

that this book is an outgrowth of lectures on astronomy and celestial mechanics given under the auspices of the National Science Foundation. This volume goes beyond elementary material presented in other introductory books on space science, as advanced ideas are clearly presented and the author often suggests models and reasonable approximation for numerical calculations.

As the book has been produced by photo-offset from a typed text, handwritten equations and handmade diagrams, the format is not exciting. There is adequate compensation, however, in the clarity of writing and the reasonable cost.

Eisele reviews the concepts and notation used in Newton's nonrelativistic mechanics, generalized coordinates, Lagrange's equations and the reduced mass for two bodies. Also included are expositions of planetary motion, rocket dynamics, orbital mechanics for two bodies, satellites, orbital mechanics and transfer theory, lunar probes and interplanetary travel.

Although the subtitle is *An Introduction to Space Science*, Eisele's book does not attempt an integration of the sciences required for space travel as does, for example, McMahon's *Astrophysics and Space Science*. Eisele's volume specializes in orbital mechanics. With its carefully written introductory sections, numerous suggestions for calculations, appendixes and bibliographies, this is a very coherent book, appropriate for self-study and for use in a senior-level university course.

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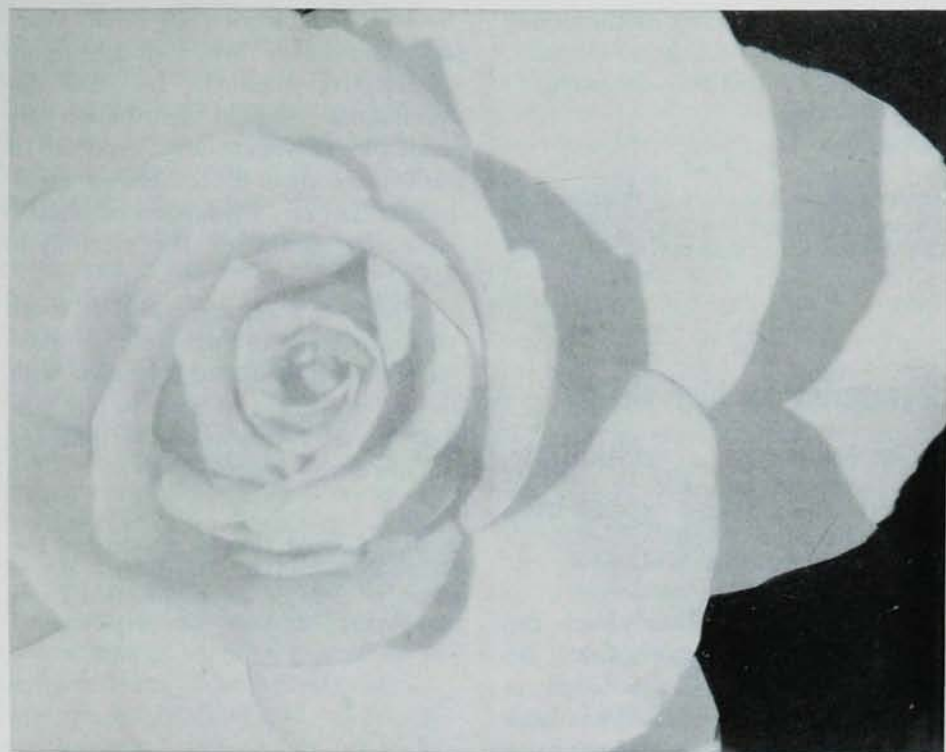
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Philosophy of color

THE RAYS ARE NOT COLOURED: ESSAYS ON THE SCIENCE OF VISION AND COLOUR. By W. D. Wright. 154 pp. American Elsevier, New York, 1967. \$5.95

by ISADORE NIMEROFF

Color is present in everything we see, be it for practical or aesthetic purposes. Since 1931, when the Standard Observer for Colorimetry was recommended for international use in color measurement and specification, color science has advanced greatly. This book is a collection of invited talks



"THIS IS PURE PHYSICS, statistical physics at that, yet it is nature at work in all her dynamic profusion and miraculous artistry." (From *The Rays Are Not Coloured: Essays on the Science of Vision and Color* by W. D. Wright.)

given by the author, which surveys the contributions he had made in the light of his forerunners, Isaac Newton, Thomas Young, H. von Helmholtz, James C. Maxwell, and Ewald Herring and his contemporaries, David L. MacAdam, Deane B. Judd, William S. Stiles, John Guild, W. E. Knowles Middleton, Manfred Richter and Yves LeGrand. William David Wright surveys the science of color with a philosophical slant, and his book ranges in depth through such subjects as color blindness, color measurement and color vision. Very practical problems such as material texture, color television, night driving and color teaching are also treated adequately. Wright is eminently qualified to have published a collection of his lectures. His contributions to the science of color are legendary, and his students extol his virtues.

The lectures are written with a clarity and sensitivity not to be found in many scientific writings. Two passages quoted from his dissertation on the texture of a rose will illustrate his fine artistic brush. On page 109 he writes: "But wait a moment. The lamp is in fact ejecting millions of photons or light quanta per second and subjecting the rose to an intense random bombardment by their minute particles of energy. What happens when they batter themselves against

the petals? Some bounce off, some penetrate a little way into the petal and are scattered back again, some penetrate so far that they escape on the other side. All this will depend on the molecular and atomic dimensions of the structures they encounter and on their own particular energies and frequencies. And out of this chaos emerges a pattern of photons reproducing not merely the overall shape of the flower but the minute structure and translucence of each petal in all its infinite detail. This is pure physics, statistical physics at that, yet it is nature at work in all her dynamic profusion and miraculous artistry."

Two pages later Wright states: "Let us take another look at our rose. What is it that makes the flower so attractive? It may be the sheer richness or depth or vividness of the overall colour, but the most fascinating aspect is surely the fine texture of the petals. This is a compound of many different elements: the detailed structure that we see both over the surface and within the petal; the sheen of the top surface reflection; the penetration of the light into and through the petal and its diffusion within the fibrous structure; the subtle gradation of colour along the length of the petal; the shading folds of the petal and the delicate tracery of its edges."

It is with enthusiastic pleasure that

I commend the reading of this scientific gem to all who have interests, ranging from casual to penetrating, in color.

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Engineering for high energy

HIGH-VOLTAGE TECHNOLOGY.
L. L. Alston, ed. 408 pp. Oxford Univ. Press, London, 1968. Cloth \$14.40, paper \$7.50

by L. MARTON

To introduce L. L. Alston's book, the easiest way is to quote from the preface: This book "... is based on a high-voltage course, which has been held annually at the Post-graduate Education Centre, Atomic Energy Research Establishment, Harwell, since 1965. It is intended as an introduction for graduate engineers and other scientists. . . ."

Alston, director of electrical research of the British Railway Board, served both as editor and as one of the authors of the 19 chapters written by 17 contributors. Roughly the first half of the book gives a fair, if sometimes rather condensed, presentation of the physical background of the relevant problems; the second half is straightforward classical electrical engineering. This is best illustrated by an indication of the main chapter contents: mechanism and characteristics of breakdown in gases or in high vacuum, electron emission from metals, conduction and breakdown in liquids and in solids, field-design problems, discussion of various high-voltage components and finally a short chapter about electrostatic generators.

Although the treatment varies throughout the book from undergraduate to postgraduate level, it contains a very useful compendium of engineering-type information for the use of the high-energy physicist. Sometimes the approach is too much on the engineering side and shows a lack of flow of information from the physicist to the engineer, or vice versa. For instance: I was quite surprised to learn that the electrical engineers are still using the semiempirical, qualitative method for electrostatic-field mapping, which was current in text-

books of engineering 40 or 50 years ago; nowadays when much more quantitative methods for the determination of field distribution are available I would have expected a little more than the otherwise excellent section on "Evaluation of electric stress by means of the electrolytic tank."

The book is recommended to those who are new to high-voltage technology or who, although familiar with the subject, want to have in one volume a useful survey of the different aspects of the subject.

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Sophomore plodders beware!

FUNDAMENTAL UNIVERSITY PHYSICS, VOL. 3: QUANTUM AND STATISTICAL PHYSICS. By Marcelo Alonso, Edward J. Finn. 598 pp. Addison-Wesley, Reading, Mass., 1968. \$10.50

by FRED L. WILSON

Depending on your belief about what sophomore physics should be, you'll praise or damn this third volume in Alonso and Finn's series. The authors don't claim to have written an ideal textbook. Instead they have aimed at writing a series that would prepare a student for a higher level of understanding of physical concepts than the traditional undergraduate courses offer.

They have tried to do that by writing a calculus-level text, intended mainly for science and engineering students. Its organization and level are comparable to those of *The Berkeley Physics Course*: The treatment is extremely advanced.

An above-average number of problems (more than 525) and excellent references to modern literature that students can find, read, and use, all help to support the text material. Adequate and numerous illustrations combined with a good layout make an attractive volume.

Throughout the book the authors strip away the classical facade at every turn to leave undraped the subjects supposedly foremost in physicists' minds today. The usual classical fanfare is desiccated in the introduc-

tion to quantum physics. Max Planck and Niels Bohr get their due, but the tone for the book is clearly set when a Feynman graph pops up on page 19.

Chapter nine, "Fundamental Particles," is my favorite. Neutrinos, antineutrinos, helicity, magnetic moment of the lambda-zero hyperon, and all eight conservation laws are disclosed. The chapter ends by answering "What is a fundamental particle?" In an eightfold way, the superfundamental particle turns out to be the quark.

The authors explain that "quark" originated from an obscure passage in James Joyce's *Finnegan's Wake*. Joyce, the lover of multilingual puns and hater of wordiness, is considered by some to be the perfect novelist, if only a perfect reader could be found. There's an analogous situation in the book under review. The range and depth of material is certainly what's needed for the bright future graduate students, but plodders—beware!

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Dictionary of diamagnetics

LANDOLT-BORNSTEIN, ZAHLENWERTE UND FUNKTIONEN AUS PHYSIK, CHEMIE, ASTRONOMIE, GEOPHYSIK UND TECHNIK. (6th edition) Vol. 2: Eigenschaften der Materie in ihren Aggregatzuständen, Part 10: Magnetische Eigenschaften II. By W. R. Angus, J. Favède, J. Hoar and A. Pacault. 173 pp. Springer-Verlag, Berlin, 1967. \$26.50

by JOHN H. VAN VLECK

This is the second of two books of the well known Landolt-Börnstein handbook series that is devoted to magnetism. The first one (Vol. II/9), which appeared several years ago, was over five times larger and covered ferromagnetic and paramagnetic components and also nuclear magnetic resonance in diamagnetic compounds. This new volume can be regarded as a supplement to include diamagnetism. The first 135 pages document mean or powder diamagnetic susceptibilities. As most molecules are diamagnetic, an enormous number of exotic components are covered that the average physicist has never heard of, such as,