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BOOK REVIEW

by Arthur Pedoe

Gerald T. Gruman, "A History of Ideas about the Prolongation of Life," *Transactions of the American Philosophical Society*, vol. 56, part 9, pp. 102, Independence Square, Philadelphia, 1966, \$3.

This remarkable work, published by the oldest scholarly journal in America, deals with man's thoughts and ideas about death and longevity through the ages. It covers the period up to 1800 and another volume is in preparation to carry on from there. With a bibliography of over 300 titles and more than 800 footnotes, it is a remarkable document of fascinating interest to actuaries. It is easily worth its price.

The word "prolongevity" is coined by Professor Gruman to cover the belief that it is possible and desirable to extend significantly the length of life by human action. It deals with man's most intimate thoughts on religion and divine intention. There is the epic of Gilgamesh who sought the secret of immortal life which can be traced back at least to 3000 B.C. The account of Adam and Eve and the tree of life, guarded by Cherubim and a flaming sword, gets another interpretation from Sir James Frazer, the famous anthropologist.

Long Life Desirable

The desirability of long life is recognized in the Old Testament and often it is cited as a reward for righteousness. The theme in the New Testament is that, with faith focussed on Heaven, the things of this world are of little importance—it is the immortality of the soul rather than the body which counts.

The Greeks expressed their fears of old age and its disabilities and Sophocles could write:

Who craves excess of days,
Scorning the common span
Of life, I judge that man
A giddy wight who walks
in folly's ways.

Oedipus at Colonus

The Greek legend of the Hyperbo-reans holds that in some remote part of the world there are people who live to a thousand years

. . . their hair crowned with
golden bay-leaves they hold

glad revelry; and neither
sickness nor baneful eld
mingleth among that chosen
people; but aloof from toil
and conflict, they dwell
afar. . . .

Pythian Odes

The legend of the fountain of youth whose waters bring about the restoration of youth is recounted. It was the quest of Ponce de Leon for that fountain that led to the discovery of Florida in 1513. Quotations from the great minds who contributed to human development abound on every page. To the question whether old age is a disease Galen replied that it is not, because it is not contrary to nature.

Two chapters outline the attitude of the ancient Chinese to prolongevity. Taoism, which arose in China in the 6th century B.C. and held sway for many centuries, was a code of life with great emphasis on the desirability of longevity. The book notes the systems of practice of the Taoists to this end covering diet, respiration, gymnastics, sex, and spiritual attitudes.

A chapter deals with the alchemists seeking the philosopher's stone to convert base metals into "gold the immortal, unchanging metal" and thereby the elixir to cure all diseases and prolong life. The latter part of the 17th century was the great dividing line when philosophers began to look forward to man's power to improve his lot, not backward to a golden age which, frankly, never was. Among the curious bits of medical history given is that blood transfusion (on animals) for rejuvenation was first performed in 1650, some 300 years before it became a regular surgical procedure for humans.

The book ends with a discussion of Malthus' *Essay on the Principle of Population* (1798), a tract written to answer Godwin and Condorcet on prolongevity. Godwin stressed the omnipotence of the mind over the body to combat disease and even death itself. Condorcet saw history as a victorious progress to a virtual heaven on earth Malthus viewed old age and death as irremediable concomitants of life itself. He expressed doubts whether in all history there was an example of an increase in the "life span" (note this is not "life expectancy"). This challenge may be said to still hold today. □

University of Michigan

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end of their programs, and some have become Associates. Typically, from 20 to 25 actuarial students per year complete degree programs.

The Master of Arts program is intended for the more mathematically inclined actuarial students. Such a student to be accepted must have a good record in his undergraduate mathematics courses which should usually include linear algebra, advanced calculus, probability and statistics. The M. A. program requires the core courses, a course in risk theory or seminar in actuarial mathematics, and a course in insurance, usually life insurance accounting.

To complete the program, a wide range of elective courses in computers, insurance, mathematics, numerical analysis, probability and statistics, and operations research is available. Through his program of required and elective courses, a student can gain an interest in and a foundation for solving the mathematical problems of insurance and pension organizations, and also basic training for the actuarial examinations.

The Master of Actuarial Science program is aimed at business oriented actuarial students. Prerequisites are a bachelor's degree with a sequence in calculus and a sequence in economics. The usual program includes the core actuarial courses, life insurance accounting, insurance law, health insurance, employee benefit plans. Elective courses may be taken in statistics, mathematics, computers, insurance, finance, and management science. The program provides an extensive background for professional actuarial work and the actuarial examinations.

Since 1956, a number of leading life insurance companies have contributed to the University of Michigan Actuarial Science Fellowship Fund which has been an essential factor in supporting graduate work at both the master's and the doctoral level. In the 12 years of the Fund, six students have completed doctoral programs with theses ranging over a variety of actuarial topics. The existence of the Fund has been very timely in view of the monies now available to mathematically able students who do graduate work in other fields. □