

RECORD, Volume 25, No. 3*

San Francisco Annual Meeting

October 17–20, 1999

Session 49SM/IF

Reading the Tea Leaves—Are We in Hot Water?

Track: Futurism
Key Words: Futurism, Models

Chairperson: ALBERT E. EASTON
Panelists: LAWRENCE D. MILLER
ROBERT D. SHAPIRO
ROBERT G. UTTER
Recorder: ALBERT E. EASTON

Summary: In 1989, the Futurism Section conducted a study in which actuaries were asked to predict trends and occurrences of interest in their respective fields.

In 1989, some of the questions asked were:

- *What is the yield on new investments?*
- *The price inflation rate?*
- *The current trend to demutualization?*

Would you have anticipated:

- *The sustained low-interest-rate environment that continues today?*
- *The sustained low inflation rates?*
- *The widespread activity among major mutual companies towards demutualization?*

This session reviews the results of the 1989 Delphi study through interactive participation. Pit yourself against the "experts." The panelists share how trends and occurrences actually emerged compared with the predictions made in 1989.

Mr. Albert E. Easton: This is the one opportunity a year for Futurism Section members to get together. We had a meeting of the Futurism Council yesterday, and I want to briefly introduce those members of the council who are here. Steve Easson is a new member of our council this year. Frank Hacker, also a new member, will be serving as the secretary of the section. Paul Laporte will be our vice chair for next year. Cathy Elder is retiring from the council after this meeting. She has served very ably for the past two years as our newsletter editor. Larry Miller also will be retiring and has served ably as program committee representative. Bob Utter is our incoming chair.

We're going to be talking about the Delphi study, and I would like to get as many people as are willing to respond to these three questions: (1) Was there a question that was not on the Delphi study that you would have liked to see included? (2) Do you have any comments on something else you would like to know about the future? and (3) Is there something else you think the SOA needs to know about the future? The feedback on this will help us to set the agenda for the Futurism Section over the coming years.

The Delphi study, which has been a major project of the section over the past year, has received a fair amount of publicity, thanks to the very good efforts of the Society staff. Most of this session is going to be talking about the Delphi study and things that we did and could've done better, and the results of the study, and what some possible interpretations of them are. We're hoping for some feedback from you on how the study went.

The 1999 Delphi study really began with the 1989 study. The Futurism Section Council of 1988 and 1989 was wise enough to realize that it would be a good idea to have some real application of futurism tools that the Section could work with, and they chose the Delphi study as a good way to work on it. Because the 1989 study had as its time horizon the year 2000, we thought this was a good time to do another study. We had not only the Society's 50th Anniversary coming along, but we also were at the end of the time horizon of the first study, so it was time that we could go back and look at how well we had done on the predictions from the first study. I am very happy to have with us Bob Shapiro, who was actively involved in the first Delphi study, and I have asked Bob to talk with you about what went into that study and some of the background on it.

Mr. Robert D. Shapiro: What we didn't project is how much memory you'd lose in ten years. I'm not sure I remember enough to be really valuable, but what I thought I would do is reflect on some of the things that we had projected because I could read that. I looked at some of my file notes and tried to aggregate some of the thoughts that might be useful.

I tried to provide a context for looking at this latest study, which was done, I think, with a little more thought and reflection on the things we didn't do in 1989 that would make it more valuable. I'm just curious. How many people who are in the room were in the Futurism Section in 1989 when we did the study? Three. If I lie, three people will know it. I should tell you what my biases are as I look back on this. I'm in the insurance business, not the pension and applied benefit business. I've been a consultant my whole life; I never really had a job. I love looking at these things. I am unencumbered by memory of exactly what we all did in organizing the study, but I do have the results at hand and I can talk a little bit about that.

As I looked back through my files, and I am a pack rat so I have a good-sized set of files from the Delphi study, I came up with five items that are actually in the files, and I thought I would read them to you and maybe establish them as hypothetical principles.

1. "Experience is a heavy burden in times of rapid change." If you look back at that study, you see some of our experience coming out as we projected interest rates at 10%, inflation rates at 6%, and AIDS infecting 4–5 million people. Those are nice extensions of experience.
2. "Conventional wisdom is an oxymoron." I remember somebody saying that and it stuck with me all the way through this. As we look at the past in this time of change the things we normally hold on to don't work as well.
3. "Optimism is the absence of facts."
4. I think this one is important in terms of getting a focus on how we might use this 1999 study: "Creating the future is the best way to predict it." Sometimes I think we all forget that what we do from day to day can actually influence what that future is. That's probably more important to think about how we influence this and how we respond to some guesses as to what it might be.
5. "42.7% of all statistics are made up on the spot." That actually came from something more recent.

I thought what I would do is just give you some thoughts and some wisdom—maybe some other ways to look at the study and think in terms of raising some questions about what that study says for the businesses we serve and the actuarial profession.

Just thinking about what came out of the study as I looked at it was: "Why did we miss these things so dramatically?" An example would be interest rates and inflation rates. We projected back then, for example, that AIDS would have two or three times the impact it's actually had today. I remember there was an actuary back then who was saying, strongly, that we're wrong in projecting AIDS like this, that the influence of AIDS in certain populations is way over-projected. He turned out to be more right than we did.

I also remember there was a strong pressure not to do anything to reduce the scare caused by that projection. It would create the right awareness and keep the marketplace responding in the right way. There was somebody there who had a lot of good information and good ideas that we could have looked at. We didn't listen to him, and that wasn't what was projected. People stayed on this curve that would be 4 or 5 million. We were way off.

Another one that occurred to me as interesting was when we projected that very few mutuals would be demutualized. Are there any mutuals left to talk about? We ask why we were so wrong there. I was one of them that believed that. I thought, why would anybody want to be a stock company and commit themselves to all that pressure when they could exist without that and give the policyholders a better deal because they don't have to give the stockholders that return. I was wrong.

I think there is an issue that you can raise about all these demutualizations. All these mutuals are getting capital to compete in the marketplace and have no engine. What's going to happen? You come into the marketplace and have 6% ROEs, and you don't have an engine to produce 15% ROEs. What's likely to happen to these demutualizing mutuals? My prediction there is most of them will get bought by banks or somebody else because they just don't have the engines. In my opinion, why didn't the mutuals spend more time fixing the engine as a mutual when they were not subject to shareholder inspection before they went into the public market? I will never understand it. So why were we wrong? I don't know. I'm still not sure it's the right thing for all these mutuals to be demutualizing, not that anybody cares.

I found something we put together after the 1989 study that we called the Standard Scenario. Has anybody seen this? What we did was put together a standard; I'll just read it and give you a quick sense of what we came up with. The Standard Scenario is based on those areas where there was the strongest consensus among the 450 members of the Futurism Section participating in the survey. There were five things we came up with:

1. It's unlikely that a major war or economic discontinuity will impact the economies of North America or their insurance industries.
2. The insurance industry and professionals in the industry will be subject to a higher degree of regulation and professional scrutiny, largely as a consequence of increased federal involvement and consumer activism.
3. In both the U.S. and Canada, the government will mandate a much larger portion of insurance coverages and benefits in the year 2000 than they would in 1989 as the private sector fails to find adequate solutions.
4. There will be substantial shrinkage in the insurance industry's existing life, health, and safety markets by the year 2000.
5. Substantial new financial security markets will emerge.

I think all this is right in a general way. Where it's missed, I suspect, is a result of a lack of awareness and sensitivity to the discontinuities that have occurred and the fundamental changes that we just didn't see.

As I looked at the studies I tried to get underneath why the consensus was that interest rates would be 9.6%, which I think was the actual number. What are the underlying assumptions as to demographics, regulation, global activities, competition, and policy that would create those estimates? I think what came out to me was something that came out of the analysis of that 1989 study. Too much time was spent on the mean value and not enough time was spent looking at the distribution. That there is a tremendous amount of information in the minds of people who aren't on the mean.

One of the issues we talked about back then was, what do we lose by looking at mean value and trying to bring people to consensus in terms of the information and thinking of those that aren't near the mean? I'll give you an example that was in *The Wall Street Journal*. They were talking about life expectancy and the estimates

of average life expectancy for people born in the year 2050. They started with the Social Security Administration projections. Social Security projects that the average life expectancy, weighting male and female, will be 80. There's a demographer at the University of Chicago whose name is Jay Olshansky. I don't know him or who he is, but he projects life expectancy at age 85. There's a demographer at Duke, Ken Manton, who predicts it will be 90. There is a physician/economist at the University of Southern California, William Schwartz, who projects it will be 120. And, there's William Haseltine, who's the chief executive of The Human Genome Sciences, Inc., who projects it will be 150.

If you took a mean of those things you might get 105, but that's useless. If you look at those numbers and where those professionals come from, you start asking, why do they come up with those numbers? Why did somebody believe 150? I think there's a lot more information, and that may be a valuable way to approach some of these things.

What else? The flaw of averages. If you start to think in terms of what's underneath the projections and think of the hypotheses you'd make and how that would affect your estimates, I think it's always helped me to try to look at things that way. To give you an example, I have a theory that because of the customer focus and technology, the insurance business will become much more heterogeneous than it has been in the past.

Companies focus more and more on customer segments. They'll know more about those segments. They'll service that business according to those segments. They'll market with those segments in mind. The in-force business and the business they write will be much more focused on who they are trying to serve. If that's true and things are becoming less homogeneous, what does that mean for things like mergers and acquisitions? People out there consolidating lots of business who are just focused on teachers couldn't pick up a general block that has 50,000 teachers, 50,000 firemen, and 50,000 nurses because that wouldn't fit their profile.

If you believe that something like that is true, that things are going to be more heterogeneous and focused, then a lot of other pieces of the business will change and I suspect that affects some of the projections of these variables.

If I believed that, I'd project differently than if I didn't believe it. Or I'd project differently than if I hadn't thought of something like that. Again, I'm not quite sure where this is all leading, but since I didn't have any facts I just thought I'd make up things that we could talk about that might be useful for 1999.

I think what I'd really like to do in the discussion is get your input and talk about, assuming this study has provided some useful input, possibilities of how the future might look. What does this mean for us as actuaries, the profession, life insurance companies that we serve, corporations we serve, and consulting firms in terms of how we might need to do business?

I haven't done this, but it would be interesting if you took results of the 1989 Delphi study and said, "Let's assume this is true. How does this correlate with how we view the actuarial profession, the vision of the profession, and our own visions as actuaries? How does that correlate? Are we doing the right thing? What should we be doing differently as a profession and as individuals?" I think that would really be useful input there that would be valuable, I think, to everybody.

I thought I'd do one other thing and then I'd go on to somebody who really knows something about the 1999 study. We had a panel discussion after the 1989 study, and in my pack of stuff I found a note that was written along the lines of, "Here's the input we got from the panel discussion as to what we'd do if we were to do this over again and what we might do to help us both strengthen the study and interpret it with more richness." Here are some of the things that we thought of:

- Ask a sample of individuals what specific projections or events would mean to them.
- Ask a sample of individuals what they would do if certain discontinuities did occur. That's one thing I think we spent some time on.
- Are there some possible discontinuities you could project, like federal regulation of insurance companies? Is that something that's possible? Or how about Schwab becoming a major competitor for financial services? What does that mean for us?
- Identify a number of potential major discontinuities and ask a sample of individuals what they'd do in anticipating them. Go outside of the actuarial audience for input. Consider, for example, academics, employers of actuaries, bankers, etc.

We thought it might be interesting if we took that study that we put together as actuaries and asked marketers or academics the same questions to see if we'd see the significant differences (we thought we would) and then try to understand what the reason for the differences would be, see if we learned anything from that, and then get input from other sections of the SOA.

The last thing I noted was, in going through the program, there are several other sessions that have a similar tone to them. There's a session on Jim Anderson's predictions, (Session 124PD, Jim Anderson's Predictions) which I wish I could go to. I'm conflicted, but it's just a discussion of things he predicted and what's come to pass and what hasn't. I suspect there will be some useful information there. He's one of the treasures of the profession's past and wasn't shy about making predictions at all. And then there's an executive session. I think it's (Session 87I, The Actuary as CEO) promoted as CEOs talking about the future of financial services and the actuary's role within them. I think that's another session that would be very interesting and can be related to this.

Mr. Easton: As I heard what you said I realized that probably we spent a little too much time, just as you did, focusing on the mean. The real Delphi technique, which was pioneered by the Rand Corporation, consisted of more than two rounds of responses. After each round you not only got a feedback as to what the

responses were numerically, but also you could call on each respondent, who was given the opportunity to explain why he or she felt as he or she did. That went way beyond the resources that we had available to do the study, and probably beyond the level of interest that most of you would've had in being respondents to the study. But it would be very interesting to know, particularly in the second round, who the outliers were.

In the first round you might have guessed wrong, you might not have read the question right, or you might have thought about it for a very short time. In the second round we hope that everybody not only looked at answers from the first round, but also had thought about the question if it was important to them sometime between then and the first time they'd seen it. They had a more thoughtful response the second time around. So it would be interesting to know who the outliers were after the second round and why they were out there. Obviously we didn't have the resources to find that out, and I don't think we could've done that. In any case, at this point I think we will spend some time telling you about the results of the study and going individually, question by question, through some of the responses that you made to the study. Larry Miller is going to be the first presenter on the first part of the study.

Mr. Lawrence D. Miller: Bob Utter and I are going to take turns in looking at a few of the questions. There are 25 questions here and we don't really want to attempt to look at them all. There is a commentary attached with your set of results that has already been drawn up, so there doesn't seem to be much point in reading that commentary to you. We thought we would touch upon some questions that might be of interest. We would encourage you to provide further input because there's a whole bunch of areas of practice covered here, and we don't represent all those areas of practice.

I am going to start off with Question 4, which asked about the probability of employment-based health insurance being replaced by some other mechanism. With respect to National Health Insurance (NHI), I really don't know a lot about this topic, but it struck me as interesting that at our opening session Governor Cuomo was talking about this too, and it seems to me that changes to employment patterns in the future might give rise to the need for some other ways of delivering coverage.

There may be an even larger need for provision for those without access currently, because what the Governor was saying was that there are already 44.3 million people without access to health coverage. It seems to me that that probably is not going to exist as a palatable situation in the long term or be allowed to grow.

There's also a comment in the results about NHI. I don't know if there's a trend towards that direction or not. There's a comment about other plans in other countries being in difficulty. I don't really think that most of them are going to end up going out of existence, though. Those plans that I'm aware of are adjusting their coverages to work together, maybe in a combination of private and public coverage, and perhaps there's something on the horizon in those kind of areas. I

don't know if anybody is an expert in health insurance that would want to comment on that one.

With respect to Question 5, on the CPI, it doesn't seem to me very long ago that there was a group of actuaries that I was working with that was quite concerned about the prospect of deflation. Today I think the CPI increase for September 1999 was announced as being 0.4%. There have been big increases recently in gas and certain kinds of food. There's a really tight labor market, so there's a lot of worry about the rise of inflation again now. Inflation hasn't really been a concern. It's been well-controlled for quite a while now, and I think I would agree with Bob that our best estimates are based on where we are currently. We don't look too much at the variation.

I don't think it's unreasonable that our best estimates are based on where we are currently. I'm not sure there's a lot of justification to say we should be estimating future inflation based on where we were in all of 1981, but we do not pay enough attention, I don't think, to variances when we're doing these kinds of estimates. I think we'd be glad to hear others talk about where they feel inflation might go given that certainly health care inflation would seem to be subject to a lot larger increases than general inflation.

Mr. Robert G. Utter: Bob didn't comment on this, but in the 1989 study one of the areas where they were way offtrack was on the level of inflation. Now, in 1989, they had just been through one of the highest, maybe the highest, inflationary period in the history of the country where inflation had been in the double digits for a few years and was now beginning to glide off to the 7% or 8% level, so they happily predicted that inflation would be at about 6% or 7% in 2000; I guess they got it down to 5%.

Actually, they were way offtrack. Inflation has been about 2.5% and probably will be at that level, at least for the next year or so. For the interest rate, which is not unrelated to inflation, we made about the same kind of a mistake in 1989. I think this is one of the things that we have difficulty doing a good job on projecting. There really is no way to project it from trends. All you can say is, this is what's going on now and as far as we know this will continue, but the probability of a level of inflation actually continuing probably isn't very good. It's probably more likely that it will be something different from what it is now, but we don't really know what it is.

Mr. Easton: One thought here is that maybe focusing on the year 2000 can be misleading. If we looked at, say, the span of years 1997-2003, we might get a different result; it's hard to pinpoint a year. We're sitting on a year right now that may be an unusual year in the whole pattern. Maybe to our credit, if you look at the average over the six years, we may not wind up with a 1.5% or 2% average inflation. Maybe our planning ought to be at something different from that number for the year 2000. There are so many ways you can look at this, but looking at points in time and looking at mean values is pretty limiting, and I think you could come to some pretty bad conclusions from that.

Mr. Shapiro: Marketers and private forecasters, like the Social Security people, try to forecast what the average will be over a 50-year span, rather than taking 1 year. If we're thinking about the future we should be thinking what's the average CPI increase possibly going to be over the next 50-100 years. Then you can think about it in quite different terms than thinking about the single year 2010.

Mr. Miller: Companies do try to pick a period of time longer than you can extrapolate for most of their future projects. In other words, the idea of a future project is to not go two or three years, but ten years where it's hard to extrapolate now. What you really have to do then is begin to think about the forces that will act over that ten-year period and then come back from there. That gives you a chance to think outside your box, and while many companies won't necessarily act on what they think, they'll now have a group of factors that they can follow more closely and be ready to act on if those things happen.

Mr. Shapiro: Maybe we can move on a little bit. Question 7 sort of addressed the topic of stock market drops, and that's always interesting in October. It seems like the stock market does funny things often when we have an annual meeting. Once again, currently there is a bit of stock market unease. The Dow went down, I think, 2.6% on Friday and then went up, I think, 96 points yesterday; it's up again substantially this morning, I believe. Possibly, Allan Greenspan's comments may be making some of this unease, but certainly there are a lot of other factors.

Some of the things that we might think about with respect to the future of the stock market are things such as the baby boomers, and the possibility they might become even bigger savers as they get closer to retirement. On the other hand, there might be more demand from them for certain types of investment, or for inflation-proof investments in some cases. Some of these factors will work together and I wonder if there will be any points of substantial cash outs from some of these markets when boomers are actually at the point of retirement. For example, they may remove money from one type of investment in favor of others if they want to reduce risk. I don't know if anybody wants to talk about the stock market; there ought to be some expertise here.

Question 8 dealt with unemployment, I believe. Again, as the baby boomers retire and the ratio of workers to beneficiaries in the Social Security System drops, it seems to me that any available workers will be more and more needed and in demand for their services. Despite the fact that boomers may retire with a pile of money, they will still need someone to actually provide services to them, and that, to me, will help keep unemployment well down in the future. But there might be some quite unappealing jobs within that that have a pretty high demand for workers, in fact.

I think it's also possible that we may be able to do more and more with fewer workers in some areas of work and that we can see some increased automation to help us with some of those things. Certainly we've seen that kind of thing happen over the last 10-30 years. There used to be a lot more human service than there is now in getting your gas or going to a bank or things of that nature.

Question 9 deals with women at work. I think the trend there that's talked about is pretty clear. I have a friend who, in fact, is dean of a university medical school. He told me recently something that kind of surprised me. In this medical school women now dominate in the numbers each year, and they expect to produce 55% female doctors to about 45% male doctors in the future. That's a real change from when I was at the high school level, when traditionally it was a male-dominated profession. The existing doctors are still probably more than 50% male, but in the future that's going to change.

It made me also wonder about the direction being taken by our own profession. I asked a few people that question, but no one really seemed to know what the current statistics about people writing examinations within the Society are. I would be interested if anybody here knows if we're going the same way as some other professions and what percentages are male and female within the profession. Does anybody know anything about that topic? I asked a couple of staff people, probably the wrong ones, because I'm not sure exactly who I should ask.

Mr. Easton: I remember one time recently, Larry, looking at a list of new Fellows and trying to figure out just from the names of people how many were male and how many were female, and the percentage of females was getting close to 50%, which is what I would've expected. That's really an anecdotal thing. I have no idea of the percentage of people now taking exams; I'm not sure that anyone knows.

From the Floor: I do not know about the exams, but I guess a related question might be, what will be the percentage of births that are female or male? As I understand it now, in Korea much more than 50% of births are male. What will happen in this country as more and more people are selecting gender in the future? What will be the percentage in the population?

Mr. Utter: That's a very good question. It is becoming somewhat possible to help choose gender, and it may become much more possible in the future.

Mr. Shapiro: By the way, the question on women in the workplace was the one place in the whole study where we did change the wording a little bit in the second round of the study. In the first round the question read like this, "The percentage of women in the labor force in 1990 was 45.3%." We were afraid that some people might interpret that to say, "Of all the women, how many are in the labor force?" That obviously wasn't the intent of the question. The question was, "In the labor force, what percentage are women?" We rewrote the question to make that clearer the second time around.

Mr. Miller: Maybe I can just make a short comment or two on Question 13. We didn't have many questions that really dealt with the issue of retirement. Question 13 deals with the ratio of workers to beneficiaries. I think a lot of predictions over many years have indicated the likely change in the ratio of workers to beneficiaries and the direction that that change is going in.

I think the baby boomers are really somewhat younger than the question or the write-up intimates. I don't think they're mostly in their 50s— the oldest of them have only reached 50 maybe 2 or 3 years ago. Many are right now accumulating substantial funds and having impact on investment markets, such as the stock market. I think the ideas about how we save for retirement are being influenced by the number of baby boomers who now are in a position to save. We end up discussing issues such as IRAs for Social Security. I think there will be a lot more public relations around saving for your retirement in future years as the baby boomers get closer and closer to retirement.

This question or other questions don't really address some of the other retirement issues of things that may be fundamentally shifting in the next 50 years, such as retirement age. Not too many years into the past we had a lot of people finding their way out of or being removed from jobs through early retirement packages as companies downsized in some areas.

On the other hand, we had people who were educated and certainly healthy enough to go on working for a number of more years. They didn't need access to retirement benefits at age 55, and we had the opposing force of why don't we push retirement ages up to match peoples' capabilities. There was a bit of a tug of war on which direction that should take. Maybe we need to look a bit, as actuaries, at where we think retirement ages in the population might go. I'd be glad to have anybody comment on that as well.

Mr. Utter: I'd like to take a slightly different approach here. Al asked me to go through and look at some of the results and some of the questions that I challenge. What I'm going to do here first is look at a block of questions, Questions 14-19, and Question 19 is the one that ends up with the estimate of the life expectancy. My feeling is that we greatly underestimate the effect of genetics and genetic engineering and improving the health care and cures in looking at these various causes of death, ultimately leading to a greatly underestimated life expectancy.

Eventually we're going to end up with a vote. We're going to vote on what this group thinks the life expectancy will be in 2050. But if you look at heart disease, it's less than a 50% decrease in deaths by 2050. In 2010 there's only a very slight decrease. It seems to me that hardly a day goes by that you can't hear something on TV or read in the newspaper about the progress that is being made towards curing heart disease and cancer. It just seems to me that we don't really comprehend how fast these things are happening. By the time you hear about them in the newspaper or on the TV, they've already been done for six months.

It's probably not fair to judge the people who completed the survey, but my sense is that through a lot of these things we greatly underestimate the speed at which a lot of these things are going to happen. That can be a big problem for our profession or our organization if we don't have a sense of what is really happening out there. Some of this stuff is scary, and some of it is remarkable. And it's happening faster and faster.

The AIDS death rate, Question 18, does show a substantial decrease by 2050, and in addition to the mean, 35% of the respondents thought that it would be less than 5%. Is that a cure? Does that mean that AIDS is cured, or that there's a treatment for it? I'm less worried about that than I am about heart disease and cancer. My challenge to you is, what is your reaction to the change in the death rates over the next 50 years in regards to some of these major diseases? Does anyone have any thoughts, agreements, or disagreements?

From the Floor: What was the life expectancy in 1950?

Mr. Miller: It was, for individuals born in 1950, somewhere between 60 and 70, depending on gender.

From the Floor: How about today?

Mr. Miller: Today, or at 1995, it is 72 and 78, something like that.

Mr. Utter: I think they just announced it was around 78 now. This is another one of those situations where you just can't keep extrapolating; you have to analyze the forces that are acting and the effect that they're going to have on the expectancy on life. I'll do my survey first, and then we can talk about that, because, really, Question 19 on life expectancy is sort of a combination of all the ones that went ahead of it. How many here think that for a person born in 2050 they can be expected, on the average, to live to be 150? No one? How about 130? 110? Let's just say 100? 90? OK, I'm not going to go to 80. There's quite a group around 100 and 110.

My concern on this question is because over half of the respondents said that it would be greater than 82. When we calculate the mean, it's going to give a false impression that actuaries think 82 in 2050 where in reality I think life expectancy will be closer to 100 or 110 in 2050.

This has significant consequences as you think about how you use this information. If, in fact, people are living to be 100-120, that has profound effects on the insurance, retirement, and annuity industry. I just wanted to make a point here that we have to be careful, as Bob said, about using these means. When 50% of the people are over the 82 number and we vote that it's somewhere between 100 and 110, we have to be careful how we express this result. A lot of people pick up on this life expectancy issue in the press. I'm just concerned that it can be misleading for our profession to say it's only going to be 82.

From the Floor: How was the mean calculated? What was the upper limit?

Mr. Easton: I think we chose about 85 as the upper limit, which is probably unrealistic.

Mr. Utter: What about 105, which would send this up to 90?

Mr. Miller: I guess we need to get into more heterogeneous questions or something. In other words, I think it would be more helpful or thought provoking if we targeted the question more to what I need to know. If we divvied this up and we analyzed how we expected the life expectancy to increase, or mortality rates to decline—let's say during the working lifetime, then I think that your point about the heart disease rate coming down certainly is much more optimistic for that age range. It will continue to fall and get better.

I guess I'm of the opinion sooner or later something has to get us. The other thing is I think a question more relevant to our needs would be, what do you believe the life expectancy is of a person at retirement age, let's take 65, and what do you think it will be in 2010 and 2050? Because that means we need products and designs that have to cover 30-50 years, and I think we need to move out.

One of the calculations that I've been thinking about is really the percentage of the person's lifetime that is actually spent working. I would guess that at some point in the past 10 years we've begun rapidly approaching the point where it's less than 50%. I think that's a real issue for society. Because of the technical nature of the job you're delaying your entrance into the workforce to get a master's degree or a postgraduate degree. Then you're getting burnt out and you want to retire sooner, and over an average life expectancy you are spending more than half your time being supported by someone else instead of supporting people. I think that's the issue that we really need to focus on, because that seems to me an insoluble social problem.

From the Floor: Isn't there a difference between the life span and the life expectancy? If you look at the graphs of how old people were in 1900, it spans from zero to 100 or 105, and if you pluck the same numbers now it's still between zero and 105, but more and more people are at the upper end. What's happening is that in this view that stays the same, so there still is a maximum life expectancy; it's just that more and more people are getting there. The question is, what's going to cause a dramatic change in the life span, which hasn't really changed a lot in the century?

Mr. Utter: I think the ability to have replacement parts, so to speak, in the body is going to lengthen the life span. Let's say the life span goes from 120, which is kind of considered where it is today, to 150. Is that longer period going to be a period of health or a period of sickness? Most of the medical profession is betting that it will be a period of health. In other words, people will live longer and healthier, which will result in what they call the squaring of the mortality curve.

Who knows, but we had a group of actuaries get together and talk about what would be the impact of a significant increase in life expectancy on our company. When that group of actuaries started they had no idea what all was going on out there. We brought in molecular biologists and geneticists to really explain what was going on. They started out with the idea of 80-90, but walked away with the believability that it would be 120 and in 50 years the life span would be 150.

I think this is a very significant point that, first, we don't want to mislead the public through our results and, second, it's a subject that our council thinks would be a healthy discussion at a future meeting: What happens if life expectancy is now 120? How would that change everything?

Back to your question about retirement. A person may retire 3 or 4 times by the time he or she reaches 120. What they may do is go to college, work, retire, go back and get reeducated, work, retire, etc. You may have three or four retirements, particularly if you maintain your health!

Mr. Easton: Bob, I just wanted to add a comment. I think we need to educate the public to the fact that the concept of life expectancy tells how long a person would live if today's mortality rates applied to them. In fact, the mortality rates that will apply to an infant born today are the mortality rates of the next century, not the mortality rates of 1999. The real expectancy, the number of years that a child today can expect to live, is probably in the neighborhood of 90-100. I saw one or two little infants at the reception last night, and I think there's a very good chance that they will be around for, and maybe even attending, the 150th anniversary of the SOA if they can pass the exams!

Mr. Utter: I think there's a good chance that we will see improvement in the average expectancy within the life span, as well as an extension of the life span. If you look at the first, a lot of the current drugs coming out don't really treat the diseases. For example, look at Cox 2 inhibitors. They do help 3-4% of people who have stomach problems, but 50% get them. It's not really treating the disease; it's treating the pain. Look at cholesterol drugs and high-blood pressure drugs. Again, they're treating symptoms, not the disease. There are some books in the popular press now that talk about the top 20-25 causes of disease and there are potential gene therapies to treat all of them. Personally, I think that's why they aren't coming down hard on the drug industry right now because of the profits. They're letting them continue to work on those that come up with a promise.

On the extension of the life span, what I've read seems to imply that the squaring of the curve is really dependent upon cell replication. There are actually a few therapies there that might extend the cell replication that are in trials on mice right now. I think there is some potential there for actually extending potential life expectancy.

Mr. Easton: Maybe we can get back together in 50 years.

From the Floor: Just to come back to the impact of genetics. I think, first of all, we ourselves should know much more about this topic. The impact of genetics, it seems to me, is potentially huge. One was mentioned earlier by the speaker, saying that the progress of medicine and the significant increase in the life expectancy are going to be using genetics and not drugs. But what would be the impact on the demographic explosion? We have just had the 6 billionth person born, so what is going to be the impact on that? There is going to be a lot of consequences on the economic side. We live on a limited planet.

Mr. Shapiro: A lot of these things we're talking about here are the U.S., the U.S., the U.S. Go to other sessions and they are saying increasing globalization. To some extent if we're talking 2050, shouldn't we be talking planet and not the U.S.? On top of that one you have a question on how many states are there in the union in 2050?

Mr. Shapiro: One counterbalancing thing that occurs to me is a wildfire theory of population control. In Yellowstone they periodically have these grass fires or brush fires that clear out the brush so new things can grow. Maybe that happens to humans, too. Now we're looking at encephalitis in New York, and strains of viruses that don't have cures, and antibiotics creating bacteria that don't respond in the people who have taken them too often.

Maybe there are epidemics, viruses, or things that will happen that might balance these genetics on the other side. I've heard it actually said in the financial services arena that all the mergers of the banks and insurance companies are clearing out the deadwood for new companies to grow up. It's just a conceptual framework we're looking at: how things might change in life. I'm not sure I agree or disagree, but I think it's an interesting way to look at this, that there are natural forces that sometimes do this balancing to some extent on their own.

Mr. Utter: In the study we did at my employer, our belief was that the technology, meaning genetic engineering, will solve all those problems. They will find the causes of these diseases and come up with solutions. The ultimate question is going to be, will society accept that? In other words, the balance of the desire of society versus the science that certainly is going to move faster than society's acceptance.

You see what is happening today with genetically engineered food in Europe. There has been a big, negative reaction to that. These genetic processes will be expensive for people to start with; you will build a superclass of people who can afford to pay for these things and a genetic underclass of people who cannot. Will society accept that? Will religion accept that? The science is almost certain to be there, but society is still a long way from there. That could stall this great advance—the fact that society just isn't ready yet to accept all that. Any other comments on these?

From the Floor: I guess I just want to follow up on one point. Because our profession is really geared towards contingencies and distributions, I think maybe we could fashion in the future some questions along that range. In other words, it's not what expectancy will be in ten years, but what volatility is involved. In other words, over the next ten years do we expect some period where we'll see a spike over 10%, and what's the predicted force on that?

I also think that's probably true overall on the mortality improvements. I believe we'll have another AIDS kind of thing, as Bob indicated. I was reading that the state of our research on microbiology has kind of been on hold for 20 years now. We thought we had cured it all, hubris being what it is. Getting back to my other

point, I think something will come along that has implications for term writers, for example. If a new disease just comes in, it's going to spike in ten years. We'll put the resources on and solve it, but in the meantime we'll take some losses. I think questions about volatility in the markets, as opposed to a single day drop or over the long term, gives us more thoughts about how we need to plan and protect ourselves in what we do.

Mr. Miller: I don't know if you saw Jack Bragg's article in the August 16, 1999 issue of *National Underwriter*, but he claims something called health expectancy, which I really thought was interesting. I know I have an 87-year-old mother, and we're all thinking about ourselves and our parents. They're more interested in how long we can live in certain various states of health. He had a discussion of this which I thought was excellent. We, as actuaries, ought to think not only about dealing with life expectancy but dealing with the concept of health expectancy. If somebody is 60 years old and in this kind of condition, what kind of expectancy of living at a certain level of health might he or she have?

I think that would be useful information in dealing with long-term-care issues and retirement funding issues. I thought he had a great idea, but I don't know if anybody else has picked up on that.

Mr. Shapiro: We really seem to be talking about two different things. The expectation of life and life span. With respect to the expectation of life, that's an actuarial concept based upon the mortality table, and it doesn't really relate to any one person, as someone pointed out. It's my recollection that neonatal mortality is a big influence on that, and I don't know how much more room we have in neonatal mortality.

With respect to life span, the survivors of some of these recoveries from cancer, for example, are substandard lives, so their expectation is greatly reduced at that time. Nature seems to be reacting: Where we find a cure, it finds a new cause. More important (and I think, someone touched on this, too) is the psychology of the people. Are they willing to change their lifestyle to be able to extend their life? I know people, I talk to them, and as you pointed out, Bob, there are those who say I don't want to live in a state where my mind isn't all there. I'm not sure I wouldn't be among that group, but maybe I am in that group.

Then, finally, there are the disasters and accidents that we have no control over, which are going to have an influence. I'm more pessimistic than some of these estimates that I've seen or heard here today. My feeling is if we get to age 90 for an expectation of life at birth that will be a real achievement.

Mr. Miller: I didn't have too many more comments. One that we didn't discuss too much was accidents. It seems to me that we're becoming more and more paternalistic and protective, trying to avoid every possible accident. I don't know, maybe we're searching out more exotic accidents to have or something to maintain the rate of accidents. I think we've already made the comments I was going to make on Questions 20 and 21.

Regarding Questions 23 and 24, I think we could think a little bit about the future of actuaries and the actuarial profession. There may also be a bit of a territorial struggle for actuaries who are entering other fields, I think, in the future, because it seems to me that non-actuaries are getting involved in some things that we would probably see as some of our traditional areas of turf.

For example, I think for some of the accounting standards in the retirement pension areas and benefits areas, the accountants have taken a really strong role in those areas. Certainly, within some insurance companies I believe that there are a lot of chief financial officers who are CPAs, not actuaries. Also, traditional actuarial evidence is sometimes being presented by people who are from other fields, like accountants, rather than actuaries. I think it would be interesting and maybe worthwhile for us to think a little bit about the future of our relatively small profession compared to some of the forces who would like to compete with us as a profession. I think that's basically the end of the list of questions. Does anybody want to comment on any of those?

Mr. Easton: I will add a comment on Question 25, which asked about the SOA members from other countries. Right now they're getting very close to 10% outside the U.S. and Canada. And that is expected to grow.

I got an interesting comment by e-mail from one respondent. He said, "I don't think this question has any meaning because I don't think the SOA will be an important context 50 years from now. I think that the international actuarial organization will predominate and whether or not you're an SOA member will be irrelevant, or the Society may have taken a different role, strictly an educational role for nationalistic concerns." It was something along those lines.

I responded by saying he should try to respond to the question as well as possible in the context that it was written. But it's an interesting question. Will the Society continue to exist 50 or 100 years from now? Someone commented on the fact that increasing globalization is already having an effect on our work, and I think the study was a little bit too U.S.-centric. I wish we could've found a way to make it have a little more of a global perspective, but we weren't able to do that. I'd be interested in any comments in this general area.

Mr. Utter: With respect to the SOA and being here in 50 years, I'm reading Bob Shapiro and those rules that he developed—creating the future is the best way of predicting. I think that that's a challenge. It's a very interesting question or comment that your respondent put to you, but I think it's a challenge for all of us to make sure that we turn this organization into a global influence. It's up to us to do something to make sure that the SOA is relevant 50 years from now.

Another comment in connection with the study being U.S.-oriented. Some time ago we were talking about improvements in life expectancy and what nature is doing to upset our improvements. We have things happening in other countries that we want to think about, I guess. We may have misprojected AIDS here in the U.S. ten years ago and we may think we have AIDS under control in North America,

but in Africa it's running out of control. There are scourges around the world that are looking after some of the population growth problems.

I just had one other comment that I wanted to talk about. Early on we were talking about unemployment rates and working beyond 65, and some people having more careers, reemployment, that sort of thing. Another interesting approach is instead of thinking about unemployment rates, think about employment rates. That's looking at all the cohorts of people from age zero-120, and forecasting in the future what percentage of those various cohorts will be working. That takes into account a lot of modern concepts, like staying at home looking after children, going on extended vacations midlife, starting work, stopping work, starting again, and that is something to think about forecasting into the future, specifically participation rates in employment.

There are some demographers who are looking at Social Security and they are thinking along those terms now, which is a different way of looking at the challenges that face our industries.