

Blinded with theory

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An Introduction to Atmospheric Physics, 2nd Edn. By Robert G. Fleagle and Joost A. Businger. Pp.432. ISBN 0-12-260355-9. (Academic: 1980.) \$29.50, £19.60. *An Introduction to Atmospheric Radiation*. By Kuo-Nan Liou. Pp.392. ISBN 0-12-451450-2. (Academic: 1980.) \$34.50, £22.80.

WE LIVE in a world where physics students seem to believe that if a process can be visualized, it must be trivial. Thus the really important things to study are theoretical physics, quantum mechanics and nuclear physics. A subject such as biophysics becomes more respectable if the object of study is first reduced to a molecular soup, less so if an actual tangible biological entity is involved. Meteorology comes somewhere in the middle because, though we have our share of specialized incommunicable topics, the essential feature of the subject is the bringing together of many branches of physics in a way that can lead to understanding the very tangible phenomena presented by the weather.

Fleagle and Businger cover aspects of cloud microphysics, scattering and absorption of electromagnetic radiation, fluid dynamics and photochemistry at a level acceptable to a graduate student of physics or mathematics. The text is clear, but as in any such collection of work from different specializations notation is a problem and the authors' suffix notation gets out of hand at times. Worked problems are used to extend the students' appreciation, though it takes a lot of will power not to cheat and look at the solution straight away. Definite improvements to the 1963 edition are the addition of a useful chapter on dynamics and more modern theory of turbulence, with the rather isolated chapter on geomagnetic effects now being omitted.

Liou deals with the transfer and detection of solar and terrestrial radiation, aimed perhaps at the student anxious to study data provided by the earth-satellite programme. Recommendation is difficult because the book is so carelessly written. The text is distinctly oriental at times — cgs and calories are dominant units, rainbows are a consequence of scattering and $1\text{cm} = 30\text{ GHz}$. A more conventional explanation of the rainbow is given later and the chapters on Mie theory and multiple scattering are extensive.

Something, however, is missing from both books and finally I concluded that it was that there isn't actually any meteorology in them. Never do the authors dig you in the ribs and mutter conspiratorially "there — you have seen that phenomenon before, and never realized the beauty of the physics behind it". Thus both books suffer because they do not make use of the students' (or the

authors') prior knowledge of what the atmosphere is like. For judgement, context and excitement the student would too often have to refer to the original texts; and so, he might as well study quantum mechanics.

Most telling to me is that the authors do not use their eyes. Liou's three-dimensional diagrams (pp.130 and 222, for example)

look as though they were drawn by Escher for purposes other than conveying information about physics. Fleagle and Businger's are not much better. □

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Mixed diet for students of climatology

J.P. Palutikof & T.M.L. Wigley

An Introduction to Climate, 5th Edn. By Glenn T. Trewartha and Lyle H. Horn. Pp.416. ISBN 0-07-065152-3. (McGraw-Hill: 1980.) £18.25, \$32.95. *Climatology: Selected Applications*. By John E. Oliver. Pp.260. ISBN 0-7131-6303-8. (Edward Arnold/Halsted: 1981.) £14.95, \$34.95. *Mountain Weather and Climate*. By Roger G. Barry. Pp.313. ISBN 0-416-73730-7. (Methuen: 1981.) £17.50, \$33.25.

If climatology were breakfast, these three books would be eggs Benedict (Barry), Spanish omelette (Oliver) and rather old porridge (Trewartha and Horn). Barry's book is imaginative and nourishing, but perhaps a little esoteric for everyday tastes; Oliver's, original in concept although not totally successful in execution, is nevertheless full of good things. As for Trewartha and Horn, while the book still has some nutritional value, the average breakfast eater would probably choose to eat out.

An Introduction to Climate is the fifth edition of a book which was first published in 1937. The style is still reminiscent of the pre-War approach to climatology, although in this edition some effort has been made to give the book a "more modern cast". Unfortunately it needs a completely new script as well as a new cast. Much of the book is devoted to the Köppen classification of climates, and little attention is paid to modern developments in climatology. One hopes that few lecturers or teachers today would structure an introductory course on climate with this sort of emphasis. As an illustration of the old-fashioned approach, the data given in the form of maps, diagrams and tables rarely have any indication of the period represented, the reliability or the source. This denies two key issues in modern climatology — the facts that climate *does* change, on all time-scales, and that our knowledge of *global* climate is very meagre. The book is at best misleading, at worst wrong; it provides a salutary lesson that a time must come when updating (even if it is done well, which it is not here) is no longer a useful exercise.

The stated aim of *Climatology: Selected Applications* is to "supply appropriate real-world applications" for basic university courses in climatology. The

author takes in turn each of the themes which form the content of such courses, summarizes it, and then proceeds to provide case studies of the incidence and impact of the climatological features involved. To take one example, Chapter 7 begins with a general description of global circulation patterns, then examines in detail the synoptic patterns of the severe winter of 1976–1977 in the United States and finally considers the impact of this unusual climatic event. This is followed by a complementary analysis of the contrasting summers of 1975 (wet) and 1976 (dry) in the US midwest. The approach is a new and valuable one, which for many teachers will supply a long-felt need. For others, awareness of this text may well provide a new dimension to teaching.

The book is likely, therefore, to be widely read and have considerable influence. As a first attempt, it must be praised. Criticism may be levelled at it for being somewhat shallow, although this can be rectified in subsequent editions when the concept is better established. British readers will perhaps think that the concentration on examples from the United States is disappointing; others will find the system of blocking the data analysis sections into separate boxes disrupting to the flow of the text. Perhaps the greatest compliment one can give any textbook is that it makes learning interesting and, dare we say it, fun. In this, Oliver's book certainly succeeds.

Barry's *Mountain Weather and Climate* is a unique volume on a special subject. He discusses all aspects of the weather and



climates of mountainous regions. The coverage is global and the framework very general, but the material presented is invariably most detailed and specific. As an example of a specialist work it is excellent: