yellow color of a wasp differing completely from the yellow color of a mimicking fly.

Even the unknowns include surprises: the pigments of red hair, whether on a girl or on a red squirrel, and of precious coral still elude identification; the green of a turtle's fat, or of a crayfish's green glands, remains an enigma. Some of the known data border on the unrealized for most readers: the myoglobin of red muscle, rather than the hemoglobin of blood, is the chief color at the butcher shop; the pink hue of boiled ham is due to a different pigment; the brown of overcooked beef is due to a third. The 17 handsome color plates will make readers eager to hunt down pigments in everything they see. A 612-entry list of references is a key to the pertinent literature.

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Source Book in Astronomy, 1900–1950. Harlow Shapley, Ed. Harvard University Press, Cambridge, Mass., 1960. xv + 423 pp. Illus. $10.

The development of astronomy from 1900 to 1950 can only be described as explosive. During those years man threw away forever his heliocentric chains, "discovered" first the Milky Way galaxy, its size and distant center, and then "discovered" the universe. This was the era of the giant reflector and the initial development of the giant radio telescope, the giant electronic calculator, and the giant rocket. This was also the time when astronomy became astrophysics—when theoretical physicists such as Planck furnished the key to the nature of stellar radiation, Saha the key to the nature of a stellar atmosphere, and Einstein and Bethe the key to the fundamental question of what makes the stars shine.

This book is therefore quite different in character from its predecessor, *A Source Book in Astronomy* by Shapley and Howarth. In addition, however, because of the great technical complexity of some of the original papers, Shapley has wisely chosen on occasion to substitute review papers for the original sources. This makes for more enjoyable reading and for greater understandability. The 69 papers deal with instrumentation, the sun, the planets, stellar motions, spectra, variability, structure and evolution, spectrum-luminosity relationships, interstellar phenomena, galaxies, relativity and cosmogony, and surveys of astrophysical progress. As might be expected the greatest number of papers (15) are reprinted from the *Astrophysical Journal*; surprisingly enough, leaflets of the Astronomical Society of the Pacific are second in number (six). Astronomers will be grateful to Shapley for providing translations of out-of-the-way but historically important papers such as those of Hertzsprung on giants and dwarfs, Ambartsumian on expanding associations, and van de Hulst's original prediction of the 21-centimeter hydrogen line in radiation from cosmic objects.

This book bears the imprint of Shapley's personality in the well-written introductions to each of the 13 divisions and in the choice of papers. It is to be regretted that a place could not be found for such papers as those of Hubble on the distance of Messier 33 (the great breakthrough that dispelled all doubts about the nature of spiral galaxies), Trumpler on the amount of interstellar absorption, Stebbins and Whitford on the law of interstellar reddening, two or three more of the early radio astronomy discoveries, and the NRL rocket spectroscopy of the solar ultraviolet.

This *Source Book* is enthusiastically recommended to all students of astronomy.

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Modern University Physics. James A. Richards, Francis Weston Sears, M. Russell Wehr, and Mark W. Zemansky. Addison-Wesley, Reading, Mass., 1960, xvii + 993 pp. Illus. $10.75

This new textbook is essentially a combination of the well-known *University Physics* by Sears and Zemansky and the recent *Physics of the Atom* by Wehr and Richards. According to the authors it represents an effort "to provide a meaningful introduction to classical, relativistic, and quantum physics." It assumes a concurrent course in calculus but no previous collegiate physics courses. Presumably, three 3-credit semesters or two 5-credit semesters are needed to cover the entire book; there are 45 chapters.

In combining two textbooks, duplication must be avoided and length kept to a reasonable number of pages. Some readers may therefore be disturbed to find that certain specialized topics have been omitted, although most of these topics will be taken up later in other courses. Fluid dynamics (including Bernoulli's theorem) and surface tension are not discussed, although Stokes' law is used in describing the Millikan oil-drop experiment. The chapter on impulse and momentum has been rewritten, and a short section on rockets has been added. This addition is timely, in view of the current interests of most students, but it is surprising that no mention is made of escape velocity. Also, Gauss' law is not stated in the section on electrostatics, nor are Kirchhoff's rules mentioned in connection with solving resistance network problems. The section on modern physics has no chapter on solid-state physics, although such a chapter is included in *Physics of the Atom.*

If the above comments appear to be adverse, such is not intended; the reader can see for himself that very little *basic* physics has been left out of this comprehensive treatment of general and (introductory) modern physics. The authors have tried to prune out material that was not essential to the basic aim of the text, and in this they appear to have succeeded. The continuity achieved is surprising for a book so ambitious in scope.

The order of topics is conventional: mechanics, wave motion, sound, heat, electricity and magnetism, optics, atomic physics, relativity, and nuclear physics. However, many of the shorter topics ordinarily classified as "modern" physics are interspersed throughout the first 36 chapters of the book—chapters nominally devoted to "classical" physics. Thus some modern theories and applications are discussed in conjunction with their classical counterparts. But this procedure is not applicable to all topics; hence, the last nine chapters of the book cover only recognized topics in modern physics.

On the whole, readers who like the approach of Sears-Zemansky and who want a one-volume textbook that includes ample modern physics for a comprehensive first course would do well to consider *Modern University Physics*; there appear to be, at present, no other single-volume texts which so nearly meet this need.

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