lo. The authors have relieved the obvious organization (past origins, present status, future possibilities) with variety: Some chapters are expository; some are historical; some are imaginary scenarios of what a day on a starship might be like: "The public address system, in that curious flat tone that no advance in technology seems able to cure, announces that the Lunar Space Ship is ready for boarding. Follow the guide, please." Some chapters introduce elementary astronomy (coordinates without tears); some are evangelical. Material has even been gleaned from committee reports of one kind or another (like the above public address system, committee prose seems to be refractory against improvement).

While this book is not your colorful coffee table ornament, it is attractively presented. Figures and reproductions are black and white. Tables unfortunately rarely turn up to summarize even abundant data contained in the text. The prose reads a bit telegraphic but not objectionably so; the authors move from point to point geodesically. Structurally, the book becomes somewhat rushed toward the end, where it jumps from discussing the feasibility of stellar travel *per se* to discussing direct manned exploration, as if the authors suddenly decided that they had spent too much time getting to the point. I find it difficult not to believe that high-speed automatic probes (in effect, the topic of the missing chapter) would precede direct human exploration; individuals might volunteer for a one-way trip to what might be a barren star, but who would finance a mission on that basis? More likely we would have ascertained atmospheric composition, conducted aerial surveys and biochemical profiles, and signed a mutual defense pact with any inhabitants before setting off, if even then. Another of the few lacunae concerns the probability of nearby habitable bodies. The authors discuss mainly the feasibility of detecting planets about other stars, and quite justly so, for such data would certainly help spur interest in sending off probes to investigate. But there has also been some interesting theoretical work on what kind of stars might be inhabitable that has moved beyond just looking under our own stellar class G2 streetlamp for the keys to life. For example, most of the nearby stars are M and K dwarves, runty little warm poker tips compared to the Sun, albeit indifferent to our own prejudices regarding where to look for life. Oddly enough, Alpha Centauri is not only the closest star (excluding possibly a few cinderlike neutron stars—long-dead pulsars—idly turning in the sky) but quite like the Sun. Alpha Centauri is one of a triple star system, but it remains far enough apart from the others (named Beta and Gamma, of course) that an "Earth" as well as much of the rest of the solar system could orbit quite unperturbedly about it or either of the others.

What this pleasant book tells us—that we might be at the technological edge of a brute-force effort to reach the nearest stars—is important, but one can't help but hope we will be more imaginative when the time comes than to shove off in a monster ark in some direction.

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Topics in Classical Biophysics

H. J. Metcalf
300 pp. Prentice-Hall, Englewood Cliffs, N. J., 1980. $9.95

Biophysics and biophysical methods not only have contributed to modern research at the cellular and molecular levels, but also have begun to provide a new level of understanding of seemingly complex relationships in biology and medicine by describing larger-scale biological phenomena (involving muscles, circulation systems, or the whole organism). Considering basic physical laws, effects of scale, and relations between energy production and transduction can often lead to simple answers. Harold Metcalf, a member of the physics faculty at SUNY, Stony Brook, has written a short book about these "classical" areas, including biomechanics, thermodynamics of metabolism, blood circulation, biological feedback, nerve cells, and hearing. In a book that requires little knowledge beyond a first course in physics, some knowledge of simple differential equations, and a minimum acquaintance with biology, Metcalf deals with subjects sometimes classified as "medical physics" and "bioengineering."

The first four chapters deal with mechanics and biomechanics; heat, thermodynamics and energy; and the viscous flow of fluids. Metcalf chooses examples from a wide variety of biological topics, including kinesiology and blood circulation. In the next chapter Metcalf treats basic ideas of feedback and control—but without the depth usually found in elementary electronics treatments; his description of the principle of operational amplifiers is sparse and limited. A chapter entitled "Nerve Cells" presents the biophysics of nerve action potentials and neural transmission up to and including the Hodgkin-Huxley equations. The most convincing chapter in the book, it should provide an elementary understanding of this important process. A chapter on sound and hearing restates many of the traditional conceptions of this process based largely on the work of George von Békésy. More modern work is not discussed, and this section would not provide a basis for the understanding of a beginning student. The last two chapters deal with "Light, Color, and Vision" and "Experimental Techniques." Both seem rather hodgepodge collections of physics and some biology, with little coherent relation between them. The discussion of geometrical and physical optics and its relation to vision is particularly dated and uninformative. Too often, Metcalf has chosen to state qualitatively some theory or idea and leave a careful description or comment to others. The experimental chapter lists a number of techniques (esr, nmr, electron microscopy, and ultrasound, to name a few) without developing this material enough to permit a reader to become very knowledgeable.

Problems selected from biological physics are appended to each chapter, and supplementary material—on such diverse topics as countercurrent exchange distribution, the moment of inertia of the human leg, diffusion and random walk, lateral inhibition and painting (an outmoded argument), and photodetectors—appears in the appendices. A bibliography contains many references for further reading.

In summary, the first two-thirds of the book would be a useful supplementary text in, or after, a first course in college or university physics for students intending to major in the biological sciences or for those planning a career in the health sciences. It would not replace a standard introductory physics text or provide enough material for a course in biophysics at the junior–senior level.

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Information Processing: Fundamentals

S. H. Lee, ed.
308 pp., Springer-Verlag, New York, 1981. $49.50

This book, the 48th volume of the series *Topics in Applied Physics*, is a companion of an earlier volume in the same series, *Optical Data Processing: Applications*, edited by D. Casasent. The present book contains seven chapters, each with a comprehensive list of references to the literature, and a subject index at the end. On the whole, the book gives an excellent treatment of the fundamental principles and experimental techniques of the various subject areas of optical information processing.

Editor S. H. Lee wrote the first chapter on basic principles. Following a brief historical overview on the devel-