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Joint Casualty Actuarial Society (CAS)/Society of Actuaries (SOA) Statement of Actuarial Principles

Track: Education and Research/SOA Research

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Recorder: ARNOLD A. DICKE

Summary: Actuarial science, the foundation for the actuarial profession, is an applied science. As an applied science, its theory is grounded in certain observations about the real world. Principles are statements grounded in observation and experience. Principles will be subject to change only if fundamental changes occur in our understanding of the observed world.

This session will focus on a discussion of the Exposure Draft of the Joint CAS/SOA Statement of General Actuarial Principles. Topics included in the draft exposed to the membership prior to the meeting, include:

- *Actuarial Modeling*
- *statistical regularity*
- *stochastic modeling*
- *time preference*
- *diversity of preferences*
- *present value of modeling*
- *modeling of actuarial risks*
- *validity of actuarial models*
- *combinations of cash flows*

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Risk Management

- *avoidance of risks*
- *actuarial soundness*
- *risk classification*
- *induced experience*
- *credibility*
- *antiselection*
- *information asymmetry*
- *selection experience*

This session provides an opportunity to discuss the exposure draft and share comments.

Mr. Arnold A. Dicke: We have a group that might be called hard-core people who have a really deep and abiding interest in actuarial science at its most abstruse. I have with me two distinguished panelists to discuss the General Principles document and the companion documents which were sent to SOA and CAS members.

The first panelist is Stuart Klugman who has been principal financial group professor of actuarial science at Drake University since 1987. Stuart received a doctor of philosophy degree in statistics from the University of Minnesota in 1975 and got his Fellowship of the Society of Actuaries in 1978. Stuart is currently vice-chairperson of the SOA Committee on Actuarial Principles. Mike Walters is our other panelist. Mike received a bachelor of science degree in mathematics from Fordham University in 1963 and a master of science degree in mathematics from Notre Dame in 1965. He became a fellow of the Casualty Actuarial Society in 1972, and is a Member of the Academy. He was the president of the CAS in 1986–87 and vice president of the Academy from 1988 to 1991. Since 1993, he has been chairperson of the CAS Principles Committee. Mike's tenure with that committee coincides with a period of tremendous progress in developing a joint set of principles.

I have the honor of having been the chairperson of the SOA Committee on Actuarial Principles since it was founded in 1988. I also have the even greater honor of telling you that, come this fall, Stuart will be taking over as the chairperson of that committee.

We are going to talk about General Principles of Actuarial Science and the Discussion Draft that you have recently received. Let me give you some of the history from the SOA side. In 1988, at the request of Steve Radcliffe who was then a Vice President of the SOA, three SOA members (Bob Miller, Wayne Bergquist and I) formed a committee to look at the possibility of writing down principles of

actuarial science. The real motivation was to come up with some principles that would relate to valuation. It took us a long time, but we managed to publish a paper in 1992 called *Principles of Actuarial Science*, which was carefully footnoted to make clear that it really only applies to those areas under the purview of the SOA and not to casualty actuarial science. Then, in 1995, we completed our original charge by publishing *Principles Regarding Provisions for Life Risks*. All along, we had been in contact with principles committees of the CAS. When we at the SOA first started working on principles, the CAS had already developed or was in the process of developing three separate sets of principles: rate-making principles, reserve principles, and valuation principles. Those documents were available to us, and our original *Principles of Actuarial Science* owed a lot to the CAS draft on valuation principles. Bob Miller was a joint fellow and was instrumental to the work of both the CAS Valuation Principles Committee and the Society's Committee on Actuarial Principles. While the CAS principles documents were helpful to the SOA Committee, we took a somewhat different tack. The CAS documents were not as theoretical as the SOA document came to be, although the CAS Statement of Valuation Principles had a lot of the same ideas behind it. On the SOA side, we decided that it was necessary to become a little bit more precise in our wording because we were running into logical problems. Every time we tried to write things down, we would realize there were circularities or other logical problems. To cure these problems, we decided we had to define our terms carefully, and that's why we adopted a rather formal language.

We had a number of conversations during that early era with the CAS that came to the eventual conclusion that it might be logical for the SOA to go down its path while the CAS committees continued down their paths. It was thought that, at some point in the future, perhaps the two roads would come together again. In 1993, a joint committee put together a draft of General Principles. In the period from 1992 to 1996, the CAS was also working on risk classification principles. In the SOA publication *Principles of Actuarial Science*, as well as in the 1993 joint General Principles draft, there were already some statements about risk classification. In this period, due to Mike's presence and the general cooperative attitude that had been developed over the preceding years, the Casualty Society was sharing those drafts with the SOA Committee. There were a lot of back-and-forth comments. In the end, the CAS Committee felt it was best to incorporate the risk classification principles into the General Principles, and this lent momentum to the joint efforts.

What are principles? In the General Principles draft, principles are defined to be "statements grounded in observation and experience." Obviously, the word principle can be used in a lot of different ways. I cannot object if you want to use it some other way, but that's the definition we are using for the joint effort we have been discussing. As we went along, we realized we were, in effect, trying to

describe and define what it is that actuaries are really doing. Through the years, I have heard speaker after speaker asking, "What is an actuary?" or saying, "Here is my definition of an actuary." Some definitions were jokes; some were serious. There are many ways to approach this question. One approach to it is to look at the things we do and the observations and experience that we have based our work on. If we can formulate these observations and this experience into statements, we are justified in calling them principles of actuarial science.

The concept of principles needs to be contrasted with the concept of standards. Here I am using the word standards in a very general sense: "rules of behavior, including particular directions on when and how professional judgment should be employed." When we use the word standards in this broad sense, we include everything that is normative that applies to the work of actuaries. In particular, standards would include laws and regulations, and qualification standards as well as actuarial standards of practice. Virtually every such standard could be reworded to include the word should, whereas the principles we are talking about can never be phrased in terms of the word should. If we find the word should in a proposed principle, we shudder and we move back. A normative statement cannot be a principle under our definition.

Another thing that came out of the interaction with the CAS was the recognition that principles could be placed into two categories: general principles and practice-specific principles. General principles would apply to all areas of actuarial practice; practice-specific principles might be different for the casualty, life, health, pensions, and investments practices.

From this, it follows that general principles should be worked out by a joint committee while practice-specific principles should be developed in each practice area, flowing out of the general principles. To go a little further, we also came to the conclusion, after interacting over the years, that the general principles would be best written in the kind of quasi-mathematical format that the Society Committee had adopted, whereas the practice-specific principles would be best stated in terms of the three- or four-part format that was used in the three early Casualty Society Statements of Principles. This format included a set of definitions, a set of principles, and a set of considerations. The considerations turn out to be descriptions of areas that appear to need some sort of guidance. If you were a standard maker, you might want to look at the considerations that accompany practice-specific principles.

Before Stuart and Mike start going through the General Principles from the life and casualty point of view respectively, let me just say a few things about what I think

we have learned from this long process of thinking about the root foundation ideas of actuarial science.

First, I believe we found that actuarial science is a coherent view of the world. It is based on observation and experience. This view of the world is not as well-defined as are those of physics and chemistry, although these days chemistry itself has gotten blurry on the edges, we do have a certain view of the world based on observation and experience. I think the principles are a step toward trying to describe that view.

The second thing that I think we have learned is that the way we approach modeling and our use of models in the management of risk are the things that set actuaries apart. Other disciplines and professions use models, of course, and still others manage risk. But the actuarial approach to modeling and risk management is, to some extent, distinguishable.

We have also learned, as part of the process, that careful definition is necessary in order to avoid circularities in actuarial concepts. Many actuaries are very careful when they are dealing with mathematics and not as careful when they are dealing with the English language. Eliminating such loose language was a very important part of the process of formulating principles.

Finally, I think we have discovered that there is a nontrivial set of principles that is shared by all the major practice areas of actuarial science. If you get into too much detail, practice areas might not agree, but once you get to a high enough level of abstraction, all practice areas have a shared approach.

What is our timetable? On May 1, 1997 we mailed out a Discussion Draft to the membership of both learned societies. The comment period on this draft ends June 1997, and we have already received a number of comments. We are looking forward to more of them. We would be happy to hear them, but we particularly want to receive written comments so we can spend time thinking about them.

By January 1, 1998, we expect to have out an Exposure Draft to the membership; by March of 1998, the comment period would be closed. By the time of the board meetings that occur in May and June for the two Societies, we hope to be able to present to these boards a final draft for adoption.

Let me turn things now over to Stuart Klugman who will tell you a little more about the life side and the life companion document.

Mr. Stuart Klugman: My job is to go over the companion document, which I cannot do without talking about the principles themselves. I know you have all read both documents carefully. I have also tried to organize the principles into some groupings. The only grouping that you found in the document is that they come in two sections; the first one is called Actuarial Modeling Principles and the second one is called Risk Management Principles—a somewhat arbitrary division, but one we have chosen to make.

What are the bases of the Actuarial Modeling Principles? One is that we make extensive use of the law of large numbers. The data we collect can lead to models, which can lead to predictions. To do our job successfully, we should also implement a feedback process and a control process. We should update our results as more information comes in and as our sample sizes get larger.

A cartoon shows a character reading the newspaper, and he says, "There hasn't been a crime in our city since 1957." The next panel says, "Definition of an optimist;" The character is thinking, "We sure are safe here." And the next panel, "Definition of a pessimist;" a different character is thinking, "We are due."

The question for you is which, if either, of them has employed the law of large numbers?

My first grouping is the Principles numbered one through three, which might be called "Models Are Us." Modeling is what we do. We can do that and these principles tell us we can do that. Principle 1.1 says, "In a sequence of independent trials, the proportions stabilize." That is the law of large numbers. The Companion Document for life insurance tells us if we collect a number of similar individuals and count the proportion who die, we learn something. The proportion of deaths stabilizes as the group gets larger and will converge to the probability of death. Of course, we can do that for any other decrement which we measure, whether it is withdrawals, election of policy options, or so on.

Our second principle, Principle 1.2, says "If things are statistically regular, then we can build a model." There has to be some stability over time so we can collect useful data. In particular, this means we can construct and use decrement tables in our life insurance work.

Principle 1.3 says, "Results from experiments, or collection of data, can help in our model building as it relates to life insurance." We can construct a mortality table. We can gather a large amount of past relevant experience, or sometimes we collect similar experience from industry tables, from other companies, and perhaps we

make adjustments. We certainly do that in our annuity tables when we want to adjust for mortality improvement.

We wanted to be sure to note in our principles document that our models can be deterministic. Many of us studied actuarial science using deterministic models and found they were sufficient to produce net premiums where process risk can be ignored. We incorporated parameter risk by loading. Of course, for us in the life insurance business, starting in 1986 with the switch to the *Actuarial Mathematics* book, we learned to measure process risk through variance calculations and build a stochastic model of the behavior of our policyholders.

One of the topics in the principles that's sometimes difficult to get a handle on is validity. We talk about models being "potentially valid." Sometimes we have no choice but to build a model. We know it is imperfect, but we have to use it anyway. That would be a potentially valid model. That is, we are doing the best we can, but due to limited data, we cannot verify that every aspect of our model is correct and eventually we hope to get more data and then validate the model. Validity must be in terms of the purpose of the model, so we always have to keep in mind what we are doing and why we are doing it.

The next group of principles says, "Time is money." I think the next three principles express that quite quickly and coherently. You would rather have the same amount of money today than tomorrow. Not everyone agrees on the monetary value to assign to a particular cash flow. If we both can express our time preferences for money, we have the ability to incorporate them into our financial models. Those three principles tell us that time is money and that it is possible to build a model reflecting this.

For life insurance, we do this by discounting as we compute premiums and reserves. Our interest rate model may be a deterministic one or a stochastic one, but our principles say we can build such a model. Again, it could be a simple, constant interest rate, fixed and known forever, or a complex algorithm of the changes in the interest rate, following some kind of Brownian motion with drift. We can make it as complex as we like.

Principle 1.7 puts it all together. At this point, we define the subject matter on which we work: the risk variables of occurrence, timing, and severity. We can put those random quantities together to create an actuarial model. It is a model of—will it happen, when will it happen, and if it happens, how much will it cost us? We point up through our examples that not all three of those risks need be present. In the life and annuity practice, sometimes it is just the timing risk. Other examples show two or all three variables can be present.

What does it mean to model these risks? You might need a multiple decrement table, if there are withdrawal risks, policy and loan risks, etc. We may need to produce interest rate scenarios or generators, and more complex interrelationships may be part of our model, such as the relationships of frequency of policy loans to the prevailing interest rate, disability rates to the unemployment rate, lapse rates to premium rates, and so on.

At one time the Employee Retirement Income Security Act of 1974 (ERISA) was called the Full Employment Act for Actuaries. While it does not carry quite the same clout as government regulation, the last principle in the first section says you cannot stop once you have built your model and analyzed it, but, because the degree of validity of your model can change over time, you have to keep monitoring the quality of your model, improving it, and changing it as necessary. Some illustrations of the forces affecting the continued validity of the model are contractual changes, external environment, and the kind of data you have been collecting.

In the Life Companion Document, we describe several kinds of models. One type of model is the model office where we're modeling our company—not a particular policy—by taking a small number of idealized contracts and then saying we have so many of this one, so many of the next one, and so on. Another type of model is the present value actuarial model—the one you may have been more likely to be thinking about being impacted by mortality changes, changes in the legal environment, underwriting, or marketing strategies.

Mr. Humphrey H. Nash: I have a question about the time preference of money. The phrasing seems to imply it is generally positive. I'm wondering if it's perhaps generally negative in the sense that people—for example, working people—don't need the money now. They would prefer to have the money later on. Also in the sense that if you look at a risk-free investment like T-bills, the average return after taxes and inflation may be negative over the long run—in other words, there may be a negative time preference for money.

Mr. Dicke: Interest rate theory goes back to the turn of the century and before. I think it was Irving Fisher that wrote a very important text based on the concept that there is a general preference for receiving things at an earlier date. Often, if you analyze a proposed counter example carefully, you do not really find a preference for receiving value later—rather there is a preference to not pay taxes now or something like that. I think the principle is a necessary thing for developing normal present value theory. There are irrational people, of course, and that is why we use the word “tends.”

Mr. Klugman: I was just going to say, the word “tends” allows for a few exceptions, so it is not universal truth.

Mr. David K. Sandberg: I think what you are really seeing is a consumer saying, “I have a choice between consuming or saving.” He or she still has a preference for the money. If he or she had a negative time value of money, he or she would just give the money away, but the consumers are choosing to either consume or save. They are just trying to time the receipt of the money. I think the principle would still apply even in that situation.

Mr. Klugman: Part 2, Risk Management Principles. This is, to some degree, the feedback and control part of our set of principles. We identify eligibility. We assess the risk through classification and underwriting. We control risk by attempting to influence policyholders' behavior. We finance the risk through our insurance contracts. Thus, these risk management principles identify various means of reducing uncertainty.

The first three principles talk about keeping score. These are perhaps the most problematic, to me anyway. The first one is reasonable. It says that if you combine cash flows, you have an opportunity to reduce risk. We mention three different ways of doing that: pooling, which is adding independent risks to your portfolio; diversification, which may or may not be adding more risks or taking the risks you have and spreading them out in some way; and hedging, which is the specific case of trying to find negatively correlated risks so if one goes bad the other one is likely to be good. An easy example in our Companion Document is combining life insurance and annuities so that the changes in mortality could offset each other.

One of the terms defined in this section is “financial parameters.” Examples are the premium, guaranteed surrender values, and statutory reserves. They are numbers that are not part of the model. They are things that are within your control or somebody else's control. They are somewhat external to the reality of the cash flows as modeled for the risk side. “Margins” promote safety by adding to the financial parameters. The term “margin” is used a little bit differently here from how you might be used to using that term. “Margin” is defined to be the amount by which the financial parameter exceeds the net value, or the break-even value. It's the level of safety being provided by that change in the financial parameter.

Principle 2.1 says you can control the probability that you'll be able to meet obligations by setting margins appropriately. That is, you can reduce the probability of things going poorly for your portfolio by changing the margins. Soundness, in particular, can depend on the premium and initial surplus allocated to that block of

business. We are very careful here: in this principle, there's no mention of reserves.

In Principle 2.2 we are talking about ultimate soundness. We sell some policies and we manage the policies. At some point in the future, that block of business closes. If we have money left over, that's good. Actuarial soundness is the probability of this good result. Reserves are not mentioned because, when the block closes, there are no reserves. There is only the cash that is left over from having conducted that business over a particular period of time. Principle 2.2 does not mention reserves, solvency, or the examination of the block of business of the company. It is just asking, "Is the piece of business you did a good piece of business? Is the probability that it will be good in the end high enough to meet whatever standard you have set?"

But the world does not work that way. Usually along the way to closing out a block of business, you get examined by various individuals: regulators, prospective policyholders or internal management. They like to know how you are doing. Ruin is the probability that, at any time along the way, something bad happens. That "something" might be key ratios sufficiently extreme to attract regulatory attention. It may be an intermediate insolvency, where you know everything would be fine, if you can only keep going until the block closes out. Then, it will be OK, but unfortunately, we are out of money. We can adjust margins to keep the probability of nonruin at a satisfactory level—this is likely a stricter standard than actuarial soundness.

Alternatively, the "something bad" could be the value of assets falling below reserves. In this case, reserves have to be part of your analysis, but they are not part of this principle.

The last set of items has to do with policyholders. Call them "policyholders behaving badly." They just have this habit of doing that. Although Principle 2.4 is not necessarily about bad behavior, it does want us to note as a principle that the mere existence of the insurance contract can change people's behavior. Your behavior with regard to the health care system may be impacted by the health insurance you have. The choices you make about what sort of health care you receive may depend on the benefit structure.

In life insurance we control this to some extent by the insurable interest provision, so I cannot take out insurance, for example, on Arnold. (Actually, I do have an insurable interest in Arnold because I want him to keep being chairperson of this committee for the rest of his term.) We can also offer reduced premiums or other incentives to positively influence behavior.

Mike will be saying quite a bit about risk classification. Principle 2.4 says that the concept of risk classification is real. Principle 2.5 says that it is possible to do experience rating. In life insurance, you might use age, sex, health, habits, occupation, and the usual things as characteristics around which to classify rates. It is required that you build a model for each class, but we recognize many classes have limited data. Thus, our models may only be potentially valid and not fully valid.

Principle 2.6 says, "When given choices, policyholders will act to their financial advantage." Not surprising. Smokers will choose a company that does not use smoking status as a classification variable. Retirees in poor health will choose pension plan annuity options with longer guarantee periods. Similarly, when the life insurance policy is surrendered, those in poor health will choose the extended-term option.

Principle 2.7 says, "If information is unavailable to the insurers, participants will tend to be those who would be in a higher premium risk class were that information to be used. Information could be unavailable to the insurance company due to legal, social, or business reasons. An example of the last is nonmedical underwriting. We choose to use nonmedical underwriting because it is less expensive. We save money by not doing the tests. As long as the death benefit is small enough, it is worth it to us to not do the medical tests.

The process of selection by the insurer and anti-selection by the insured creates experience differences. The main point of Principle 2.8 is that we should construct our models to reflect these experience differences; in particular, we should validate our models against insured experience and not population experience. We should also note that the selection process does not change the probabilities. Principle 2.5 talked about how what we do might change behavior; Principle 2.8, in contrast, points out that the selection process itself does not impact the policyholders and what might happen to them. It does affect who becomes our policyholders and this principle says that we should be sure we build and validate our models against that group of individuals. All Principle 2.8 is saying is, we should use select tables and use select experience to validate our tables against.

Mr. Michael A. Walters: I think we first came together with the casualty side back in 1980. Risk classification principles were initially handled by the American Academy of Actuaries. The Academy's work was in reaction to an insurance commissioner in Massachusetts which formulated some actuarial principles on risk classification in conjunction with hearings on auto insurance in Massachusetts. Some interesting concepts were in that document, but it was felt actuaries ought to

play a bigger role in formulating actuarial principles. Thus, the Academy put together a set of risk classification principles.

Then the CAS started down the path of developing principles. These were “inductive” principles. I think Steve Radcliffe coined this phrase. The casualty actuaries went down this inductive path in developing rate making and loss reserve principles. “Tell us all you know about major areas of your practice—rate making, reserving, etc.” It was an inductive process. The SOA went down the “deductive” path. What are some fundamental truths so we can derive standards of practice from them? We went down different paths, both of which are valid. I call the CAS principles operating principles. You call them practice-specific. Whichever name is used, the principles are close to actual practice and we felt it is therefore a little easier to get from them to standards of practice.

The SOA put together a more fundamental approach based on Charles Trowbridge’s monograph and asked the CAS to comment. The CAS committee concluded the principles the SOA put together were very clever and well constructed. The CAS gave feedback on the General Principles draft. The SOA, for its part, adopted an inductive-type principle on reserving. So both Societies seem to have concluded that both types of principle are valid. In 1993 the Principles Committee at the CAS began to review the SOA draft and thought it was very clever. We added some things that are unique to casualty work: experience rating for large commercial risks; credibility; a full notion of risk management; risk assessments; and so forth.

We thought we needed a principle on exposure base, but we have not come up with one yet. Exposure base is a practical measure involving a uniform scaling of risk on top of which you impose a classification system. In life insurance, your exposure base is one life per year. Health insurance is the same. In casualty insurance you have receipts for general liability, amount of insurance for homeowners, etc. The classification system can vary depending on the line of business. Thus, we do not have a principle yet, although there is probably one implicit in the current set of principles. This is symptomatic of what we struggled with for the last three years.

At our last session, some of the members said, “How do you know you have all the principles?” We do not know we have all the principles. This is a process that is going to take decades to refine. We decided to go forward and put forth the thinking of the committee so far and get some feedback. We are not saying this is all the wisdom there is, but we've got to start somewhere.

We also reviewed what other professions are doing and what kind of precedents exist. Accounting, law, architecture, and economics do not have any principles like

we have per se. The “principles” of accounting are more standards of practice. As for the things that we are tackling in the professions, such as the philosophical kind of expositions of truth, there is really nothing comparable. The Australian Society issued a paper a few years ago dealing with financial risk, probability and statistics, time value of money, homogeneous risk classification, and the need to make assumptions about the future. But it was not at such a fundamental level. We concluded that nobody else in the world has tackled this problem: we are the first.

Sam Gutterman took on the task of describing the actuarial paradigm. The paradigm gives the context in which these principles are set forth and demonstrates we are more than builders of models of risk. We build risk into our models based on knowledge. What distinguishes us from the operations research people is an in-depth knowledge of the environment and an attempt to replicate reality with models. However, we also interpret the results of the model to build better programs. This paradigm is not restricted to insurance, but includes anything involving risk or the present value of future contingent events. Also, we use feedback systems to modify the risk via loss reviews, experience reviews, etc. This is the essence of what actuaries do when functioning as actuaries. Of course, there are actuaries who are functioning as chief executive officers (CEOs), but they are not putting their actuarial hats on.

Principles are observed truth and are not expected to change. However, we cannot take the position that these articulations are immutable truths. As the audience matures and we get more input, I am sure we will change the articulation of the principles. The fundamental truth—for example, the law of large numbers—is not going to change, but our ability to articulate is going to improve over the next few years. Still, we have got to get started, so that generations from now they will have something to work with.

The Companion Document was an idea the CAS came up with. We got some early feedback from the CAS membership that the pithy, mathematical expression of the General Principles document was not going over that well. It takes some work and study to get through it, so we came up with the idea of a Companion Document to give some examples. We will see how that works. Also, there was feedback that said, “Why do we need these principles? We have done fine without them. What do we need these ten commandments for?” I think we need to tell the members exactly what the principles are for. They are not standards of practice, of course, but they guide research and education.

On risk classification, the new simplified principles of risk classification got down to one or two or three statements. Every risk is in one and only class. You can actually do risk classifications so the classes are mutually exclusive and exhaustive.

Everybody with the same characteristics falls into the same class. The risk variables can actually be put in a model that is valid, if you have data from observed results that is potentially valid for every class.

The CAS had developed a draft of risk classification principles. This was a working version, which we will probably have to suppress or change or maybe put in an educational document. "A risk classification system groups insureds with similar characteristics to reflect differences in expected cost" This is a definition. "Every insured is in exactly one class and insureds with the same characteristics are in the same class." "A risk classification system is actuarially sound if rates are established using rate-making principles." The CAS has such principles; the SOA does not. The rate-making principle says rates should provide for all expected future costs of the individual risk transfer.

Another principle has the word "should" attached to it: "You should avoid material risk of adverse selection." Principles are observed truth and statements of principles do not involve "shall" and "shall not." This "principle" probably belongs with the standards.

Just to rehash: the Academy's Risk Classification Principles of 1980 had lots of should and shall. This document is, I guess, still binding on everyone because we adopted it officially through the Academy. Again, this was written as a response to a regulator that had coined some phrases that seemed logical—causality and controllability.

Causality is hard to prove in a particular case. Correlation may be important, but you do not actually have to have causality.

Risk classification is a major area. I believe we need a white paper to put it in context. The short version that is in this draft of General Principles is not sufficient to guide actuaries. Standards will have to be looked at again by the Actuarial Standard Board.

Mr. Dicke: We should mention that companion documents are being worked on for the health and pension areas, and we are even considering whether there should be one from the practice area in the Society that relates to investments and financial management. We hope to have those companion documents produced so that they can accompany the Exposure Draft when that is mailed out. Also, I would encourage anybody in those practice areas that has an interest in principles to contact the chairpeople of the practice area principle committees. The chairpeople are: health practice area, Jim Roberts; investments and financial management area, Mike Hughes; and pensions, Carol Gramer. Call any of those people if you have

ideas on how the principles do or do not fit those practice areas. We would like to have your input before these people start working on companion documents.

Of course, we have been receiving comments from the membership and I thought it might be interesting to bring up some of these comments, although they have not yet been discussed by the joint committee.

I will not identify the commenters because they were not told their comments would be used in public, but I think they would be happy to have their ideas discussed. One comment criticizes the Discussion Draft for a narrowness of vision of actuarial and financial modeling and mathematics and suggests that the related key core concepts of utility theory, risk-adjusted economic valuation, markets and arbitrage, and market price of risk are poorly developed, if at all.

Mr. Walters: This is the very thing we want to surface. Get the commentator's name, put him or her on the committee. Twenty-five percent of British actuaries function on the British equivalent of Wall Street. They don't do any insurance work at all, but their training in actuarial science enables them to work in the investment area. The area of investments and other financial risk is an area we do need input on. Are these all the principles and all the truths? No, they are not. We have to wrestle with that and invite any input, so I would entertain that we get a subcommittee going, maybe even in collaboration with the U.K., on abstracting those principles that are essential to actuarial work, which is not carried out in the context of insurance.

Mr. Klugman: One of the difficult distinctions to draw is what is an actuarial principle versus what is a principle that governs what actuaries do. We do many things that aren't purely actuarial and that overlap with other fields. There are other things about which you can say, "That is clearly an actuarial function." One of the things we struggle with is whether an actuarial principle is supposed to be limited to those unique things that make us actuaries and that separate us from other folks, or should this collection of principles also include other things that actuaries do.

Utility theory, economic valuation, arbitrage are about the way in which we set premiums, the way in which the markets impact what we do. Are there actuarial principles here or is this merely practice? I think there may even be a larger struggle on these particular topics. If we declare that utility theory is a principle, does that mean that is the way we have to do all of our work? If utility theory is just a tool, then it is not a principle. That is not to say actuaries should not know or use utility theory. One of the hard questions is, "Are these things on the list of principles or are they merely subject matter that we should know about and use as appropriate?"

Mr. Dicke: I will say a little bit more about markets, arbitrage, and so forth. Financial economics is a whole new area in which actuaries are undoubtedly very interested. Writing some principles for financial economics would be relatively easy right now, because that discipline is at the stage where it is getting founded and people may be a little more clear-eyed about what they are trying to do. First of all, you would define “securities” and other forms of financial instruments. Then you would say, “There are markets that determine the prices on all these things.” That would be an assumption. Unfortunately, for most of the things that actuaries have dealt with historically, the prices are not set in quite the same way as are prices of securities. Insurance does not have secondary markets that ensure that arbitrage is purged out. Thus, some of the concepts from financial economics apply only to a limited degree. But we are now starting to develop products, such as equity-indexed products, that are going to reflect more of the market, so maybe the time has come to start adopting some of the principles of financial economics as actuarial principles. That would mean a whole new chapter to the General Principles draft. We did nod in this direction by adding the definitions of hedging, diversification, and pooling.

Mr. Sam Gutterman: I am interested in the evolution of accounting on the international scene. One of the fundamental principles of the accounting community appears to be the existence of a “fair value” of financial instruments as opposed to market value, because not everything has a market. That is a concept that might be useful to explore. It may be an operating principle rather than a general principle.

Mr. Dicke: That is an interesting point. Basically you are saying they have a definition—fair value—and, if they have a principle, it is that a fair value can be assigned, even in the absence of market value. Clearly there are some places where the accountants would prefer to say “market value,” and if you have a market value, they want you to use it. But if you do not, they have a concept of “fair value” which sometimes they look to actuaries to help assign.

Mr. Klugman: As we get these suggestions for areas we have left out, it raises the question of whether we should issue General Principles until we have them all.

Mr. Walters: How many feel we should wait until we have them all before we issue something like this? The record shows none.

Mr. Klugman: We have obviously received lots of picky, small comments, and that is good. If you do not like just a particular word we have used, feel free to tell us about it. Send us dictionary definitions of how we have misused something. Anything is fair game.

Mr. Dicke: Fred Kilbourne called our attention to a definition from a strange dictionary. It defined the word “executioner” as “a person who does what he can to abate the ravages of senility and reduce the chances of being drowned.” I thought this definition could be helpful to actuaries. It comes from something called *The Devil's Dictionary* by Ambrose Bierce.

Another person has taken us to task for using the word “predict.” I throw this in Mike's direction because I think the word “predict” came in the context of credibility where it was a measure of predictive ability. The comment may be paraphrased, “One can never tell the future, so how can one predict?”

Mr. Walters: I thought we had wording that set the context. Maybe we have to clarify, but we certainly didn't mean actuaries can predict next year's result.

Mr. Dicke: One of the comments we have run into in the SOA over the years is avoid words like “predict,” and we tend to try to, but I think a lot depends on what is meant by “predict.” It is a question of whether you mean “predict exactly which event will happen,” which no one would try to do, or whether you mean “predict some average or statistical measure.”

Mr. Michael J. Cowell: We know as actuaries you can never predict precisely the probability of any event. I think your use of the word “predict” is appropriate. It comes from the Latin “pre-” meaning in advance and “decorate” meaning “to speak,” so you are “speaking in advance.” I think it is entirely right on.

Mr. Walters: It's definitely important that our document make clear, whatever word we chose to use, that we are not seeing the future. We are giving our opinion of what might—not what will—happen.

From The Floor: I am with a very small firm, I do not have time to do any theoretical work, so this is a real stretch for me. I agree with you that the word “predict” is fine as long as you do not use the word “prophecy,” which is what you just denied.

When you examined other professions who claimed not to have done any such work, I wonder if you had any concept as to why that is. Are others waiting for litigation to tell them what their principles are?

Mr. Dicke: Other professions do have some similar types of things. I think it probably depends on the type of people in the profession. I have a personal definition of an actuary as a mathematician who has found a way to earn some real money. In fact, we are a certain kind of people who perhaps like to analyze a little

more than other people do. There are accounting frameworks, for example, that are very important to the accounting profession and are very important in helping them determine the ways to approach a new problem, which they get a lot of. Those frameworks are not quite as theoretical as ours, but then accountants tend not to be as interested in theoretical aspects as our membership is.

You actually could write principles of this kind for some of the other sciences. In fact, there are philosophers of science who do that. Working scientists tend to not say them explicitly, but they work from these kinds of points of view. You could describe Newtonian physics, for example, in terms of observations about the world. It would not be hard to do that. In fact, it is fairly clear that this is what "physical laws" actually are. We are not completely alone. We just made it a bit more formal.

Mr. Klugman: We did talk at times about the issue of litigation; it is important to define what we do and that we have the right to do it. I think this showed up clearly in our reserving document which said that even if an actuary uses the right methods and the right procedures and does everything correctly, the world can turn out wrong. In this case, it is not the actuary's fault. Our document made that point. It is the method that we use, the building of the models, and the methodology that has to be sound. We cannot guarantee that the final numbers a few years from now are going to be satisfactory.

Mr. Robert L. Brown: I want to go back to some comments that were made earlier about the companion pieces and the desire to provide more of an introduction and perhaps more motivation. It seems to me this is not a document that is going to become dog-eared in the hands of a practicing actuary. We should let practicing actuaries know that is true. The motivation may be more to build a foundation that then allows consistent standards of practice and codes of conduct to be created so that they can at least have this common core of truth, if you will. If the operating actuary who has concerns saw that, then they would perhaps look at the document in a different light. Do we wait until we have all the principles? I think by definition we can't have all the principles. Certainly, we wouldn't have had any credibility principles in 1916 and we might not have had any arbitrage principles in 1940. Hopefully, we'll be doing some things a century from now that we don't even have words for today, much less principles. It is even possible that, while I have described these principles as "truths," they might change. In 500 B.C., "the earth is flat" or "the sun goes around the earth" might have been a principle. We might find that we have to change some of our principles as we become wiser and more knowledgeable.

The final part about this companion piece that concerns me are some of the letters that are coming back. There is some friction right now between the two large operating bodies of actuaries in North America. By the way, that differentiation does not exist anywhere else in the world. A couple of letters say, "I do not want these principles adopted because the SOA started this process." Or, "Do not tell me that a life actuary can determine which principles a health actuary has to operate by."

If we can state that these principles are supposed to be as close to absolute truths as possible and create a foundation for others to build on and that the General Principles statement will not become a dog-eared document in the hands of practicing actuaries, I think that would help a lot.

Mr. Walters: Yes, I especially like that. A foundation allows building, because we are not presumptuous enough to think we can articulate things for all time. We struggle with this and we hope that others will improve upon this. It's going to take decades before this thing is mostly done, but you have got to start somewhere.

Mr. Klugman: I hope everybody understands the Life Companion Document is a set of illustrations. It is intended to help you understand what the principles mean as applied to a particular practice area. It does not imply that we created the principles thinking only as to how they would apply to the life practice area. This document was just to help you as SOA members understand a little better what the principles mean in a context that I expect we all have some substantial training in.

Mr. Dicke: We have said that we are not sure this is a closed set of principles. I have thought one of the advantages is that at least we had a chance to think about that question. There were some things we tried and were not able to describe very well. "Exposure" is the most notable one. We spent a long time on this issue before we had the joint committee, and it is a very difficult concept. Sometimes a document like this can give you clues as to its own open ends—the loose ends that are dangling. The definitions I mentioned before of "hedging" and so forth were put in intentionally to be loose ends to troll out some good fishes from the sea of investment-oriented actuaries. Also, we defined "risk management systems," but we do not really say very much until we narrow the definition to "financial security systems." Did anybody notice that? Are there any open areas, any loose ends, that lead anybody to think of things that ought to be included that are missing now? We have heard about markets, of course, and if we want to include market economics, that would be certainly a big area to add.

To help us sum up, I consulted a book of poetry to find words to describe what we have been up to. This is the best I could find:

"Philosophers, more grave than wise, hunt science down in butterflies."

Hopefully, we have done a little more than that, but at the very least, we have had a lot of fun butterfly hunting.