years, from the combined efforts of two remarkably young men, a physicist and a chemist, the fourth son of a New Zealand farmer, and the seventh son of a successful London merchant. In his foreword, Professor N. Feather, who must be more deeply versed in general radioactivity than any other physicist in Britain, and a one time research student of Rutherford in Cambridge, writes of Trenn's analysis: "He sees the collaboration of 1902–03 as the collaboration of equals: I am convinced that he is right". I agree. □

Sir Mark Oliphant collaborated with Rutherford from 1927–1937, was Professor of Physics at the University of Birmingham from 1937–1950, and was Director of the Research School in Physical Sciences at the Australian National University from 1950–1965.

Linear oceans

Waves in the Ocean. By P. H. LeBlond and L. A. Mysak. Pp. 602. (Elsevier Scientific: Amsterdam, Oxford and New York, 1978.) $98.50; Dfl237.

In the realm of ocean waves and circulation, as in most other physical systems, the system's behaviour can often be described to a good approximation by linear theory. In the ocean the approximation works best for waves in which the water particles move much more slowly than the waves themselves. Thus, it works well for tidal waves in the deep ocean.

The approximation also works for sea waves, the ones that give sea sickness, but here non-linearities can become important after a few hundred wavelengths. The approximation does not work well for internal waves or planetary waves. Internal waves are waves on the density surfaces within the ocean and planetary waves give the meso-scale eddies in the ocean, which correspond to the high and low pressure regions of the atmosphere. They dominate the currents over most of the ocean.

The linear approximation is also a good basis for a book, and it has been chosen by LeBlond and Mysak as a central theme in their excellent review of the theories concerning the complete spectrum of waves within the ocean. The authors approach the subject from the point of view of applied mathematicians and they take pains, and many pages, to show how the various approximations arise, how they are related, some of their pitfalls, and how they can lead to elegant analytical results.

They make qualitative comparisons between the models and the real ocean, but rarely go further. The approach and results of the more realistic numerical models are only briefly discussed, apparently because "no advantage is to be gained from approximations designed towards the application of analytical methods". But within the limits of the authors' self-imposed constraints, and the restricted understanding of the ocean it produces, the book is up to date and comprehensive. It contains 1,100 references.

Chapter one covers the equations of motion, the basic approximations and the general properties of plane waves. Wave action is introduced as an adiabatic invarient and is then used as fundamental quantity in the rest of the book. Chapters two and three review the various types of wave in a flat-bottomed ocean with simple stratification.

Chapter four introduces coastlines and includes good sections on the trapping of waves near to coasts and around islands. Chapters six and seven cover the interactions of waves with each other and their surroundings. There are sections on critical layer absorption and baroclinic instability and an original comment that the results of Longuet-Higgins and Fox support Hasselmann's theory of the growth of the sea wave spectrum.

The final chapter is on the generation and decay of the waves. The section on surface waves is very up to date. It starts with Banner and Melville's recent work on flow separation and finishes with a comparison between experimental data and Gent and Taylor's numerical model. The section on tides is weak. It includes an interpolation between the diurnal and semi-diurnal tides without apparently realising that the forcing functions are orthogonal. The authors are honestly vague on the generation and decay of internal waves and conclude with another good section on coastally trapped waves.

The authors are to be commended on producing an excellent review of waves in the ocean, but they must be held partly responsible for the price, which puts the book beyond the reach of most readers.

D. J. Webb

D. J. Webb is a Physical Oceanographer at the Institute of Oceanographic Sciences, Wormley, Godalming, UK.

Molecular virology reviews

Molecular Biology of Animal Viruses. Vols 1 and 2. Edited by D. P. Nayak. Pp. 552 and 480. (Marcel Dekker: New York and Basel, 1977 and 1978.) $45 each volume.

These two volumes on animal viruses are announced by the publishers to be textbook covering the major groups of animal viruses in a systematic fashion. Volume 1 begins with a chapter on virus architecture and another on interferon, followed by seven chapters on particular groups of RNA viruses: picornaviruses, togaviruses, rhabdoviruses, myxoviruses, reoviruses, and retroviruses. Volume 2 comprises five chapters on DNA viruses: parvoviruses papovaviruses, adenoviruses, herpesviruses and poxviruses.

Most of the chapters are authoritative and clear accounts of the virus groups under discussion. But there are two major aspects of these volumes that lead one to question the wisdom and value of publishing such a book at all. The first is the rapid obsolescence of the reviews, a matter about which the editor is acutely aware in his preface. Nearly all the chapters were written in 1975 and although some have brief addenda citing major advances up to early 1977, too high a proportion of the chapters seem seriously dated already. A two- to three-year incubation period between writing and publishing is not viable in this field today. Many of the authors apparently feel the same, as they have taken pains to state precisely when their chapters were completed.

Secondly, these volumes do not really represent a textbook, rather a series of unlinked reviews. Each of the chapters could equally well have appeared without alteration and much faster in one of the volumes of annual review publications that cover virological topics. So one must ask whether there is a particular advantage to grouping them into two volumes with the consequent delay in publication. The answer would be affirmative if the book represented a genuine textbook and included some general aspects of the molecular biology of animal viruses. But this is not the case; the student will gain little insight into the diversity of viral strategy nor the unity of virology as a discipline, without a chapter on the comparative molecular biology of viral replication and expression, or of pathogenesis. And important groups of animal viruses (arenoviruses, bunyaviruses, most insect viruses) are not mentioned. As a collection of special reviews the volumes will be useful to some virologists, but they cannot be recommended to those in search of a modern textbook of molecular virology.

R. Weiss

R. Weiss works at the Imperial Cancer Research Fund Laboratories, London, UK