Cracow, who (in a weak sense) was Infeld's teacher. (Infeld, by the way, was Natanson's sole Ph.D.) The weakest sketch is that of Oppenheimer. It is petty, and it somehow trivializes a highly nontrivial person.

Infeld suffered from the ultimate in what Robert Merton calls the Matthew effect (the disproportionate dominance of the better-known of scientific collaborators, as reflected in the words in the Gospel of Matthew, "For unto every one that hath shall be given . . ."). Still, there was enough light in Einstein's shadow for Infeld to more than hold his own. After Einstein's death in 1955 he became one of the acknowledged elder statesmen of relativity, and he cherished and enjoyed the role.

The book makes a distinct contribution to the celebration of the centennial of Einstein's birth.

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Cloud Processes

Microphysics of Clouds and Precipitation. HANS R. PRUPPACHER and JAMES D. KLETT. Reidel, Boston, 1978. xvi, 714 pp., illus. $39.

This book grew out of a series of lectures to students, but it is by no means a textbook. Rather than emphasizing basic concepts and principles, the authors pay considerable attention to details more of interest to those already possessing a basic knowledge of cloud microphysics than to those seeking an introduction to the field.

The treatment of the Kelvin equation is a good example of this attention to detail. Half of the treatment deals with the effects of air and the compressibility of liquid water on the equilibrium vapor pressure of water (both are noted to be negligible). Such detailed treatment is lacking in other books of this genre and is a welcome contribution.

The overall organization of the book leaves much to be desired. Following two introductory chapters (one is a historical review of some interest), topics seem to be interspersed almost at random. Discussion of the structure of water and ice is split between chapters 3 and 5, discussion of homogeneous and heterogeneous nucleation is divided between chapters 7 and 9, and the nonwater aerosols are treated in chapters 8 and 12. Somehow "Cooling of moist air" comes between a chapter on the hydrodynamics of single particles and one on the mechanics of atmospheric aerosols. Admittedly, there is considerable leeway for personal preference, but the logic of this particular sequence escapes me. The final chapter, on the relation betweeen cloud particles and cloud electrification, seems almost an afterthought.

A chapter on the hydrodynamics of single cloud and precipitation particles is an excellent treatment of an important topic rarely dealt with in such books. Here, the interest and expertise of the authors lead to a well-organized and critical presentation. Starting with the basic equations governing fluid motion, the chapter covers flow past rigid spheres, the internal circulations and shapes of falling water drops, and the motion of ice crystals, snowflakes, graupel, and hailstones. This chapter and a companion chapter on cloud-particle interactions, have applications in many fields besides meteorology and may well be worth the price of the book.

Unfortunately, the high level of these chapters is not maintained throughout the book. The treatment of ice phase nucleation is particularly poor. No mention is made of condensation freezing as a distinct mode of nucleation. The discussion of physical mechanisms for contact freezing is an uncritical hodgepodge of different theories, some of which should not be taken seriously. It is particularly disturbing to find that a discussion pointing out the inability of present instruments to characterize natural ice nuclei is followed by several pages devoted to such measurements. I had thought the idea of an extraterrestrial source of ice nuclei had been given a decent burial, yet it is revived here as a possible explanation for so-called "IN storms." The treatment of "ice multiplication" as "processes which are known to occur in clouds" is likewise an uncritical review of the past literature.

With the exception of the chapters on cloud hydrodynamics and cloud-particle interactions, the reader is often confronted with a great many differing opinions and observations, with little or no attempt made to assess their reliability or validity. There is little evidence of an attempt to select from the incredible wealth of references presented. To the beginning student, this does a great disservice; to the experienced researcher, it provides a useful literature survey but little more.

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Neurophysiology

Studies in Neurophysiology. Presented to A. K. McIntyre. R. PORTER, Ed. Cambridge University Press, New York, 1978. xiv, 440 pp., illus. $75.

This is a collection of papers by students, colleagues, and friends of A. K. McIntyre, presented to him on his retirement. McIntyre was professor of physiology at the University of Otago before establishing the flourishing physiology department at Monash University. He is a man of broad interests whose rigorous work represents a significant contribution to the physiology of the nervous system. The diversity of the papers in this collection demonstrates the wide range of the scientists whom he influenced. The overall quality of the contributions is high.

Some of the chapters are concise, up-to-date reviews that are interesting to read and provide a good introduction for the nonspecialist. Among the papers I found particularly interesting, one by B. Katz combines a historical discussion of the vesicle hypothesis with a description of recent work with noise analysis. Y. Laporte discusses current views of muscle spindle innervation and includes his recent work on β axons, which innervate both extrafusal and intrafusal fibers. C. C. Hunt describes the mechanical and ionic events underlying the response of primary muscle spindle receptors. J. J. B. Jack provides useful data on selective activation of various muscle proprioceptors or afferents, together with a review of recent experiments bearing on the suggestion that secondary spindle receptors contribute to the stretch reflex. There are also interesting papers by R. A. Westerman on mechanisms by which muscle tension is restored after partial denervation, by C. Eyzaguirre and S. J. Fidone on carotid body chemoreceptors, by M. Zimmermann on mechanoreceptors and sensation, and by W. I. McDonald on experimental and clinical studies of demyelination. Other papers present interesting recent findings on subjects ranging from receptor physiology to memory. The emphasis throughout is on neurophysiology at different levels of complexity, but there are also excursions into psychobiology and homeostasis.

In summary, this is a good collection of papers. Most of them are both interesting and useful.

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