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Janus the actuary, looking backward and forward

by James C. Hickman

The party is over. The lights have been turned out. The ballroom has been swept, and the Canadian Brass will now be heard only on compact discs. There will not be another such celebration until 2089. What did we learn from this opportunity to review our professional past?

In the first century of the organized actuarial profession in North America, we went from Benjamin Harrison and Sir John A. Macdonald to George Bush and Brian Mulroney as chiefs of government and from Dr. Hollerith's first 80-column punch cards to supercomputers. What will the next century bring?

There are probably as many answers to the first question as there are actuaries who have read Jack Moorhead's chronicle of our history, *Our Yesterdays*, and the answer to the second question can be seen only as through a glass darkly. Yet there is an urge, almost an imperative, to attempt both summarization and prophecy as a final Centennial act. The outline for the project comes from the observation that the actuarial profession has been part of the great movements that have shaped the societies and economies of Canada and the United States. We can summarize our history and, perhaps, peek into the murky future by identifying these movements and their relationship to the actuarial profession.

For example, the final decades of the 19th century and the first decade of the 20th century were years of rapid industrialization. A cost of the

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An actuary goes to Parliament

(Ed. note: The Actuary recently interviewed W. Paul McCrossan, who served three terms as an elected member of Parliament in Canada. His experience may be helpful to all of us in both initiating and supporting an actuarial input to the development, design, costing and maintenance of social programs.)

Q.: How did you come to enter politics?

McCrossan: Believe it or not, because of my service on the Society's Education and Examination Committee. In 1973, I became chairperson of the new Part 9 committee, which examined design of social programs as well as taxation. After reviewing the study material, I concluded that Canadian social programs were not well designed. I wrote to the Leader of the Opposition offering help in preparing policy responses in the social program area. Within weeks, the national director of the party called me both to discuss my ideas and to encourage me to become involved in my local constituency association.

Within three years, two events propelled me into active politics. First,



W. Paul McCrossan

in response to public criticism about the cost of public service pensions, the government of the day (Liberal) published a "Basic Facts" paper. This paper was so misleading that it prompted the Canadian Institute of Actuaries to issue its first public statement, which condemned the "facts" presented by the government. As a result, I was asked to prepare a "politically safe" but sound position for the official opposition to take. Several

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shift from agriculture to factories was the increased human toll of industrial accidents. The response was workers compensation, a new type of insurance combining elements of group and social insurance. In turn, workers compensation had both institutional and intellectual consequences for the actuarial profession. The Casualty Actuarial Society was the institutional response, and credibility theory was one of the intellectual developments associated with the industrialization of North America.

What may be one of the broad movements of the next 100 years that will nudge our profession? Our populations are growing older, and our family structures are weakening. Financing long-term care is part of the resulting problem. New institutions also may be needed to replace family members as advocates and decision makers for the elderly. A radically different distribution of people by age in the next century is now almost assured, and to maintain our standard of living, our society must increase its productivity and modify employment practices to utilize effectively the workers who, in an earlier time, would have been retired. The implications of this massive shift on the actuarial profession are only now beginning to take shape.

It was 19 years after the organization of the American Society of Actuaries that the first Ford Model T was built. The automobile changed both rural and urban North America forever. It also produced an entirely new line of insurance and a host of associated actuarial issues virtually undreamed of in 1889.

How about the next century? Certain to move up on the actuarial agenda are managing the risk of new energy sources and creating systems for the adverse financial consequences of industrial accidents that imperil our environment.

Improved nutrition and public health measures had advanced life expectancies before 1889. Nevertheless, a student of the history of medicine has said that it was well into this century before an average encounter between a sick person and a physician could be expected to improve the health of the patient. The explosion of our understanding of life processes and the associated growth of therapeutic methods in

the past 75 years have generated demand for financial security systems for health. The result has been a concomitant growth in actuarial activity. I believe our founders would have been surprised by the amount of time devoted to health issues at the Centennial.

The crowning intellectual achievements of the first half of the 20th century were in physics. In the second half, the acceleration of the rate of expansion of knowledge of biology seems to be the most dramatic intellectual event. This acceleration will have implications for the actuarial profession. The possibility of more precise classification of risks for life, health and disability insurance is very real. Will society permit this precision? The new technology, derived from the growth of the basic biological sciences, may dramatically increase or, perhaps, decrease healthcare costs. In either case the financing of healthcare will be altered, and the challenge to actuaries will change.

The actuarial profession is built on the foundation of actuarial science, which, in turn, is a collection of mathematical ideas for building models useful in designing and managing financial security systems. A profession, like a building, must not outgrow its foundation. Actuarial science could not develop until the foundation ideas of probability were in place. Several developments of the past century were initiated, not by massive social and economic movements, but by new mathematical ideas. The North American actuarial profession was about 20 years old before Lundberg started to build a model for general insurance systems based on the new theory of random processes. The Actuarial Society of America was 11 years old. Victoria was queen of the British Empire, and William McKinley was president of the United States when in 1900 Bachelier presented his doctoral thesis, "Theory of Speculation," to the Academy of Paris. The century was half over before the implications of Bachelier's works were recognized in practical finance and in the design of investment-indexed insurance products. In the past 20 years, the rapid growth of the futures and options market and the use of derived financial securities to manage investment risk have had a profound effect on insurance products and the work of actuaries who design them.

The growth of the theory of finance has not stopped. Jim Tilley's Centennial paper, by introducing both stochastic differential equations and nonlinear dynamics, has indicated the new intellectual tools that may shape the development of systems designed to manage investment risk in the immediate future.

By enormous good fortune the first actuarial organization on our continent was international, surely a harbinger of today's internationalism. In the past century fax machines, satellite communications and 747s have accelerated the movement of ideas and people. Multinational corporations and multiple sources for components have almost destroyed the definition of a Canadian or U.S. product. A nation's ability to carry out effectively a domestic economic policy has been reduced by the increased importance of international trade. Epidemics are worldwide, and science now has no boundaries. If actuaries are to remain relevant in this global business environment, they must become internationally minded, and their organizations must provide a worldwide network for their professional activities.

What does all this mean? What kernel of advice can be gleaned from the experiences of a century and a scan of the future? I would venture two items of advice. First, maintain strong foundations. Without preserving deep roots into the mathematical sciences, the actuarial profession will lose its identity. Second, keep actuarial organizations and continuing education operations flexible. The organizations, sections, committees and boards as we have organized them in 1989 may not correspond to the realities of 2019 and certainly not the realities of 2089. Our founders in 1889 did not have a clear picture of actuarial challenges created by the industrialization of North America, the growth of the use of the automobile, the development of information technology and expansion of the demand for healthcare. Species and professions are killed by overspecialization. The celebration in 2089 will be even more memorable if we add to our intellectual foundation and maintain organizations that can adapt to the inevitable changes that the next century will bring.

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