

Deevey E S Jr. Life tables for natural populations of animals.
Quart. Rev. Biol. 22:283-314, 1947.
[Osborn Zoological Laboratory, Yale University, New Haven, CT]

Life-table notation, not previously used in field ecology, tabulates survivorship at each age x from birth to x_{\max} . If ages of wild animals (alive, found dead, or extinct) are known, fates of oysters and songbirds can be quantitatively compared with fates of people and *Drosophila*. [The SCI® indicates that this paper has been cited in over 315 publications since 1955.]

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Biodemography is not only the oldest kind of ecology, it is one of the oldest kinds of quantitative science. To calculate annuities, Ulpian published a life table in the third century. One of Halley's essays gave a life table. Plainly, no 1947 contribution can be a "classic." If ecologists have made that paper a classic of citation, the reason must be that I taught them some useful arithmetic just when their research required it.

If there's a modern classic in quantitative ecology, published before Hutchinson's,¹ it's Lotka's 1925 book, *Elements of Physical Biology*,² which was reprinted in 1956.³ I looked at the book as a student but can't say that I understood it. Having looked again, I see that life-table notation is fully expounded, but not for such as me. Its year of publication was the year in which I barely passed eighth-grade arithmetic. What I noticed in about 1940, when teaching led me to the works of Raymond Pearl, was that tabling mortality data enabled tyros like me to avoid calculus.

Even so, I missed one of Pearl's most elementary points, and the 1947 paper was written first to correct a mistake I had made in 1945 and second to put other ecologists on their guard. It came about in the following way.

In the laboratory, my students had repeated some of Pearl's experiments with *Drosophila* populations, and Pearl and Miner⁴ was a standard reading. Throughout those years (1939-1943) my wife had been rearing black widows, and as her teacher, Alexander Petrunkevitch, was retiring, we contributed a little paper on spider mortality to the *Festschrift*.⁵ I tabulated the data as Pearl had done, noting that a male black widow could expect to live one-third as long as a female, whether or not he ever met one. The next year, through correspondence with the human ecologist S.F. Cook, I was invited to a symposium on life tables. I had some data of my own, on barnacles, and I had talked with Aldo Leopold about pheasants, so I was ready to give a comparative paper at the Christmas American Association for the Advancement of Science meeting in 1946. Or so I thought, but I was in for a shock. Cook hadn't told me that A.J. Lotka was to be in the chair.

As I listened to the first paper, by Margaret Merrell, I knew that I was out of my league. As she said, comparisons are misleading if survival is tabulated arithmetically; mortality rates come out as straight lines when the logarithm of survivorship is plotted against age. Never good at logarithms, I had made a bonehead mistake, in a paper of which my wife was senior author, and was now about to repeat the offense in public.

As to what I actually said, my memory draws a veil, but Merrell's comments were gentle, and Lotka asked for my manuscript, for citation in the next edition of his book.⁶ I did some homework before I sent it to him. If other ecologists have profited from my homework, I'm glad, but my eighth-grade teacher would appreciate the irony.

1. Hutchinson G E. *An introduction to population ecology*. New Haven: Yale University Press, 1978. 260 p.

2. Lotka A J. *Elements of physical biology*. Baltimore: Williams & Wilkins, 1925. 460 p.

3. -----, *Elements of mathematical biology*. New York: Dover, 1956. 465 p.

4. Pearl R & Miner I R. Experimental studies on the duration of life. XIV. The comparative mortality of certain lower organisms. *Quart. Rev. Biol.* 10:60-79, 1935.

5. Deevey G B & Deevey E S Jr. A life table for the black widow. *Trans. Conn. Acad. Arts Sci.* 36:115-34, 1945.

6. Dublin I I, Lotka A J & Spiegelman M. *Length of life: a study of the life table*.

New York: Ronald Press, 1949. 379 p.