



The Newsletter of the
Society of Actuaries

VOL. 25, NO. 1
JANUARY 1991

THE Actuary

HIV testing – history and trends

by Thomas W. Reese

Antiselection at the time of issue is one of the major considerations for valuation actuaries in projecting AIDS-related insurance claims. A key element affecting antiselection at the time of issue is the insurer's HIV blood testing limits compared to those of other companies. Tillinghast has conducted a series of surveys over the past several years of individual life insurance HIV blood testing limits. This historical information can be used by actuaries to estimate antiselection that may have occurred in various segments of business resulting from differences in testing limits, and to formulate appropriate assumptions about future rates of AIDS-related claims.

The rates of AIDS claims cannot be determined from past experience. These rates have been increasing rapidly, and future rates will likely be higher than in the past. Further, AIDS claims rates will vary considerably for each block of business, because of potential differences in insured population HIV-infected proportions, the effects of selection and antiselection at issue, and the changes in these factors over time. Finally, it is difficult to determine which claims are AIDS-related; thus, experience rates will reflect varying degrees of completeness.

Since past AIDS claims rates are not applicable for future periods, the valuation actuary must construct hypothesized future claims rates. The development of assumed AIDS claims rates should include adjustments to past period experience rates in order

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Message to the members

Can the actuarial profession survive the 1990s?

by Daphne Bartlett
1990-91 President
Society of Actuaries

Today, the Society of Actuaries looks very healthy. Our finances are in great shape. We have a record number of students in our education and examination system. Our meetings are well attended. Most of us are employed in satisfying, well-paid positions.

But ominous signs loom on the horizon. Suddenly, in the past few months, insurance companies have been added to the list of troubled financial institutions, along with savings and loans and banks. The defined benefit pension plan is disappearing from the scene. Layoffs and cutbacks have become the norm rather than the exception among not only the publics we serve, but also our own employers. Meanwhile, our traditional turf is being eroded by



accountants, computer programmers, and MBAs. Can we survive?

The answer is "yes," if we broaden our traditional ideas about ourselves; if we use our education, intelligence and strong personalities to assert ourselves. The answer is "no," if we refuse to recognize the challenges ahead, and remain complacent about our qualifications, incomes, and professionalism.

We claim to be the guardians of solvency of financial security systems.

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The Actuary

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The Actuary is published monthly (except July and August) by the SOCIETY OF ACTUARIES.

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students, \$6.00; others, \$15.00. Send
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HIV testing cont'd

to properly validate the hypothesized system against past experience.

An important factor in the anti-selection at issue with respect to AIDS is the insurer's testing limit compared to the limits of other companies. An insurer that used HIV testing limits higher than much of the rest of the industry might expect higher AIDS claims rates as a result of antiselection from HIV-infected individuals who apply for higher amounts of insurance through that company.

The Tillinghast surveys were conducted among the largest U.S. writers of individual life insurance. The results for September 1987 and later apply to the same group of companies. These results, with details developed in the following paragraphs, are shown in the accompanying table.

The early years – 1986 and 1987

HIV blood testing began to be implemented by the life insurance industry in late 1985 and 1986. (The survey results shown for 1986 were collected in May 1987. Companies were asked to give their HIV testing limits in effect "last year.")

This period showed introduction of testing for large amount issues, with companies reducing test limits in 1987 as testing began to become more routine and as knowledge of the AIDS problem increased. Considerable publicity about AIDS occurred during these years, and there was likely considerable room for antiselection under the high HIV test limits. In fact, there were rumors about the publication of companies' test limits in "underground" newspapers.

Settling in – 1988 and 1989

By the March 1988 survey, HIV testing limits had declined dramatically. They settled in at the \$100,000 testing level, where they stabilized and remain today for most states.

A significant decision was whether testing should begin for policies of \$100,000 face amount or only for policies issued for amounts more than \$100,000. The difference between a limit of \$100,000 and \$100,001 is substantial. One insurer doubled the number of its HIV tests when it reduced its limit from \$100,001 to \$100,000. It is important for actuaries projecting AIDS claims rates to take this difference into account. By March 1990, about half the insurers surveyed had reduced their testing limits to \$100,000. Further, some of the insurers that

still used a \$100,001 limit used a \$100,000 limit or lower for term insurance issues.

Maximizing effectiveness – current limits

The trend to reduce HIV test limits is continuing. However, these reductions are focused on the areas where it is expected that the most return will be realized on the investment in testing.

The major change in testing limits in 1990 has been in their variation by state. Ten of the seventeen companies surveyed have lower testing limits in certain states, the District of Columbia, and Puerto Rico.

The determination of which states will have lower test limits is based most commonly on reported AIDS incidence levels in those states, but a couple of companies use their own claims experience in making this decision. Pressure from agents has caused some companies to retain higher limits or even to return to higher testing limits after trying to impose lower limits.

The accompanying table shows test limits for two categories: highest-tier states and other states. Ten companies include California in the highest tier; nine companies include Florida, New York, and the District of Columbia; seven include Texas, and six include New Jersey and Puerto Rico.

A few companies use a longer list of states where lower testing limits apply. Three companies include Illinois, and two companies include Georgia and Maryland. Eleven other states plus the Virgin Islands were included by one company each.

Another area of differentiation is lowering test limits for term products, which is being done by five companies. For term products issued in the highest-tier states, only one of the seventeen companies surveyed still has a testing limit as high as \$100,001, and seven test at \$50,000 or \$50,001.

The move to less expensive tests

Two strong factors continue to change company HIV testing rules – agent pressures and underwriting budgets. If the tests have to be made, agents want them to be more convenient than drawing several vials of blood. In addition, company cost control is creating pressure to reduce underwriting expenses.

Four of the seventeen companies use dried blood spot (DBS) testing for some tests. One company uses DBS

up through \$500,000 amounts; one uses it through \$600,000; and one uses it through \$999,999. Another uses DBS in about one-fifth of its geographic regions. These companies report favorable experience with DBS—the results of the HIV test are still reliable and agents like it better. A paramedic must be involved to do this test, so there are only small cost savings over the venipuncture test.

Two other companies experimented with DBS but discontinued it. The primary problem cited was that sometimes not enough blood was drawn to make a good test.

The primary change in the near future appears to be the use of a urine specimen instead of blood. Only four of the seventeen companies are using this test now, but almost all of the others are considering it or will consider it in the future.

One insurer uses the urine test for amounts through \$150,000; one uses it through \$250,000; and another uses it through \$500,000 for ages through 40 and through \$250,000 through age 60. One company uses the test for amounts up to nearly \$200,000 in most states and to a lower limit in the highest-tier states.

If paramedics continue to collect the specimens, the cost savings are about \$5 per urine test. However, one company has the agent collect the specimen, reducing the total testing cost to only \$17, including tests for drugs and nicotine, as well as HIV. This company first experimented with agent-collected specimens, and then fully switched to this method after determining that positive test rates were about the same for agent-collected and paramedic-collected specimens.

Some companies anticipate that urine testing will make the change to lower HIV test limits more acceptable to their agents. Others would simply replace part of their current testing structure with the urine test, thereby reducing their costs.

The companies not yet using urine testing cite several concerns: questions about the accuracy of the test, fears of switched specimens, and confidentiality problems. Confidentiality is an issue, since the urine test is only a screening test and is not adequate to confirm HIV infection. When the insurer goes back to the insured to collect a blood specimen for the confirmation test, this request appears to reveal a positive HIV infection finding.

Modern insurance testing

AIDS has forever changed the insurance industry's use of laboratory testing for underwriting. Before the AIDS era, insurers followed a trend to higher nonmedical issue limits, and laboratory tests were performed only for a small percentage of issues.

Faced with the threat of increasing AIDS claims, insurers are now routinely ordering laboratory tests on a large proportion of new issues. The tests go beyond the HIV test that was the primary motivation for lower test limits. Insurers also are testing for drugs and nicotine, and are usually ordering an extensive blood chemistry profile. Since the paramedic has to be involved for one test, the other tests yield valuable information at marginal extra cost.

Along with this new deluge of testing, the laboratory testing industry has come of age. Labs have created the capacity for the new testing volumes, and new competitors have entered the laboratory testing field.

Many advances are being made in laboratory testing technology.

This increased use of laboratory testing has greatly improved underwriting information. Better underwriting from this new information will prove to be a significant offset for the increased claims that are due to AIDS.

As the industry's underwriting knowledge increased, so has its underwriting expense. This increase comes at a time when insurance companies are under great pressure to control expenses. As a result, many testing limit decisions seem to be based as much on current budgetary concerns as they are on long-term value of the knowledge obtained.

Future years should produce a balance between expenses and underwriting value. Testing practices will continue to change, with the HIV test currently being one of the key driving forces.

Thomas W. Reese is with Tillinghast/Towers Perrin.

Number of Companies Routinely Testing At and Above:

(Issue Age 35)

Test Limit	Term	Permanent						
	Sep 1990	Sep 1990	Mar 1990	Mar 1989	Mar 1988	Sep 1987	May 1987	1986
"Highest-Tier" States								
\$ 50,000	3	2						
50,001	4	4	4	3	2			
75,000	1	1	1					
75,001	1	1	1	1				
100,000	7	5	6	6	5			
100,001	1	4	5	7	9			
200,000					1			
Other States								
\$ 50,001	1							
100,000	11	8	8	6	4			
100,001	4	8	8	10	11	3	1	
150,000	1	1	1	1	1	1		
200,000					1	4	3	1
250,000						5	5	5
300,000						2	4	3
400,000							3	2
500,000+						1	4	7
# Companies	17	17	17	17	17	16	20	18

Note: Each category contains all test limits above the lower category. For example, "\$100,000" includes all companies with test limits greater than \$75,001 but less than \$100,001.

Note: Limits are for permanent insurance, except for Sep 1990 term column.

Universities announce openings

Three universities have announced positions to be filled in 1991.

University of Toronto

Position: Tenure-stream appointment in actuarial science at the assistant or associate professor level starting July 1, 1991. Salary and rank will be commensurate with qualifications and experience.

Duties: Undergraduate and graduate teaching and graduate supervision.

Qualifications: Ph.D., demonstrated excellence in actuarial science, and a strong research background.

Applications: Letter of application with curriculum vitae and three letters of reference by January 15, 1991, to Professor M.S. Srivastava, Acting Chairman, Department of Statistics, University of Toronto, Toronto, Ontario, Canada, M5S 1A1. In accordance with Canadian immigration requirements, this notice is directed to Canadian citizens and permanent residents.

* * *

Ball State University

Position: Tenure-track position in actuarial science at the rank of Assistant Professor in the Department of Mathematical Sciences effective August 1991.

Qualifications: Ph.D. in mathematical science and Associateship in the Society of Actuaries. Evidence of accomplishment or promise in teaching and research. Salary and benefits are competitive and commensurate with qualifications. Consideration will be given to practical work experience; i.e., life insurance actuarial work and consulting actuarial work.

Applications: Initial evaluation will begin January 24, 1991, and will continue until the position is filled. Send a letter of application, curriculum vitae, research plan or list of publications, and at least three letters of reference to: Dr. John A. Beekman, Faculty Search Committee, Department of Mathematical Sciences, Ball State University, Muncie, Ind. 47306-0490.

* * *

University of Michigan

Position: Faculty position in actuarial science beginning September 1991.

Duties: Direct the undergraduate program in actuarial science, including teaching and counseling.

Qualifications: Minimum of a master's degree in actuarial science, or equivalent experience. Associate or Fellow of the Casualty Actuarial Society or

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FACTUARIES

by Deborah Poppel

This is another in a series of profiles of members of the Society's Board of Governors.



Name: Dan McCarthy.

Birthday: June 21, 1938.

Birthplace: New York City, but I was raised in a small upstate city near the Canadian border.

Current hometown: Matawan, New Jersey (I work in New York City, which is several light years away from where I live, but that's normal in the New York area).

Current employer and function: Milliman & Robertson, Inc, consulting actuary, principally for life insurers and for health and welfare plan sponsors.

Marital status: Married 31+ super years to Virginia.

My first job was: manufacturing and packaging ice cream (the fringe benefits are obvious!)

I'd give anything to have met: The namesakes of the Teenage Mutant Ninja Turtles, now that Virginia and I have had a chance to wander around Italy and see their stuff.

Children: Deirdre Gelinne (married to an actuary, one child), Daniel (married, three children, teaches classical languages and English), Justin (a state trooper—don't drive too fast on the Jersey Turnpike!), Anne Knight (a nurse, married, no children), Judith (works in publishing), Elizabeth (looking for work).

The number of exams I flunked: The first two; that's when I realized that passing meant studying.

The book I recommend most often: *Bonfire of the Vanities*, because it conveys certain aspects of New York City like no other. For the potentially traitorous, I would recommend the biography of Benedict Arnold, which I am currently reading!

The movie I'd most like to own the tape of: Sorry, I'm not big on tapes of movies, and Virginia, who is, already owns them all!

Nobody would believe it if they saw me: Driving below the speed limit, or early for a plane.

The TV show(s) I'd stay home to watch: I am informed that I am not home enough for this question to be meaningful.

If I could change one thing about myself, I'd: Put the dishes in the sink after I've finished eating (I've been told that this is very important.)

When I'm feeling sorry for myself, I: Get some fresh air or the nearest equivalent that's available in NYC.

My fantasy is: 36-hour days, which might enable me to enjoy all the things I like to do.

The silliest thing I've ever done: (Also the best, as it turned out) was taking a job as an actuarial student 32 years ago without having the slightest idea what it was all about.

If I could do it over, I'd: Learn to manage my time better, so 24-hour days would be long enough.

My proudest actuarial moment: Being elected to the SOA Board of Governors, because it was a form of affirmation from people I respect highly.

I'm passionate about: Spending time wandering around in parts of the world I've never been before.

My favorite way to spend a Sunday: Allocated among the Lord, my family, the *New York Times*, a little exercise, the Giants (you know perfectly well which Giants) and getting ready for Monday.

Back to the future becomes forward to the past

by Barnet N. Berin

In the first grade, at P.S. 119, Sunset Park, Brooklyn, they trusted us - gingerly - with pencils. They had no erasers on these pencils which was most savings. I'm sure it could not have been anything else from the mess we made.

We learned the alphabet. Small letters, first. Big letters much later. It wasn't much fun. Progress was slow.



In the third and fourth grades, we went to ink and this meant a stick pen, with metal point inserted, inkwells in the desk with little brass-like tops that made a clicking noise, an ink monitor and the opportunity to dip an unsuspecting braid into the inkwell.

This was a sloppy operation. We needed individual blotters and a cloth to wipe the penpoint. Both took on the look of Rorschach tests matched by our hands, cuffs, shirt front, particularly the pocket.

We studied penmanship, an unpleasant chore of drawing, over and over, convex arcs and concave arcs, along with parallel lines and all sorts of geometric figures, some quite strange. These were inspected for overall aesthetics. The teacher must have been a good sport.

We learned to live with smudges, blots, crossing out (neatly) and running out of ink. By junior high school, a pen became part of our uniform. If it lasted more than one year, a fountain pen took on a friendly role and its eventual loss was depressing.

But then the ballpoint was invented. It could write under water, on ceilings, and it did not blot, smudge, or leak. There was no need for regular fillings, a blotter, or a cloth. It did pick up lint, but then nothing is perfect, and nothing lasts forever.

Strangely, all of this is changing and we are moving back to the fountain pen with all its accoutrements.

Check the newspaper, magazine advertisements, and television commercials. The fountain pen has returned.

The product is better. Quick-drying ink and ink cartridges make handling a fountain pen easier. True aficionados will have none of this, preferring a bottle of ink and insisting on old-fashioned wet ink. For them, the pen and the writer are mystically linked.

While these enticements seem to be aimed at the yuppie generation, apparently interested in such things, its appeal must be broader, judging by those who are actually using fountain pens in public.

Now that this has happened, it will be interesting to foresee the next trend - quill pens, in cigar-shaped canisters, with ink supplies cleverly hidden? If this continues, we can go back to personal correspondence in soft stone and chisel.

Do I own a fountain pen? I received two as gifts. The first did not survive being run over by a car. Interestingly, only the logo remained intact. The second pen required my finding a cloth to wipe the nib - not every cloth works - and making my own blotters (no longer available with someone's advertising on the reverse side).

The mystery is how the fountain pen managed to return. It virtually disappeared only to reappear. Kitchen brooms with long wooden handles (excellent for stickball) and straw working ends may be next, but I doubt it.

There may be some advantage in analyzing obsolete products of the last 50 years. Whoever thought trolleys would come back? This pursuit could lead to a new drawer in the venture capitalist's filing cabinet.

I like my fountain pen and, if it lasts, we will surely become bonded.

Barnet N. Berin is Managing Director and Chief Actuary, William M. Mercer Incorporated.

Message cont'd

Can any one of us say with confidence that the insurance company or pension plan that uses our services will remain solvent through the 1990s?

If we're not in a position to directly influence the solvency outcome, have we discussed it with our superiors? If we are in such a position, have we tried? Or have we sat back and let someone else make the important decisions? Actuaries must become involved in the asset side of this equation. The only way we can make that happen is to take action.

Our profession is close to a crisis. If a major insurance company becomes insolvent, we will all be damaged. We are each responsible for doing whatever is in our power to avoid this, even if it means taking some personal risks - speaking up, even if our position is unpopular. That's what being a professional is all about.

Meanwhile, we must broaden our professional scope. We need to understand that the concepts of risk and the time value of money are not unique to the insurance and pensions fields. People with actuarial skills are needed throughout society; we must find those areas, and let our abilities and skills be known. It won't be as easy as it used to be. But each of us possesses a unique combination of skills - a solid, technical base enhanced by practical, common sense business skills. This is a combination that in today's society should be in great demand.

This year, the Task Force on the Actuary of the Future is charged with identifying non-traditional actuarial opportunities, and with developing a plan for communicating the skills of actuaries to these potential employers.

This effort will, hopefully, result in employment opportunities for our future members. It may not help today's actuary unless we take action as individuals. So, I challenge each of you to broaden your scope beyond the areas with which you're comfortable. Take advantage of opportunities you encounter to promote the idea of an actuary as a business person with technical skills, rather than as an insurance or pension technician. Also, promote the need for actuaries everywhere there are future risks to be evaluated. And, most importantly, have the courage to speak out if something is wrong.

If we all do this, I'm confident we can survive.

Workforce 2000: the most recent projections

by Anna M. Rappaport

The U.S. workforce of today is quite different from the workforce 15 years ago – and the workforce in 2000 will be quite different from the workforce today. The Department of Labor has published two sets of projections of the year 2000 workforce. The most recent projections were published in November 1989, and show some changes from the earlier projections.

This article will present some key trends, discuss the difference from the earlier projections, and the significance of the trends for actuaries.

Exhibit I shows the results of the projections, and Exhibit II compares the new projections with the prior projections. The new projections are based on labor force projections through 1988, whereas the prior projections are based on labor force

participation through 1986. The new projections show a higher projected labor force in the year 2000, with the increase equal to 2.4 million persons. The difference between the projections is largely due to an increase of more than two million in the projected labor force at ages 55 and over.

Exhibit III shows the changes in the labor force between 1986 and 1988, the base year. Exhibit IV shows changes in participation rates at ages 55 and up.

Major trends

The major workforce trends are:

- A long-term trend to early retirement
- Net increase in minority representation in the workforce
- Increased participation among women, leading to an increase of two-worker families
- Shifting age distribution and decline in the number of younger workers

The significance to actuaries

Actuaries will generally be interested in these trends if they affect the actuarial assumptions that should be used in valuing employee benefits, or costing the programs, or designing the programs. Some also will be interested if the trends have widespread social implications. Chart A shows a summary of some of the implications for benefit design and actuarial assumptions.

Financial security programs can be funded on a pay-as-you-go or current cost basis, or on an advance funded long-term cost leveling basis. A shifting population distribution will change the levels of funding needed for a pay-as-you-go or partially pay-as-you-go system. Whether this is a problem or not depends on the program, the magnitude of cost relative to resources, what advance commitments are made, and whether the benefit levels are sustainable. The shifting demographic scene creates substantial concerns for Social Security, and also will change costs for employer one-year-term funded programs.

For advance funded programs, there should be less concern, since, at least in theory, each cohort pays for itself.

Chart A
Implications of Various Trend Areas

Trend area	Implications for Plan Design	Implications for Actuarial Assumptions
Older worker participation	Plans – pension and medical – need to accommodate and foster desired retirement age range Plan sponsor may wish to encourage retirement at a certain age In the last few years, early retirement has been encouraged; is it desirable to shift away from early retirement?	Past experience may not be a good indicator of early retirement rates for the future
Net increase in minority representation in the labor force	None	Mortality and morbidity rates for employer plans may change, reflecting the changing mix of the population Employee termination rates also need to be watched carefully and may change
Increase in female labor force participation and two-worker families	Plans are desired which offer choice Method of handling coordination of benefits is important Need for life insurance tied to dual vs. single breadwinner concept	Selection issues must be considered in pricing
Changing age distribution of the population and fewer younger workers	Plan design may need to help attract most wanted workers	Medical, life and disability costs can be expected to increase with changing age distribution; valuation needs to appropriately reflect age distribution

Exhibit I
Projections of the U.S. Labor Force — 1988-2000
 (all population numbers in thousands)

	U.S. Labor Force			Net Change		% Change per year	
	1976	1988	2000	1976-88	1988-2000	1976-88	1988-2000
Total,							
age 16 & over	96,158	121,669	141,134	25,511	19,465	2.0%	1.2%
Men,							
age 16 & over	57,174	66,927	74,324	9,753	7,397	1.3%	0.9%
Age 16-24	12,572	11,753	11,352	-999	-401	-0.7%	-0.3%
Age 25-54	35,576	46,383	53,155	10,807	6,772	2.2%	1.1%
Age 55-	8,846	8,791	9,817	-55	1,026	-0.1%	0.9%
Women,							
age 16 & over	38,984	54,742	66,810	15,758	12,068	2.9%	1.7%
Age 16-24	10,588	10,782	11,104	194	322	0.2%	0.2%
Age 25-54	22,925	37,659	48,112	14,734	10,453	4.2%	2.1%
Age 55-	5,471	6,301	7,594	830	1,293	1.2%	1.6%
White	84,767	104,755	118,981	19,988	14,226	1.8%	1.1%
Black	9,565	13,205	16,465	3,640	3,260	2.7%	1.9%
Asian & other	1,826	3,709	5,688	1,883	1,979	6.1%	3.6%
Hispanics*	4,289	8,982	14,321	4,693	5,339	6.4%	4.0%

*Persons of Hispanic origin may be of any race

Changes in the retirement age range. The changes at ages 55 and over are of particular interest. For many years, labor force participation rates have been steadily lower at these ages. However, the new participation rates indicate that this trend may be changing, or at least that it has temporarily stopped. At the same time that participation rates were dropping, there have been concerns about the long-term implication of the aging of Baby Boomers and the implications of very early retirement at a time when the elderly will comprise a much larger proportion of the population. Many studies indicated that when asked, older people said they would like to continue working, but labor force data indicated that in fact people were retiring earlier. A human resource manager from a major electronics firm recently described the situation. He indicated that while he constantly hears projections of labor shortages at younger ages, today the message from management is "encourage earlier retirement." The many early retirement window programs used to help implement restructuring are a strong indicator of that message.

During the last decade, a number of public policy changes have been enacted which may encourage (or at least facilitate) later retirement. These include abolishment of mandatory retirement, a requirement for pension

accruals after normal retirement age, future increases in Social Security normal retirement ages, reductions in the Social Security earnings test, and future increases in the delayed retirement credit. The abolishment of mandatory retirement and the requirement for future pension accruals are currently in effect. The mandatory retirement age was previously 70, and it appears unlikely that the mandatory retirement repeal had much effect since few people remained in their

jobs to age 70. The big changes to Social Security will be phased in over time and are not yet in effect. This area needs to be watched closely.

Changes in women's participation and family structure

Women have accounted for a substantial part of the workforce growth over the past decades, and labor force participation rates of women are expected to increase. Women who are in the workforce, particularly in full-time jobs, frequently are under considerable stress. It is often argued that when such women are married, they in effect have two full-time jobs, because with many couples the household responsibilities still fall heavily on the woman. Women have experienced substantially lower mortality than men historically, and the spread in life expectancies has widened. An open question is whether the changed role of women will lead to a narrowing of this spread, and whether mortality rates for women might even increase.

The two-worker family is very common today, and will become even more so. This raises some interesting selection and actuarial issues in connection with the design of health benefit plans. The family does not need two sets of health benefits. Employers today are increasingly designing programs to make it attractive for one of the people in the two-worker family (or for the entire family) to get health coverage with the other employer. The actuary may

Continued on page 8 column 1

Exhibit II
U.S. Labor Force — Projections to 2000
Comparisons with Earlier Projections

	Earlier Proj.	Current Proj.	Net Change	% change
Total,				
age 16 & over	138,775	141,134	2,359	1.7%
Men,				
age 16 & over	73,136	74,324	1,188	1.6%
Age 16-24	11,506	11,352	-154	-1.3%
Age 25-54	53,024	53,155	131	0.2%
Age 55-	8,606	9,817	1,211	14.1%
Women,				
age 16 & over	65,639	66,810	1,171	1.8%
Age 16-24	11,125	11,104	-21	-0.2%
Age 25-54	47,756	48,112	356	0.7%
Age 55-	6,758	7,594	836	12.4%
White	116,701	118,981	2,280	2.0%
Black	16,334	16,465	131	0.8%
Asian & other	5,740	5,688	-52	-0.9%
Hispanics*	14,086	14,321	235	1.7%

*Persons of Hispanic origin may be of any race

Workforce 2000 cont'd

be asked: How much can the employer afford to pay to the employee if he or she elects health coverage in the other employer's plan? How much should be paid to encourage the employee to elect coverage elsewhere? Response to these issues is complicated because claims are distributed according to some variation of the 80%-20% rule, i.e., 20% of the employee population experiences 80% of the claims.

The changed family structure also raises other issues in connection with the design of health benefit programs. There are an increasing number of single-parent households, and often these households represent families with relatively little money. There are a few families with a large number of children, but it is more common to have households with one and two children.

Minority representation in the labor force

The black, Asian and other, and Hispanic groups grew at a more rapid rate than the entire labor force in 1976-88, and more rapid growth is expected to continue. The fastest growth is among Hispanics. This is the result of several forces: (1) the older individuals leaving the labor force are heavily white; (2) the younger groups entering the labor force are proportionately more minority than the population as a whole, largely due to higher historical birth rates among these groups; and (3) immigration.

Age distribution of the labor force
This shifting age distribution is largely the result of the Baby Boomers

Exhibit III
U.S. Labor Force
Change from 1986 to 1988 (Base year for projections)

	<u>1986</u>	<u>1988</u>	<u>Net change</u>	<u>Annual % change</u>
Total,				
age 16 & over	117,837	121,669	3,832	1.6%
Men,				
age 16 & over	65,423	66,927	1,504	1.1%
Age 16-24	12,251	11,753	-498	-2.1%
Age 25-54	44,406	46,383	1,977	2.2%
Age 55-	8,766	8,791	25	0.1%
Women,				
age 16 & over	52,414	54,742	2,328	2.2%
Age 16-24	11,117	10,782	-335	-1.5%
Age 25-54	35,159	37,659	2,500	3.5%
Age 55-	6,138	6,301	163	1.3%
White	101,801	104,755	2,954	1.4%
Black	12,684	13,205	521	2.0%
Asian & other	3,352	3,709	357	5.2%
Hispanics*	8,076	8,982	906	5.5%

*Persons of Hispanic origin may be of any race

moving through the labor force plus the trend to early retirement. The age distribution changes will increase the cost of employee benefits if all other forces are held constant.

Dependency ratios

It should be noted that although the elderly dependency ratios will be increasing as the Baby Boomers age, the number of dependent children will be lower, so that total dependency ratios will not increase. Whether or not this is a problem depends on one's viewpoint. Actuarial analysis would be most helpful in understanding this issue better.

NSF/CBMS asks for conference proposals

The National Science Foundation (NSF) and the Conference Board of the Mathematical Sciences (CBMS) will be financially supporting six to eight regional research conferences in 1992 to stimulate interest and activity in mathematical research. Proposals are now being accepted from individuals or groups interested in organizing one or more of these conferences.

Each five-day conference will feature a distinguished lecturer who will deliver 10 lectures on an important current research topic in one sharply focused area of mathematical sciences. Financial support will be provided for about 30 participants at each conference; however, a larger number of attendees could be accommodated. The conference organizer will invite both established researchers and interested newcomers.

Proposals are due April 1, 1991. Those interested in finding out more about these conferences or in submitting proposals should call Mark G. Doherty, Director of Research at the Society of Actuaries office, 708-706-3570, for a copy of the "Request for Proposals Guidelines."

Exhibit IV
Labor Force Participation Rates at Age 55 +
Annual Rates of Change

	<u>1976-85</u>	<u>1985-88</u>	<u>1988-2000 Projected</u>
Men			
55 to 59	-0.5%	-0.1%	0.0%
60 to 61	-0.8%	-0.9%	-0.1%
62 to 64	-1.9%	-0.5%	-0.1%
65 to 69	-2.0%	1.9%	-0.2%
70 to 74	-2.8%	0.9%	-0.4%
75 & over	-3.1%	1.9%	-0.8%
Women			
55 to 59	0.5%	1.9%	0.9%
60 to 61	0.3%	1.1%	0.6%
62 to 64	0.0%	-0.1%	0.2%
65 to 69	-1.1%	4.5%	0.8%
70 to 74	0.3%	-0.4%	1.2%
75 & over	-2.2%	2.9%	-0.7%

The complete actuary

Effective listening

by Brian Brown

In a recent insurance company advertisement a spokesperson states, "Success comes from listening. I've never learned anything by talking."

But just because the key point of this message is listening, does the same apply to actuaries?

Benefits of listening

First, as the ad points out, by listening you can learn. None of us knows everything, not even about a specific subject.

A second benefit of listening is building rapport. If you show that you are listening to someone, it is more likely, although not certain, that he or she will listen to you when you speak. This shows respect for people and their views and builds a rapport with them.

You can avoid redoing work by listening properly — listening not only to instructions given to you, but also when you give instructions. Have you ever had people not carry out your instructions correctly? Is it because, when giving those instructions, you have not listened to the questions, doubts, or lack of understanding of the person receiving the work?

Barriers to listening

To listen properly, not just to let someone talk, is not easy. Many things can interfere with effective listening.

Time is one problem because there are so many other things to do. It is difficult to allow 10 minutes for a conversation that would take only 5 minutes if you did all the talking.

Interruptions are another problem to be avoided. To listen carefully to someone needs your full attention. It is a clear indication how unimportant you feel someone's views are if you allow the phone or your secretary to interrupt the conversation.

A person's style of delivery also can interfere with effective listening. Style can cover many aspects of conversation, including language, accent, hesitation, and technical vocabulary. Given time and inclination, a person can improve most problems in delivery. You, on the other hand, can make a greater effort not to be distracted by another person's style.

When we are not actually talking, most of us spend much of the available listening time thinking about what we are going to say next. A key part of effective listening is to train oneself to use this non-speaking time as an opportunity to listen.

What to do

Effective listening is a skill, not just knowledge. You cannot read a book or an article and suddenly become an effective listener. You must want to improve your listening skills, and continue to improve them, which means practicing.

If you would like to start with a course of reading, try *The Art of Managing People* by Phillip L. Hunsaker and Anthony J. Alessandra, published by Simon and Schuster (1230 Avenue of the Americas, New York, NY 10020), 1980. It has an excellent chapter on listening, besides many other well written topics relating to person-to-person skills. *The Eloquent Executive* by William Parkhurst, published by Times Books (201 E. 50th Street, New York, NY 10022), is another "how to" book which has a chapter on listening. Dale Carnegie's *How to Win Friends and Influence People* also is an ideal reference book for all people-related skills.

Meanwhile, here are several key actions for those of you who would like to improve your listening skills now:

- Cut down significantly the time you spend talking. The less you talk, the more time there is for listening.
- Be sure that everything is ready before you begin a discussion. Place your phone on "do not disturb" before the conversation starts.
- Take a few notes. These can assist with follow up questions and can save you from having to memorize every topic discussed. However, taking too many notes may interfere with listening.
- Recap what has been said to confirm that you have listened properly.
- Interrupt and ask for clarification if needed. This is not impolite but sensible. There is little point in listening without understanding.

- Look directly at the speaker. Your body language can defeat or enhance the perception that you are interested in what the other person is saying. You are wasting your efforts to listen intently and to gain rapport if your expressions and posture give the opposite message.
- Try to put yourself in the other person's shoes. If you can improve your ability to do that, you will make a great leap forward in not only your listening skills, but in all your relationships with people.

Brian Brown is Partner, Sobeco Inc., and a member of the SOA Management and Personal Development Committee, which has arranged sessions on "Effective Listening" at each of the Spring 1991 Society meetings.

Early-release copies of TSA papers

The following papers have been accepted for publication in Volume XLIII of the *Transactions*. Members who would like to obtain an early-release copy of a TSA paper, before it is published in a preprint, may do so by sending \$5 for each paper to the Books & Publications Department at the Society office.

"Intervention Effects Among a Collection of Risks," H. Dennis Tolley and Kenneth G. Manton

"Modeling Home Equity Conversion Mortgages," Thomas N. Herzog and Theresa R. DiVenti

"Macro Pricing: A Comprehensive Product Development Process," Shane A. Chalke

"Statistical Tests of the Use of the Lognormal Distribution as a Basis for Interest Rate Changes," David N. Becker

"Multivariate Duration Analysis," Robert R. Reitano

Small groups report available

The literature search report of the "Effect of Duration on Small Group Medical Claims" research project is now available. For a copy, please call Judy Yore at the SOA office, 708-706-3573.

1991 Yearbook adds fax numbers

by Fran Lemery

The 1991 edition of the Society of Actuaries *Yearbook* includes some important additions and changes. The most obvious is the addition of fax numbers to the membership directory (Appendix A). When verification cards were sent to members last summer, they were asked to supply their fax numbers and also indicate whether they wanted them listed in the *Yearbook*. About one-third of the members added this item to their addresses. The fax number is the last information item in each member's listing.

Another major addition is the indication of special interest Section membership in the directory. Immediately following the FSA or ASA designation is another set of parentheses containing a letter abbreviation for Section membership. The codes for these abbreviations are explained at the beginning of the membership directory on page A-1. Sections are groups of Society members organized to study and discuss their common functional and professional interests. Membership in a Section does not necessarily indicate any special expertise in that area.

Another addition to the 1991 membership directory is the extension number for easy access to those with electronic telephone systems.

The business connection listings (Appendix B) now comprise 11 categories. New categories in the 1991 listings are consulting actuary, insurance broker, investment banker or

advisor and software developer/vendor. The seven other categories are insurance company, insurance department, other government employment, organization serving insurance business, miscellaneous, university or college, and retired.

Other new features this year are a description of the publication opportunities offered by the Society (page 64) and an order form for Study Notes (page C-7).

The *Yearbook* also offers regular features that contain important information:

- Society officers and Board of Governors
- Society committees: a description of their charge, their chairpersons, members, and staff liaisons
- Officers of special interest Sections
- Requirements for admission, including a course listing
- Publications available from the Society: books, reports, proceedings, serials, tables, diskettes, videotapes
- Future Society meeting dates and places
- Membership statistics: 1989 versus 1990; by type of employment; Canadian and United States; and outside Canada and the United States.

If you have any suggestions for improving the *Yearbook*, please contact the *Yearbook* Advisory Committee.

Fran Lemery, chairperson of the *Yearbook* Advisory Committee, is Senior Vice President and Actuary, Kansas City Life Insurance Company.

Study manuals, review seminars offered

ACTEX Study Manuals for the May 1991 exams are available for all Associateship and Fellowship courses. Details are available in your Society Study Note package, or by mail from the Actuarial Bookstore, P.O. Box 1229, Dover, NH 03820, or by mail or phone from ACTEX, P.O. Box 974, Winsted, CT 06098, 203-379-5470.

* * *

Exam preparation seminars for the May exam period will be conducted in April 1991, in Chicago, New York, and Toronto for Courses 120, 130, 135, 140, 141 (EA-1 Part A), and 150. For details, please contact Professor S. Broverman of the University of Toronto at his *Yearbook* address or call 416-978-4453.

* * *

An intensive three-day problem-solving workshop for the EA-1, B exam will be given by Actuarial Study Materials in April in New York City. A.S.M. also has study manuals and textbooks for the May 1991 SOA exams. For details, write to A.S.M., P.O. Box 522, Merrick, NY 11566 or call 516-868-2083.

* * *

The Temple University Actuarial Institute will be offering intensive review seminars for the Course 100 and 110 examinations on January 14, 15, 16, and 17, 1991, from 9 a.m. – 4 p.m. For information write: Bonnie Averbach, Program in Actuarial Science, Ritter Annex 475, Temple University, Philadelphia, PA 19122 or call 215-787-8153.

EA-1 exam May 1991

The EA-1 Examination, which is required for anyone who wants to become an Enrolled Actuary in the United States, is scheduled for Monday, May 20, 1991. Special arrangements will be made for anyone observing the Jewish holiday of Shavuoth. For more information, call Bernard Bartels, Society Registrar, at the Society office, 708-706-3588.

In memoriam

Frank L. Griffin FSA 1942
Yeshwant G. Kanitkar ASA 1973
Thomas F. Lannert FSA 1975
James C. McIntyre FSA 1961
Philip A. Rabenau FSA 1939
Charles A. Yardley FSA 1958

E & E needs volunteers

The Education and Examination Committee is looking for volunteers to serve on various course examination committees. Help is especially needed on the Associateship examinations. ASAs not writing the Fellowship examinations are welcome to volunteer along with FSAs. If you are interested in serving on one of the examination committees, please contact Janet Rumlow, 708-706-3500, at the SOA office. Your contribution will be much appreciated.

50 years of Fellowship

During 1991, seven actuaries will celebrate their 50th year as Fellows. FSAs who attained Fellowship in 1941 are:

R. L. Bergstresser
William C. Brown
Herbert S. Gardner
Robert L. Jex
Morton D. Miller
Walter J. Rupert
Robert J. Towne

Early history of probabilities

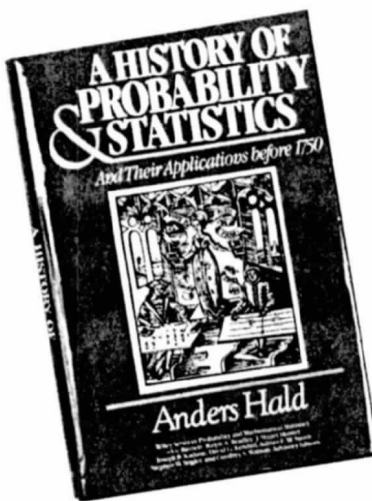
by Stuart Klugman

A History of Probability and Statistics and their Applications before 1750 by Anders Hald. Published by John Wiley and Sons, 605 Third Ave. New York, N.Y. 10158-0012 (201-469-4400), 1990, 586 pages.

The introductory chapter of the book promises a study of the development of probability and statistics through problems, methods, and persons. The problems are mainly games of chance, astronomy, demography, and life insurance. It is, of course, the inclusion of the latter two topics that makes this book potentially interesting to actuaries. It is then noted that the various proofs will be reconstructed in modern notation which "makes evaluating the contributions of various authors easier and minimizes the danger of attributing too much to an individual author. Furthermore, the importance of the results to the following period and to today becomes evident." This is especially useful when the results of Abraham deMoivre and Thomas Simpson are stated in International Actuarial Notation. Hald notes that while practical problems provided the impetus, they quickly took on a life of their own as the mathematical community strived for improved proofs and generalizations.

The bulk of the book (Chapters 2-6 and 11-24) covers problems arising from games of chance and resulting development of combinatorics, multiplication and addition rules, the binomial distribution, the negative binomial distribution, the gambler's ruin problem, and eventually the law of large numbers and the normal approximation to the binomial. Learning about the lives of the men and the way they advanced the theory through correspondence and challenge problems is fascinating. I saved considerable reading time by skipping the proofs. Problems included at the end of most chapters allow the reader who has enough time to work on some of the interesting problems of the time.

Chapters 7-9 and 25 on demography and life insurance are well



worth reading. (Chapter 10 deals with astronomy.) Chapters 7 and 8 deal with the first life table, the one constructed by John Graunt in 1662. His contribution was more than the table itself; this was the first-ever descriptive statistical analysis. Gaunt investigated the reliability of the data and noted that the reported cause of death was unreliable (the study had been motivated by the need for an early warning system for the onset of plague). Graunt is a good role model for today's actuary. He possessed limited analytical tools and flawed and scanty data, yet he produced a solution which was reasonable and useful.

Next, Hald writes that the Huygens brothers and Nicholas Bernoulli used the life table to find the median lifetime, the expected lifetime, and some joint life values. A key realization was that the probabilities must come from observation and estimation. This was a radical change from the analysis of games of chance where the probabilities could be deduced from the physical structure of the game. Unfortunately, it would be another 100 years before a theory of errors of measurement would be developed. (*The History of Statistics: The Measurement of Uncertainty Before 1900* by Stephen Stigler, The Belknap Press of the Harvard University Press, 1986, provides an excellent discussion of the development of the theory of errors of measurement. His book also is more appropriate for readers who are interested in the history of statistics

and data analysis rather than a history of probability.)

The early history of life insurance mathematics is found in Chapter 9. It was common for governments to sell life annuities as a fund raising scheme. In 1671 Jan deWitt constructed a table with uniform distribution of deaths over the intervals (3,53), (53,63), (63,73), and (73,80). He then successfully computed a_x using the formula $\sum a_{\overline{n}|} d_t / I_x$. (It is interesting to note that only with the publication of *Actuarial Mathematics* did North American actuarial education return to this as the basic formula for annuity values.) deWitt found that the government was underpricing the annuities by 12.5%.

In 1694 Edmund Halley introduced $a_x = \sum v^t l_x + t / I_x$. Hald also reveals how it came to be that an English astronomer was called on to analyze data from Breslau. His data consisted of deaths and births. He was astute enough to realize that the population was not stationary and so adding the deaths would not give the correct l_x . Halley was able to determine that the English government also was underpricing its annuities by 45% and that having the price be independent of age was foolish. He also did joint life calculations.

Finally, in 1725, deMoivre used $l_x = 86 - x$ for $x \geq 10$ to obtain a simple formula for a_x .

With two exceptions, Hald's history does not return to insurance matters until the final chapter. One is a discussion of Nicolaas Struyck who, in books published in 1740 and 1753, constructed eight tables based on data from annuitants. He did some graduation and interpolation and again found that his government was selling annuities too cheaply. There also is a discussion in Chapter 17 of the first attempts at a test of a statistical hypothesis. It was a demographic problem: $H_0: p = .5$ vs. $H_1: p > .5$ where p is the probability that a newborn is male. A key question of the day also was the stability of p over time (if it was, this was thought to confirm the creation of man by God).

The final chapter covers the work of deMoivre. He generalized his

Book review cont'd

mortality "law" to include piecewise linear l_x . In 1742 Thomas Simpson published a book that duplicated deMoivre's joint life formulas. It also began a running battle between the two over the accuracy of various approximations and the merits of an experience table versus an idealized law. Neither did much with life insurance and deMoivre was unable to correctly obtain A_{xy}^1 (making an error that is often duplicated by today's students). Simpson was able to obtain the correct UDDYA approximation.

In summary, Hald succeeds in his mission. For those of us whose idea of early actuarial history is "Graunt and Halley made tables and deMoivre proposed a mortality law," there is much to learn and admire about those who started our profession. But lest we get too full of ourselves, Hald explains why the latter 17th century saw an explosion in mathematics (particularly the development of calculus) but not probability: "...probability theory did not yet have any important applications in science, only in life insurance."

Stuart Klugman is Principal Financial Group Professor, Drake University.

Actuarial Phonebook supplements Yearbook

The Council of Presidents has authorized publication of a 1991 *Actuarial Phonebook* that includes the telephone numbers and organizational affiliations of actuaries who are members of one or more of six U.S. and Canadian professional organizations. The phonebook includes members of the American Academy of Actuaries, American Society of Pension Actuaries, Canadian Institute of Actuaries, Casualty Actuarial Society, Conference of Actuaries in Public Practice and Society of Actuaries. Fax numbers also are included for those members who have provided one.

This phonebook is a supplement to, not a replacement for, the yearbooks published by each organization. Society of Actuaries members will receive the phonebook in the same mailing as the 1991 SOA *Yearbook*.

Transactions authors profiled

These biographical sketches profile six of the authors of papers that have been accepted for publication in Volume XLII of the *Transactions*. Fifteen papers were accepted for Volume XLII and five authors were profiled in the November 1990 *Actuary*. The remaining seven authors will be featured in a future issue.

"Additional Source-of-Earnings Analysis under FAS 97 Universal Life Accounting and Some Observations on the Effect of Unlocking Assumptions," by Michael V. Eckman



MICHAEL V. ECKMAN, FSA 1976, received a bachelor's degree in mathematics from the University of Minnesota. His first actuarial position was as an actuarial student for Equitable Life Assurance Society (1969-70); then he joined Lincoln National Life Insurance Company (1971-1981). He is currently assistant vice president and tax actuary at Northwestern National Life Insurance. Eckman is a member of the American Academy of Actuaries, has served on the Society's Part 5 Examination Committee, and at present is an Education general officer of the Education and Examination Committee. His paper, "A Policy Year Model for GAAP Valuation Coinsurance and Modified Coinsurance," co-authored with David N. Becker, appeared in Volume XXXIII (1981) of the *Transactions*.

"Stochastic Life Contingencies with Solvency Consideration," by Edward W. Frees



EDWARD (JED) W. FREES, FSA 1986, is an associate professor of business and statistics at the University of Wisconsin-Madison and in 1989 was a visiting mathematical statistician at the U.S. Bureau of the Census. He received a Ph.D. in mathematical statistics in 1983 from the University of North Carolina at Chapel Hill. Prior to being at Chapel Hill, he was employed by M & R Services, John Eriksen's (a New Zealand actuarial consulting firm), and the United Kingdom's Government Actuaries Department. For the Society, he is past chairperson of the Committee on Relations with Statistical Societies, and currently a member of the Education Policy Committee, the Society liaison to the American Statistical Association, and academic instructor and co-chairperson for the Society's new intensive seminar on applied statistical methods (Course 121). Research interests include stochastic models of insurance and finance and statistical inference. His paper, "Net Premiums in Stochastic Life Contingencies," appeared in Volume XL (1988) of the *Transactions*. Frees also has published papers in *Insurance: Mathematics and Economics*, *Journal of Finance*, *Journal of Business and Economics*, *Annals of Statistics*, *Journal of the American Statistical Association*, *Journal of Insurance Issues and Practices*, *Journal of Statistical Planning and Inference*, *Sankhya*, *Stochastic Processes and Their Applications*, *Sequential Analysis*, *Naval Research Logistics Quarterly*, *ASTIN Bulletin*, *Management Science*, and *Scandinavian Journal of Statistics*.

"Early-retirement Reduction and Delayed-retirement Increase Factors under U.S. Social Security Law," by Robert J. Myers and Bruce D. Schobel



ROBERT J. MYERS, FSA 1940 and AIA, served in various actuarial positions with the U.S. Social Security Administration from 1934 until 1970, including chief actuary (1947-70). Since then he has been a member of the National Commission on Social

Security (1978-81), Deputy Commissioner of Social Security (1981-82), executive director of the National Commission on Social Security Reform (1982-83), and chairman of the Railroad Unemployment Compensation Committee (1983-85). He is currently chairman of the Commission on Railroad Retirement Reform. He also has been an actuarial consultant to various Congressional Committees and the Federal Judiciary and a member of missions of technical assistance in connection with Social Security or pension programs in many foreign countries. He was President of the Society of Actuaries and President of the American Academy of Actuaries in 1971-72. He is a Fellow of the Casualty Actuarial Society, the Conference of Actuaries in Public Practice, the American Statistical Association, the American Association for the Advancement of Science, and the Royal Statistical Society. His numerous awards include the Triennial Prize from the Actuarial Society of America and the Distinguished Service Award from the U.S. Department of Health, Education, and Welfare. Myers is the author of several books, including *Social Insurance and Allied Government Programs* (Richard D. Irwin, Inc., 1965), *Medicare* (Irwin, 1970), *Social Security* (Irwin, 1st ed., 1975; 2nd ed., 1981; 3rd ed., 1985), and *Indexation of Pension and Other Benefits* (Irwin, 1978). He has published 775 papers in technical and scientific journals, of which 32 have appeared in the *Transactions*, the *Transactions of the Actuarial Society of America*, and the *Record of the American Institute of Actuaries*; about 500 discussions, book reviews, and letters to the editor; and 135 testimonies before Congressional committees and advisory groups.



BRUCE D. SCHOBEL, FSA 1976, is an actuary in the tax department of New York Life Insurance Company, which he joined in June 1990. Before that, he was a principal in the Louisville, Kentucky, office of William M. Mercer, Inc. In 1979-88, he was with the U.S.

Social Security Administration in various actuarial and policy development positions, including staff actuary to the National Commission on Social Security Reform. His first actuarial position was with the Prudential Insurance Company. Schobel earned a B.S. in mathematics from the Massachusetts Institute of Technology in 1974. He is a Fellow of the Conference of Actuaries in Public Practice, a Chartered Life Underwriter, and a Certified Employee Benefit Specialist. In 1984-88, he performed technical assistance missions on behalf of the U.S. Government and the United Nations. Schobel's paper, "Money's-Worth Analysis of Social Security Retirement Benefits," co-authored with Robert J. Myers, was published in Volume XXXV (1983) of the *Transactions*; his paper "Social Security Considerations in Transfers to and from the United States," published in *Benefits and Compensation International* (April 1989), will become a Society of Actuaries Study Note in 1991; and he also has published articles in the *Wall Street Journal*, *Journal of Taxation*, *The Actuary*, and *Contingencies*.

"A Statistical Analysis of Banded Data with Applications," by Robert R. Reitano



ROBERT R. REITANO, FSA 1980, received a B.A. and an M.A. in mathematics from the University of Massachusetts and a Ph.D., also in mathematics, from the Massachusetts Institute of Technology. He is senior financial officer in investment policy and research at John Hancock Mutual Life Insurance. He has been an assistant professor at the University of Massachusetts, a visiting scholar at M.I.T., an instructor of a risk theory seminar for the Society of Actuaries, and a moderator of a panel discussion on Funding for Investment Risk at the 1990 Annual Meeting. Currently, he is an instructor for the Actuaries' Club of Boston and is presenting two seminars on Multivariate Duration Analysis for the Society. Reitano is a

member of the American Academy of Actuaries, the Mathematical Association of America, and Sigma Xi. Reitano has published papers in *Actuarial Research Clearing House*, *Journal of Portfolio Management*, and the *Transactions* ("Mortality Cost Valuation of Underwriting Requirements," Vol. XXXIV, 1982).

"Computing the Probability of Eventual Ruin," by Eric S. Seah



ERIC S. SEAH, FSA 1984 and FCIA 1985, is associate professor of actuarial science at the University of Manitoba. Before joining the University of Manitoba, he was associated with the Great-West Life Assurance Company in Winnipeg. He received a B.Sc. in 1979, an M.Sc. in 1981 and a Ph.D. in 1987, all from the department of computer science at the University of Manitoba. He now serves on the Education and Examination Committee of the Society. Seah's research interests include combinatorial designs, applications of expert systems in financial industry, and computer applications in actuarial science.

Yet another international opportunity: summer school 1991

by John M. Lenser

Many of you returned from the Orlando meeting of the Society of Actuaries, as I did, with a greatly heightened awareness of the international aspects of actuarial activity. You may even have felt an increased enthusiasm for your involvement in this expanding realm of the profession. The meeting presented an excellent cast of actuaries from countries throughout the world, acquainting us with their activities and introducing us to the frenzy of international growth and expansion in which many companies are presently involved. The "international opportunities" meeting theme reminded me of an international opportunity that is available to all of us — the International Summer School.

Nearly every summer since 1982, the Swiss Actuarial Association has offered members of the international actuarial community the opportunity to attend an actuarial summer school session in Switzerland. The Association found upon completion of the 1980 International Congress of Actuaries, which it organized in Zurich and Lausanne, that the gathering had produced surplus funds. (No less than one would expect, of course, from a profession so focused on prudence and even more to be expected from an association of Swiss actuaries.) The Association decided to use the surplus to create a fund "for the purpose of promoting professional training at an international level." And, it has done so each year from 1982 on, except for 1990. It did not conduct a summer session in 1990 because of its commitment to organize the ASTIN Colloquium in Montreux at the same time that it would normally have conducted its summer school session.

The summer school runs for about a week, usually before or after the Labor Day weekend. It is conducted at a site in Switzerland, and draws a very geographically diverse group (in 1989, the 57 attendees were from 17 countries), including nearly all those in Europe, except for Eastern Bloc countries. At least in recent

years, the classes have been conducted largely or entirely in English, and have dealt with a current mathematical topic.

I have attended two sessions: one conducted at the University of Lausanne in 1985, where the topic was "Stochastic Models for Life Contingencies," and the other at Villars in 1989, with the topic of "Modern Investment Finance and Applications." Classes typically ran all day, Monday through Friday, with a lecture format supplemented by problem-solving sessions for a part of the afternoon. The presence of professors or other experts among the student group tended to provide an occasional lively discussion of one esoteric point or another.

In 1985, I was the only one attending the summer school from North America. In 1989, the students included one other American and a Canadian. The age mix of the students was young, with the majority falling in the 25-40 range, although there were older students.

Over the years, the instructors have been a geographically diverse group. In 1989, there were two professors from Europe, Heinz Müller from Zurich and Philippe Artzner from Strasbourg, as well as two Canadian professors, Phelim Boyle and Elias Shiu. In 1985, most of the instruction was carried out by two professors from the University of Lausanne, Marc-Henri Amsler and Hans Gerber. (The latter is well-known in the United States for his role in the actuarial program at Michigan, his many contributions to the *Transactions*, and his co-authorship of *Actuarial Mathematics*.) A Swiss pension consultant, Dr. Ernest Kuhn, dealt with pension aspects of the topic.

I recommend the program to others, at least as much for the opportunity that it presents to meet with an interesting and varied group of actuaries as for the opportunity to study a particular mathematical topic. The social time spent with other students and professors was a highlight of the sessions. The session at Villars, the more isolated of the two

sites, had an organized social schedule including dinners, hiking, and riding chair lifts to nearby peaks. Two of the events were among the most pleasant and memorable social events of my life. (Can I really be saying this about social occasions that were nearly "actuaries-only?") In 1989 at Villars, the organizers offered us a hike to the somewhat remote, old mountain village of Taveyannaz, where homes and other structures are maintained and rebuilt only in their original style. We spent the evening singing, accompanied by an accordion, and eating fondue and wine. A visitor arrived in the late dusk dressed in the traditional local garb to play the alpine horn for us. Its sounds echoed through the high mountain valley as the sun set and darkness settled in on the village. (Incidentally, our horn player explained to us that during the day we would find him dressed for business in his office at one of the Swiss banks in Villars.)

A high point of the Lausanne 1985 session was a student-organized evening that began with a ferry ride across Lake Geneva to the small French town of Evian. We walked along the lake and through the town until a couple of the French students found a restaurant that would accept a dozen or so foreign actuaries for a long, relaxed late evening dinner.

According to a recent *Bulletin* of the International Actuarial Association (IV-1990), the 1991 session will focus on "APL and its Applications in Insurance Mathematics." More specific details on the session usually appear in various publications early in the calendar year.

I heartily recommend the International Summer School, especially in the context of the current expansion of international insurance and actuarial activity, and particularly for those who have an interest in becoming acquainted with some of their European counterparts.

John M. Lenser is an actuary currently on sabbatical.

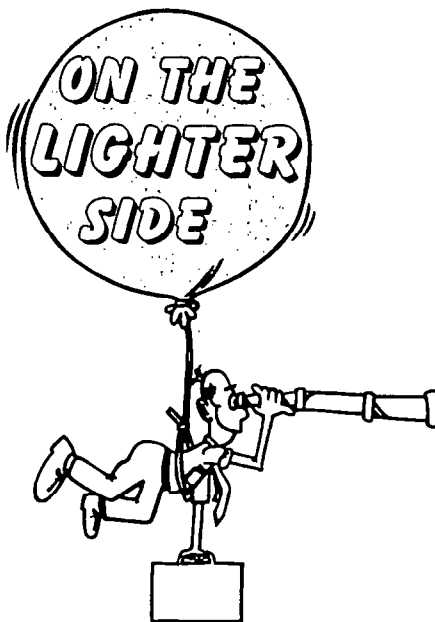
FSAs and other trophies

by Timothy J. Ruark

I first heard it from the local barber. The FSA as marital property. I missed most of the conversation because some kid was screaming at the barber that he wanted a haircut like Bart Simpson. What I heard was, in case of divorce, the FSA might be considered joint property and its value could be divided among husband and wife. It's an awesome thought, although personally I'll never have to worry about it. It's not that I'm single or a perfect husband, but that my wife Sheryl the Great, not a member of the Society, is morally opposed to divorce. Plus, she loves my family because they all decorate country, and most important, I removed the lawyer ads from our yellow pages.

Despite my apparent safety, the prospect of my awards being transferred to Sheryl the Grabby, still not a member of the Society, got me to thinking. You see, I only have three awards — my FSA and two trophies. A person with only three awards gets fairly protective about splitting up his booty. You might think that the FSA would be my greatest concern. After all, it took many years to acquire and if you believe other people with FSAs, it's worth a lot of money. But, it's the trophies I'm worrying about.

The trophies were special to me because they taught me a lesson about values. I received my first trophy when my hometown baseball team won the championship. I had one primary responsibility on this team. I was to make sure that Howey Stafford, our big hitter, got a ride to each



game, since fate had dictated that we would be neighbors. Howey, not a member of the Society, was an oversized kid who was confused easily. My only other chore was the computation of batting averages. Despite my modest contribution, I was awarded a trophy. A very large trophy. I called the trophy "Greta," in memory of my sister's pet pig, which weighed 296 pounds. On the plaque was a beautiful engraving which reminded me of the Gettysburg Address. I don't remember all of it but it said something like "Fourscore and... Recognition for Service to Baseball and Country... God Bless all Rotarians... Both Honor and Glory for Evermore. Amen." I think it also mentioned Sammy Davis Jr. How proud I was!

My other trophy was for finishing first in a regional math contest in Michigan. I don't want to

brag, especially to a group of actuaries, but this math contest was a big deal and I won. I knew there would be a trophy and I was appropriately excited. After all, I got Greta for doing nothing. Think of what I would get for winning a math contest!

What a shock. The math trophy awarded was a thimble-size unit with an unduly humble plaque supposedly proclaiming me the "Math Champ." But no, there had been an ugly incident at the plaque shop, and my trophy read "Bath Champ." I protested, but according to the head math nerd, they didn't have enough money to fix the error. So, here's a 12-year-old kid with a piddling trophy that boasts of his cleanliness. How embarrassing.

To me, those two trophies are a perpetual reminder of society's values: sports are king, brains are pawn. It was a hard lesson for a youth at the 99th percentile analytically but the 6th percentile physically.

So now I hear that my awards are in jeopardy. A lifetime of achievement reflected in three tangible items and now Sheryl the Covetous is taking them away. I tell you one thing, if we have to split up my awards, Sheryl the Greedy, still and forever not a member of the Society even if she has half my FSA, can have the FSA and the Bath, but I'm keeping Greta. Hey, I'll be single and I'll need proof of my athleticism. You know what they say, "It's the jocks that get the babes."

Timothy J. Ruark is Assistant Actuary, CIGNA RE Corporation.

University openings cont'd

the Society of Actuaries, or have a Ph.D. in a related field. A research component is desirable.

Applications: Consideration of applications will begin February 1, 1991.

Curriculum vitae and reference letters should be sent to Professor Morton Brown, Search Committee Chairman, Department of Mathematics, University of Michigan, Ann Arbor, Mich. 48109-1003. Professor Emeritus Cecil J. Nesbitt is cooperating in the search.

January Board meeting open to members

Interested SOA members are welcome to attend the next Board of Governors meeting to be conducted January 22 in Atlanta.

Also, members are reminded that minutes of Board meetings are available upon request. For more information on the meeting and the minutes, call the Society office.

ARC 1991 announced

The Census Bureau's 1991 Annual Research Conference will be conducted March 17-20, 1991, at the Holiday Inn Crowne Plaza in Arlington, Va. ARC 1991 includes a mix of topics such as editing, estimation in the presence of outliers, statistical methods for use with missing data, the effect of sample attrition on estimation and analyzing data in the presence of missing data, and nonsampling errors. For further information, contact Maxine Anderson-Brown, ARC Conference Coordinator, Office of the Director, Bureau of the Census, Washington, DC 20233, 301-763-1150.

Dear Editor:

Actuaries next for Nobel Prize?

I was delighted at the announcement made recently by the Nobel Committee that the 1990 Nobel Prize for Economics was awarded to three distinguished American econometrists. This is the first time that the Nobel Committee has recognized the importance of financial economics and has put it in the same class as chemistry, physics, and mathematics. The three honorees are Harry Markowitz, Merton Miller, and William Sharpe. In the 1970s Harry Markowitz and his wife, Barbara, cooperated extensively with the Society's Committee on Theory of Risk (COTOR) in the development of a methodology for the determination of provisions for the various types of adverse deviations that need to be recognized in the calculation of GAAP policy reserves.

Eventually, Harry and Barbara Markowitz and Alice Goldstein cooperated with John Wooddy, then chairman of COTOR, in writing the paper "A Corporate Model for GAAP" published in the *Record of the Society of Actuaries*, Vol. 5 (1979) and the well known monograph "Adverse Deviations" published by the Society in 1981. Both publications would not have seen the light of day had Harry not built SOFASIM — a stock life insurance company model which has been extensively used in North America.

Awarding the Nobel Prize to econometrists makes me feel that in the not too distant future, this prize also will be awarded to actuaries. When the time comes, the Nobel Committee may not have to travel far to find the recipient — Scandinavian countries abound with worthy candidates for the honor.

I am sure that members of the Society are as pleased as I am for the honor bestowed upon our friend Harry Markowitz.

Frank P. DiPaolo

How significant was court decision?

The first-page story in the October *Actuary*, "FSA may be a marital asset," was interesting but may have misled readers regarding the significance of the court that made the determination described. The Supreme Court of New York is not, as one might believe, the highest court in the state; to the contrary, it is the court of general jurisdiction, equivalent to the Superior

Court in most other states. Its decisions are generally not binding on any other courts. New York has two appellate levels of court, with the higher being the Court of Appeals. Its decisions are binding on other courts in the state, but to my knowledge no appellate court has ruled on the value of the FSA designation.

I am not suggesting that the decision was not noteworthy, just that its significance was not as great as it may have seemed to many readers.

Bruce D. Schobel

Should actuarial science lose traditional symbol?

Several weeks ago while perusing the SOA's new mathematics textbook, *Actuarial Mathematics*, I noticed that, unlike Jordan's text, there is no mention or definition of c_x , the one-year cost of insurance. My letters to the five authors generated two replies.

The question of whether actuarial science should be losing a traditional symbol, despite all the new ones being gained in the new text, is an interesting one.

I believe a coherent symbology forms the foundation of actuarial mathematics, or any branch of mathematics. Generally speaking, fundamental or elementary concepts are assigned the simplest symbols; refinements or elaborations require more complex expressions. In insurance, no form of coverage is more fundamental than the one-year term plan, regardless of the peril involved. Coverage for more than a year can always be expressed as a discounted sum of one year coverages. It seems incongruous that students relying on this text will never understand that c_x is a simpler, traditional alternative to writing $A_x^1:\bar{1}$. A short footnote to that effect would have served the purpose.

One year insurance costs are primordial (rather than quarterly or quinquennially) because insurance is above all a financial concern, not merely a financial one. For financial purposes, annual accounting is axiomatic and the cost of insurance for any individual or company for a year is an unavoidable part of the financial picture. The laudable emphasis on statistical foundations in the text may have inadvertently obscured the real truth of insurance as a financial security mechanism. Actually, actuarial symbols for insurance coverage can only be regarded as financial symbols with a statistical

underpinning rather than statistical symbols with financial implications.

However, perhaps a wider audience could generate more light on the subject.

Kenneth M. Heck

Reply from James C. Hickman, co-author of *Actuarial Mathematics*:

When we were working on Chapters 14 and 15, the issue of whether to introduce the symbol c_x was the subject of a heated discussion. Because c_x does not fit into the recipe for net single premium insurance symbols that had been introduced in an earlier chapter, it might be confused with the commutation symbol C_x and many students believe that actuarial mathematics already has too many special symbols. We decided to stick with $A_x^1:\bar{1}$.

Reply from Hans U. Gerber, co-author of *Actuarial Mathematics*:

Thank you for your letter of October 19 and your question. To my knowledge, we did not use the symbol c_x for Cx/Dx for the following reasons:

- We don't believe that c_x is used internationally.
- We did not want to introduce a special symbol for vq_x .
- We used the symbol c_k for another purpose (page 443).
- The symbol $A_x^1:\bar{1}$ is consistent with the set of symbols that are introduced for multiple lives.

ASPA contributes much to actuarial profession

I read with deep dismay Larry Keys' letter to the editor in the October *Actuary* about ASPA. It is extremely unfortunate that there remains among some members of the Society of Actuaries a prejudice toward an organization that contributes so much to the actuarial profession.

I joined ASPA many years ago because I decided at that time that ASPA was doing more for me as a pension actuary than any other actuarial organization. I rose to become President of ASPA in 1989, the first Fellow of the Society of Actuaries to do so. I served in that office with pride, and I continue to be proud to be associated with all members of ASPA.

It took very forward thinking individuals who now serve as presidents and presidents-elect of the five North American actuarial societies to favorably consider ASPA's affiliation with the Council of Presidents.

I served on the Council of Presidents, representing the actuaries of ASPA, not the non-actuarial members, for almost two years, and I was welcomed as a contributing member of the COP, not only because I was an actuary, but because I represented ASPA. I also should point out that ASPA's representation on the COP is conditioned upon the sitting representative always being an actuary, and on ASPA's pledge to seriously consider a change in its name. Our representatives on the COP will always be actuaries; and we have formed a working task force to investigate and recommend a change in our name.

I suggest that actuaries consider that in these changing times the actuarial profession must recognize all aspects of the business of being an actuary – and those aspects, in today's times, are not limited to functions performed only by those with actuarial credentials. Since, in my view, the business of being a pension actuary includes having an expertise in pension law, pension consultation, and pension administration, I find significant public relations reason for working closely with ASPA, whether those affiliations are actuarial or non-actuarial.

Howard M. Phillips

Confine SOA functions to education

In the early years of the Society its membership consisted almost entirely of employees of insurance corporations. Now, the membership seems to be almost equally divided between insurance employees and consultants and their employees.

The interests of insurance corporations, and hence of their actuaries, are not always the same as, and on occasion can actually clash with, those of consulting actuaries. An example is the matter of whether a risk should be insured or be carried by the person or persons exposed to the risk, commonly referred to, but improperly, as "self-insurance." In the case of pension and other employee benefit schemes, "self-insurance" has resulted in pressure on governments to provide, or to make arrangements for the provision of, the insurance protection that "self-insurance" lacks. Insurance corporations and their actuaries would be justified in opposing such pressure on the grounds that governmentally supervised and regulated means of providing the desired protection (insurance corporations) already exist.

The disciplining of a member also is a matter in respect of which the solution, insofar as the Society is concerned, can differ materially according to whether the member is an employee or a consultant.

In respect to public image, insurance corporations are concerned with the qualifications gained and represented by membership in the Society, but little, if at all, concerned with public acceptance of such qualifications.

Accordingly, it seems to me that functions of the Society should be confined to education, and functions not directly related to education (such as public image) be the prerogative of some other body or bodies.

Reginald Barnsley

APL can be appropriate for Transactions

In the October 1990 issue of *The Actuary*, we were treated to an attack on the APL programming language by Robert Clemens. Like most such anti-APL diatribes, this one contains a number of inaccuracies and unsubstantiated assertions. Permit me to comment on a few of the more blatant of these:

1. If one defines "structured programming" narrowly, to refer only to such technical programming constructs as loops, gotos, do...whiles, and the like, then Clemens is correct that APL does not support structured programming. However, if one considers instead some of the aims of "structured programming," such as modularity and "top-down" design, there can be little doubt that APL is indeed a structured programming language. In fact, in its encouragement of programs ("functions" in APL parlance) that do only one thing, and return only a single result, APL can be considered the most "structured" of programming languages.
2. Because of APL's large collection of primitive functions (i.e., functions supplied as part of the language), it is indeed possible – some, such as Clemens, would say easy – for an experienced programmer to write code that is difficult for anyone else to decipher quickly; APL is not a collection of English words like many other programming languages. However, as with other programming languages, APL allows the programmer to include comments in his programs. It has long been my contention that, where APL systems are not as well documented

as they should be, the fault lies not in the language, but in the programmer or his supervisor. (It is undeniable that APL tends to attract a greater proportion of iconoclastic individuals to its ranks than more traditional languages such as FORTRAN or COBOL.)

3. Clemens refers to a "disciplined approach" to variable typing. As one who came to computer programming rather late in life (after graduating from college), I have found that one of the most infuriating aspects of programming in languages other than APL is the necessity to distinguish between an integer 1, a real 1.0, and a "double precision" 1.0e0. The great strength of APL, which it shares with no other programming language of which I am aware, is that it lets the programmer or system designer concentrate on the problem he is trying to solve. He doesn't have to concern himself with type conversions and other JCL-like operations, which can get in the way of solving the problem.

4. Clemens' contention that programs written (and run) in an interpreted language, such as APL, run more slowly than programs written in a compiled language is undeniable. However, an interpreted language has significant advantages over a compiled language during program development. APL's development environment gives the programmer more tools than are normally available with a compiled language, and these tools are far easier to use. The capability of stopping a program while it is running, examining or re-setting intermediate variables, then restarting the program from the point at which it was stopped, is unavailable in any other programming language to my knowledge. The price one pays for this ease of development is slower execution of the final system. However, when one compares this cost against the gain in ease of development or modification, it is far from obvious that it is a disadvantage that APL is an interpreted language.

Clemens' evident enthusiasm for Pascal and Modula-2 is, in a way, laudable. What is not so laudable is his desire to praise his chosen programming languages by referring to another language – a language that, for good reason, has found great favor among members of the actuarial profession – as "an inappropriate medium for...the

Continued on page 18 column 1

Dear Editor cont'd

Transactions." Perhaps if he had given some solid reasons for APL's inappropriateness, this comment could be considered seriously. In his letter in the October *Actuary*, Clemens has failed to do this.

Kenneth T. Pawulski

* * *

I read Robert Clemens' letter, "APL Inappropriate for *Transactions*" (*The Actuary*, October 1990), with a mixture of concern and amusement. The point of Clemens's commentary seems to be that APL is unsatisfactory for use by actuaries for three reasons: first, because it has no support for "structured" programming; second, it cannot be used to present algorithms in a clear, concise manner; and finally, it is far slower in execution time than some compiled languages.

In response to APL's lack of "structure," I will concede that APL inherently does not have a defined set of rules that must be followed in order to develop an application correctly. APL does have the flexibility to allow a person to develop a program without the restrictions found in other languages. If companies spent half the time training their actuaries to write in APL as they do teaching their DP people to write "good" COBOL, they would find themselves developing their own set of guidelines for "structured" and readable APL code. As it is now, most actuaries are given a copy of an APL textbook and a problem to solve – and they do it using APL because APL works the way that an actuary thinks, mathematically and intuitively.

Clemens also states that "APL is well known as the single most unreadable programming language ever invented." I find Chinese unreadable, yet over a billion people seem to manage with it quite well. Perhaps if I took the time to learn it, I also would find it understandable. Assuming a satisfactory knowledge level on the part of the reader, the readability of code is more dependent on the supply of comments and the conciseness of the code rather than its use of symbols or words. This leads to the point it made about APL being weak in terms of presenting algorithms. It is unclear whether this could be true since APL uses most of the same symbols that are used to present algorithms on paper. In fact, APL was first developed because there was a need to represent

mathematical problems in a clear, concise manner. Only then was it ever thought of being used as a tool to solve numerically intensive problems on a computer. If one compares the APL and Pascal code needed to solve common actuarial problems, the advantage of APL for presenting algorithms becomes obvious.

Lastly, Clemens states that "the run time of an APL program will be many times longer than that of a corresponding Pascal or Modula-2 program." This is patently false. In most cases a well-written APL program will run as fast, if not faster than other programs solving the same problem. APL will run slower than Pascal if you write an APL program like a Pascal program – but then again if you drive a Boeing 747 along the highway it won't get you to your destination any faster than a Ford.

As computers become faster and less expensive, development and revision times become as important as run times. APL's interpretive nature makes it very easy to step through complex code with test data, examining the results at every step to provide not a guess, but an absolute understanding of what the code does. This, combined with the conciseness of APL code, makes for easy development and revision of code for the ad hoc "what if" problems with which actuaries are commonly faced.

Don Erickson

* * *

Robert Clemens suggests in his October *Actuary* letter that *Transactions* should eschew APL programs, but he ignores some of APL's attributes that would favor its inclusion:

- APL is an analytic and formal language, meaning that its notation is similar to that of mathematics, and that you can use it for proofs of mathematical theorems.
- It is widely used in the actuarial profession.
- It is relatively concise. (The compilers and readers of *Transactions* would surely prefer conciseness to verbosity.)
- An APL program is complete: you can copy a printed listing from *Transactions* and execute it immediately on your PC. For this reason, APL is preferable to, for example, pseudo-code, or source code that doesn't specify the compiler, PC, or other critical environmental information.

Other points raised in his letter have little to do with including APL in *Transactions*, but need correcting:

- You can make an APL system as modular as you like, with no penalty. If management chooses to tolerate a lack of modularity in a system, it's management's problem.
- It's true that APL lacks structured programming techniques ("if-then-else" constructs), but it has much less need of them than other languages because of its intrinsic array-handling properties.
- Lack of readability due to a poor coding style is a criticism of a program, not a language. Management can choose to accept unreadable code, or to set standards in order to avoid it. The phrase "lack of readability" applied to APL also can mean that the reader isn't familiar with the APL symbols; if that's true, the reader should withhold judgment on the language.
- APL isn't always so slow. An example given in "APL: A Prototyping Language" (APL86 Conference Proceedings, published by Quote-Quad) compared a BASIC program, whose run time was five minutes, with an APL equivalent, whose run time was seven seconds. The latter was written in SHARP APL/PC, which is not known for its speed.

For those of you who aren't comfortable with APL's symbols, you may be interested in the following: Ken Iverson (APL's inventor) has recently developed a new language, J, which is a radical evolution of APL, and which uses only the characters in the ASCII alphabet. The large number of APL verbs (primitive functions) is obtained by using the period or colon in conjunction with other symbols. The implications of this are quite far-reaching.

A future implementation will include structured programming constructs. J shares with APL the aim of providing a consistent notation for teaching and analysis.

Finally, a quotation from Pope:

A little learning is a dangerous thing;
Drink deep or taste not the
Pierian spring.
Shallow draughts intoxicate
the brain;
Drinking largely sobers us again.

David Crossley

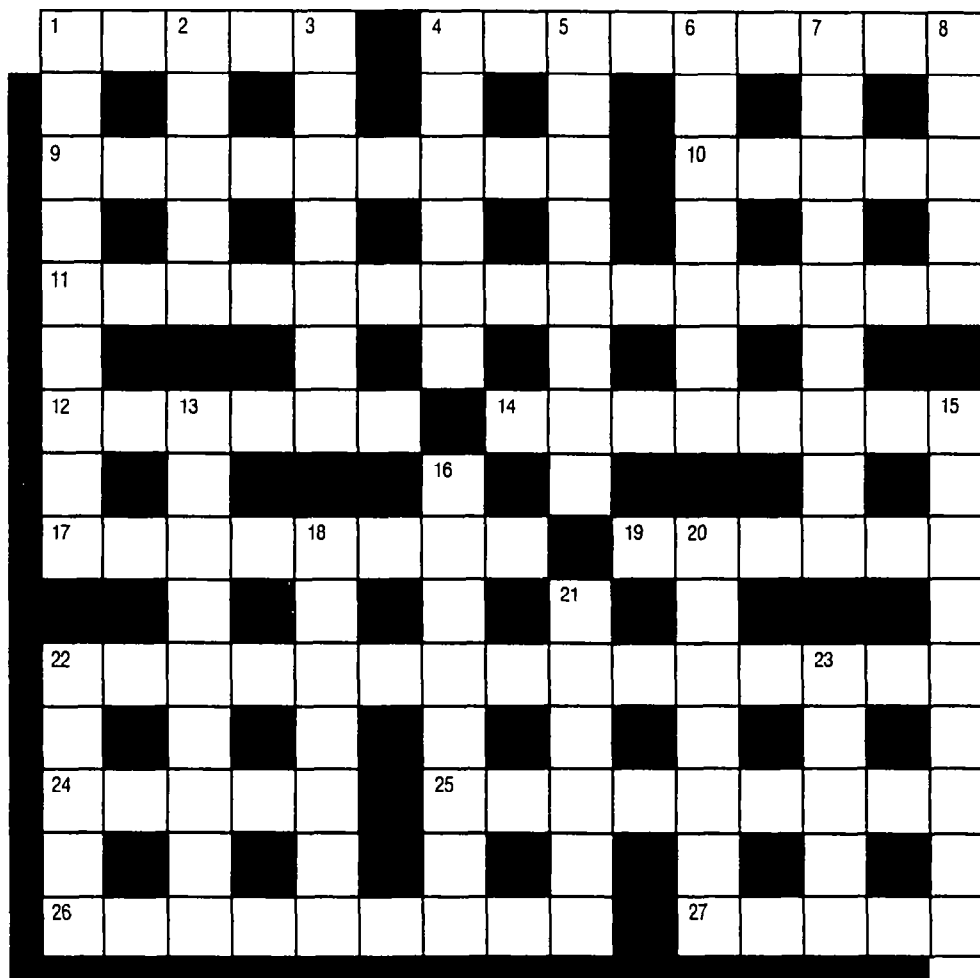
ACTUCROSSWORD

Across

1. Shadow sometimes after a pen (5)
4. Support of pageant or condescension (9)
9. Country limits his right to vote (9)
10. Assets that do so are ineligible as sinking funds (5)
11. It is most commonly depicted by a form of 10 (7,8)
12. A stop in spades is tricky here (6)
14. Turncoat in trouble-endangered but not with North Dakota (8)
17. In Syria and Amsterdam as customs show (8)
19. Utterly spent-mostly at outdoor entertainment (6)
22. Money purchase plan or pad Lloyd claim (6,9)
24. Stature of Elgar's composition (5)
25. Unrecognized quality of coin and ingot (9)
26. Vine length of education (3,6)
27. Substitute for silent cards (5)

Down

1. Baseless-nothing in action of 10 (9)
2. No. 8 or form of verse (5)
3. One of them has a vital statistic in Alaska (7)
4. First person bending in a factory (6)
5. One can also be guilty of bending these (3,5)
6. Occasion of guilt of one who receives stolen goods (7)
7. Source of dislike-i.e. atom ban (9)
8. Act of bookkeeping-by taking occupation (5)
13. Mary is Lil alike in fashion (9)
15. "When _____'s somebody, then no-one's anybody" (Gondoliers) (9)
16. Coagulation of healing act about a demand loan (8)
18. State of unequal sides if seen about it (7)
20. Made an 8 loudly and punished (7)
21. Indian state in pain (6)
22. Geographical location of model histogram (5)
23. Self evident that ten comes twice in the morning (5)



November's Solution

100% SOLVERS -- **September and October:** W Allison, F Alpert, D Baillie, F Bernardi & R Wilton, T Boehmer, F Clarke, J Darnton, B Dibben, Mrs C Edwards, K Elder, C Galloway, A Garwood, E Goldstick, P Gollance, P Hepokoski, R Hohertz, A P Johnson, R & J Koch, L Laderman & D German with M Roth (Sept), D Leapman, M Lykins, H Margolit, P Marks, R C Martin, D McDonald, H Migotti, R A Miller, B Mowrey, B Packer, J Schwartz, G Sherritt, M Steinhart, H Tate, B & J Uzzell, M Vandesteeg & A White, C Walks, D Weill, A Whiton, D S Williams, and F Zaret. **September:** J & M Accardo, S Alpert, B Averbach,

PERADVENTURE R
 I N L A G M A G
 NODULAR B BASTIC
 T O E I O R E K
 EARLY ENDLESSLY
 R S O I N M
 PGINIS WELTGOO
 R N R B S A P U
 EXGRATIA ASTERN
 I D E R N T
 APPLIANCE FLORA
 Y L T N G R R A
 IGENI I ABANDON
 O A O U T S E S
 N DENOMINATORS

D Baldwin, J Braue, G Cameron, R Carson, K Coleman, S Coppitts, C Conradi, S Dulle, M Eckman, E & G Fairbanks, E Goral, M Grover, R Hamamo, W Hill, O Karsten, A Keys, W Lumsden, T Mathews & N Wilsman, C Montpetit, F Mullin, R Nolle, J Paddon, E Portnoy, F Rathgeber, J Ripps, A Santos, N Shapiro, K Shaw, W Sheets, D Taub, Mrs J S Thompson, C Walker, C Wasserman and R Weitzenkamp. **October:** J Beaton, J Brownlee, L Cralle, E Crane, F & M David, J Grantier, HTI Hogs, W Jones & J Lurkin, C & P & S Kroll, J Mario, P & J May, L Oxby, F de Regnaucourt, and M Whitby.

Send solutions to: Competition Editor, 8620 N. Port Washington Rd (312), Milwaukee, WI 53217

ACTUCROSTIC

- A. Attentive; on the ball; prompt. (4 wds) _____
 75 157 89 126 63 212 183 3

 198 36 105 51 143 226 19
- B. Differently; vice versa; conversely. _____
 73 97 189 49 121 225 204 29 153
- C. Meteor; fireball. (2 wds) _____
 141 24 102 159 83 124 74 180

 55 175 203 9
- D. Obstinate person; diehard. _____
 110 208 58 169 77 93 219 22
- E. Out of the blue. _____
 28 172 164 207 7 190 154 133 72 109
- F. Natural liking; fondness. _____
 122 15 230 186 205 149 80 54
- G. Sir Galahad in a Piper Cub. (3 wds) _____
 191 38 6 60 166

 87 117 132 151 223 210
- H. Great liking; love; mania. _____
 221 12 160 137 56 94 76

 188 34 118 150
- I. Sprout; film; photograph. _____
 68 214 31 114 155
- J. Pleasant; free and easy; upbeat. _____
 10 195 173 111 43 92 227 145
- K. Lukewarm or faint expectation. (2 wds) _____
 17 174 192 129 33 200 52 162 115

 224 96 217 67 148 4
- L. Touch on; call to mind. _____
 21 57 232 81 138 196 108
- M. Postage-wise, the step above first class. _____
 27 177 70 53 215 130 104
- N. Wicked; evil; treacherous. _____
 1 25 197 144 48 85 182 69 112
- O. Fast and spotted African cat. _____
 26 134 79 170 216 116 199
- P. Submerged. (2 wds) _____
 61 158 41 120 101 213 82 13 206 171
- Q. One born in 1972-1977, eg. _____
 16 140 44 86 179 113 193 66
- R. If at first you do succeed, try not to look _____ (2 wds). _____
 5 125 39 178 47 202

 100 165 20 88 64 222
- S. Haunted house. (3 wds) _____
 2 168 62 218 78 194 50 184 18

 152 209 107 136 30 142 95 231 123
- T. Irrefutable; beyond all question. (2 wds) _____
 187 40 229 128 65 103 23
- U. Narrative about S. (2 wds) _____
 71 176 14 45 163 91 127 146 181 59
- V. Opposite of flow. _____
 135 201 37
- W. Ocean perch below 650 feet. (2 wds, 1 hyph) _____
 233 11 99 119 139 185 220

 32 156 46 84
- X. Demon; grave robber. _____
 35 98 147 167 211
- Y. Bench mark; instance; specimen. _____
 8 131 161 106 42 228 90

1	N	2	S	3	A	4	K	5	R	6	G	7	E	8	Y	9	C	10	J	11	W	12	H	13	P	14	U	15	F	16	Q	17	K	18	S	19	A	20	R							
21	L	22	D			23	T	24	C	25	N		26	O	27	M	28	E	29	B	30	S			31	I	32	W		33	K	34	H	35	X	36	A		37	V	38	G	39	R		
40	T	41	P			42	Y	43	J	44	O	45	U	46	W	47	R	48	N	49	B			50	S	51	A		52	K		53	M	54	F	55	C	56	H	57	L	58	D	59	U	
		60	G	61	P	62	S			63	A	64	R	65	T	66	O	67	K	68	I	69	N	70	H	71	U	72	E	73	B	74	C		75	A	76	H	77	D	78	S	79	O	80	F
81	L	82	P			83	C	84	W	85	N	86	O	87	G	88	R			89	A	90	Y	91	U			92	J	93	D	94	H	95	S	96	K		97	B	98	X	99	W		
100	R	101	P	102	C	103	T	104	M	105	A	106	Y			107	S	108	L	109	E			110	D	111	J	112	N		113	Q	114	I	115	K		116	O	117	G		118	H		
119	W	120	P	121	B	122	F	123	S	124	C	125	R	126	A			127	U	128	T			129	K	130	M	131	Y		132	G	133	E		134	O	135	V		136	S	137	H		
138	L	139	W	140	O	141	C			142	S	143	A			144	N			145	J	146	U	147	X	148	K	149	F	150	H	151	G		152	S	153	B	154	E	155	I	156	W	157	A
158	P			159	C	160	H			161	Y	162	K	163	U	164	E	165	R	166	G			167	X	168	S	169	D	170	O	171	P	172	E	173	J	174	K	175	C	176	U		177	M
178	R			179	O			180	C	181	U	182	N	183	A	184	S	185	W			186	F	187	T			188	H	189	B	190	E		191	G	192	K	193	Q	194	S	195	J		
196	L	197	N			198	A	199	O	200	K			201	V	202	R	203	C	204	B	205	F			206	P	207	E	208	D	209	S	210	G	211	X	212	A		213	P	214	I	215	M
216	O			217	K	218	S			219	D	220	W	221	H	222	R			223	G	224	K			225	B	226	A	227	J	228	Y	229	T		230	F	231	S	232	L	233	W		

NOVEMBER'S SOLUTION: Randy Barnes in The Spotlight, "Randy Barnes, America's best shot-putter, had summoned his family . . . to watch him in the Jack in the Box Invitational. He had told them he was ready to toss a world record and wanted them to witness it. Barnes kept them waiting only until his second toss. As good as his word, he set a world record." The Milwaukee JOURNAL, May 21, 1990.