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# The Actuary

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## COMPUTERS: SOME FORECASTS 1949 AND 1980

by Edmund C. Berkeley

*Ed. Note: Edmund Berkeley was a pioneer actuary in the computer field. In 1949 he published a popular book, Giant Brains or Machines that Think. We have persuaded him to catalogue here the outcomes of some forecasts he made in Chapter 11 of that work, entitled "The Future: Machines that Think, and What They Might Do for Men."*

It has been a delight to me to be surprised many times over between 1950 and 1980 as the computer field appears on its way to becoming the most important industry in the world—and it's a pleasure to add up the score of those predictions made three decades ago.

Chapter 11 in "Giant Brains" began:

The pen is mightier than the sword, it is often said; and if this is true, then the pen with a motor may be mightier than the sword with a motor.

In the Middle Ages there were few kinds of weapons, and it was easy for a man to protect himself against most of them by wearing armor. As gunpowder came into use, a man could no longer carry the weight of armor that would protect him, and so armor was given up. But in 1917 armor equipped with a motor and carrying the man and his weapons came back into service as the tank.

In the Middle Ages there were few books, and it was easy for a man to handle nearly all the information that was in books. As the printing press came into use, man's brain could no longer handle all recorded information and the effort to do so was given up. But in 1944 a brain to handle information, equipped with a motor and supporting the man and his reasoning came into existence—as the sequence-controlled calculator.

(Continued on page 8)

## ELECTIONS 1980

The results announced in Montreal are:

<i>President-Elect</i>	Robert H. Hoskins
<i>Vice Presidents</i>	Dwight K. Bartlett III Charles Barry H. Watson
<i>Secretary</i>	Kenneth T. Clark
<i>Treasurer</i>	Robert J. Johansen
<i>Director of Publications</i>	Robert E. Hunstad
<i>Board</i>	John C. Angle Geoffrey B. Crofts Myles M. Gray Joe B. Pharr Thomas C. Sutton John C. Woody

The number of votes cast, from among 4,192 eligible voters was 2,359 (56.3%).

## Colin Jack Is First Executive Director of The Canadian Institute

It's a pleasure to report that Colin E. Jack, one of whose many distinctions has been an Associate Editorship of this newsletter, has been appointed to the newly created post of Executive Director of the Canadian Institute of Actuaries at its headquarters in Ottawa. We extend heartiest congratulations to the Canadian Institute and to Mr. Jack.

## DOG LIFE INSURANCE IN SWEDEN

by Carroll E. Nelson

Is it possible to conduct a useful and profitable life insurance business on dogs? In Sweden, definitely Yes! That country has a dog population of about one-half million, of whom 43% are life insurance policyholders.

One company, that I visited in Stockholm last summer, writes more than 85% of Sweden's dog insurance. It is the Jordboukets Försäkringsbolag

(Continued on page 7)

## BOOK REVIEW

### Global 2000

Reviewed by Geoffrey N. Calvert

*The Global 2000 Report To The President: Entering the Twenty-First Century.* Prepared by the Council on Environmental Quality and the Department of State. Gerald O. Barney, Study Director. Vol. I. Summary, \$350; Vol. II. Technical Report, \$13.00; Vol. III Global Model, \$800. Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

This major report was commissioned by the President in May 1977, and completed in July 1980. Many government agencies contributed projections of population, resources and the environment. What emerge, therefore, are mainly projections, not predictions, showing what will happen if present policies and trends continue.

"Our conclusions are disturbing," state the joint authors. "They indicate the potential for global problems of alarming proportions by the year 2000. Environmental, resource, and population stresses are intensifying . . . the earth's carrying capacity is eroding. The trends . . . suggest . . . a progressive degradation and impoverishment of the earth's resource base." Responses that are underway fall far short of what is needed, states the report. Necessary changes go beyond the capability of any single nation. An era of unprecedented global cooperation is essential. "Sustainable economic development, coupled with environmental protection, resource management, and family planning are essential." . . . Finally, our federal government requires a much stronger capability to protect and analyze long-term trends . . .

Among the report's specific findings:

- Population growth from 4 billion in 1975 to 6.35 billion by 2000, the growth rate slowing only from 1.8% to 1.7% a year. In sheer numbers, world population will be growing faster in 2000 than today—100 million

(Continued on page 5)

## Global 2000

(Continued from page 1)

- people added that year compared with 75 million in 1975. And 90% of this growth will be in the poorest countries.
- While gross national product per capita will rise substantially in some third world countries (notably Latin America), it will remain below \$200 a year in the enormously populous nations of South Asia. The large economic gap between rich and poor nations will widen.
- World food production will have increased but the bulk of the increase will have gone to countries already having high food consumption levels. The less developed countries (L.D.C.'s) of South Asia, the Middle East, and Africa will scarcely improve, or even decline below present inadequate levels. Meantime, real food prices will have doubled.
- Arable land areas will expand by only 4%. Projected higher yields will therefore depend on fertilizers, pesticides, power for irrigation and fuel for machinery—all of which depend heavily on oil and gas whose availability is not assured.
- For the one-quarter of humankind that depends on wood for fuel, the outlook is bleak. Needs will exceed supplies by 25% before 2000.
- The quarter of the world's people that inhabit industrial countries will continue to absorb three-fourths of all mineral production, but will become increasingly dependent on imports from the L.D.C.'s. Demands from the L.D.C.'s for a New International Economic Order (i.e., for more) will determine availability and price.
- The world's forests are disappearing at the rate of 18-20 million hectares a year (half the area of California), mostly in the tropics. By 2000, 40% of the remaining forest cover will be gone.
- Regional water shortages will become more and more severe, as demands double in half the world, and deforestation makes supplies erratic. Water and air are the two substances most fundamental to the existence of man, to life itself.

- World agricultural soils are deteriorating. An area the size of Maine becomes barren wasteland each year.
- The era of readily available cheap fossil fuels is closing. A whole new energy resource base requiring long lead times must be developed, and fuel use restraint will become ever more imperative.
- Atmospheric concentrations of CO<sub>2</sub> and ozone-depleting chemicals are increasing steadily as more coal and fossil fuels are burned and forests (which remove CO<sub>2</sub>) destroyed. Acid rain is damaging lakes, soils, crops. Radioactive and other hazardous materials are accumulating.
- Hundreds of thousands of species—perhaps 20% of all species on earth—will be irretrievably lost by 2000, as their habitats vanish.
- Grim as this picture is, it may understate the impending problems, due to its taking insufficient account of the interaction among its parts.

Yet there is reason for hope, states the report, since its projections are based on unchanged present national policies and trends. Policies are beginning to change, as reforestation and soil conservation, for example, are getting more emphasis, and alternative energy sources are attracting more research funds. But these encouraging developments are far from adequate.

### An Actuary's View

The study is presented as "no more than a reconnaissance of the future." Perhaps its most striking aspect is what it omits. A severe picture of the world at the turn of the century is presented, but there's not much reference to what lies beyond the year 2000—a period of great concern to actuaries. Time will not stop, and the processes of deterioration will not suddenly be arrested in twenty more years. With unforgiving relentlessness, whatever continues from this century's trends will go on into the next century, further affecting mankind's living standards and economics. No country will be able to insulate itself from these effects. Nor is any allowance made for the potential effects of war, even though the world is presently spending \$1.5 billions *each day* on weapons and defence, and directing one-half of all scientific research to this field.

As actuaries, we must consider this long-term outlook, and weigh the realism of expecting reversal or cessation of its negative aspects, and the chances that enough new positive developments will arise to offset them. Further, we must project and translate all of this well into the next century, in terms of inflation, productivity, demographics, and the wisdom of promising vast programs of benefits, some of them indexed without limits.

With a report such as this to ponder, one that is broadly in agreement with other global studies, one must consider very carefully, for example, the opening statement in the Report of the 1979 Advisory Council on Social Security that "all current and future Social Security beneficiaries can count on receiving all the benefits to which they are entitled." Perhaps, a future Council will give thought to the source from which all these benefits must come, and the ethics of unlimited indexing, using a hyped-up index, in the context of the potential lowering of material living standards so clearly foreshadowed in the Global 2000 report.

To be considered also is the widening gap between society's treatment of (a) employees covered by civil service pension plans similarly indexed without any limits, far into the next century, but supported by funds having cavernous unfunded liabilities, and (b) those who pay taxes but have no pension coverage at all, or non-indexed pensions. In the context of Global 2000, this difference may reach epic proportions. Should we be silent about this? □

How far are we, as actuaries, able to contribute to the "stronger capability to project and analyze long-term trends" called for by this government report, and perhaps even to the solution of certain of the major problems which it lays before us all? □

### Rulon Williamson

(Continued from page 4)

had expanded unduly beyond its original concept. Without rancor against those who disagreed with him, he pursued his crusade as long as his health permitted.

Bill's interests were too wide for me to cover properly. But I can confidently say that our profession will remember him with respect, affection and pride. □