changes in urbanization, population explosions in parts of the world, altering life styles (including jet travel) and so on, wonder how we have escaped with so few pandemics. Again and again, the authors argue that we are at the mercy of viruses, not the other way around. That does not mean we should be defeatist, and I suspect that many of the contributors are concerned with seeing that we are not. But individuals can do little. It requires surveillance at government levels, which means money invested in epidemiology, tropical medicine and communication. Outside the United States, who at high level is considering such problems? Will it prove a regrettable mistake that the UK Medical Research Council closed down its Tropical Medicine Board a few years ago?

Government safety inspectors in Birmingham (England) monitored closely by interested, but not very knowledgeable, scientific correspondents in the daily press, have recently been concerned with what is viewed as a breach of safety rules involving genetic manipulation of a viral component (see *Nature* **367**, 499; 1994). One research laboratory of the university has apparently been closed. *The Times* (op. cit.) used this incident for an attack on academic freedom, censoring scientists for "still inhabiting the sequestered world described by C. P. Snow". Although there may be some justification in this criticism, it seems equally imperative to pay attention to the fact that viruses are manipulated constantly in nature, in a manner well beyond our control and on a scale that transcends many times the efforts of a single laboratory. Let us hope, globally, that our various Health and Safety Executives, and our press, are alert to this fact. How many of them will read this book? May I close by drawing it to their attention? □

Beverly E. Griffin is in the Department of Virology, Royal Postgraduate Medical School, Hammersmith Hospital, Du Cane Road, London W12 0NN, UK.

A physicist's tour of chaos

Paul Glendinning

Chaos in Dynamical Systems. By Edward Ott. *Cambridge University Press: 1993. Pp. 385. £45.00, $69.95 (hbk); £16.95, $29.95 (pbk).*

THE term 'chaos' was first used in the context of dynamical systems by T. Y. Li and J. A. Yorke in 1975 (*Am. Math. Monthly* **82**, 985–992). Ever since, the group at the University of Maryland (Yorke, C. Grebogi, E. Ott and others) has been at the forefront of work on applied dynamical systems. Ott's book collects together many of the results obtained at Maryland (and a few from other sources) to provide a stimulating selection of topics that could be taught *à la carte* in postgraduate courses. The book is given unity by a preoccupation with scaling arguments, but covers almost all aspects of the subject (dimensions of strange attractors, transitions to chaos, thermodynamic formalism, scattering, quantum chaos and so on).

The study of chaos, and dynamical systems in general, has always been multidisciplinary. Ott approaches mathematical phenomena as a physicist, using the computer as his experimental tool. There is little attempt to make statements mathematically precise and, as in many physical textbooks, the reader is expected to acquire a great deal of knowledge on trust. For example, by looking at computer simulations we are shown that the attractor for the Hénon map, a simple map of the plane to itself, is geometrically complicated ('fractal') and "hence [that the map] has a strange attractor". The fact that this is not an established result for Ott's example goes unmentioned. (It is only very recently that rigorous results have been obtained on the existence of strange attractors for *some* Hénon maps and these serve only to demonstrate how many other complications are possible.) Nevertheless, his description provides an excellent, intuitive account of chaos, which is essential to developing scientists — much more important than the mathematical niceties that have been swept under the carpet.

These remarks are not intended as criticism. What Ott demonstrates is the power of the physical approach to mathematics. It allows him to go further into the infinite intricacies of dynamical systems than would be possible using purely mathematical techniques. The chaotic scattering of particles in potential systems becomes something to be observed numerically (experimentally) and carefully unravelled. Just as in mathematical physics, the correspondence between the models and some (ideal?) reality is questionable, so, in this form of physical mathematics, the nature of the conclusions drawn is unclear. Even so, Ott has managed to capture the beauty of this subject in a way that should motivate and inform the next generation of students in applied dynamical systems. □

Paul Glendinning is in the Department of Mathematics and Theoretical Physics, University of Cambridge, Silver Street, Cambridge CB3 9EW, UK.

Genetic fusion

J. Delharty

Chromosomes: A Synthesis. By Robert P. Wagner, Marjorie P. Maguire and Raymond L. Stallings. *Wiley-Liss: 1993. Pp. 523. £75.00, $89.95.*

CHROMOSOMES are currently fashionable mainly because of the rapidly expanding field of molecular cytogenetics and its many applications in human, mammalian and evolutionary genetics. Attention has also focused on the chromosomal assignment of genes as a starting point for their isolation by the Human Gene Mapping Project. So it is undoubtedly a good time to bring out a book that attempts to cover this fusion of classical genetics and molecular biology. *Chromosomes* does this with considerable success.

In a sense, the title is misleading. From the central core of topics related to chromosomes, the book branches out to include almost all of modern genetics. For example, the chapter entitled "Basic chromosome structure" also covers topics such as reassociation kinetics, formation and cloning of DNA molecules, DNA sequencing methods and higher-order organization of chromatin. "Chromosomes and the cell cycle" includes a good mini-review of eukaryotic DNA repair and "Variations in chromatin organization and amount" has a section on transposable elements that includes retroviruses and their relation to human proto-oncogenes.

The book will be a good source of reference and up-to-date information for advanced students of genetics, giving a lead into a wide variety of aspects. In addition to some historical coverage there are many recent examples, principally from *Drosophila*, human and mammalian genetics, with relevant photographic illustrations, although with occasionally less than accurate captions. In general, the figures are clear and informative, but there are lapses into amateurism where the chromosomes appear as squiggles and the labels are microscopically small. More than 50 pages of references are usefully given as a chunk at the end of the book, but organized by chapter for ease of location. The price will be beyond a student budget but librarians and tutors would be well advised to keep copies: it is a volume that will be much sought after. □

J. Delharty is in the Department of Genetics and Biometry, University College London, 4 Stephenson Way, London NW1 2HE, UK.

■ Also recently published is *Sex Chromosomes and Sex Determination in Vertebrates* by Alberto J. Solari (CRC Press, $149.95).