

**RECORD OF SOCIETY OF ACTUARIES  
1993 VOL. 19 NO. 4A**

**ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES**

Moderator: CURTIS E. HUNTINGTON  
Panelists: SAMUEL H. COX  
              OLIVA SANCHEZ\*  
              JOHN SHEPARD†  
Recorder: CURTIS E. HUNTINGTON

- Panelists from other countries will discuss their approach to actuarial education.

MR. CURTIS E. HUNTINGTON: I am currently at the University of Michigan where I hold an appointment as an adjunct professor.

John Shepard comes to us from Australia where he has earned a bachelor of arts degree in actuarial studies and a diploma in education. He is also an Associate of the Institute of Actuaries of Australia. His permanent position is as a lecturer in actuarial studies at Macquarie University in Sydney. Those of you familiar with Australia will recognize that the Macquarie program is the preeminent actuarial program in that country. He has been there for six-and-a-half years. Currently, he is also working on a master of arts degree in higher education. Previously, he has taught computer sciences at a polytechnic university in New South Wales, Australia, and prior to that he spent ten years at Oceanic Life working in a life insurance company in the Australian market.

Next will be Sam Cox who holds the A. J. Pasant Chair in Life Insurance and Financial Services at Michigan State University in East Lansing, Michigan. At Michigan State he is teaching in the areas of life insurance, risk management, and financial decision models. In addition, he has taught at the University of Puerto Rico, the University of Texas, the University of Nebraska: The two areas that he will be discussing with us are Warsaw University in Poland, where he has taught at the Actuarial Science Summer Program for three summers, and Nankai University in Tiajin, China where he has participated in the program that the Society of Actuaries has been sponsoring for the last six years.

Our final speaker is Oliva Sanchez from Mexico City, Mexico. She has received her bachelor of science degree in actuarial science at Anahuac University in Mexico City and a master's degree in statistics at the University of Wisconsin in Madison. She has taught several courses at Anahuac University since 1982 and currently holds the position of the Director of Actuarial Science School at Anahuac. She is also President of the Advisory Board of the Colegio Nacional de Actuarios of Mexico.

\* Ms. Oliva Sanchez, not a member of the Society, is Director of the Actuarial Science School at Anahuac University of Lomas Anahuac Mexico in Mexico City, Mexico.

† Mr. Shepard, not a member of the Society, is a Professor at Macquarie University in New South Wales, Australia.

The process that we will go through is to give each of the panelists a chance to present, from their area of the world, what is happening in the educational arena.

John is currently spending some time at the University of Waterloo in Ontario while on sabbatical, and he has a perspective on the education of actuaries from the English-speaking world from his Australian and Canadian experiences. He has some background in what is going on in the U.K., as well. Since that program is quite similar to what we see in the U.S. and Canada, that seemed like a logical place for us to begin. Sam will give us a perspective on what is going on in the field of education in Eastern Europe, particularly the Warsaw program in Poland. He will also be touching on programs in the developing world by discussing the Nankai program in the Peoples' Republic of China.

Finally, Oliva will be talking about a system that is different from what we are used to here in the U.S. and Canada, a program that is university-based and one that will become increasingly important to us as the North American Free Trade Agreement (NAFTA) starts taking over in terms of some of the relationships between our three countries.

MR. JOHN SHEPARD: As Curtis mentioned, my permanent home is Macquarie University in Sydney, Australia, and, of course, the phrase Sydney 2000 now means a little more than just the postcard for Sydney. We'd love to see as many of you as possible down in Sydney for the Summer Olympics in that year.

Actuarial education in Australia is what I'd like to talk about. I should just explain first where I'm coming from. I'd like to look at actuarial education in Australia from an educational viewpoint primarily, and as Curtis mentioned, I'm currently working on a master's degree in higher education, and my primary research interest is teaching and learning actuarial studies.

Well, I guess we should first ask, what is Australia? Of course, if you ask that question of someone from New Zealand, he or she will tell you it's an island off the coast of New Zealand. Very briefly, Australia has approximately 17 million people, of whom some 700 are actuaries. There are the basic facts. Well, we also have cricket, of course, and four, different types of football in winter. I've found it very interesting while I've been over here in North America finding out a little about baseball.

As a cricket aficionado trying to come to terms with baseball, there was one thing in particular that intrigues me. I wonder why these superb professional, highly paid, fit athletes need a great, big glove to catch that tiny, little ball. Perhaps you can explain that to me later.

What is an actuary in Australia? Well, again briefly, there are basically four qualifications that entitle one to practice as an actuary in Australia: Fellowship of the Institute of Actuaries of Australia, Fellowship of the Institute of Actuaries in London, Fellowship of the Faculty of Actuaries in Edinburgh, Scotland, or Fellowship of the Society

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

of Actuaries. The professional body in Australia is the Institute of Actuaries of Australia, and as far as its members' activities are concerned, without going into great detail, actuaries in Australia work predominantly in the traditional areas: life insurance and consulting practice, mainly concerned with superannuation, as we call it, employee benefits, pensions, and so on. There are some actuaries but still relatively small numbers working in nonlife insurance: property and casualty, finance, and investment banking. Most actuaries in Australia work in the traditional areas.

I think to understand the current state of actuarial education in Australia it's necessary to have a quick look at what has happened historically, and we can do this in three phases, I think: pre-1968, 1968 to the present time, and then perhaps after this we ought to look at the future.

Pre-1968, those who wished to become qualified actuaries in Australia studied privately part-time for the examinations of usually the Institute of Actuaries in London, sometimes the Faculty of Actuaries in Scotland. Such study usually took place while the student was employed full-time in an actuarial or a para-actuarial environment, such as a life insurance company or consulting practice. Textbooks were available. Tuition notes were available. In some cases students organized themselves into discussion groups, but it was basically distance education with the emphasis on the word distance, 12,000 miles in fact. Examinations were set and marked and graded in the U.K. but administered likely at least in the main centers, Sydney, Melbourne, and some of the other capital cities, and of course, the students' learning was within a U.K. framework. Basic actuarial principles, the actuarial method, and so on, were acquired within the framework of U.K. legislation, U.K. economic conditions, U.K. practice, and so on, so that overseas subscriptions to publications like the *Economist* and the *Financial Times* did quite well for Australian actuarial students. Having the exams marked in the U.K. also had some interesting side effects. I can remember several times sitting for London Institute exams and writing my answers on airmail paper so that the costs of mailing them to the U.K. could be kept to the minimum.

In 1968, we witnessed a watershed in Australian actuarial education. Of course, it was also the year that the Summer Olympics were held in Mexico City, to continue the Olympic theme. But we're more interested for the moment in the fact that a program of actuarial studies, an undergraduate program, leading to what was then a bachelor of arts degree but has since received a bachelor's degree in economics in actuarial studies at Macquarie University in Sydney, was set up under the leadership of Professor Pollard, an eminent Australian and international actuary. It's significant that the program was established within the School of Economic and Financial Studies. So, it wasn't located within what is perhaps the more common for actuarial programs, Mathematics Faculty or Mathematics-Related Faculty. It's within the School of Economic and Financial Studies.

The Australian actuarial profession is deeply indebted to the London Institute of Actuaries for its very early recognition of the program at Macquarie, and I can vouch for the fact that it was very early recognition because I can say with pride that I was a member of the first group of students to go through the Macquarie program, from 1968-70, and our anxieties were relieved at a very early stage when we learned that the London Institute would recognize the Macquarie program for the purpose of granting exemption from its first, of what were then, six technical subjects -- the

basic actuarial mathematics. The basis of the exemption was that one or more nominated courses within the Macquarie program were regarded as being equivalent to one Institute subject, and a student would gain exemption from that Institute subject on gaining grades of A or B standard in the equivalent Macquarie subjects. So in the years immediately following 1968, the situation in Australia was that there were two routes to qualification: either by undertaking the degree program at Macquarie and gaining anywhere from zero to six exemptions and then completing the actuarial qualification by the traditional distance education from the U.K. for the final, what at that stage were three but later became four professional subjects in which a student is expected to show professional judgment, and perhaps finishing off by distance education any of the subjects for which the exemption was not gained, or completing the whole program by distance education from the London Institute or the Edinburgh Faculty.

Let's look at subsequent developments after 1968, and here we are in another Olympic year, in the year 1980. Of course, the summer games were in Moscow, which at that stage was not all that far from Poland, which Sam is going to talk about. In 1980, Australian examinations were introduced for the final four professional subjects. The Australian Institute at that point decided that it had the personal power, it had the inclination and the will to conduct Australian exams for that final professional stage, to replace the four U.K. exams. The final four subjects were in the traditional areas of life insurance, institutional investment, and regulation, plus what was then still seen as the wider field, nonlife insurance. Further development occurred in 1986 when the Australian actuarial profession, through the professional body, the Institute, made an even stronger commitment to university actuarial education by establishing an education trust and the Macquarie University Actuarial Foundation to provide even further financial support for the university program. One of the main purposes here was to ensure that academic positions within the actuarial program at the university were attractive to actuaries in relation to the salaries that they could otherwise command in the marketplace.

In 1991, Macquarie introduced what is called the Graduate Program. This is a one-year, full-time crash course in the technical actuarial subjects. It's designed for people who are already graduates in an appropriate area, statistics, for example, or a degree with a high statistics content, and the aim is to get them through the first six technical subjects within a 12-month period. That's a tall order. It's a pretty rigorous program. And to date the experience has been that it's not necessarily attracting the right quality of people. It may be a marketing problem. The students in that program have struggled to get their full quota of exemptions in one year of full-time study.

In 1992, we saw the commencement of a master's degree program in actuarial studies at Macquarie and that was accompanied by the decision by the Australian Institute to grant a maximum of two further exemptions, from two of the final four professional subjects to students who attained sufficiently high grades in the equivalent subjects of Macquarie's master's program. That now makes it possible for a student to spend four years at Macquarie University and come out with exemptions from, speaking about the immediate present, eight to ten subjects required for full qualification as a Fellow of the Institute of Actuaries of Australia. In fact, last year three outstanding students left Macquarie having satisfied all requirements for the

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

Fellowship because they passed by private part-time study an Australian Fellowship exam and an Australian professional exam, in each of their last two years at Macquarie. So, they came out having satisfied all the academic requirements. They only needed to wait until their 23rd birthday to be able to call themselves Fellows of the Institute of Actuaries of Australia.

The year 1992 also saw the establishment of an Actuarial Studies Department at the University of Melbourne. Sydney and Melbourne have always vied for being able to call themselves the financial capital of Australia, and there has always been, since the establishment of the program at Macquarie, some pressure from Melbourne employers of actuaries to have a similar program there. Well, that now exists. It was established last year. It has a faculty of three actuarial members – which brings us to the situation where in Australia the routes to qualification are several. A school leaver can go straight to Macquarie University or the University of Melbourne or, in the last couple of years, the Australian National University (ANU) in Canberra, which also has an undergraduate program in actuarial studies but no actuarial faculty of its own. Courses at ANU are taught as correspondence distance courses by the faculty. So, a school leaver can go to any one of those three universities and do an undergraduate program in actuarial studies and gain up to six exemptions from the U.K. subjects. It's also possible to complete, first, a nonactuarial degree and then go into the one-year program, the graduate program, at Macquarie, or now at Melbourne, which has also set up a one-year graduate program or, following a nonactuarial degree, to do the entire U.K. program of subjects by distance education, or of course, it's possible to still follow the old route and do the complete U.K. program by correspondence without any other tertiary studies. Having completed the first six subjects, it's then possible to tackle or to qualify for two of the final four subjects by doing the master's at Macquarie or to do them by the traditional part-time correspondence study from the Institute of Actuaries of Australia.

Prior to final qualification as a Fellow, it's necessary for those who have satisfied the academic requirements to attend a professionalism course that lasts one or two days, and the only assessment is based on opinions. It's also possible for those with overseas qualifications to do the professionalism course, become accredited members, and then after a residential qualification period, become Fellows.

Just to give an idea of the numbers involved, in 1993, 86 new students entered the undergraduate program at Macquarie, 45 at the University of Melbourne, and 15 at the Australian National University. Eleven students began the graduate program at Macquarie, four at the University of Melbourne, 12 by part-time study after completing another degree, three at Macquarie, and 79 new students enrolled in 1992 – the 1993 figure wasn't available – for the correspondence course from the U.K. In terms of completing Fellows, in 1993 roughly 50% of the new Fellows had been through the Macquarie program. Roughly 50% had studied purely by private part-time study, distance education. The proportion going through the universities is expected to rise to 80% within the next ten years. It's an estimate.

Well, what about the future? What's likely to happen in Australia? The 1993 Biennial Convention of the Institute of Actuaries of Australia was held in August in Alice Springs. I wasn't there, but I've had a number of reports from those who were there of a climate for further change, in actuarial education, and one of the changes

that is at least being discussed is the possibility of replacing the first six technical subjects – the U.K. has, in fact, just changed from six subjects to four – which as far as Australia is concerned are currently the U.K. subjects, by a completed university degree in actuarial studies, in other words, removing the requirement for completing the first six technical subjects, which happen to be the U.K. subjects. I might add that the motivation for doing this is not just simply hopping on the republican bandwagon, which currently appears to be growing in strength in Australia and replacing those subjects because they are U.K. subjects, but if that comes about, it will be because a university degree in actuarial studies is seen as being at least as good or better than completing those first six subjects under the present arrangement. So, that topic is being debated. A straw poll was taken at the convention, and just reading from the notes of the discussion, there was overwhelming support for replacing the first six technical subjects in the long term and a substantial majority in favor of doing so in the short term. So, for a fairly conservative body that's fairly strong support.

I might just mention briefly the recent changes to the U.K. curriculum. I don't claim to be an expert on this, but I think from an educational view it's worthy of comment. The U.K. has recently radically revised its curriculum. Not only has it changed from six subjects to four, but also it has rethought the way in which its syllabuses are structured. It has – and this is a very radical move, indeed – actually taken into account some educational principles in structuring those syllabuses. The syllabuses are now set out in terms of learning objectives rather than just a list of topics supported by some prescribed reading, and the U.K. has also attempted rewriting its syllabuses to place greater emphasis on actuarial principles, the core competencies, if you like, to borrow a phrase, and to remove what might be regarded as extraneous detail.

I just want to quickly refer to rewriting the syllabus in terms of learning objectives. If I understand it rightly, the sort of thing the U.K. is doing is this: instead of having a syllabus which is one-dimensional, which is a list of topics, the sort of thing that we've traditionally been used to, the U.K. has added a second-dimension syllabus, if you like, in the form of a matrix or a grid. Associated with each of these topics is a verb, and the sorts of verbs used are *state*, *define*, *describe*, *explain*, *apply*, *analyze*, *synthesize*, and *evaluate*. In other words, the U.K. is attempting to define what a student is expected to be able to do with these syllabus items, and these verbs, if you like. It is to follow a rough hierarchy from lower to higher levels in terms of the impacts on the educational objectives. So, that seems to me to be a step in the right direction, in the sense that students will be able to know more precisely what they are expected to do, and I think perhaps even more important examiners will become more accountable. Examiners will be more accountable because they can no longer claim some tenuous connection between the question that they have asked and the syllabus. They will also have to deal with the second dimension of the syllabus.

Well, I might just add one further comment. While I think this is a step in the right direction, I think it should also be said that, in terms of the development of our understanding of the education process, this stuff is still from the 1960s. There's a lot more that's happened since then.

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

Finally, can I just finish by making one comment that was inspired by some of the things that Dr. Gary Hamel said at the General Session? I jotted down a number of the sorts of things that he said somebody who is going to seriously consider the future needs to be able to do. We need qualities like curiosity, humility, creativity, being able to be a dreamer, learning faster, being able to challenge our own orthodoxies, having a wide-angled lens, knowing how to unlearn or being flexible. I think that's not a bad sort of checklist against which to consider our education systems, and I have to be honest and say that in terms of our program at Macquarie University I don't think we come up too well against some of those criteria, and perhaps it would be a useful exercise if we all looked at our education programs in the light of some of those requirements.

MR. SAMUEL H. COX: As Curtis said, I'm a professor at Michigan State University, and when I travel about and run into actuaries in different parts of the country and different parts of the world and mention that I'm from Michigan State University, they invariably say, oh, yes, that's the university with the actuarial program, and I always correct them immediately and say, no, this is the university with the football team.

The subject of my remarks is mostly about the Poland program but also about the China program that you may know more about because of its association with the Society of Actuaries. As I was listening to John, I was thinking of how different the situation is in both Poland and China with regard to actuarial education because these are very new actuarial education programs. They're both about five years old, and you'll see that compared to what he described in Australia, they're not as well-developed, and their problems are probably very different.

I thought I would start with some remarks about the history of the actuarial profession in Poland. I learned this from Kris Stroinski who is a Professor of Actuarial Science at the University of Western Ontario and the proponent or sponsor of the rebirth of the actuarial profession in Poland. There was an actuarial profession in the 1920s. There was a Polish Institute of Actuaries, and actually there was a thriving capitalist economy before World War II in Poland. It was not reestablished after World War II. That is, the Institute of Actuaries was killed, or it effectively died off, and although there were a few actuaries who survived and continued to work in the insurance area, there was no organized actuarial activity. After World War II, the insurance industry consisted of two state-owned insurance companies, PZU, General Insurance Company of Poland, and ZUS, Social Insurance Institute. There were some actuarial activities there. For example, there was an actuarial meeting in Poland during the 1960s, and there are a few other actuarial contacts, but essentially the planned economy that existed after World War II did not leave room for independent actuarial organizations, and there was not much in the way of actuarial education either.

In 1988, with the establishment of Westa, the first private insurance company in Poland, the situation began to change. In the next year restrictions on ownership of insurance companies was lifted, liberalized, and in the next few years a number of insurance companies were developed, many of them as joint ventures with outside, that is, non-Polish owners. Now there are more than 20 private life insurance companies operating in Poland, and they've already had their first insolvency this past spring.

In 1991, PZU split into a stock life insurance company, and a nonlife unit, and I'm not sure what organizational form it has. It's still controlled by the state. I think at this point the state still owns the stock in PZU, but it was formed as a stock company with the idea that it would be sold to the public, and it would become a publicly owned stock company eventually. The nonlife unit, I understand, is going to be split into two stock nonlife companies and similarly sold. The new laws that were promulgated in the late 1980s and early 1990s require an actuary to calculate reserves, and the law and the fact that there's a growing, booming insurance industry there has created a demand for actuarial services, and there's also some other sources of demand as the possible reform of ZUS, as it's called. This is an organization that includes everything we think of as social security and a lot more as well, things like maternity leave and other sorts of benefits that we usually wouldn't include in social security. There are actuaries needed there, and also the Ministry of Finance, which regulates the banking and insurance industry, is sending students for actuarial training, also.

So, there's a good, strong demand for actuarial talent, and the program at Warsaw University has been successful in training students to meet some of that demand. One of the things that resulted was the establishment by these new actuaries in Poland of another actuarial organization, the Polish Society of Actuaries. The three levels of membership: Aspirants, which I think we'd call students, Associates and Fellows. The qualifications for Associateship are spelled out in their by-laws. It's an education requirement that right now is pretty narrow, that is, there is only one way to attain the education requirement, and that's to attend a summer actuarial studies program at Warsaw University. Those programs are five weeks. There are three levels. You'd have to attend all three summers to get the education qualification. There's an additional examination requirement. The examinations are given in the winter. There are three examinations: one in finance, one in life, and one in nonlife mathematics, and Associateship also requires two years' experience in actuarial work.

The current membership is – two Fellows. I don't know how you become a Fellow other than starting the Polish Society of Actuaries, but that's how these two became Fellows. There's no other route to Fellowship described. And there are 11 Associates and 29 aspirants who have passed one or two exams. They have other things a Society might have, a library they've recently established, and they have a newsletter. If you're interested in either of those, I have information about that I could pass on to you later.

The Warsaw University program is right now summers-only. There are three levels. I'll just briefly describe those. There are the traditional actuarial topics, but keep in mind that they include nonlife. That is, nonlife, pension, life, and financial mathematics are all covered in those three levels during three summers. So, the program includes all this material in Level 1. Some of the topics appear again in Level 2 where they're reviewed and extended. So, there's life insurance introduction in Level 1. There's more advanced life insurance mathematics in Level 2. And the program includes a number of practical courses as well, some life office simulation, some case studies. There's really a lot of material that the participants go through in a short amount of time. The students are in class about five hours a day, five days a week, for five weeks. It's very intense. The students work hard. They are very talented,

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

good students. Kris Stroinski recruited the faculty from mostly Canada but also the U.S., Britain, Scotland, France, Denmark, Israel, and Poland.

There are a lot of organizations helping sponsor it. The primary one is the Warsaw University itself, the Department of Economics – it's interesting that the program is in the Department of Economics. Kris is a Warsaw University graduate in mathematics, and my understanding is when he first approached the Math Department with the idea of developing an actuarial studies program, the people there weren't interested, but the Economics Department has been very supportive. It turns out the university will now, beginning in 1994, have an undergraduate program in actuarial science, and I think that's going to be in addition to continuing the summer program, but in the long run the university won't need both, I don't think. Probably the undergraduate actuarial program will provide enough actuaries to meet the needs in Poland.

The requirements to get into the program are that you can speak enough English to understand the lectures. The lectures are all in English, although there were a couple of interesting attempts to try something else. Some of the Polish actuaries tried speaking in Polish, but they're using English texts, and it didn't work well so they wound up switching to English, and then this past year there were a number of students who didn't speak Polish. So, there were students from three different groups: three different groups of Russian students, one from Moscow, one from St. Petersburg, and one from Siberia, then other students from the Ukraine and Lithuania, so English was used throughout the program.

The math background was substantial. All of these students had degrees already in some statistics or mathematical field, and they paid a fee as well to get in. Most of the students are sponsored by companies. Even the students from Russia were sponsored. Some of them might have had help from some of the sponsoring organizations because the fees would have been difficult to pay with Russian currency.

As far as the financing of it goes, I think the Canadian government was the major contributor. This is considered a Canadian foreign aid project to Poland, and the Canadian government regards the project very highly. It's one of the governments most successful programs in Eastern Europe, and the original plan was to run it for three years. It looks like it will now be sponsored by the Canadian government for two additional years.

My own estimate is that eventually the summer program will probably be phased out, and the undergraduate program at Warsaw University will be the source of actuaries. There are some mathematicians in the Warsaw program who are from other universities, and several of them mentioned that they're studying actuarial science so that they can go back and teach it at their universities. One of them was a Polytechnic University also in Warsaw, but also another university in Krakow.

MS. BONNIE AVERBACH: What is the source of the data that actuaries in Poland use?

MR. COX: Well, all the data there have problems. Both in Poland and Russia the students were always asking us, what can we use for data? That's a problem.

There are tables that are based on experience from the existing state life insurance company. That is, they have mortality tables based on their experience. For other types of insurance there are no good data to use. For auto insurance, for example, there was very little private ownership of automobiles and very little need for insurance for property damage to automobiles, for example. Now that has become a big item. Of these new companies started up, about 75% of the business is nonlife. So, that may change. The life insurance business is growing there. So, there are all kinds of problems associated with not having data for the products that these countries are trying to develop. Life insurance is just one area, but getting good data is a problem in all areas.

MS. AVERBACH: We had a Chinese delegation from mainland China come to our university two years ago, and those members were telling us that they were using Hong Kong tables because they had no tables of their own, and their life company was making a lot of money at that time.

MR. COX: Well, I'm sure there are data problems in China as well, and that's a good lead-in to my brief remarks about the actuarial education in China. As I mentioned, you probably are familiar with this from reading what has been reported in *The Actuary*. The coordinator of that program is Kailin Tuan. The Society of Actuaries has provided faculty and other support for the program. That began in 1988. I understand there were 11 graduates in 1991. Five of these are working for Chinese insurance companies, two for social insurance organizations, and four of them are teaching actuarial science at other Chinese universities.

In 1992 the graduates of the Chinese program began taking the SOA exams with good results, and I think those were reported in *The Actuary*, also. There's demand there again because of a growing insurance industry with the Chinese government allowing competition with the state-owned People's Insurance Company of China. In addition to the Nankai program, new programs are being developed, and I understand the People's University now offers undergraduate degrees in actuarial science and risk management and insurance, and as well, a graduate degree in risk management and insurance.

The actuarial programs at other universities are similar to the Nankai program in that they're getting foreign assistance. The British Institute of Actuaries is assisting one university, and the Institute of Actuaries in Japan is assisting another. These programs either began this year enrolling students for undergraduate degrees in actuarial science or will begin next year. So, that's four new programs to begin this year or next. And I guess with that I conclude my remarks about actuarial education in Poland and China.

MS. OLIVA SANCHEZ: I will be talking about actuarial education in Mexico, and as Curtis mentioned earlier, there are some differences between the educational system in the U.S. and Canada and in Mexico basically because our education is given through university programs. We have a few other differences, but I think that's the main one and the one that I'm going to be talking about.

At present in Mexico every professional who wishes to work as such has to have a bachelor of science degree from an authorized university. This authorization is given

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

by the Ministry of Education, and the Ministry of Education gives a written permit to work as a professional. In Mexico there are seven universities that offer the actuarial science degree. The first one that offered it was the National University, and that university started its program in 1946. Right now it has about 250,000 students, 2,000 of which are in the Math Department and 600 of which are in the Actuarial Science Program.

Since then, six other universities started. Five of them are in Mexico City, two are outside Mexico City, one is in Puebla, and the other one is in Guadalajara. We have about 1,800 certified actuaries, and I don't know the numbers, but there must be about 7,000 *pasantes*, who are actuaries who are not fully certified. I'm going to talk about the procedures to become a fully certified actuary.

To become an actuary one has to undergo a four-year program at the university. All these universities have a very similar program, and there are different areas of the courses, but students have to study the full, complete course load. They have to demonstrate an English proficiency and some knowledge of another language; that is, a student has to be able to translate from a third language into Spanish. They have to put in a period of six months of public service work. This has to be done usually at the government institutions. Before, it was in banks. Now the banks don't belong to the government anymore, only the National Bank. They could be in some insurance companies belonging to the government or in different areas. This is four hours a day during the six months. Besides that, students have to write a dissertation. This dissertation is about some subject related to actuarial science. The material has to include some original work. Usually it's applied methodologies or looking into different problems. And students have to defend the dissertation in front of an examination committee. This committee is formed by faculty members. Usually the members need to have taught for about five years to be able to be on that committee. And the committee members can ask about any subject, not only about the dissertation research, or the thesis the students worked on, but also about any course students have taken during their courses.

The programs at the seven schools are very similar. There are 38-49 different courses. We have some courses in mathematics that include four calculus courses, usually two algebra, two geometry, one differential equation course, and a real analysis course. Then we have some applied mathematics courses, which are probability and statistics, operations research, and numerical analysis. In some courses in actuarial mathematics and insurance we have usually three courses on insurance where we have some law and regulations, life insurance, health insurance, and casualty. We have life contingencies and risk theory courses. We have some pension courses and some social security courses. This varies between the universities, but they're more or less the same ones. We have some finance and economic courses. We have, obviously, interest theory courses, some financial system ones and micro- and macroeconomics. Then we have some business and accounting courses. We have computer science courses. They have to learn how to use some languages, some prevailing languages, and other general courses where we have ethics and communication skills courses. And then there are some elective courses at the end of the last two semesters where students can choose between the different areas in which they can work. It could be pensions or life insurance. It could be finance, and different areas that the actuaries in Mexico have been working on, not

only on what are called the traditional areas but also areas that we consider as traditional for actuaries in Mexico. This is the complete course load for these four years.

On the average I think they have ten courses in mathematics, seven in applied mathematics, eight in actuarial and insurance, and five in finance. They have administration, accounting, computer science. There are three general courses, which are humanities and communication ethics and the different elective courses that they can choose.

On the average it takes about six years to graduate, to finish baccalaureate studies, that is, four years to do these courses, and then two years to work on a thesis, and usually when students are working on their thesis they work full-time in their jobs, and then it is a little difficult for people to complete that. Probably that's why we have I think less than 25% of the people their thesis actually started their thesis actually finish the complete process.

Out of 1,800 actuaries in Mexico, little less probably than 25% of them work in the traditional areas, and another 30% work in finance, and the rest of them work in different areas such as demography or computer science, statistics, operations research, and marketing is a new area where actuaries are working very strongly. Besides these undergraduate programs, we have started graduate programs in two different universities. Both of them are in actuarial science. One of them is in the life area. The other one has different technical courses such as credibility, graduation, and loss distributions, the kind of courses, which we think that we need. We don't have those in our undergraduate programs.

Besides that, there are three different associations in Mexico. The first one is the Colegio Nacional de Actuarios, which is what may be called the umbrella organization. It includes all actuaries, and it doesn't matter which area they are working on. They could be actuaries in finance or in life or in casualty or any of the areas. Then the Asociación Mexicana de Actuarios was mainly for life insurance actuaries. And the Asociación Mexicana de Actuarios Consultores en Planes de Beneficios para Empleados is for actuaries who are mainly in a consulting practice in employee benefits.

Right now after all the meetings we have had about NAFTA, we have had to review many things, and we're working to have some continuing education alternatives. After one finishes all the formation of the process in Mexico right now, one is done. You don't have to study anymore. You can be there. Some people may have had some different courses, which let them become up to date in what is happening, but we don't have anything yet already implemented on an organized basis. We are starting to do that, and it will be a responsibility of Colegio to do that, and I think in that area is where we should work more and where we have a lot of things to do.

MR. WOLFE SNOW: Well, you stated explicitly for Mexico that the education is in a sense very narrow. It's not like the American model where there is a strong liberal arts component in the education. The first part of my question would be just for Mr. Shepard. Which model holds true in Australia? And for both of you the follow-up, which is the important part of my question, does this lock the people in, in times like

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

now where people have a hard time getting a position? So, with the American type of education there's some sort of flexibility, but are your people sort of locked into the actuarial field, and that means that they cannot get a job if they can't get an actuarial job?

MR. SHEPARD: Let me just briefly outline what the program is at Macquarie University. In the first year, students study accounting, economics, mathematics, computing, statistics and a little probability and compound interest. But it is just general stuff at that stage so that at the end of first year, if they feel, either because they find it deadly boring or they find that their grades are not quite what they would have liked them to be, they have the opportunity to change to virtually any one of those areas. Second year and third year are very much more tightly centered on actuarial courses. There's not a lot of room in second year and third year to fit in courses from other areas, which I think is one disadvantage of our program. So, our first year is very general. Students get a very broad background in first year. Second and third year are taken up with mainstream actuarial stuff. There is an opportunity in third year to do some finance, and most of the good students do that, but the weaker students tend not to take those options and concentrate on their mainstream actuarial courses.

What happens when they graduate? Well, until very recently demand exceeded supply for actuaries and actuarial graduates in Australia so that people had no problems finding jobs. In the last couple of years we've basically had equilibrium. We don't yet have actuaries walking the streets unemployed, but people are now having to think a lot more seriously about the wider field as a source of jobs, not just as a vague concept. So, at this stage not many actuarial graduates have had to face up to the problem of trying to sell themselves in other areas, but that is certainly coming in the next couple of years.

MS. SANCHEZ: I think in our case the experience is really interesting. All our programs are very focused on actuarial science areas, and one good thing in having that instead of the liberal arts tradition where you could have different areas of interest, you would be in trouble finding a job. But what happened probably in the 1970s is that there was not enough jobs for the actuaries going out of the universities, but somehow they started using their skills that they had learned, what they had learned with all the mathematics courses, with all the finance courses and other things, too, put together into some other kind of jobs. The jobs were not limited to the insurance companies, or the traditional areas, and that's why in Mexico we don't label the actuaries as in life actuaries and casualty actuaries. We have actuaries in many different areas, and they are respected in whatever area they are. I know many people who are now doing quality control, and marketing, and many, many things. Obviously, that was because there was more supply than demand, but I think when they have a good undergraduate preparation, they can do very well in whatever they want to do. The financial area I think is one of the areas that actuaries anywhere should focus on because, when you're working in finance, you are looking at risk all the time. It's very close to what our foundation is. It's not very far away from that. Actuaries can do very well in those areas, and we have to start looking for different ways of doing things.

RECORD, VOLUME 19

MR. GEOFFREY CROFTS: In 1990, I took part in the Society of Actuaries' program at Nankai University. That was a marvelous experience, but there was no evidence of actuarial science before that program in China. There was one insurance company that handled everything -- the PICC -- the communist government insurance company. It didn't really need to worry about actuarial science because in reading the annual statement of PICC its management people mentioned that the reserve basis for life insurance products was that you took the premiums you collected, added interest to them, subtracted the expenses and taxes, and I think an element called profit, and the rest was reserve. So, you didn't need actuaries for that purpose. Perhaps it wasn't altogether necessary to have proper reserves because the company couldn't fail. It was owned by the government, and it could do what it wanted. I have a couple of questions for John Shepard. Does the actuary in Australia have a legal status or some recognition? Is there a requirement for a Fellow to sign an annual statement?

MR. SHEPARD: Yes, in two areas, Geoff. The Life Insurance Act, which is a piece of federal legislation in Australia, requires that an actuary perform certain tasks like conducting an annual investigation and writing a report, and within that piece of legislation *actuary* is defined as a Fellow of the Institute of Actuaries of Australia primarily. In saying this, the definition also encompasses Fellows of the London Institute, the Edinburgh Faculty and the American Society. Also, in some of the similarly superannuation, pensions legislation there are tasks that are defined there that must be performed by an actuary with a similar definition.

MR. CROFTS: And then the definition of an actuary does include Fellow of the Society of Actuaries, I gather.

MR. SHEPARD: I think that's right.

MR. CROFTS: Therefore, I think you have another route. A person could take the examinations of the Society of Actuaries and become accredited. I presume nobody does that.

MR. SHEPARD: I'm not aware of anyone who's done that from Australia, no.

MR. HUNTINGTON: If I might add that from a New Zealand context, the New Zealand Society of Actuaries, of which I'm a member, does recognize the FSA, the Fellow of the Canadian Institute of Actuaries (FCIA) or a Fellow of the Casualty Actuarial Society (FCAS), for that matter, as a fully-recognized, qualified actuary in the New Zealand context. The New Zealand Society has recently started considering a continuing education requirement. In addition, it has a residency requirement before one can be fully qualified as a Fellow. Now, New Zealand is a relatively small country that is not able to maintain its own exam system, and from a practical viewpoint it's mostly Canadians who have been emigrating to New Zealand recently. They currently form approximately 10-15% of the membership of the New Zealand Society of Actuaries. Many of them come in as pre-Fellows and continue taking the New Zealand Society exams through Fellowship, and the New Zealand Society currently has examination centers in both Wellington and Auckland.

MR. MORRIS W. CHAMBERS: I'm from the great, white north up there. I'd like to supplement briefly Oliva's response to Mr. Snow. In respect of the broader base

## ACTUARIAL EDUCATION/TRAINING IN OTHER COUNTRIES

upon which the actuarial profession is built in Mexico we've heard a lot of discussion the last couple of years in Canada and the U.S. about the need for the actuary to broaden his or her horizons and the areas in which his or her skills are applied. In Mexico that same problem, crisis, bridge was faced some two decades ago, as Oliva has indicated, and the bridge was crossed, and we have an awful lot to learn from the Mexican actuaries. They have a lot of valuable information and experience to provide to the actuarial organizations in Canada and the U.S.

Having added that little bit to Oliva's comments, I have a question for Oliva. I'm intrigued by the requirement in Mexico that the actuary provide a period of gratis social contribution to the country, six months I believe it is. Is it generally the case that is provided subsequent to graduation from university but before completion of the dissertation, or is it provided subsequent to the completion of the dissertation, or is there a pattern?

MS. SANCHEZ: It has to be after the students have completed 70% of their course credits. Usually it's the last year of their school, but it can be after they have finished. Usually they do it while they are studying. Obviously, they want to get out of school and start earning money.

MR. WILLIAM J. BUGG, JR.: Just recently, last month, I went with a small group of actuaries over to Eastern Europe visiting in Moscow, Warsaw, and Budapest, and I just want to augment a little bit what's going on at least in Russia and Hungary, since Sam has already covered Poland. The insurance law has been passed in Russia, and it requires some actuarial input into such calculations as reserves and perhaps premiums as well, but as in these other Eastern Block countries, there were no actuaries. So, the Russians are on the way to starting a program. They are working with the French, as I understand it, and what is visualized is a program at Moscow State University, perhaps three to five years duration, and classes are anticipated to start, I believe, this winter, and they may be thinking of ultimately a program at several other sites within the country.

In Hungary a program has been underway, worked out with the United Kingdom. There's a variety of topics, not unlike the Polish summer school, but the people there have taken another tack. They have eight modules, and there's one week of study in eight consecutive months, and they've just completed a second such cycle covering what I guess is referred to as the basic level. They plan to have a second level, anticipating people moving up, those who have graduated from or completed the first level, and I think they plan to have this second level next year. Now, they are hoping, not unlike the Nankai program, that out of the participants who successfully complete the second level, that there will be some Hungarians who will pick it up at that point and carry their training farther from there.

MR. HUNTINGTON: I think it's important for us in the U.S. and Canada to become more aware of what's going on in other countries in the world, particularly in the training of actuaries. We've had an opportunity to travel widely across the globe Down Under, over to Eastern Europe, and then, more importantly, also to look just south of our border. There are solutions to the problems that we face in the U.S. and Canada that are available in these other countries, and the more familiar we become with these countries, the better off we will be in solving our own problems.

