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BOOK REVIEW

Gordon R. Taylor, *The Biological Time-Bomb*, pp. 230 (The hard-cover edition from the World Publishing Company, is \$5.50; the New American Library paper back version is 95¢.)

by Arthur Pedoe

The explosion inferred in the title is that of our advance in biological knowledge—man's probe into nature: the origin of life, the deferment of death, tinkering with heredity, the transplantation of organs, etc. While the book was in the press several of the achievements forecast to be accomplished "within the next five or ten years" became accomplished facts—here is a list of those forecasts:

1. Extensive transplantation of limbs and organs.
2. Test-tube fertilization of human eggs.
3. Implantation of fertilized eggs in womb.
4. Indefinite storage of eggs and spermatozoa.
5. Choice of sex of offspring.
6. Extensive power to postpone clinical death.
7. Mind-modifying drugs: regulation of desire.
8. Memory erasure.
9. Imperfect artificial placenta.
10. Artificial viruses.

These items give an idea of a few of the matters discussed in the text. An account is given of research taking place on matters of the greatest interest and practical importance to actuaries in underwriting, mortality trends and longevity. One chapter is headed "Is Death Necessary?" In case it is inferred that the book is another of those popular science texts where fact and fiction are inextricably mixed, with emphasis on the latter—it makes better headlines—the author's background should be outlined.

Mr. G. R. Taylor has written other biological texts including "The Science of Life" (McGraw Hill, 1963) which has a foreword by the Professor of History of Science at Harvard. Until recently he was editor of the B.B.C.'s science program which involved extensive travel in the United States and other countries to contact leaders in the biological field. Full credit is given to the leadership of the U.S. in biological research. A biologist with extensive experience in journalism and in close touch with biological

developments has a unique background for a work of this nature.

Dwelling on the future the author gives what in his opinion will be accomplished after 1975 and before the year 2000. Among the twelve items named are: enhancement of intelligence in men and animals, prolongation of youthful vigour and organ regeneration. Note the last item refers to *regeneration* not *transplantation* which has already been accomplished. In the final phase which covers accomplishments after the year 2,000 he refers, among other items, to "control of ageing: extension of life span; gene insertion and deletion; indefinite postponement of death."

The author refers to a recent objective study held in the U.S. of current trends by 82 experts and records that these experts expect to see primitive forms of life created in the laboratory in the next twenty years and the control of hereditary defects by the year 2,000. Referring to these experts the author states "like me they don't expect extension of life until the same date (year 2,000) when they foresee fifty years being added to the expectancy." There is nothing in the text to justify this statement. The reviewer may express his personal doubts on this point. Perhaps the thought is that so much has been accomplished in the last thirty years that anything and everything can be done in the next thirty. So actuaries with billions of dollars of liabilities in pensions need not take fright—at least, not just yet!

In the October 1967 issue of *The Actuary* the present reviewer stated:

"There is so much nonsense being uttered, by those who should know better, on the extension of man's life to one hundred and fifty years due to current medical discoveries and an increase in the expectation of life at birth to 85 by the end of the century . . ."

Part II of a paper presented to the Institute of Actuaries by Frank M. Redington, M.A., F.I.A., last February, deals with this very subject and refers to an article by Professor Leonard Hayflick on "Human Cells and Aging" in *Scientific American* for March 1968. Redington's paper should be of great interest to actuaries.

In a brief review one cannot refer to the multitude of items covered in this

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ACTUARIES CLUB OF NEW YORK
JUNIOR BRANCH

by Anna Maria Rappaport

The program at the June 3 meeting provided an introduction to a new and important topic for all business men. Many actuaries have worked with management science, but to others the field is completely new. Dr. Michael Shegda, Director, Research and Development for the Management Consulting Services Division of Lybrand, Ross Bros. & Montgomery spoke on Decision Theory and its Application to the Solution of Business Problems.

In his talk, Dr. Shegda showed how to lay out clearly and qualify alternative results of business decisions. The expected return resulting from an action is the sum of the return for each possible result multiplied by the probability of that result. Taking no action is an alternative with an expected return of zero.

A complex set of alternatives can be precisely spelled out using a decision tree. In the decision tree, each decision point is explicitly stated, and from there each possible outcome is looked at. The various outcomes of one decision are then followed by a new set of decisions.

The probability distribution of the expected profit or rate of return provides management with greater insights than the single point estimate. Single point estimates of the volume of sales, amount of expenses, etc. are being replaced by estimates of the distribution of these items. These are developed from the most likely value, smallest reasonable value, largest reasonable value, etc. Such estimates are usually subjective.

These estimates are used together with corporate planning models using simulation techniques to develop probability distribution of projected operating results. These models allow the executive to play the "What-If" game. Computers with time-sharing facilities are very useful in allowing a rapid turn around to the executive who is asking "What-If" questions. Sensitivity analysis allows the executive to measure on which variables the results are most dependent. This enables a company to see what it should try to control first. □