**A Primer on Number Sequences.** Shailesh Shirali. Universities Press (India) Ltd, 3-5-819 Hyderguda, Hyderabad 500 029. 2001. 240 pp. Price: Rs 290.

Students at the high-school level and even a general reader interested in mathematics can read this book and derive enjoyment. The first part of the book may be roughly described as experimental in nature. Here, the author introduces several types of sequences of numbers and points out patterns among them. The main focus is to observe and make a general guess at the pattern using the method of differences. Sequences given by polynomial or exponential expressions can profitably be dealt with by this method. In particular, the familiar formulae for sums like those of squares $1^2 + \ldots + n^2$ or of cubes $1^3 + \ldots + n^3$ learnt by students in school typically by rote or blindly, are shown to appear naturally in this discussion. Another such example is the formula $n(n-3)/2$ for the number of diagonals of a convex polygon with $n$ sides.

The style is easy, but the author makes it clear that there is a distinction between observing or guessing a pattern and proving it rigorously. This was important because an unclear understanding of this distinction has been a major drawback even among mathematically talented students at the high-school level.

In the second part of the book, some special sequences are introduced and studied. Here, the methods vary quite diversely, although they are still reasonably elementary. The most advanced discussion here is an explanation of the notions of limit and convergence of sequences and series. This all-too-brief discussion could have done with a more detailed, leisurely treatment in keeping with the easy pace of the rest of the book.

Some of the prominent sequences dealt with are those of powers (squares, cubes, square roots, etc.), primes, polygonal numbers (triangular, pentagonal, etc.), Fibonacci numbers and reciprocals. The selection of the sequences clearly indicates the author's taste. He has been actively involved in the Mathematics Olympiad Programme in our country for several years. I cannot envisage the book being used as a textbook at any level, but it can be useful supplementary reading for students finishing high school or even for undergraduate students in any science discipline. It will surely be of use to students who intend to participate in the Mathematics Olympiads.

There are instances (for example, when primes are discussed) when one gets the feeling that a deeper probe could have been done. However, if the intention is to write an easily-paced, elementary-level book meant as much for the general reader interested in mathematics as for students participating in Mathematics Olympiads or similar competitions, the author has succeeded in this modest aim. The pricing seems pretty steep though.

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**Stability in Model Populations.** Laurence D. Mueller and Amitabh Joshi. Princeton University Press, Princeton, NJ 08540, USA. 2000. 319 pp. Price: US$ 29.95.

How living organisms maintain long-term orderly spatio-temporal distribution in the face of vagaries of nature has been one of the central questions in population ecology. Since multigenerational persistence is a prerequisite for any evolutionary change to take place, the question of how the biotic and abiotic processes can contribute towards the mechanisms that allow organisms to attain sustainability is also important for evolutionary ecologists. Traditionally both these areas, viz. population ecology and studies on life-history evolution, have been fancied by different sets of people and rarely have the two been considered together. The consideration of population as a group of individuals whose dynamics and persistence characteristics may contribute to the success/failure of the individual has gained importance in evolutionary thought only during the last few decades. Thus a combined approach to study population behaviour in conjunction with the species life history and their effect on each other should be an obvious choice if one wants to understand what causes species to inhabit this world and how they regulate themselves to maintain a semblance of balance in nature.

In general, stability is equated to equilibrium behaviour. In reality, populations have always shown ups and downs in their abundance and parasite/pathogen populations exhibit large population variations leading to epidemics. Though from a dynamical point of view there is no reason to consider such regular and irregular oscillations, such as chaotic oscillations, to be manifestations of an 'unstable' (in the "run-away" sense) system, yet evolutionary considerations indicate higher risk of extinction in populations that may show large fluctuations in their size in a single species population. Growth models of single species populations with non-overlapping generations (e.g. insects and annual plants) can show a variety of dynamics, from equilibrium to simple and chaotic oscillations, with increasing growth rates. This has led to a large body of theoretical work, both using mathematical modelling and time-series analysis, to demonstrate if populations really show chaotic oscillations. The theoretical explanations, unfortunately, have not been supported generally by either field or laboratory experiments in ecology. In the absence of empirical validation of predictions from models, this has remained a major lacuna in the understanding of the factors that affect/control stability in natural populations.

The book under review is a powerful document that argues for a laboratory-based approach to address such questions. In the authors' own words – 'Our intention in writing this book has been to review the work done on single-species population dynamics using model laboratory systems, and to highlight, through this review, the tremendous potential of such systems for testing and refining theory in population ecology.' The book has not only succeeded in doing what it intended, it has also covered an area in evolutionary ecology for which there was no easily accessible text until now. This is certainly not a textbook meant for those who are looking for a detailed theoretical analysis of single species continuous or discrete population models, nor is it a research monograph on insect life-history studies. There are many mathematical biology textbooks and research papers (referred in this book) for