

tions. It is indeed a pleasure to read Van Mieghem's *Atmospheric Energetics*, which explicitly presents the time-averaged governing equations and analyzes the effect of Reynolds stresses on the energy of the mean and turbulent motions, exactly the things that should be emphasized.

The monograph consists of two parts. The first, which provides the theoretical background for a general understanding of the atmospheric energetics processes, presents essentially the basic equations for the energy of the mean and turbulent motion and for the eddy flux of sensible and latent heat. The second, which presents the atmospheric energy processes in various space and time scales, deals with the Boussinesq approximation, the energetics of forced and free convections and of small- and large-scale motions, Lorenz's cycle of energy conversion and transfer, and quasistatic and ageostrophic motions in the atmosphere. The space and time averages are precisely defined and applied to atmospheric motion of various scales. Energy balance in both the boundary layer and free atmosphere is analyzed carefully and in detail.

Although the book is handsomely produced, a number of misprints appear. For example, the term on the left-hand side of eq. 11.2 (p. 115) should be time-averaged and in the first term on the right-hand side a divide sign is missing.

In spite of the misprints, the material of the monograph is well organized and presented, and the book is both detailed and comprehensive. It is suitable for students at the graduate level and for researchers in atmospheric dynamics.

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The Sun

Solar Activity Observations and Predictions. PATRICK S. MCINTOSH and MURRAY DRYER, Eds. M.I.T. Press, Cambridge, Mass., 1972. xvi, 444 pp., illus. \$17.50. *Progress in Astronautics and Aeronautics*, vol. 30.

The extensive solar observations now being conducted by the astronauts on Skylab are giving beautiful new results and insights into the nature of the sun. Each day's observing schedule is prepared on the previous day at

Houston by the group of experimenters who have supplied the instruments for Skylab. To prepare the most efficient observing schedule it is necessary to have a good anticipation of the location and extent of solar activity on the following day. The supplying of the solar forecasts to the Skylab experimenters is probably the most intensive use of the solar physics and techniques that are described in this book. The terrestrial results of solar activity and the associated need for forecasting this activity become increasingly significant as our globe shrinks and we become increasingly dependent on long-range communications, power networks covering an appreciable portion of a continent, and travel in high-altitude jet aircraft. All of these may be seriously disturbed by solar activity, and there is also increasing evidence that our weather and climate may be significantly influenced by solar activity.

The attempts to forecast solar activity provide a meeting place for solar physics research and the operational forecasting techniques. Forecasting looks to solar physics for the fundamental knowledge on which the daily specific techniques will be based, and the resulting degree of success provides an evaluation of the solar physics involved. Both the solar physics and the forecasting techniques are far from perfected, but the past few years have seen significant improvements as a result of spacecraft observations, improved ground-based observations, and the use of modern digital computers.

A basic dichotomy in solar physics is discussed in the present volume. In the classical picture, sunspots and flares are comparatively localized and short-lived features deriving their energy from magnetic fields that have been amplified by differential rotation. The newer half of the dichotomy, discussed by Schatten, involves large-scale and long-lived sectors within each of which the solar magnetic field is predominantly directed either inward or outward. This sector structure is carried outward by the solar wind and flows past the earth, causing an appreciable portion of the total terrestrial response to solar activity. The sector structure tends to recur from one solar rotation to the next, enhancing the forecasting possibilities.

This book is an excellent encyclopedia of the basic solar physics and of the resulting forecasting techniques. I would recommend it to a new student

of solar physics, and it would be obligatory for a practitioner of forecasting. Each of the chapters is concise yet complete, with a rather uniform technical level, showing evidence of a firm editorial hand.

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Metal Chemistry

The Chemistry of Platinum and Palladium. With Particular Reference to Complexes of the Elements. F. R. HARTLEY. Halsted (Wiley), New York, 1973. xiv, 544 pp., illus. \$45.

Now for the first time a book has been written assembling practically all of the available information about the chemistry and structures of platinum and palladium compounds in one place. The subjects covered range from the isolation of these elements from ores to inorganic complexes, to substitution mechanisms, to organometallic complexes and their reactions.

Particular emphasis is placed upon spectral and structural information. Not only the usual infrared and nuclear magnetic resonance data but, where available, electronic, vibrational, and photoelectron spectra and nuclear quadrupole absorptions are given. An appendix gives the bond lengths and angles for essentially all of the platinum and palladium complexes that have been investigated.

The book is more than just a compilation of data, however. The author discusses many relevant subjects in detail while presenting the data. For example, the concept of hard and soft acids and bases is used to predict the formation and relative stabilities of complexes. The bonding involved in the various complexes is considered in detail in an attempt to explain the observed bond lengths and spectral data. Reaction mechanisms are discussed where information is available to explain the many new and unusual reactions these complexes undergo.

The formation and chemistry of the inorganic complexes are the concern of the major part of the book. An entire chapter is devoted to hydrides, since these complexes are involved in many commercially important catalytic reactions of platinum and palladium. Other topics include complexes with boranes and group IV B, V B, and