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PRESIDENTIAL ADDRESS

The once & future actuary

by David M. Holland
Address at the Annual Meeting
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In his 1949 address as the first president of the Society of Actuaries, Edmund M. McConney asked: "What are actuaries?" We are still struggling with this question today. Perhaps this is the sign of an identity crisis.

Maybe it's a response to changing times. In keeping with the retrospective mentality ascribed to actuaries, to help figure out where we're going, we should first know where we've come from. Accordingly, let's focus on the "Once and Future Actuary": the one who was, the one who is, and the one who is to come.

The one who was ...

People have been interested in actuarial concepts for ages. Moses said in Psalms 90:10 that the length of our days is 70 years or 80 if we have the strength. In Ecclesiastes 9:11, Solomon observed that our fate is a function of "time and chance." This was long before Benjamin Gompertz stated in "On the value of Life Contingencies, &c." in 1825:

> It is possible that death may be the consequence of two generally coexisting causes; the one chance, without previous disposition to death or deterioration; the other, a deterioration, or an increased inability to withstand destruction.

The concepts of risk transfer and insurance predate actuaries. The code of Hammurabi, circa 1750 B.C., discusses sharing the risk of robbery among businessmen. In the times of the Roman Caesars, there were death benefit funds (*Collegia funeratica*). Ulpian's Table, dating from around 220 A.D., was intended for valuing annuities relating to legacies.

In the 1530s, churches in England started collecting records of deaths as an early warning system for outbreaks of the bubonic plague. John Graunt, who was a merchant of buttons and needles, became fascinated with what could be learned by studying these records and in 1662 wrote *Natural and Political Observations Made upon the Bills of Mortality*. This work has been called the first example of the analysis of statistical data in modern times. It is noteworthy for actuaries, because it set the stage for the development of a mathematical model for mortality.

In 1693, Edmund Halley of comet fame published mortality tables based on the more complete information from records of the city of Breslau. *Actuarial Mathematics* (Society of Actuaries, 1986) says that some scholars date the beginning of actuarial science from this time.

While statistics were being collected and analyzed in Great Britain, much early correspondence on the origins of probability theory took place in Europe. In the 1600s, correspondence regarding questions on gambling between Pascal and Fermat led to the foundation of probability theory. Haberman and Sibbett's 10-volume *History of Actuarial Science* (William Pickering, London, 1995) contains copies of seminal papers on the founding of actuarial science. In discussing the scientific origins, they say:

> Some of the pioneers in the 1700s and 1800s were eminent scientists and mathematicians who became

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Three "generations" at the Presidential Luncheon take an international view: (L-R) 1996-97 SOA President Holland; Duncan Ferguson, president of the United Kingdom's Institute of Actuaries; 1997-98 SOA President Anna M. Rappaport; and SOA President-Elect Howard J. Bolnick, SOA president in 1998-99.

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interested in actuarial problems. Thus, we find Leonhard Euler, James and Daniel Bernoulli, Carl Friedrich Gauss, Abraham de Moivre, Benjamin Gompertz becoming involved in the science and making significant contributions.

The practical and theoretical lines merged in England in 1762 with James Dodson and the founding of the Society for Equitable Assurances on Lives and Survivorship. Dodson showed how premiums and reserves could be set up for permanent insurance, and the Equitable is said to be the first life insurance company founded on scientific principles.

Following Dodson's premature death, Edward Rowe Mores took over as the promoter of the Equitable. Mores picked the term "actuary" to refer to its chief administrative officer. The term had been used for clerks who recorded acts of the court, but it actually dates back to the time of Julius Caesar when the actuarius recorded the acts of the Roman Senate. As Robert Mitchell said in *From Actuarius to Actuary* (SOA, 1974):

> Whatever qualifications Mores may have had in mind in choosing the designation, it is evident that mathematical ability was not one of them.

In fact, none of the Equitable's first four actuaries had the technical ability to function as actuaries in today's understanding of the designation; when the directors who made all the major decisions thought computations were needed, they had an outside mathematician make them.

Dr. Richard Price was the Equitable's consultant, and some consider his *Observations on Reversionary Payments* the first major work on actuarial science in general. Price managed to get a job for his nephew, William Morgan, as assistant actuary. Morgan eventually became the chief administrative officer with the title "actuary." It is said Morgan disliked the title of actuary. Nevertheless, his skills and mathematical abilities led to the title of actuary having its present-day meaning.

With this evolution of the modern actuary, is it any wonder that the general public is confused about this obscure but influential profession? At times, even actuaries have tunnel vision about what is a truly broad and multifaceted profession.

The one who is ...

Today is a great day to be an actuary. Actuaries are respected and rewarded for their intellectual capacity and technical ability. Over the past several years, *The Jobs Rated Almanac* has twice ranked actuary the number-one profession.

You should also be proud to be a member of the Society of Actuaries, the largest actuarial organization in the world.

You have an outstanding staff at the SOA, and I very much want to say what a pleasure it has been working with them over the past year.

Implementing the SOA's mission

The actuary of today is often defined in terms of practice areas: investment, pensions, life, and health. In fact, the SOA organizational structure focuses on staff support by practice areas.

The SOA mission statement, however, states:

> The Society of Actuaries is an educational, research, and professional organization dedicated to serving the public and Society members. Its mission is to advance actuarial knowledge and to enhance the ability of actuaries to provide expert advice and relevant solutions for financial, business, and societal problems involving uncertain future events.

Note that the SOA mission is defined in terms of actuaries; the SOA seeks to advance actuarial knowledge and enhance the abilities of actuaries regardless of current or future practice area.

As a professional organization, the SOA also has a responsibility for the conduct of its members. We have adopted a Code of Professional Conduct and By-Laws dealing with discipline. The SOA aspires to meet the following definition of "profession":

> A calling requiring specialized knowledge and often long and intensive preparation including instruction in skills and methods as well as in the scientific, historical, or scholarly principles underlying such skills and methods, maintaining by force of organization or concerted opinion high standards of achievement and conduct, and committing its members to continued study and

John Holland performs Prokofiev's Violin Concerto no. 2 in G Minor at the Board of Governors Dinner. The son of President Holland played before the distinguished gathering at Washington's restored Union Station on Oct. 25.

to a kind of work which has for its prime purpose the rendering of a public service.

Today's changing environment

Even though today's actuarial profession is vigorous, "the times they are a-changing," to quote the singer/poet, Bob Dylan.

- Twenty years ago, the top two sources of income for life insurance companies were life and health premiums. Today, the leading sources of income are annuity considerations and investment income.
- Bancassurance is well established outside the United States. Banks are already in the insurance business in Canada and are pushing hard for insurance powers in the United States. Last year witnessed a record year number of mergers and acquisitions in the life insurance industry.
- Insurance companies in recent years have suffered a one-two punch from well-publicized company failures and market conduct problems.
- Managed care has resulted in a revolution in health care and health care financing.
- Pension legislation is more complex, and government policy is still favoring defined contribution plans over defined benefit plans.

Such changes must be frightening indeed, if the future is a simple extrapolation of the past. Thus, the SOA faces the same challenges as modern management: it must meet the needs of current members and their employers while simultaneously preparing to meet the changing needs of future actuaries. And it must have a vision.

The one who is to come ...

Proverbs 29:18 says, "Where there is no vision, the people perish ... ." The vision of the SOA is:

> ... for actuaries to be recognized as the leading professionals in the modeling and management of financial risk and contingent events.

Note that the SOA vision is not expressed in terms of practice areas. An actuary — one who is grounded in the principles of actuarial science

David and Faye Holland say farewell and thanks as Holland ends his presidency at the Presidential Luncheon on Oct. 28.

— should be able to master the time-, nation-, and practice-specific materials that comprise the science of compliance.

In focusing on the actuary of the future, we must think of actuaries as the heirs of Morgan, Price, Dodson, Halley, Graunt, and others. These people long predated the qualification requirements of the Institute of Actuaries or the Actuarial Society of America; yet the consulting mathematician, the model builders, the collectors and interpreters of data are our real spiritual ancestors.

When President McConney answered his rhetorical question, "What are actuaries?", he said:

> The actuary in reality is a sound, practical rather than too theoretical mathematician applying simple principles of probabilities to human affairs in the unknown future.

This is not a bad definition for 1949, or even for 1997.

Challenges of a brave new world

A glimpse into the future shows that the general public will be facing increasing financial uncertainty. Who better than actuaries can design and manage programs that will provide for financial security in such uncertain times?

In addition to the many efforts underway by the SOA, we need to look to the contributions that are being made to the actuarial profession by actuaries all over the world. The Institute of Actuaries of Australia has developed the concept of "The Actuarial Control Cycle." The Control Cycle can be applied to traditional areas such as health, investments, life, and pensions, but a much wider range of problems may also be brought under the rubric of this paradigm. For its 150th anniversary celebration next year, the Institute of Actuaries has chosen as its theme, "Actuaries Make Financial Sense of the Future." This is a most appropriate description of the true talents of actuaries.

Actuaries are not mere mortals. They are wizards who can make uncertainty certain. Examples abound.

- You can't be certain how long you'll live, but actuaries can design plans to care for your loved ones in the event of untimely death and plans to provide income if you live long beyond your working lifetime.

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Did you know...

- The SOA's annual budget is over $15 million.
- Of the SOA's membership in some 50 countries, U.S. members comprise 72% of the membership, 19% live in Canada, and 9% live outside Canada and the United States. Today there are more SOA members outside North America than there were total members when the SOA was founded in 1949.
- Seventy-five percent of our members belong to at least one of 13 special interest Sections. The largest are Investment, Pensions, Product Development, Financial Reporting, and Health.
- In a year, the SOA administers 57,000 examinations at more than 300 centers worldwide.
- The SOA produces almost 700 study notes and materials for the examinations.
- Some 550 volunteers serve in the SOA's education and examination process.
- Over 800 speakers are recruited annually for four major meetings serving 4,000 attendees.
- The SOA organizes about 25 seminars, university programs, and video conferences per year.
- The SOA manages some 85 research projects and experience studies involving 350 volunteers and a budget of almost $2 million.
- The SOA publishes the *North American Actuarial Journal, The Actuary, The Future Actuary, Actuarial Mathematics,* the *Yearbook, Directory of Actuarial Memberships, ARCH,* numerous monographs, and newsletters for the 13 special interest Sections. This year, the *Record* became the first SOA publication available only on the SOA's Web site.
- The SOA staff consists of 85 people, including actuaries, Ph.D.s, and other association professionals.

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- You can't be certain whether or not you will get sick, but actuaries can design plans so that you will have medical care and even income if this happens.
- You can't be certain when or where a tornado, hurricane, or earthquake will strike, but actuaries can design programs to provide financial relief from such events.
- You can't be certain of the default risk on a single loan, but actuaries can transform a portfolio of such loans into a new type of security.

Actuarial science is not smoke and mirrors. It is built on the solid foundations of mathematics, probability, statistics, and finance. And while actuaries cannot predict the future, we can build models to project the future assuming various actions.

As actuaries, we must never lose confidence in our ability to make a difference. The "Once and Future Actuary" is the model builder and manager, the financial architect and engineer, who can lay the foundation for a secure financial future. It is ours to invent.

A cheer for actuaries

Finally, the future of the profession depends on the students we recruit. One thing we are doing to attract students is developing actuarial cheers that can be used at football and basketball games. Contributions of cheers are welcome, but for now, the SOA cheer selected is:

e to the x dx dy

Radical transcendental pi

Secant cosine tangent sine

3.14159...

2.71828...

Actuaries, actuaries, you are great!

Go-o-o-o-o ... actuaries!

President Holland passes the gavel to Anna M. Rappaport, the 1997-98 president, during the Presidential Luncheon on Oct. 28 at this year's annual meeting.