SOCIETY OF ACTUARIES

Article from:

The Actuary

June 1973 – Volume 7, No. 6

The Actuary
The Newsletter of the Society of Actuaries
VOLUME 7, NO. 6 JUNE, 1973

BOOK REVIEW

Allan Chase, *Biological Imperatives*, Holt, Rinehard and Winston, New York, 1971, pp. 399, $8.95.

by Jerome M. Stein

Biologist Allan Chase grinds a few axes in this analysis of the present and future conditions of our health and health care. Writing in a style that should be understandable to laymen, he argues that the nation's health and longevity have been jeopardized by the motorized economy, insensitive industry, and the demands of the war in Vietnam. The insurance industry is also charged with placing profits above people.

He begins with the assertion that "our physical survival now demands the existence of a national system or integrated group of systems of comprehensive health care—starting with environmental health controls— that meets the demands of our present and projected biological imperatives." Then, after describing the four stages of health care as prevention, early detection and prompt treatment, acute care, and postacute (convalescent rehabilitative, and terminal) care, he discusses the problems of each.

Of particular insurance interest is his concern over possible development of automated health screening as a broad prevention technique. He claims that the margin of error of each test in multiple screens is such that, on a 16-test screen, the odds are better than even for at least one "false positive." He also fears that an industry based on such screening could use up more dollars and people than would be justified and would inundate us with data beyond our capabilities of distinguishing the medically relevant.

His discussion of biological and pharmacological research includes a history of the National Institutes of Health which, he claims, have supported three-

(*Continued on page 8*)

CAREER CONSULTATION

by Wendell Milliman

Editor's Note: Mr. Milliman is chairman of the Society's Special Committee on Career Consultation.

This Committee was established in 1971 as a Special Committee with the charge to examine the feasibility and desirability of the Society's establishing a career consultation service, or placement service, to aid actuaries in obtaining the type of work which may be best suited to their potential capabilities. The establishment of this Committee was influenced by the fact that some services of this general character are provided by some other actuarial organizations, notably the Institute of Actuaries. Further several members had urged that the Society consider comparable action.

The Committee has sought both factual information and opinions of members in a variety of ways. Members of the Committee have talked with a number of employment agencies and executive search agencies in order to get a better understanding of how these organizations operate. A questionnaire was sent to those members where a change in listing in the 1973 Yearbook indicated the possibility of a change in employers. Special sessions were held at each of the recent Spring meetings at which the background and activities of this Committee were summarized and members were given an opportunity to ask questions and to air their viewpoints. (At this time any member, whether or not he spoke up at one of these sessions, who would like to offer information or state an opinion relative to the charge to this Committee is invited to do so by writing to the chairman.)

Some of the information developed from the survey of 1972 job changers may be of general interest. 190 of the

(*Continued on page 6*)

PENSIONS FOR PUBLIC EMPLOYEES

Thomas P. Bleakney, F.S.A., *Retirement Systems for Public Employees*, published for the Pension Research Council, Wharton School of the University of Pennsylvania by Richard D. Irwin, Inc., Homewood, Ill., and Irwin-Dorsey, Ltd., Georgetown, Ont., Nov. 1972, pp xvii, 205, $6.75.

by J. Darrison Sillesky

This book assumes considerable importance in the literature dealing with Pension subjects because it speaks authoritatively about a major segment of the Pension field concerning which very little has been written. The book gives the reader a satisfied feeling that the author's conclusions are based upon analysis of a large number of public employee retirement systems.

Public employee retirement systems are an important part of the total economic security structure of the nation. As noted in the Foreword, "Mr. Bleakney examined with a critical eye the environment in which public employee retirement systems operate and called attention to the prevailing concepts, practices, and influences that will have a bearing on how these plans will fulfill their assigned mission and at what cost to the taxpayers." The reader is made aware of some major deficiencies in the design and operation of such systems, as an integral part of the author's discussion of generally accepted characteristics of good design and operation. Further says the Foreword, "the book is written at a level and with a focus designed to further the understanding of public employee retirement systems by legislators and others responsible for their proper functioning."

The book does not require that the reader have a prior knowledge of Pension matters, and so the author has to develop all the basic concepts of plan design, actuarial costs, funding, and the importance of investment quality and

(*Continued on page 8*)

To Be Continued

(Continued from page 2)

a science in its babyhood. If civilization continues to advance, in the next two thousand years the overwhelming novelty in human thought will be the dominance of mathematical understanding."

The need for a greater public comprehension of the "dominance of mathematical understanding" is increasing at a rapid pace. The need is dictated by the increasing use of mathematical models with the aid of computers in an increasing number of fields of human activity. Social, economic, business, political, and ecological analyses are typical of recent applications of mathematical models, in particular stochastic models. The purpose of these models is to enhance understanding of the present relationships of relevant variables by forecasting their future relationships using computer iterations. This may permit better understanding and control of the modeled configuration.

This purpose coincides with that of actuaries in their use of mathematical models. Actuarial models, such as that implicit in a pension fund valuation, are submodels of a stochastic model of the world society and economy in its entirety. Examination of the similarities between the pension fund submodel and this larger model suggests many ways in which pension techniques can be helpful to the study of the more cosmic questions. An understanding of the pension fund actuarial model can contribute to greater public understanding of model design in general and design of a social system model in particular.

The "system dynamics" studies for world-wide, city, and corporate social systems, such as those made by Professor Jay W. Forrester and his associates at M.I.T., are good examples of the use of mathematical models. Their work appears to be bringing about a fundamental change in the way in which we must view the world. Their studies apply to all systems that change through time. Their techniques are a composite of mathematical models and other patterns of thought expressed in terms of symbols. In this way they seek to clarify and improve the mental models on which our actions are now based. The new insights gained from these studies need to be integrated into our thinking. A part of this thinking is the symbolic world of cost accounting (such as dollars, capital expenditures, gain and loss), of economics (gross national products, health welfare programs, and other economic indices) and of actuarial science. These disciplines can better serve the institutions desired by society in the light of the new discoveries of Professor Forrester and colleagues.

Their work requires an understanding and acceptance of their findings by those who seek to apply them just as actuarial work requires an acceptance of the actuary's method by those who use his work such as pension clients. For a pension fund model this method involves the restatement in symbolic language of all aspects of the fund over time such as the magnitude of liabilities (both funded and unfunded), assets, income, and expenditures in dollars, and concepts of actuarial soundness. These must be understood by all concerned with the pension fund's operations so that they can know what actions must be taken in order that an actuarially sound plan may be maintained. The methodologies for system dynamics studies and for pension fund projections both seek to analyze the composite problem with its relevant important and understandable parts so that the relationship of each part to the whole may be in the proper proportion with the resulting good of a harmonious composition.

It is clear that computer models can do no more than spell out the implications of their own assumptions. The mind must continuously monitor the design of models in the light of developing future experience relative to that forecast. Those future events which are not dictated by fixed mathematical relationships can be changed by the actions of man himself and the assumptions underlying the model should reflect this. Human learning capacities, intentions, emotional reactions, mental patterns, and values, which determine asumptions in the first place, can also bring about their subsequent change.

The more nearly the computer input assumptions can be expressed as a fixed mathematical relationship verified by experience the more accurate the predictive value of the assumptions. Conversely, the greater the possibility that emerging experience can be changed by human action the greater is the probability that future experience will necessitate a change in those assumptions. This last group of assumptions can be classified as philosophic and subject to the limitations of human knowledge and thinking. To the extent that this group of assumptions affects the overall validity of the results the model can be classified as philosophic, or as scientific, or as intermediate between them.

Psychologists and writers on the subject of forecasts, including pension fund projections, have emphasized two attributes of the mind which need to be taken into consideration if bias and error are to be minimized in rational thinking. One attribute is the tendency of the mind to adhere to the single future possibility that appears most probable or affectively most desirable, rejecting the more difficult alternative of contemplating a large variety of future possibilities. Dr. Samuel Johnson expressed this view as follows: "The future not yet being experienced is pliant and ductile in our thinking and will be imperceptibly molded by what we wish it to be rather than what in reality it may become. Also, the past once it has been safely removed, becomes ductile in our memory and the mind inevitably and imperceptibly plucks out of our total experience a pattern or ideal in order that our thinking may conform to our hope of what will become."

The second mental attribute is the tendency to confuse time perception, telescoping recent events while increasingly spacing out distant past events. The greater the distance from the present the greater is the tendency to space past events. In this way our conceptions of possible future events can be unduly influenced by the experiences of the recent past. These two characteristics of the mind underscore the need for careful evaluation of all input assumptions into computer models to minimize subjectivity in their selection.

Students of computer modeling agree that to maximize the validity of models, data affecting input assumptions must be obtained for as many diverse groups as possible and must reflect all available information from existing mental models, mathematical and otherwise. In order to select assumptions with which to construct actuarial models for pension projection reports actuaries face the same task—to obtain all relevant information, both general, e.g. demography, economics, and specific e.g., employment conditions including management and labor viewpoints, and other significant information from as many sources as possible.

(Continued on page 8)