analysis of rhenium metal and industrially manufactured rhenium compounds is included.

The first chapter gives a very brief (3 pages) history of rhenium. The second chapter is devoted to the properties of rhenium metal and some of its alloys (including phase diagrams) and to the properties of rhenium oxides, sulfides, and perrhenates. The third chapter lists the applications of rhenium and provides production figures to 1956. Chapter 4, on rhenium sources, discusses the general geochemistry of rhenium and the concentration of rhenium in molybdenum and copper metallurgical processes. Chapter 5 covers in detail the extraction of rhenium from the metallurgical concentrates. This is the most detailed chapter in the book and is devoted primarily to the Russian practices. The preparation of rhenium metal is covered in some detail in chapter six. The final chapter is a very brief summary of the analytical chemistry of rhenium.

The vast majority of the references are to the Russian literature, and they include a substantial number of the lesser-known publications. The book was published in the Russian language in 1960, so references only up to 1958 are included in the bibliography.

Those persons concerned with the industrial production of rhenium will find the book useful, but those concerned with the basic chemistry of the element will find it of little value.

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Introductory College Texts

Understanding the Physical Sciences. Olaf P. Anfinson. Allyn and Bacon, Boston, Mass., 1963. xvi + 456 pp. Illus. $8.50

Basic Concepts of Physics. Arthur Beiser. Addison-Wesley, Reading, Mass., 1961. x + 341 pp. Illus. $7.75.

One of the choices that must be made by an author who embarks on the task of initiating the nonscientist into the activities of the scientist—a task that is not only worthwhile, but one that is essential in our culture—is how much space and effort to give to the "philosophical, historical, and cultural aspects" of science. In this respect the two books here considered differ radically, with Beiser stating clearly in his preface that his decision is to limit himself to the formal content of physics. A second choice is the order in which the topics to be considered are presented, and which topics are to be included. In this respect, too, Anfinson and Beiser differ; Anfinson considers topics from almost every branch of the physical sciences, and he presents them in a rather unusual order—for example, he begins with a consideration of sound and light.

I find this an unfortunate choice, and I am not convinced of its validity by the reasons the author advances in the preface—"Beginning our inquiry in the realm of sound and light," he states, "is not by chance. As children we became dependent on the sense organs as our primary means of learning about our surroundings." It is, of course, simply not true that, as Anfinson seems to imply, our earliest means of learning about our surroundings are through sound and light—Piaget has amply documented this—and, when sight does become an important means of communication with the environment, we do not become aware of light as a wave in the sense that we early become aware of masses translatable through effort. It is not, indeed, by chance that science developed historically in the order it did.

It is true that the order of presentation used needs no justification other than the results obtained, but beginning with sound and light appears to have forced Anfinson to present an abnormally large number of statements that must be accepted on pure faith long before any rational basis for this faith has been established, either by experimental evidence or by supporting conceptual schemes. Thus, we find the principle of conservation of energy stated, without any justification, on page 9; on page 49 he tells us that light waves "manifest a combination of electric and magnetic effects," but it is only on page 322 that the first statements of elementary electric effects are given, and then they are incompletely presented. The number of such examples could be extended almost indefinitely.

Clearly, the method does not lend itself to the exploration of the historical aspects of science, and the many asides that seem to be intended to probe into the cultural and philosophical aspects strike me as neither novel nor deep. A few questions and problems are given at the end of each chapter, and the book is provided plentifully with illustrations. The format is the fashionable two-column page. I must confess to a deep and irrational dislike of this format for a textbook.

The order in which topics are presented by Beiser is traditional but in this case I feel there is much to be said for tradition. Within its self-imposed limits (the volume is intended as an introduction to physics designed for use in a one-semester college course), this is a fine book, clearly written, and with the elegance of accurately used language. One could question whether the basic concepts have been sufficiently plumbed: is it enough, for example, to state Newton's first law without explicitly questioning the frame of reference with respect to which the "straight line" and "constant speed" are measured? It may be true that common practice is to leave this question unasked, but I doubt that this really constitutes a valid excuse for continuing the practice today.

Beiser's book is plentifully supplied with problems, and the illustrations used seem to have been chosen to clarify the text, rather than simply to make the book "attractive." Some of these illustrations, however, as well as the use of two colors in the printing (some of the sentences are in a rather garish red), seem to me rather in poor taste, especially when they are compared to the sober clarity of the author's language.

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Geophysics

Principles of Applied Geophysics. D. S. Parasnis. Methuen, London; Wiley, New York, 1962. vii + 176 pp. Illus. $4.50.

The author states that "the object of this monograph is to give a brief but fairly comprehensive survey of the principles of applied geophysics, including some of the recent advances in the technique of interpreting geophysical data."

The physical property principles, on which the various methods are based, are, with a few exceptions, tersely and explicitly presented. If for no other reason, the concise statement of these physical property concepts makes the book a valuable starting point for any university student in geophysics.

The author's survey of interpretation is far from briefly comprehensive, and it is not particularly selective. The quotation of geometrical body formulas is in order in a compact treatise such as this, the physical concepts having been laid, but in his treatment of magnetism Parasnis does not quote the induction formulas for a sloping face, from which practically all others can be simply deduced. Analytical projections upward and downward and derivative derivations are suggested but not quoted. Although the Smith rules, which are used in magnetics and gravity essentially for depth control, are newly presented, they have been used, in somewhat different form, by industry for several years. No formulation is given of the induced polarization method for simple body cases even though such formulations were available when this book was being prepared.

Although the extensive North American literature on various electromagnetic dipole-dipole systems is restricted to about one page on airborne electromagnetic systems, the Swedish systems are well presented and indicate clearly the physical factors and parameters involved. The treatment of seismic methods merely touches the simple refractive and reflective boundary. The simple but comprehensive time delay approach is not presented. Bore-hole work, geothermal work, and geochemistry are mentioned in a paragraph. Nowhere does geologic noise, which is present in all these methods as the response from unsought formations or bodies and variable surface conditions, receive more than occasional mention; when such factors are mentioned, it is not with respect to the methods and systems where they are known to bulk largest.

In summary, however, I recommend this presentation as one of the best available concise statements of the physical property factors and physical parameters involved with respect to magnetic, gravity, and electromagnetic methods. Its presentation of interpretation is too limited, and many known items of usefulness have been omitted. Its treatment of induced polarization, seismicity, Afmag, and geochemistry are only introductory. Essentially, the book will be of value to university students and engineers in the field of mining geophysics.

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New Books

Mathematics, Physical Sciences, and Engineering

Advances in Organic Chemistry. Methods and results. vol. 3. Ralph A. Raphael, Edward C. Taylor, and Hans Wynberg, Eds. Interscience (Wiley), New York, 1963. 341 pp. Illus. $13.75.

Chemical Calculations. An introduction to the use of mathematics in chemistry. Sidney W. Benson. Wiley, New York, ed. 2, 1963. 266 pp. Illus. Paper, $2.95.

Chemistry of Coal Utilization. Supplementary volume. H. H. Lowry, Ed. Wiley, New York, 1963. 1150 pp. Illus. $37.50.

The Complete Book of Slide Rule Use. Ira Ritow. Doubleday, Garden City, N.Y., 1963. 216 pp. Illus. Paper, $1.95.

Corrosion and Corrosion Control. An introduction to corrosion science and engineering. Herbert H. Uhlig. Wiley, New York, 1963. 381 pp. Illus. $10.

Developments in Theoretical and Applied Mechanics. vol. 1. Proceedings of the first southeastern conference (Gatlinburg, Tenn.), 1962. Plenum Press, New York, 1963. 543 pp. Illus. $16.

Differential-Difference Equations. Richard Bellman and Kenneth L. Cooke. Academic Press, New York, 1963. 478 pp. Illus. $13.75.

Differential Equations: Geometric Theory. Solomon Lefschetz. Interscience (Wiley), New York, ed. 2, 1962. 400 pp. Illus. $10.

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An Elementary Introduction to the Theory of Probability. B. V. Gnedenko and A. Ya. Khinchin. Translated from the fifth Russian edition (1961) by Leo F. Boron. Dover, New York, 1962. 142 pp. Illus. Paper, $1.45.

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Infrared Absorption Spectroscopy. Practical. Koji Nakanishi. Holden-Day, San Francisco; Nankodo, Tokyo, Japan, 1962. 245 pp. Illus. $8.

An Introduction to Electronic Analogue Computers. M. G. Hartley. Methuen, London; Wiley, New York, 1962. 163 pp. Illus. $4.50.

An Introduction to Electronics. Dennis F. Shaw. Wiley, New York, 1962. 346 pp. Illus. $6.25.

An Introduction to Mathematical Probability. Julian Lowell Coolidge. Dover, New York (reprint), 1962. 226 pp. Illus. Paper, $1.35.

A Laboratory Guide in Chemistry. Joseph H. Roe. Mosby, St. Louis, ed. 4, 1963. 262 pp. Illus. Paper, $3.75.

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Magnetohydrodynamic Shock Waves. J. Edward Anderson. Massachusetts Inst. of Technology Press, Cambridge, Mass., 1963. 240 pp. Illus. $6.50.

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Methods in Exterior Ballistics. Forest Ray Moulton. Dover, New York (© 1926), 1962. 265 pp. Illus. Paper, $1.75.

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Numerical Analysis. Nathaniel Macon. Wiley, New York, 1963. 175 pp. Illus. $5.50.

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A Précis of Mathematical Logic. J. M. Bochénski. Translated from the French and German editions by Otto Bird. Reidel, Dordrecht, Netherlands, 1959; Gordon and Breach, New York, 1963. 110 pp. Illus. $5.25.

Principles of Chemistry. Joseph H. Roe. Mosby, St. Louis, ed. 9, 1963. 388 pp. Illus. $5.95.

Statistical Analysis in the Geological Sciences. Robert L. Miller and James Steven Kahn. Wiley, New York, 1962. 497 pp. Illus. $12.75.

Superconductivity. E. A Lynton. Wiley, New York; Methuen, London, 1962. 184 pp. Illus. $4.50.

Textbook of Polymer Science. Fred W. Billmeyer, Jr. Interscience (Wiley), New York, 1962. 615 pp. Illus. $12.75.