

tice among good referees, and the point I am making here is that they should be made mandatory for all.

To begin, it seems to me that certain (many?) of the judgments made by referees should be supported by (compulsory) physical evidence. For example, if a referee wishes to claim that the work under scrutiny is not original, then he should be required to cite a reference to the earlier work. If a referee cannot recall where he saw a piece of work before, how can he be sure it is, indeed, identical? Yet, on a number of occasions editors have seen fit to pass on such comments to me.

Contradictory instructions are also sometimes sent on to an author. For example, one reviewer may request reduction while a second reviewer demands elaboration of the very same point. I have had several editors request that I revise a manuscript to take both such (and other) disparate views into account. I have never known how to proceed in such a revision. It seems to me that editors could, in clear conscience, be prohibited from resorting to such mindless acts of xerography.

There are, of course, those times when your paper is rejected and a nearly identical one is subsequently accepted by the same journal. (I will cite specific examples if anyone would like to have them, but for now I do not choose to single out any particular journals or editors.) To deal with this all-too-common complaint a permanent board could be established to compare (upon the request of an author) rejected manuscripts (a copy of which is retained by each editor) against recently published ones. If the manuscripts are judged to be "nearly identical" in content, then the rejected work would be published under its original submission date.

I am sure that numerous other rules can be suggested by our community and taken as a foundation for a future "refereeing/editorial law."

R. JONES

National University of Singapore
Kent Ridge, Singapore

3/82

More on writing

As authors who have succeeded in writing a 360-page book¹ as a part-time project in two years, and who remain reasonably balanced (we hope), we found the suggestions of Oliver C. Wells on "How to write a book" (June 1981, page 9) most interesting. We would like to add a few remarks based on our own experience.

The first step, in our opinion, too, is to gather as many publications on the

subject as you can lay your hands on and classify them according to the chapters you have in mind. The comparatively short time we devoted to the work is due mainly to the fact that we used a treasure of papers that had been collected and classified over ten years. One must, of course, continue looking for updated references during the whole period of writing.

As the next step, we would suggest writing down preliminary yet detailed contents, including the titles of the chapters and sections and a short description of each. Thus you are able to see the whole picture from the very beginning of your work. On the other hand, you should remain flexible enough to make changes during the later stages, if necessary.

The third step should be to sit down at your desk and being the actual writing. However, we strongly recommend that you not do this until you have a signed contract with a publishing house. It is most frustrating to dedicate years to the enterprise just to find out at the end that you cannot find a publisher. For professional books most publishers are ready to give a definite answer—a contract or a rejection—based upon the detailed contents and perhaps one sample chapter. You may be asked to provide further information concerning the potential audience, comparison with existing books, the possibility of using your work as a textbook for graduate or undergraduate students, the anticipated length of the book (number of words and illustrations) as well as details of your own experience and status in the field. Including this information in your first application may expedite the process.

An important decision you have to make at this stage is whether to correspond with the publishers in series or in parallel. In other words, should you write to one publisher, wait weeks or months for his reply, and then—in case of rejection—write to the next one, or should you send letters simultaneously to several publishers? The two main flaws of the first technique is that the process may be quite long and frustrating and you can never be sure that you have gotten the best offer (there may be large differences between contracts offered by different publishers). Our suggestion is to write to several publishers simultaneously, using a less binding style; do not write: "I would like my book to be published by your distinguished company," but rather something like: "I would like to check the possibilities of having my book published." We sent letters to nine publishers, got five answers of the type "your proposal is under consideration" and finally received two contracts from which we picked what seemed to us to be the better one.

A publisher may inform you that, due to the limited audience your highly specialized book may appeal to, the sky-high costs of printing and so on, he can publish your book only if you provide clean camera-ready typescripts that will be reproduced in their original form (some publishers might be willing, in this case, to cover your costs of typing). Besides the obvious limitations of this method regarding the final form of the book, it also has some advantages: The process of preparing the book may be much faster and it will be easier to correct errors and to insert up-to-date supplements. These points should be considered in case you can choose between this method and regular typesetting.

Once you get to the stage of the actual writing, set a timetable with a deadline to each chapter, and try to stick to it. If possible, dedicate two or three days a week, from morning to night, to the book. In addition make it a habit to write at least a few lines each day to keep the momentum.

If the book is written as a collaboration of two or more authors, it is a good idea to apportion the planned chapters among the participants. Each chapter, after its completion, should be read by all of you, but the person who has written the first draft should have the final say concerning the last version. A weekly meeting of all the authors, to discuss current problems and difficulties, may be very advantageous. We have found that, for several reasons, the time and effort required by each of two authors may be much less than half the time and effort that would be required if one of them writes the book by himself; you write faster having a partner who reminds you of your timetable; it is easier to make decisions knowing that someone else is going to read the manuscript and share responsibility; when stuck with a problematic paragraph it is heartening to have someone who may help pull you out; and last but not least, each of the authors has, naturally, his own fields of interest within the variety of subjects included in the book, and the cooperation is very likely to yield a broader view. The value of the collaboration is obvious in the proofreading stage; it is very unlikely that one person, careful and hawk-eyed as he may be, would be able to find all the errors; thus it is important that in this stage each of the authors read the whole book independently.

Be careful not to make your book an extended review article or a literature survey. Telling that Adirovitch has used this method and Bellington has demonstrated that method, or that Ting developed one model and Tong suggested another one, leaves the reader in the dark regarding the question of

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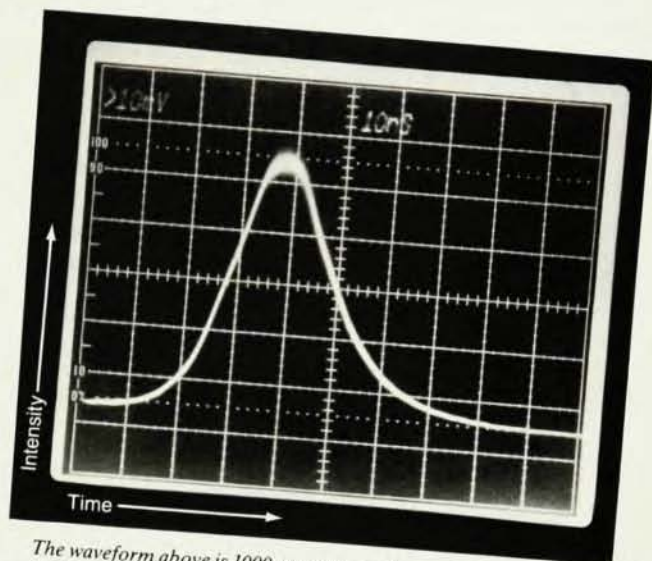
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letters

what method or model he should use for his own purposes. Most of your readers will be less anxious to know how people in the past have struggled than to understand what they can do here and now. (We are grateful to H. K. Henisch from Pennsylvania State University for his comments on this point as well as other matters pertaining to the writing). You should be the reader's guide in the labyrinth of conflicting techniques and results, using to this end your best experience and seasoned judgment, and being selective and critical without being offensive.

Strive to make your book an image of the present state-of-the-art of the field, without neglecting to mention alternative routes and options that may be of importance in the future. A book that stands the test of time is one that serves as a guide to future research as well as to the present.

To conduct the reader safely through the maze of published results, use diagrams, graphs, flow charts and so on whenever you can. Use these graphic presentations to compare between different models or techniques and to demonstrate their dependence on various parameters. Numerical data should be compiled into tables whenever possible; this way they can be used much more efficiently than if they are scattered throughout the text.

Insert summaries and synopses not only at the end of chapters or sections but whenever you feel that the reader deserves to be taken by the hand and told where he is now, where he is going to go, and where he has just been. Don't be thrifty on sub-headings; they serve to break the material into smaller chunks that can be more easily digested.

Your book is almost finished. The temptation is great to hurry up now, complete the work, send it on its way and go to the beach. But be patient; this is the time to read it once more from the viewpoint of the user rather than the writer, to make it more readable and clearer to the newcomer and to do final linguistic polishing. Remember that this may be your last opportunity to make improvements and corrections (to do it in the second edition is less effective, since the most important readers have already been "creamed off").

Your book is really finished—printed and bound. Don't rest on your laurels yet. Think of possible contributions to sales promotion. For example, make a list of potential buyers and send it to your publisher; tell him to whom he should send free copies, to whom he should send advertisement brochures, and in which journals to advertise. Most of the publishers will willingly

accept such suggestions; after all, at this moment no one knows the market better than you do.

Reference

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Y. KIRSH
Everyman's University
Tel-Aviv, Israel
R. CHEN
Tel-Aviv University
Tel-Aviv, Israel

12/81

Franken article

Having enjoyed so much Peter Franken's delightful review of recent progress in optics (November, page 160), I cannot resist noting that the remarkable ability of man to recognize patterns was recorded by Moses (Genesis 2:19-20), probably a millenium before Socrates, when Moses described Adam naming the animals.

JOHN A. MCINTYRE
Texas A&M University
College Station, Texas

2/82

Laser gyro history

An excellent discussion of the current status of fiber-optic gyroscopes and a brief discussion of the commercially available ring laser gyro were given in October (page 20). It seems that as a device nears commercial use, the early history is of little interest to most of us. At the same time this early history becomes of considerable interest to those few involved in patent litigation. Since I was involved in this early history, I will give a brief and biased account.

Over twenty years ago while I was consulting for Space Technology Laboratories, the concept occurred to me that the degeneracy between clockwise and counterclockwise traveling waves in a resonant electromagnetic cavity would be removed by rotation, and that the frequency difference could be used to measure angular rotation. A disclosure of invention¹ was filed on 7 October 1959 and a more detailed report was made available in the STL library for military and space contractors.² This disclosure included coiled waveguides as an improvement on the Sagnac interference measurement as well as the entirely new concept of using a resonant cavity to measure rotation. Since *Physical Review Letters* was not enthusiastic about either a Sagnac experiment with matter waves or the measurement of rotation with an electromagnetic cavity, these ideas were

presented at the January 1961 meeting of the American Physical Society in New York.³ The comment of the referee that the resonant cavity concept was "interesting if true" gives an indication of the evaluation of this new idea. It was noted in the talk that the difference in angular frequency in a toroidal cavity with a path of m wavelengths is $m\Omega$, and a listener referred to this phenomenon as the "Coriolis-Zeeman effect for a photon." This listener may have been A. M. Sutton of the Kollsman Instrument Corp., who subsequently expressed his interest in a letter.

A proposal was submitted in March 1961 to the Air Force Office of Scientific Research, the National Aeronautics and Space Administration, and the Office of Naval Research for the development of a cavity with a negative resistance, such as a maser, as a device for the measurement of rotation. Even coiled light pipes and optical masers were included for study. A supplementary proposal in January 1962 proposed in more detail a resonant four-mirror gyro with laser gain. These proposals were rejected and P. K. Cheo and I began construction of a gyro of this design at Ohio State University. A. H. Rosenthal of Kollsman described a similar gyro⁴ in a paper which was submitted in October 1961 to the Journal of the Optical Society of America and published a year later. The first operating laser gyro of this design was reported in February 1963 by W. Macek and co-workers at Sperry Gyroscope⁵ in a post-deadline paper at the Third International Quantum Electronics Conference in Paris. After this successful demonstration, support and interest increased. Very important problems such as "lock in" of the degenerate modes remained to be recognized and solved. The commercial development of the present laser gyro owes much to the intense belief during the ensuing years by persons such as J. Killpatrick of Honeywell that the laser gyro could become a useful device.

Since I am collecting historical material regarding the laser gyro and fiber-optic gyro, I would appreciate receiving current and historical information from readers.

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C. V. HEER
Ohio State University
Columbus, Ohio □

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