however, the CAS could pursue its own independent ERM designation.

Many details remain unresolved as the task force continues its discussions with other actuarial organizations and develops detailed implementation plans for each of the alternatives, for future board consideration. The board expects to make a decision on the CAS course of action by the end of 2009. AR

ERM Call for Papers Award Winners Announced

Three awards to recognize outstanding research papers on ERM topics were announced at the 2009 ERM Symposium, which was held April 29-May 1, 2009, in Chicago. Authors submitted papers that covered theoretical and practical topics, in response to the 2009 ERM Call for Papers.

The Actuarial Foundation's ERM Research Excellence Award for Best Overall Paper, along with a $5,000 monetary prize, was awarded to B. John Manistre for his paper, "A Risk Management Tool for Long Liabilities: The Static Control Model."

PRMIA's Award for New Frontiers in Risk Management was given to Dan Rosen and David Saunders for their paper "Risk Factor Contributions in Portfolio Credit Risk Models." The award has a $5,000 monetary prize.

David Ingram received the Joint CAS/CIA/SOA Risk Management Section Award for Practical Risk Management Applications, along with a monetary prize of $5,000, for his paper "Risk and Light."

These three papers, along with five others, were presented by the authors during sessions at the 2009 ERM Symposium. All of the research papers submitted to the 2009 ERM Call Paper Program are available for download from the ERM Symposium Web Site (http://www.ermsymposium.org).

The 2010 ERM Call for Papers will be announced in July. Questions regarding the ERM Call Paper Program should be directed to Steven Siegel, Research Actuary, Society of Actuaries, at ssiegel@soa.org. AR

Liars, Truth Tellers, and Random Answers

This is another puzzle from Peter Winkler. You are at a fork in the road, and you want to know which of two roads leads to the village. There are three natives present, one who always tells the truth, one who always lies, and one who answers at random, but you don't know who is who. How can you ask two yes-or-no questions, with each question addressed to one native, and determine which road leads to the village? It's not fair to ask, ``Did you hear they are giving away free beer in the village?'' and follow them to the village.

Cake Cutting

The problem involved cutting a white cake with chocolate frosting and flipping the pieces over. You fix an angle α, successively make cuts of that angle, flip each piece cut over in place, and cut the next piece adjacent to the one you just flipped. We asked how many cuts and flips it took before the top of the cake was all chocolate again if α were 181 degrees, and if α were one radian ($180/\pi$ degrees).

Dave Oakden said he found the solution quite surprising (as did I!) and wrote:

"The key to the solution is that when you go around the cake for the second time the cut lines from your first time around are flipped and become the cut lines for the third time around. In general if the angle A is such that $n \cdot A$ is less than 360 degrees and $(n+1) \cdot A$ is greater than 360 degrees then the cake can be divided into $2 \cdot n + 1$ pieces that change position but remain in the same order. Each cut consists of flipping and reversing two adjacent pieces. It is fairly easy to demonstrate that after $2 \cdot n \cdot (n + 1)$ cuts you will be back to your starting point.

"To answer the questions you posed:

- For an angle of 181 degrees, $n = 1$ and four cuts will return the cake to its original chocolate up position.
- For an angle of one radian, $n = 6$ and it will take 84 cuts.

Frank Chang submitted a solution to the puzzlement for α equal to 181 degrees, and David Uhland submitted solutions for both angles.

Additional Solvers for a Previous Puzzlement

Charles Stimler, Dave Westerberg, and Lili Xu solved the puzzle from last November.

University of Wisconsin-Madison to Host '09 Actuarial Research Conference

Academics and practitioners will gather at the 44th Actuarial Research Conference (ARC) on July 30-August 1, 2009 to discuss actuarial problems and solutions and other general issues regarding actuarial education.

The University of Wisconsin in Madison is the host of this year's conference, which is cosponsored by the CAS and other actuarial organizations in North America.

The ARC program has historically consisted primarily of contributed paper talks; anyone interested in making a presentation should send their title and abstract to Yunjie (Winnie) Sun at ysun@bus.wisc.edu.

Details on the conference can be found on the University of Wisconsin Web Site at www.bus.wisc.edu/arc2009/about.asp.

June 29-30, 2009
Limited Attendance Seminar on Loss Distributions
The Millenium Knickerbocker Hotel
Chicago, Illinois

July 30-August 1, 2009
44th Actuarial Research Conference
University of Wisconsin-Madison
Madison, WI

August 10-14, 2009
22th International Summer School 2009 of the Swiss Assocation of Actuaries on Monte Carlo Methods and Applications in Finance and Insurance Models
University of Lausanne
Lausanne, Switzerland

August 12-13, 2009
Predictive Modeling Limited Attendance Seminar (LAS)
The Deloitte Building
Chicago, IL

August 24, 2009
Testing Loss Reserve Assumptions LAS
The Allerton Hotel
Chicago, IL

August 25-27, 2009
Reserve Variability LAS
The Allerton Hotel
Chicago, IL

September 14-15, 2009
Casualty Loss Reserve Seminar (CLRS)
Chicago Marriott Magnificent Mile
Chicago, Illinois

October 5-6, 2009
In Focus: The Underwriting Cycle Seminar
The Westin Alexandria
Alexandria, VA

November 15-18, 2009
CAS Annual Meeting
The Westin Boston Waterfront
Boston, MA

In Memoriam

Joseph V. Naffziger
(FCAS 1968) 1943-2009

The CAS Discipline Committee, empowered by the CAS Board of Directors, upon recommendation from the Actuarial Board for Counseling and Discipline, has expelled Charles M. Lederman from the Casualty Actuarial Society.

FSC LOGO

The Actuarial Review always welcomes letters and story ideas from our readers. Please specify what department you intend for your item—letters to the editor, news, puzzlement solutions, etc.

Send your comments and suggestions to:
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