reader should go straight to these chapters and then look at the rest as time permits.

And now we return to the original question: What is a grain boundary? Well, it is quite literally nothing, arranged not quite at random and having powerful chemical affinities. Much of the detail will be found in the book.

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Laser Technology

Gasdynamic Lasers. An Introduction. JOHN D. ANDERSON, JR. Academic Press, New York, 1976. xii, 180 pp., illus. $17.50. Quantum Electronics.

Many laser physicists are probably less familiar with gasdynamic lasers than with most other varieties. This is largely because the distinctive pumping technique ensures that experimental work is effectively restricted to a few major laboratories with large wind tunnel facilities and a pool of expertise in aerodynamics. Moreover, at least some of the research is done behind closed doors. One would nevertheless be foolish to neglect this branch of laser physics, not only because gasdynamic lasers have formidable power capabilities, but also because the gas-kinetic information obtained from the related research has a direct bearing on more conventionally pumped gas (particularly CO_2) lasers.

Anderson's book succeeds admirably as an introduction to the world of gasdynamic lasers. The text is readable, the style informal, and the treatment sufficiently concise to enable the reader to grasp the basic principles of gasdynamic laser operation after only a brief perusal. In particular, Anderson, by including some rather elementary material in the early chapters, has clearly taken to heart the saying attributed to Enrico Fermi: "Never underestimate the joy people derive from hearing something they already know." Indeed, the momentum attained in the sections in chapter 2 on population inversion and small signal gain carries the reader through the treatment of the vibrational rate equations for the CO_2-N_2 system in chapter 3 with remarkably little difficulty.

In his attempt to present an up-to-date review of the gasdynamic laser field, however, Anderson is less successful. The book certainly includes a substantial amount of information on research up to 1974, but the coverage reflects the author's own interest in the theory of the gasdynamic process. Although there is a chapter comparing theory and experiment and another on the present research situation, one searches in vain for a table comparing the values achieved at various laboratories for such basic parameters as mean power and energy per unit mass. Perhaps it is the closed doors that are causing the problem.

Despite these shortcomings, the reviewer enjoyed the book and commends it to others who wish to be better informed about this important branch of laser technology.

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Seed Anatomy

The Seeds of Dicotyledons. E. J. H. CORNER. Cambridge University Press, New York, 1976. Two volumes. Vol. 1. xii, 312 pp. $39.50. Vol. 2, Illustrations. viii, 552 pp. $65.

Seed anatomy has been a neglected subject, despite its inherent importance in the study of taxonomy, phylogeny, dispersal mechanisms, and dormancy characteristics. The appearance of this major contribution is therefore a welcome event. There is no need for anyone with an ambition to work in this intriguing field to feel inhibited, however. Although the book presents a wealth of new information (volume 2 consists wholly of illustrations derived from original research), only a small fraction of dicotyledonous genera and species have been covered by Corner—or by earlier workers. Those interested in seed anatomy will also have to acquire a copy of Netolitzky's 1926 monograph, *Anatomie der Angiospermen Samen*, which Corner rightly respects highly, cites liberally, and does not supplant.

Corner's choices of genera and species are, predictably, biased. Any worker would show a bias, if only in response to the availability of material. Surely every organismal botanist is familiar with Corner's "durian theory," which proposes that ancestral angiosperms had black seeds with red arils and such features as pachycauly (thick stems with large pith and cortex). Few botanists have accepted this colorful theory, to the best of my knowledge, but the reader of *The Seeds of Dicotyledons* will want to keep Corner's ideas in mind as he peruses the book. The reader will readily be able to separate theory from data, and one cannot fault Corner's accuracy or scholarship in the description of seeds. However, arillate seeds (which are admittedly interesting for a variety of reasons) bulk large in Corner's presentation, as do seeds with vestigial arils, arillike structures, or unusual venation.

Corner is alert to the phylogenetic and taxonomic implications of his data. The phylogenetic analysis is extensive, but it is based almost exclusively on seed anatomy. Attempts to build a natural system of classification are faced with the far more difficult task of integrating all types of data. For example, Corner finds it difficult to place Anacardiaceae on the basis of seed anatomy, but the totality of evidence seems to me clearly to show that the Anacardiaceae are sapindalean. Those interested in phylogeny will have their thinking briskly challenged by some of Corner's ideas. For example, according to Corner, seeds of the admittedly enigmatic Rafflesiaceae show a relationship "to those of Piperaceae, Saururaceae, and Podostemaceae, which may be thought a curious alliance, but if all can be derived from a Magnolialean beginning, the inter-relationship is not impossible. It suggests a pachycaul line that has failed in vegetational dominance but discovered some of the most remarkable ways of existence." Corner's speculations will be stimulating to some, and they are certain to create some controversy.

The terminology in these volumes is clear and simple, and is explained by suitable diagrams. The illustrations are all drawings, admirable for their clarity. Corner's main concern is with the seed coat; endosperm, embryo, and fruit histology receive more abbreviated treatment. The arrangement of families in both text and illustrations is alphabetical—an eminently sensible scheme that should be more widely adopted in botanical monographs. The reader will encounter a few recondite segregate families (Balanitaceae, Legnotidaceae, Nandinaceae, Sauvagesiaceae), and some families are omitted altogether, presumably because liquid-preserved material was not available. Although the price is too high for most individuals, institutions where plant anatomy is represented will certainly want to acquire *The Seeds of Dicotyledons*.

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