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ADDRESS BY HENRY ROOT STERN, JR. NEW YORK STATE SUPERINTENDENT OF INSURANCE BEFORE NEW YORK REGIONAL MEETING

HUMAN society's dependence upon the services of the actuary has grown to sizable proportions. As just one example, the retirement benefits of more than twenty-five million employees covered by retirement plans depend upon your vocation for sound actuarial bases for benefit premiums.

While your profession has been growing to its present stature, mankind's laws have long since recognized the need for certifications of competence in other professions. One needs a license to practice medicine or law, to be a teacher, or, for that matter, to write insurance; but not to call oneself an actuary.

The enormity of the law's omission may be seen in proper scale against the backdrop of your profession's history. Consider the extent to which our economy depends upon the reliability of actuarial work today. Reflect, then, on the fact that our laws today demand no more proof of the actuary's competence than did the laws of ancient Rome.

The earliest known references to any estimate of the value of life annuities which I have been able to find date from 40 B.C. Then the Roman Empire adopted the Falcidian law, which declared that a testator should not give more than three-quarters of his property in legacies to others. The result was that at least one-quarter must go to his legal representatives.

As an outgrowth of this requirement, it would then have frequently become necessary to value life annuities or life estates upon the testator's estate. Later Roman writers recorded the method employed while the law was in force. This primitive attempt at valuation, however, contained no consideration of compound interest. Also, the basic assumption of the Falcidian actuary was equivalent to stating that all persons attaining age 30 will survive to age 60 and then certainly die. And yet a man could set up as an actuary in the United States today with no more legal requirement than was demanded by Roman laws of 40 B.C.

Later Roman tables—notably that of Ulpian in the second century A.D.—likewise failed to consider the compound interest factor. Equally unsophisticated, although some 250 years has passed, was a basic as-

sumption that there was no probability of an annuitant dying between ages 40 and 50!

The Roman failures to consider interest factors and the gaps in their nevertheless significant innovations are understandable. At the time, the mathematicians' colleagues in the philosophical sciences were examining bird and animal entrails to predict the future. It is far more difficult to understand why our present laws demand no more assurance of an actuary's reliability than did the laws of the soothsayers' time.

No more correct estimates of such values appeared until the late seventeenth century. The Dark Ages with all their awesome events were hardly a time of intellectual progress. The subordination of thought, knowledge, and truth to senseless war, to inane maintenance of feudalism, and to ruthless suppression of "heresy" effectively stifled productive intellectual development except in the most privileged of religious orders. When the Renaissance freed knowledge, art, and science from the Middle Ages' unproductive rigidity, there followed an almost unparalleled three centuries of development.

In 1666 the Great Fire of London produced an awareness that some means for distributing fire risk was necessary. The loss of life also brought home the need for distributing risk. London's laws laid no requirements for competence on those who performed the mathematics involved—nor do our laws today.

Correspondence between Jan DeWitt and John Hudde between the years 1670 and 1671 discloses the relatively crude but meritorious first statement of the mathematical principle of the value of an annuity at any age. These calculations, usually deduced from observations of the life of annuitants, remained in effect until the English astronomer Edmund Halley—of Halley's Comet fame—came up with the Breslau Table of 1693.

Armed with Nicholas Bernoulli's Law of Large Numbers, Halley first showed how to calculate the value of an annuity on correct principles. Halley's approximately correct mortality table was derived from the records of the number of deaths and baptisms in the city of Breslau. The astronomer showed how it might be employed to calculate the value of an annuity on the life of a nominee of any age. Two hundred and seventy years have passed—but actuaries today are as lacking in licensure as was Halley.

You are aware of the historical connections between your science and the formation of the International Order of Odd Fellows, which sprang up in the seventeenth century. Fraternal insurance grew in order to meet the needs of the guilds, individuals, and groups. Later, life insurance began

to be written on a broad scale through professional risk-bearers. The programs promoted were not always in the best interests of the individuals. This led eventually to the legal regulation of insurance, abroad and in the American states. But oddly, our law here is still as lacking in standards for the qualification of actuaries as was Europe's in the days of the Tontine.

The free-wheeling insurance practices of the United States at the turn of the century led to the Armstrong Investigation of 1905. The aftermath of that investigation was a sweeping overhaul and tightening of the regulation of insurance. This gave more work to the actuaries but led to no legislation for *their* regulation.

The guiding principle of civilization is to improve the environment of man; its process is an increasing refusal to accept fatalistically the effects of disaster. Montaigne protested elegantly that "our wisdom itself, and wisest consultations, for the most part commit themselves to the conduct of chance." In more homely terms, Robert Burns echoed that "the best laid schemes of mice and men gang aft a-gley." While essayists and poets have protested the tyranny of chance in man's affairs, actuaries have done something about it.

The actuary has served the civilizing process in helping to develop a sound self-supporting system of programming future benefits through current payments. Earlier in human history, the only gesture in this direction was charity—the hit-or-miss modifications of the tradition that harvest gleanings be left for the fatherless and the widow, as recorded in Deuteronomy and Leviticus.

As civilized man learned to provide in advance against disaster, mathematicians discerned that measurement of mortality was a group problem: one that required the correlation of data on masses of individuals for its solution. Actuaries noted that while it was not possible to predict which members of a group would die in a given year, it was nevertheless statistically predictable how many members of the group would die during the year.

Early actuaries also noted that the expected life-span varied according to age. They then used age, rate of mortality, and compound interest rates to create a benefit amount payable at death, which amount was programmed by advance payments. It thus became practical to build a pool of premium funds from the living to pay beneficiaries of individuals when they die.

As the life-span of individuals increased, and society became more concerned about the economic security of its members in their post-working years, it became necessary to establish a basis for funding benefits payable to retirees. This represented the emergence of civilization's greatest

reliance on the actuary—and hence of the greatest need for legal standards to assure his competence. Out of society's concern for keeping its elder members out of the poorhouse grew the Social Security system. Social Security in turn came to be regarded as a kind of minimum retirement fund on which people ought to build.

Today Americans have set aside an enormous total for their retirement years, both privately and through employers, unions, and other organizations. In New York State, as of 1963, 1,135 welfare and pension funds were registered with the Insurance Department, covering 2,251,965 employees. And these are only those welfare and pension funds which are jointly administered by unions and employers.

On a national scale, the President's Committee on Corporate Pension Funds and Other Private Retirement and Welfare Programs has pointed out that, as I said earlier, about 25 million employees were covered by retirement plans at the end of last year. The accumulated reserves of these plans amount to $75 billions, with annual benefit payments of some $2.75 billions to nearly 2.5 million beneficiaries.

It is estimated that by 1980, about three out of five employees, or 42 million, will be covered by retirement plans. Yearly benefit payments will be around $9 billions. Reserves at that time will stand at about $225 billions.

It is an invitation to disaster for programs of this scope to be based on the assumptions of actuaries without legal definition of what constitutes competence in a man who professes this calling.

Legal safeguards for the competence of physicians were introduced shortly after the practice of medicine ceased to be entrusted to barbers, whose art consisted of blood-letting and the application of leeches to relieve the "humours," with a little dentistry on the side. Medical science and actuarial science have since advanced by comparable strides, and the training and experience needed for competence require many years in both cases. Yet the physician's competence is certified by licensing, while that of his actuarial opposite number still is not.

The Society of Actuaries must be congratulated on the excellent job it has done of bridging the gap in our laws on a voluntary basis. Those who satisfy the standards and qualifications which the Society sets for admission, qualifying as Associates and then as Fellows, are undoubtedly as competent as any reasonable law could demand.

Within the insurance fraternity, your group is the mother lode of vice-presidents, presidents, board chairmen, and other key executives. And yet anyone who was so inclined could advertise himself as an actuary with no such background, and no law would say him nay.

Your Society and other organized actuarial bodies also deserve credit for proclaiming the need for the legal establishment of minimum qualification standards. I learn that in 1924, your predecessors considered these two problems:

> Should any steps be taken to have the word "actuary" officially defined in state laws or otherwise? and, Is it desirable or feasible to have a joint examination board for any part of our examinations?

These two questions appear in the archives of the Society's Transactions and Proceedings. Of course, forty years ago, the question of propriety of actuarial evaluations was not nearly as urgent in the public interest as it is today. Today, in the regulatory sphere, insurance commissioners find the determination of whether proposed insurance programs are fair and equitable puts an even higher premium on the competence of the actuary.

We who deal with the regulation of insurance are satisfied that your Society, and its counterparts in casualty and property lines, maintain standards amply high for our own recruiting requirements. Our Civil Service Commission acknowledges that recognition by the Society of Actuaries and the Casualty Actuarial Society constitute a proper basis for qualification in the actuarial titles of Civil Service.

The New York Insurance Department relies heavily on the talents of its actuaries. We need to satisfy ourselves that the activities of our insurer licensees comply with the Insurance Law. In the field of fire and casualty insurance, the actuaries provide the bases for determining whether rates are reasonable, fair, and equitable. Analysis of loss and expense expectations are a necessary part of this determination.

In the field of life insurance, the actuary is in the forefront in analyzing the mortality tables which are adopted from time to time and also in ascertaining the sources of distributable surpluses.

The federal charter of an American Academy of Actuaries would be an historical first step toward adequate licensure to assure the public of competence on the part of actuaries. I am convinced of the necessity for standards such as those of your Society to become part and parcel of the requirements for actuaries who function in a sense of public disclosure.

Some months ago, after learning of your project to bring this home to the public, I had occasion to address the Casualty Actuarial Society at its fiftieth anniversary meeting. I referred to the Dodd-Curtis Bill, which did not achieve passage before the adjournment of Congress last year, but which I understand has been re-introduced.

Such a measure's passage would expand the efforts that have distin-

guished actuaries within insurance circles for the benefit of everyone touched by insurance. The terms of the proposed federal charter state that the American Academy of Actuaries would work to advance the knowledge of actuarial science; to encourage a consideration of monetary questions involving the mathematical doctrine of probabilities and the principle of interest; to promote education in actuarial science; and to establish, promote, and maintain high standards of conduct and competence within the actuarial profession.

Your actuaries are to be commended for seeking to place their science at the service of others who need it. The primary effect of federal chartering would be to benefit the private social security systems that have grown so enormously in American industry.

The formation of the American Academy of Actuaries is even more necessary today in view of the recommendations of the President's committee on retirement programs. This report urges that "the funding process of every qualified pension plan should be certified at the inception of the plan and periodically thereafter by an actuary with acceptable professional qualifications."

Our nation cannot continue to permit the legal possibility that actuaries whose expertise may be at the level of a medieval barber's application of leeches may work on programs involving 40 million American employees. For these employees, almost a quarter of a trillion dollars will soon have been set aside in retirement funds.

I might add that a former New York State superintendent of insurance, Bob Dineen, shares my convictions in regard to federal chartering of the American Academy of Actuaries. As he summed it up in a letter to me in February:

> With the demand for actuaries not only for the life insurance business but in the fire and casualty business, pension funds, Social Security, self-insured plans, consultants, etc., it is important to put the entire range of actuaries on the highest professional plane. This is particularly necessary because of the need for their certification as to adequacy of reserves in many areas of the business.

With these observations in mind, I would welcome the development of required standards for actuaries at the state level as well.

You may have gathered by now that I approve of the work of your Society. In token of my appreciation for what you are doing, I sent to London for a relic of the past that may interest you. It may be of use in making the point that a man may call himself an actuary today with no more legal challenge than could the pioneer of your profession who produced this work.

It is a book entitled *The Calculator*, published in 1747 by James Dodson, "Accomptant" and teacher of mathematics. I am told that it contains the first life insurance computation tables printed in English.

With *s*'s for *f*'s, the title page describes *The Calculator* as "Being Correct and Necessary Tables for Computation Adapted to Science, Business and Pleasure." They include tables of compound interest, annuity values, annuity for life at various percentages, and of present worth of an annuity certain.

A note on the title page records that "This book was bought at Mr. Sparke's Sale," adding that the handwritten notations are supposed to be in the author's own hand, and "seem not to be wrote when he was in good humour."

In the margin of a page describing a cumbersome use to which a simple multiplication table may be put, a handwritten note tersely comments, "Sad uses." As the text goes on to describe even more cumbersome means of finding logarithms with the table—Table the 38th—the author marginally comments: "One may multiply or divide the difference in less time than turn to the Table 38."

It is not clear whether Mr. Dodson was having second thoughts about his own work, or that of the typographer.

Please accept this as a token of esteem, and with my very best wishes for the continued success of your excellent work.

Thank you.