mortality rates (p. 104). It would be very interesting to take these up, since we lack as yet a clear picture of the geography of infant mortality decline in Europe. The significance of individual choice or group pressure is also touched upon (p. 167). While group pressure and local custom are often associated with nuptiality, and the marriage pattern in general, pressure to conform to local, social or parental norms may also have been important in influencing varying levels of marital fertility in the past. Quite how much such an exploration of the dynamics of group pressure could be used to explain innovatory behaviour remains to be explored at greater length. Finally, the author makes several references to the importance of gossip, particularly among women, and its role in supporting and creating group norms, and spreading information. Again, this is a valuable insight.

> Neither the local communities or the networks that connected them with each other are directly visible in the demographic data that describe provincial aggregates. But just as the aggregate demographic data are the precipitates of courtship and sex among ordinary people in the past, so also do these data trace the tracks between communities in the past. By examining these tracks, we can partially re-create the networks that connected them (pp. 169–70).

In short, with this book Susan Watkins has provided another valuable contribution to our understanding of the European fertility transition. She has grappled heroically with the problems of using ecological data sets, and she has introduced her readers to other variables, social pressures, and informal networks of communication which we may follow with profit. She has also made several important rediscoveries in the field of population geography.

ROBERT WOODS
Department of Geography,
University of Liverpool

The Biology of Life Span: A Quantitative Approach. By L. A. GAVRILOV and N. S. GAVRILOVA. Chur, London, Paris, New York and Melbourne: Harwood Academic Publishers, 1991. Pp. vii + 385. $120.00 Hardback. ISBN: 3-7186-4983-7.

In this book – a notable product of the new openness – a Russian husband-and-wife team present the results of their research in biology, gerontology and demography, including analysis of prodigious numbers of human and animal life tables: just listing of the latter, published since 1911, and ranging from butterflies to owls, turtles, and wolves, takes 17 pages. Among the wealth of results, observations, and deductions it is possible to mention only the more important in this review.

To the old question of whether life has a definite limit, the authors' answer is a well-reasoned and unsurprising 'no'. They also reject the 'genetic clock' theory of ageing, presenting the argument that organisms live longer in controlled conditions than in their natural habitat, and the former give no evolutionary basis for a self-destruction programme to arise and be maintained; the same applies to humans who only a few thousand years ago apparently rarely lived beyond the age of 50. Instead, the authors defend a 'wear and tear' hypothesis based on the notion of limited reliability of the organism, although it is a multiply redundant system. This always allows for a certain risk of death, and there can be no question of totally eliminating the so-called premature deaths.

The authors observe a large variability in the lifetimes in genetically identical organisms living under laboratory conditions, and find that the low heritability of longevity in man applies to other species as well. They conclude that this weakens the heterogeneity hypothesis but does not refute it, if the selection for longevity is ineffective.

Some readers may be surprised at the assertion, backed up with examples, that 'no biologist or demographer is capable of distinguishing between human life tables and the analogous tables for laboratory animals, if the units of age are not specified'. This leads them to the very practical conclusion that the effect of past events on mortality is of an altogether lower magnitude than that of age and the current situation.

Downplaying the significance of causes of death to the age-dependent, supposedly biological component of mortality, the authors stress non-specific vulnerability, going as far as to state that its 'various concrete manifestations are tendentiously called "causes" of death'.

Among other issues the authors give examples to prove that the longer life span of females is not a general biological law. They also find that the expected rectangularization of the survival

curve is not happening, discuss analogies between technical and biological systems (failure rate, ageing), and devote a chapter to the possibility of life-span extension, and another to experiments to that effect. The book's usefulness is enhanced by the many formulae given; however, I spotted a wrong sign in (10), obviously a misprint.

For mortality analysis the authors, after discussing alternatives, prefer the Gompertz–Makeham formula. Decomposing a large number of human life tables, they discover that the age-dependent component varies widely between human populations, but claim that in each case it is historically stable and the present mortality levels were predictable at the beginning of this century. If this was strictly true, various European countries would be doomed to permanently different adult mortality levels – hardly an acceptable view. Mortality patterns in Europe are described on maps in considerable detail, but at times too easy explanations are offered to complex problems.

The authors observe that the lines that represent logarithms of the age-dependent component in more than 200 life tables in the age interval 20–80 years, when extrapolated, intersect at a point around age 95. They call this the species-specific life span for humans, and argue that its significance does not depend on whether the point of intersection really exists and what happens after it; they consider the available data insufficient to determine this, but assume that a plateau of constant mortality is reached soon after. Interesting as these findings are, they might look different if they were based on a different age interval. At any rate, they prove little about life after 80. Official life tables for such ages are, indeed, not always helpful, being often excessively graduated, boldly extrapolated, or calculated according to some model not always judiciously chosen (e.g. Wittstein's formula gives an upward bias). Yet reliable data and published studies allow us to conclude that mortality does not continue to rise in a log-linear manner but gradually lags below it. The lines which on the cover of the book advance towards a meeting point, actually never arrive there and, apart from possible stragglers, no one will come to the rendezvous. My own extensive database shows that the graphs of log $\mu(x)$ bend to gentler slopes without, as a rule, intersecting. But though mortality probably tends to an asymptote, no plateau has yet been reliably observed: at 108–110, the highest ages for which rates can to-day be computed, they still point upward.

The book concludes with a call for a major international project for the extension of the active life span, to be financed through reduction in arms production – a laudable idea which we can only hope will be accepted by decision makers!

A reader, like this reviewer, may differ with some of the views presented, but their relevance, scientific foundation and often compelling logic are not to be denied. The Gavrilovs have made a valuable contribution to the study of life span, and any future work on the subject will have to take account of the rich contents of this book.

VÄINÖ KANNISTO
Lisbon

Undocumented Mexicans in the United States. By DAVID M. HEER. The Arnold and Caroline Rose Monograph Series of the American Sociological Association. Cambridge and New York: Cambridge University Press, 1991. Pp. x+232. £25.00 Hardback. ISBN: 0-521-38247-5.

The central aims of this book are to aid sociological understanding of the conditions of life among undocumented Mexican immigrants to the United States of America, and to summarize all the facts about them that should be of relevance to policy-making. To achieve these objectives Professor Heer's book is divided in two broad sections; in the first he reviews and compares previously gathered data (Chapters 2–4), and in the second he describes and analyses his own data before presenting his personal policy preferences (chapters 5–11).

The first section begins with a brief presentation of the author's conceptual scheme for the analysis of one of the demographic determinants of the volume of migration; the individual propensity to migrate, which classifies the factors affecting the decision to migrate into those which affect a preference system (i.e. relative attractiveness of different places as goals for the potential migrant compared to other possible goals), a price system (i.e. the expenditure of resources that is both a precondition and a consequence of migration), and the total amount of resources in time and money available for all goals. After applying this scheme to potential migration from Mexico and summarizing Mexico's population growth for the period 1950–80 (i.e. the other demographic determinant of the volume of migration; population at risk) in a two-paragraph statement as 'among the most rapid in the world' (p. 11), the author reviews 111 years (1875–1986) of U.S.A.