

1 July 1975

How Long Can People Live?

Linus Pauling

In recent press reports it is stated that the oldest person in the Soviet Union had died at the age of 135 years. She was said to be lively and in apparent good health until shortly before her death. A son, still living, is said to be 91 years old.

From time to time reports are made of even greater ages, such as the Englishman Thomas Carr, said to have died at age 152. It seems likely that some of these ages have been exaggerated. No age at death greater than 120 (?) has been substantiated by reliable birth records or other documents. A tendency to exaggerate their age by old people was indicated by the census of 1911, which showed a deficiency in people who gave their ages 85 to 90 and an excess in those 91 and over.

It is possible to make a moderately reliable prediction of the number of people who will live to be more than 100 years old, by use of the population figures and death rates collected by the United States government. Tables giving the number of people surviving to specified ages and the probability of death at each age, from government sources, have been given in the Statistical Bulletin, published by Metropolitan Life Insurance Company. According to these tables, of 100,000 people born alive, 20,908 have survived to age 85 in the United States.

The chance of surviving to age 85 is considerably larger for women than for men: Of 100,000, 29,538 have survived to age 85, and of 100,000 men, 13,168, less than one-half as many. The explanation of greater survival for women than for men is that the chance of dying during the year is greater for men than for women at every age. At age 85 the chance is 12.6% for men and 11.3% for women.

At earlier ages the discrepancy is still greater; at age 20, the death rate for men is three times that for women; at 29 it is twice, and continues to be twice as great to about age 70, after which the two death rates begin to approach one another.

For both men and women the chance of dying during a given year increases with increasing age. Between ages 75 and 85 the increase is by 7.3% each year for men and 10% each year for women.

If we ask how many men may expect to live to be over 100 years old in the United States, and how many women, we may use the continually-increasing death rates, year by year, to calculate the number of survivors in a population originally of 100 million men and 100 million women. This calculation gives the result that about 150,000 men and 430,000 women can expect to live to be 100 years old. About 5,000 men and 5,000 women can expect to live to be 105 years old, and a few, perhaps 10, might live to be 110 years old.

There is some indication, however, that very old people do not continue to age so rapidly as younger ones. There is some evidence that the

death rate does not continue to increase by 7 to 10 percent each year, after age 100, but becomes constant, with value about 0.5 per year. That is, a person who reaches the age 100 may have a chance of one-half of surviving each succeeding year in his life. If we calculate the number of survivors of 100 million men and 100 million women on this basis, we find that 150 men and 400 women would be expected to live to be 110 years old, 5 men and 13 women to be 115 years old, and one woman would live to be 119 years old.

No one knows how reliable calculations of this sort are. There is the possibility that a few people have such a genetic constitution that they can achieve an unusually long life. It seems likely, however, that the claim that the oldest person in the Soviet Union reached the age of 135 is in fact probably unjustified.

The conclusion that people now living probably cannot achieve ages greater than 120 years does not mean that greater ages may not be realized in the future. The increase in death rate with increasing age is the result of the phenomenon of aging, which is not well understood. If investigators succeed in finding what factors are involved in aging, what factors cause the probability of death to increase with increasing age, some significant steps may be taken to slow down the rate of aging, and the life expectancy could be correspondingly increased. If the death rate at each age could be cut in half, the life expectancy would be increased by about 8 years. It is known that cigarette smokers have a life expectancy of about 8 years less than nonsmokers.

It is probable that nutritional measures can be taken that improve health and decrease the death rate, thus increasing the life expectancy. There is a real possibility that research on nutritional factors and other factors that affect the health and well-being of people could increase life expectancy by 25 years or more, for the average American, and that some increase could be achieved also for those people who live beyond the age 100.

(Note: Check Guinness's Book of Records, 14th edition of the Encyclopedia Britannica, and other books.)