air thrust downward produces an upward force on the wing (lift) by Newton's third law of mechanics.

An analogous phenomenon is familiar to many people who have observed the depression of the surface of the water behind a water-skier. In this, as in any, application of Newton's third law the primary action must be properly distinguished from its reaction. Such a discussion of the physical principles involved would add considerably to the understanding of the phenomenon of lift for the uninitiated reader.

A second example occurs in the discussion of the rate of climb of an airplane. On page 280 there is an italicized statement that "drag is smaller for climbing flight than for level flight at the same speed." To show this "more clearly" a laborious example calculation is made. Actually all that is needed is a statement that in climbing flight there is a vertical component of the thrust of the engine, which supports part of the weight of the airplane, thus reducing the lift needed from the wing. When lift is reduced the induced drag is reduced and, therefore, so is the total drag. Such physical insights and explanations are often lacking.

The book is very well done with regard to simplified mathematical formalism and is very comprehensive in treating all forms of flight and their associated propulsion systems; it includes both supersonic flight and ballistic flight (spaceflight). For the uninitiated it provides a clear and complete lexicon of the specialized jargon of aeronautical engineering. I have no hesitation in recommending this book as a good introduction for the reader who has little or no background in aeronautics, but some science background.

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Noise and the Solid State

David A. Bell

175 pp. Wiley, New York, 1985.
ISBN 0-470-20229-7 $34.95 hardcover

David Bell is a veteran researcher in fluctuation phenomena, and his book is a personal overview of the field. His aim is not to give a complete coverage of noise in solid-state physics, but to give the reader an idea about many interesting aspects of the field.

Topics discussed in detail include thermal noise, $1/f$ noise, noise in ferromagnetic materials, hot-carrier transport, cryogenic devices, oscillator noise and noise in radiation detectors. Notable absences are noise in transistors and noise in field-effect transistors.

The author gives many valuable

references to earlier papers that now are not well known. He does not usually indicate, however, who was the first to use a new approach. For example, he refers to E. N. Rowland's discussion of Campbell's theorem published in 1936, whereas N. Campbell published his original theorem in 1909 [*Proc. Cambr. Phil. Soc.* **15**, 117, 310, 513 (1909)].

Readers who make the effort to assimilate this readable book will be rewarded by gaining valuable insights that will help them directly in their work or lead them to the study of new topics. For these reasons I recommend the book to physicists and engineers either working in the field or having an interest in gaining an understanding of it.

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Optical Holography: Principles, Techniques and Applications

P. Hariharan

319 pp. Cambridge U. P., New York, 1984.
ISBN 0-521-24348-3 $75.00 hardcover;
ISBN 0-521-31163-2 $24.95 paper

Sixteen years ago, a book entitled *Optical Holography*, by R. J. Collier, C. B. Burckhardt and L. H. Lin of Bell Laboratories appeared, and soon became the bible of that fledgling science. It has since been reprinted in paperback, and is still widely referenced. P. M. Hariharan, by his choice of title, invites comparison to that earlier volume; Hariharan's book has a similar format and rigor (and is also now in paperback). A quick scan of their indexes provides a fascinating synopsis of the progress over the years. New topics include dynamic holography; four-wave mixing and phase conjugation (although holographers were on to this well before those scientists dealing in nonlinear optics); rainbow, sandwich and multiplex holograms; pseudocolor imaging; heterodyne interferometry; holo-scanners; silver halide gelatin; and photorefractive crystals.

But this newer volume is much more than an update. Hariharan is a distinguished photographic scientist who joined W. H. Steele's group at Australia's CSIRO labs in the mid-1970s and undertook a widely ranging study of the theory and applications of optical holography. His work on novel processing techniques for holographic materials to produce high-efficiency, low-noise results has been particularly influential. He has also made important inventions and offered refinements to both rainbow and reflection white-light holography, and also to the