find in Susskind's book many of these assertions. For example, "opponents of technological advance" would not be so bold "if they realized that it would mean a return to, say, outdoor privies" (p. 69). Engineers should listen to warnings regarding hazards of "nuclear weapons, electronic computers [etc.]" only if the warnings are "logically derived from facts and visible trends" (p. 88). "Blaming engineers for the shortcomings of technological society makes about as much sense as blaming the failure of a new play on the stage hands" (p. 118). "Technology, the source of the problem, will once again prove to contain within itself the germs of a solution compatible with the betterment of man's lot and dignity" (p. 132). The list could be easily doubled in length. Such assertions simply provoke counterassertions, which effectively stifle discussion.

Finally, Susskind the engineering professor deals with dissenting and protesting students. He observes that there was little problem among students of medicine, engineering, or the other professions. The "true believers" in student movements were "more likely to be students of the humanities and social sciences." The reason? They were "demoralized by the devastating thought that they, who should be the future leaders if there was any justice, might turn out to be unwanted and unnecessary," made obsolete by technologists. My counterassertion: the suggestion that this is what the student movement was all about is simply fatuous.

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Atmospheric Physics

Earth's Magnetospheric Processes. Proceedings of a symposium, Cortina, Italy, Aug. 1971. B. M. McCORMAC, Ed. Reidel, Boston, 1972. viii, 420 pp., illus. $37.50. Astrophysics and Space Science Library, vol. 32.

Every two years, B. M. McCormac organizes a two-week international conference on magnetospheric physics. The conferences are always well attended, because McCormac carefully promotes interaction between participants. Every two years, a well-edited conference proceedings appears. I have found these to be the best summaries of the current status of this sprawling field. These proceedings will provide the future historian of science with a series of snapshots of the development of magnetospheric physics. Our future historian may well conclude that the 1971 Cortina conference symbolically marked a turning point. It certainly was for McCormac's conferences themselves. Originally conceived in part to educate a fledgling European space science community, they now, by the number of high-quality European papers in the 1971 volume, announce the growing size and sophistication of the European program. More important, 1971 found a fundamental change in magnetospheric physics. No longer would simple discovery suffice, the physics had to be addressed. With the geometry of the magnetosphere settled, its time dependences had to be understood. These concerns permeate the volume.

Earth's Magnetospheric Processes contains over 30 papers by acknowledged experts grouped under the headings Magnetospheric Structure and Processes, Magnetospheric Particles, Magnetic Fields and Currents, Electric Fields and Plasma Convection, Acceleration and Diffusion (of particles), and Magnetospheric Substorms. The papers in their diversity illustrate the many different physical processes—and the different measurements they require—we need to synthesize into a working model of the time-dependent magnetosphere. The very fact that they are collected in one volume, rather than dispersed throughout the journal literature, clarifies the task ahead. Of the many papers presented, I would like to single out two whose topics seem to have stimulated incessant discussion afterward. It now appears that whenever the solar wind magnetic field changes direction the magnetosphere adjusts by changing its internal plasma flow, creating a characteristic sequence of events in the auroral zone, called a substorm by its discoverer, S. I. Akasofu. The controversy provoked at Cortina by M. P. Aubry's tart review of substorms continues to this day. V. M. Vasyliunas's theoretical paper on the interrelation of magnetospheric processes, published only in these proceedings, became a foundation of future work in magnetospheric convection theory. Vasyliunas wrote down and used the full set of equations describing the coupling of the magnetosphere to the highly conducting ionosphere to produce calculations of the flow for the special case of a magnetosphere loaded with energetic protons during magnetic storms. Although definitive results are still to be obtained from the research program so initiated, there seems to be general agreement that this is the way all time-dependent magnetospheric flow problems should be solved.

All in all, *Earth's Magnetospheric Processes* is indispensable for libraries and serious magnetospheric physicists. Since some papers are tutorial in nature, it is also useful for students, though its price is a drawback.

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Widespread Mineral

Apatite. Its Crystal Chemistry, Mineralogy, Utilization, and Geologic and Biologic Occurrences. D. MCCONNELL. Springer-Verlag, New York, 1973. xvi, 112 pp., illus. $17.40. Applied Mineralogy, vol. 5.

Apatite is a mineral which is widely distributed in nature. It is the major constituent of the hard tissue of vertebrates, forms the tests of some invertebrates, and is ubiquitous in rocks. It is also the major raw material used by the chemical industry for the production of phosphorus and its compounds.

McConnell's studies of the mineralogy, crystallography, and crystal chemistry of apatite extend over more than 35 years and have been paramount in the advancement of the field. It therefore is fitting that he should prepare this volume on apatite. McConnell stresses the crystallography and crystal chemistry of the compound. This emphasis is found even in the chapters entitled "Phosphorites," "Geology: igneous and metamorphic occurrences," and "Biological apatites." Since the size of the book—11 chapters are included in little over 100 pages—precludes complete coverage of the many and diverse topics related to apatite, it is fortunate that this common denominator is stressed.

The author's style of writing, blunt statements, and critical comments will be amusing to some readers, serve as admonitions to others, and be irritating to still others. Regardless of one's disposition toward this style, it does serve to identify and alert the reader to controversial matters and important reservations concerning apatite studies. In the final chapter, a critique, the author gives a cautionary review of some practices and techniques in the