concepts of physics; a limited number of specific phenomena are described, primarily as examples of these concepts. Hewitt is more directly concerned with 'how things work' and describes, somewhat superficially, many devices such as an aneroid barometer, microelectronic circuits, a ruby laser and a fluorescent light. Giancoli takes more of a traditional approach, stressing important concepts but with a tendency toward describing a wider variety of phenomena.

The four books vary considerably in their scientific sophistication, the liveliness of their presentation and the visual appeal of their format. Shapiro's book displays a deep understanding of physics, with a number of unconventional approaches such as introducing mechanics through the concept of energy and defining force, pressure, surface tension and torque as ratios of "energy transferred" to distance, volume decrease, surface increase and angle, respectively. A serious student can gain significant insight from the book, especially if guided and reinforced by an accompanying course; less intensive reading of the book, however, is likely to lead to little more than a familiarity with the vocabulary. Unfortunately, the formal tone of exposition and the lack of liveliness in the illustrations and format make it unlikely that most non-science students will be spontaneously attracted to the book.

The visual features of Giancoli's book, on the other hand, are unusually attractive. There is an abundance of lively, and often humorous, two-colour illustrations, imaginatively designed to attract attention as well as to give insight into physical principles. The pedagogy and organisation of the text are more conventional, except perhaps for a series of "experiment-projects" to be performed independently by the students. The book attempts to cover a very large number of topics by presenting and discussing results usually without derivation. For a 'physics for poets' course, it would seem preferable to treat a limited number of topics in greater depth.

Hewitt's book has some of the same visual advantages as Giancoli's. In its 650 pages, however, it tends to be even more encyclopaedic, while consciously being even less quantitative. I fear that its admirable (but not subtle) attempt to relate to students with scientifically disadvantaged backgrounds will unfortunately backfire for most liberal arts students. Some of its chapters start with full-page photographs of children with comic-strip-like 'balloons' containing expressions such as "man-o-man-you should've seen the wild spills I used to take before I got into wide wheel bases", before the chapter on rotational motion. The imagination and humour in the book's many small illustrations seem appropriate for all students; the occasional use of a less mature approach and vocabulary may give many students the impression that the author is talking down to them. □

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Introductory meteorology

Ira W. Geer

Fundamentals of Meteorology. By Louis J. Battan. Pp.321. (Prentice-Hall: Englewood Cliffs, New Jersey, 1979.) $14.95. *The Atmosphere: An Introduction to Meteorology.* By Lutgens and E. Tarbuck. Pp.413. (Prentice-Hall: Englewood Cliffs, New Jersey, 1979.) $14.95. *A Basic Meteorology Exercise Manual.* Revised edition. By Chelius and Frentz. (Kendall/Hunt: Dubuque, Iowa, 1978.) $7.95.

THE three publications reviewed here are intended for introductory college-level courses in meteorology for students not majoring in the atmospheric sciences.

By far the best of those examined is *Fundamentals of Meteorology* by Battan. Clearly written and highly readable, it treats topics found in most introductory weather texts and includes chapters on atmospheric optics and acoustics, and weather applications. Reflecting the author's background and interests, frequent referral is made to basic physical principles and relationships which in turn provide the foundation on which subsequent descriptive information is based. Various aspects of air pollution are presented in ways which will no doubt enhance student interest in a number of topics discussed. The book is relatively free from typographical errors or mistatements. However, one is the mention of South Atlantic hurricanes, when hurricanes in the southern North Atlantic Ocean was obviously intended (page 183). This book is recommended without reservation for use as a course text, a handy teacher reference, or just plain good reading.

The Atmosphere by Lutgens and Tarbuck was an attempt to write a non-technical and non-mathematical treatment of weather and climate. It seems to be geared to the reading and interest levels of the poorly prepared student. Despite the good intentions of the authors, the book fails miserably. It is lacking in scientific accuracy and quality of writing. The concept of (air) pressure is frequently equated to force (pages 10,121,122 and 124). This leads one to conclude that the authors fail to demonstrate an understanding of basic physics, let alone its applications to the atmospheric environment. Statements about "the infinite universe" (page 1) and that "air condenses" (page 233) illustrate the multitude of errors which at best can be called sloppy writing. Simply stated, the book cannot be recommended for any purpose.

A Basic Meteorology Exercise Manual by Chelius and Frentz is "for students of basic meteorology to be used as a supplement to a lecture course or used in an independent laboratory course". Twelve exercises are presented on topics entitled Temperature, Moisture, Winds and Pressure, Clouds and the Precipitation Process, Fronts and Extra-Tropical Cyclones, Upper Air Flow, The Thunderstorm, Climatology, Air Pollution, Weather Radar, Weather Forecasting I and Weather Forecasting II. The bibliography contains a brief list of books and other sources of information.

The manual's sections touching on satellite imagery, air pollution, weather radar, the relating of surface to upper air weather features, and weather forecasting are somewhat unique as they are not typically treated in the few other basic manuals available commercially. They add a great deal to a publication which is weak in terms of its layout and the quality of its narrative portions. Statements such as "the condensation of water vapour produces precipitation" (page 15) and the description of saturated air as being "like a sponge that can hold no more water" (page 19) appear too often. Unfortunately, student analysis of data from actual atmospheric observations is not often called for. In its present condition the manual cannot be recommended for course adoption. Teachers might find a copy useful for ideas they might want to develop on their own. With considerable revision, the manual could become suitable for general use. □

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