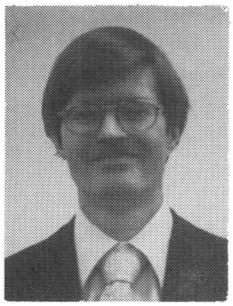

Editorial

H. J. Caulfield, Editor

On Originality

I recently corresponded with an author on the topic of originality. *Optical Engineering* seeks to publish "original papers." Over 90% of the paper submitted to us was taken verbatim from a prior paper by the same author (a discovery by a referee that was not volunteered by the author). The author says he thought he had exceeded some threshold of originality. This raises, in a somewhat exaggerated manner, a more general question of what constitutes your editor's definition of an original paper. Unfortunately, I can offer no clear definition. Thus I must ramble through some special cases hoping that my readers can sense the pattern and spirit of my decisions on this matter.

First, an original paper must not have appeared in print in a refereed journal. This seems simple enough, but it causes seemingly endless confusion. Conference proceedings are not refereed journals, so it is altogether proper to submit proceedings papers for possible publication in *Optical Engineering*. An obvious correlate is that reference should be given to the conference proceedings. Another question is whether publication in a trade magazine preempts publication in *Optical Engineering*. My answer is, "No." Trade magazines and scientific and technical journals have different paper requirements. Neither would publish a paper suitable for the other. It is customary (and, to my way of thinking, appropriate) to publish the technical paper before publishing a popularized version in a trade magazine.

Second, a review can be original. It must be clearly labeled as a review. The review must cite prior reviews and clearly state why a new review is needed and what is new about this review.

Third, all verbatim quotations from previously published material should be clearly labeled. In the case of a paper based on a conference proceedings, a simple footnote suffices. In the case of a refereed paper, I would like to see quotation marks used. This would essentially eliminate abuses such as the one referred to earlier in this editorial. Not abiding by such rules is being somewhat dishonest with the readers.

Fourth, it is important to label the new, original material in a paper. Background material should take no more than a third of a paper, and usually less, to avoid confusing the reader between the old and the new material.

Fifth, the new material should be surprising or clever as opposed to obvious but never-before-published. The object is not to publish many papers but to publish useful papers. Usefulness and unavailability elsewhere in books or refereed journals are the two primary criteria I use in accepting papers for publication.

OPTICAL ENGINEERING EDITORIAL SCHEDULE

November/December 1982
Conical Optical Element Metrology
T. R. Ferguson
AFWL/ARAO
Kirtland AFB, NM 87117
505/844-0226

January/February 1983
Obscuration Effects on Electro-Optic, Infrared, and Millimeter Wave Systems Performance
Richard B. Gomez
Chief of Engineers, Research and Development Office
ATTN: DAEN-RDM
20 Massachusetts Ave., N. W.
Washington, D. C. 20314
202/272-0259

March/April 1983
Submicron Lithography
Phillip Blais
Westinghouse Research and Development Center
Building 501, Room 2D20
1310 Beulah Road
Pittsburgh, PA 15235
412/256-7585

May/June 1983
Raman Spectroscopy
Stanley M. Klainer
1140-90
Lawrence Berkeley Laboratory
Berkeley, CA 94720
415/486-6729

July/August 1983
Laser Damage in Materials
Theodore T. Saito
FGRL/NH
USAF Academy, CO 80840
303/472-3133

September/October 1983
Fluorescence
Stanley M. Klainer
1140-90
Lawrence Berkeley Laboratory
Berkeley, CA 94720
415/486-6729

Book Reviews

Solar Heating and Cooling: Active and Passive Design

Jan F. Kreider and Frank Kreith, 479 pp., illus., index, references. ISBN 0-07-035486-3. Hemisphere Publishing (McGraw-Hill), Washington, D.C., second edition (1982) $29.95.

Reviewed by Robert E. Jones, Jr., University of Colorado, Department of Physics and Energy Science, Colorado Springs, Colorado 80933-7150.

Solar Heating and Cooling covers the application of solar energy to heating and cooling of buildings. It provides the necessary information and design tools to enable engineers, architects, and builders to design and size the common active and passive solar energy systems. Much of the information is presented in graphic or tabular forms as well as by equations in order to be useful to designers with differing mathematical backgrounds. This book stresses applications and for many topics the fundamentals are only touched upon. Its primary use is as a design manual. It also may be suitable as a solar applications text for technologists or even for engineering students provided the necessary fundamentals are covered elsewhere in the curriculum.

The introductory chapter discusses the relation of solar energy to the overall energy situation. Basic concepts and components for solar energy systems are treated in the next three chapters. Chapter 2 covers solar radiation calculations. The discussion of the use of sun path diagrams and shadow angle protractors is one of the best available. The usually messy conversion of average daily horizontal insolation data to insolation on a tilted plane is handled primarily by tabular information so minimal math skills are required. Here, as in a number of instances throughout the book, the technically oriented reader is referred to the authors' more advanced book[1] for the analytical expressions. As a design manual this approach is acceptable. However, for engineers and engineering students, I wonder about presenting a diffuse radiation tilt factor in tabular form without identifying it as a radiation view factor and without giving the simple parametric form $(1/2)(1+\cos\beta)$ where β is the tilt angle. Collectors and collector efficiency and testing are described in the third chapter. The next chapter covers thermal storage, and the detailed but straightforward design method for rock bed storage is especially appreciated.

Chapter 5 deals with the all-important solar energy economics. Life cycle costing, present worth, capital recovery, and other economic concepts are well presented in both analytical and tabular form. The well-selected examples illustrate both the concepts and the method of calculation. Differences between residential and commercial applications are recognized. The material is organized so that designers of residential systems can perform optimizations with the simpler material at the beginning of the chapter.

The major solar heating systems are treated in the following group of three chapters. Chapter 6 discusses solar service hot water and swimming pool heating systems. System and component sizing are well covered. The advantages and disadvantages of different approaches are discussed with the proper emphasis on durability. The troubleshooting and corrosion of materials tables are highly useful. Direct gain, solar storage wall, attached greenhouse, and roof pond passive systems, as well as a hybrid solar heating system, are discussed in the following chapter. The P-chart sizing and performance prediction monograph is present. The P-chart is based on the solar load ratio method developed at Los Alamos National Laboratory. The next chapter deals with both air-and water-based space heating systems. A work sheet for system sizing is included. The information on system controls and sizing of pumps, pipes and fittings, fans, ducts, and heat exchanges will allow designers to avoid some of the mistakes made in the early days of solar application.

Chapter 9 treats solar cooling, a less developed technology at present, but one with great potential because of the better coincidence of demand and solar availability. This chapter is at a higher technical level than the others and includes pressure versus enthalpy curves and various thermodynamic cycles. This is reasonable given the state of the art. Solar cooling system design usually requires a significant engineering input today.

Chapter 10 introduces the application of solar cells, solar panels, and wood stoves. The last chapter is a fairly extensive discussion of present solar legislation in each of the 50 states. This is followed by over a hundred pages of useful appendices and a subject index. The appendices include a glossary, conversion factors, sun path diagrams, insolation maps, clear-sky insolation tables, solar and climatic data for U.S. locations, thermal properties of materials, P-chart factors, and a list of federal and state information sources.

Kreider and Kreith have again demonstrated their ability to write readable, clear, and correct technical literature. This second edition offers considerable updating from the first. Significant new material includes the P-chart passive sizing tool, solar energy economics, and the discussion of legal aspects. Overall it is one of the best solar heating and cooling design manuals available. It is intended to address applications, and the treatment of the fundamentals of heat transfer and optics in solar energy are quite limited. Anyone interested in solar engineering optics would do better to read the authors' other solar book[1] or other advanced solar energy books.[2,3] As a university text its usefulness is limited by the lack of theory and lack of a uniform mathematical level as well as by the absence of problems. It is more appropriate as a text for a short course for design professionals or for two- and four-year technology degrees.

References

1. Frank Kreith and J. F. Kreider, *Principles of Solar Engineering,* Hemisphere Publishing (McGraw-Hill), Washington, D.C. (1978).
2. J. A. Duffie and W. A. Beckman, *Solar Engineering of Thermal Processes,* Wiley-Interscience, New York (1980).
3. Sol Wieder, *An Introduction to Solar Energy for Scientists and Engineers,* Wiley, New York (1982).

Master Optical Techniques

Arthur S. Devany, 600 pp., illus., index, references. ISBN 0-471-07720-8. John Wiley and Sons, Inc., 605 Third Ave., New York, NY 10158 (1981) $55.

Reviewed by Frank Cooke, Frank Cooke, Inc., 59 Summer Street, North Brookfield, Massachusetts 01535.

The book is good. It should be studied by all who aspire to become optical technicians. Even the experienced worker will find much interest in its perusal.

The text is in four well-delineated parts, the first being fundamental operations. It is pointed out that the most precise optical machinery has a finite accuracy and that the optician must achieve closer tolerances largely by handwork. Many of the contemporary optical machines are illustrated and their functions described. The elementary mathematics needed to run these machines is well covered, and comments on hand polishing are made by a person who knows whereof he speaks.

The testing of glass—a subject often neglected—is very well covered. This brings home to the optician the importance of knowing the quality of his raw material.

The book's second part, devoted to the fabrication of prisms and lenses, is very technical and will require serious study—but then it should.

Measuring angles by means of the autocollimator is covered better than we have seen before. The errors observed and what to do about them are well described. It would take the student much time and labor to discover the facts so clearly shown here.

Working of newer optical materials, scarcely known a few years ago, is carefully described. Hard and soft crystals as well as metal mirrors get adequate treatment.

Part three, devoted to telescope systems, is complex for the amateur but not for a serious worker. Such difficult work as off-axis paraboloids and Schmidt cameras with their mathematics and suggestions as to manufacture are in abundance. Illustrations on the use of cutaway or profiled pitch polishers to make aspheric surfaces are excellent. John Brasher, the famous early optical worker, described this technique almost a century ago. As with so many facets of optical work "what's past is prologue."

In light of this writer's experience, modern optical technology should mention single-point diamond turning of metal mirrors, the use of planetary lappers to polish both sides at the same time, achieving great flatness and parallelism, and the use of single-face polishing. The mention of this omission is not meant to be critical of this book.

Each chapter has a bibliography which certainly covers the subject. Throughout the book, information is given as to where items can be purchased. What a blessing this is to one duplicating the work.

In summation, the book is excellent and very scholarly. It is not for the beginner, but if he aspires to advance he should own a copy.