

Publish or Perish—An Ailing Enterprise?

Mohamed Gad-el-Hak

Three recent events, taking place in rapid succession, incited me to write this Opinion. The first was an annual report from a major school of engineering whose dean proudly listed 52 papers that he wrote in the course of the previous year. Such an output is, on average, one idea conceived, executed, written, and published every week. That is an amazing feat for a busy administrator, or anybody else for that matter. The second was a physics professor who was introduced at a meeting as the author of 80 books. This man was not the superhumanly prolific Isaac Asimov, but a professor with a publication rate, over a 20-year career, of one technical book every three months. The straw that broke the camel's back, at least this Arabian one, was a book on flow control I was asked to review for a journal. The 200-page, camera-ready manuscript was clearly never seen by a copyeditor and was mostly a shoddy cut-and-paste job from the author's doctoral dissertation—and worse, from the publications of others. The book offered little of value, yet it was priced at 50 cents per page. The three events are a syndrome of what is ailing academic publishing today.

Academic institutions in the US have made it imperative for faculty members to publish in order to survive and prosper. The publish-or-perish mantra became a household motto for faculty. There is nothing wrong with that principle if it emphasizes quality rather than quantity. For the most part, that emphasis on publishing has worked for many decades. The number of publications was reasonable, and tenure and promotion decisions in research universities were largely based on the impact of a candidate's scholarly work, as measured by the number of citations and, less quantitatively, by expert opinions. The number of journals and consequently the number of requests for refereeing were both manageable. Overall, technical books were published when a senior researcher with years of experience had something

significant to write about.

Unfortunately, today we witness a different environment from that of a generation ago. The publish-or-perish emphasis for some, but not all, institutions has deteriorated into bean counting, and the race is on to publish en masse. Demand spurs supply. Mostly-for-profit publishers of books and journals have mushroomed, and mediocrity has crept into both venues. Journal pages have to be filled, and library shelves have to be stacked with books. The number of periodicals worldwide currently stands at 169 000,¹ and the number of books published in the US alone in 2001 is 56 364.² Of course, not all of these are academic publications, but the sheer numbers are frightening enough. Currently, more journals in a particular research field are published than anyone can reasonably keep up with. The publishing craze has now extended to all-electronic journals. Many articles, both print and electronic, remain without a single citation five or more years after publication. Although more difficult to measure, I presume even more papers remain unread by anyone other than their authors. The way some papers list their authors today, some articles may not even be read by all their respective coauthors.

Measure for measure

One measure of journal quality is the impact factor, which is defined, for a specific year, as the total number of citations made in that year for articles published in the two preceding years divided by the number of citable articles published in those years (see the article by Henry H. Barschall, "The Cost-Effectiveness of Physics Journals," *PHYSICS TODAY*, July 1988, page 56).

Acceptance rate is another factor, but that rate is also an indication of either a shortage or oversupply of journal pages. If, say, 80% of the journals in a given field accept 20% of the submitted papers, there is probably a need for those journals. If, on the other hand, 80% of the journals accept 80% of the manuscripts submitted, perhaps there is an excess of journals in that field. Either extreme is independent of whether there are 5 or 500 journals.

The peer review system, although

criticized by some (including this writer³) as somewhat biased against unorthodox ideas, is essential to weed out the charlatans, the misguided, and the fools. Peer review must be preserved if not strengthened. However, more papers published means that, on average, each researcher receives more requests for refereeing. The good referees are inundated with more papers to review than they can possibly handle. Other types of referees typically do not do a thorough job, and mediocre papers make it through the system. Of course, shoddy work always existed and competed with good work for journal space. But with the deluge of new journals, enough shoddy work is now being done to fill whole journals. Hoping from one journal to another until something is eventually accepted for publication is fast becoming a pastime for some researchers.

When did the bug strike? Although our malaise was slow in the beginning, it accelerated in a classic chain-reaction fashion. About 15 years ago, the problem became perceptible (see, for example, two great Reference Frame columns by David Mermin, "What's Wrong With This Library?" *PHYSICS TODAY*, August 1988, page 9, and "Publishing in Computopia," *PHYSICS TODAY*, May 1991, page 9), about the same time that grade inflation took hold (although some trace the roots of this to the Vietnam era); instant gratification became a birthright; and, in the film "Wall Street," Gordon Gecko declared that greed is good. I make no claim of causality.

In an ideal world, counting the publications of individuals should not be used to evaluate them. Instead, the impact of the individual's publications should be what is important. But measuring impact is neither easy nor straightforward, despite the availability of the Science Citation Index and similar measuring tools. For example, particularly for young researchers, the number of citations per publication is a fairer index of competence than the total number of citations.

Some time during the last 15 years, bean counting became acceptable to some universities. As researchers found they were not getting sufficient credit for producing high-impact publications, they decided to publish more

Mohamed Gad-el-Hak is the Inez Caudill Eminent Professor of Biomedical Engineering and chair of mechanical engineering at Virginia Commonwealth University in Richmond.

papers. A tendency developed to add undeserving coauthors. The cut-and-paste button on the computer facilitated the exponential growth of papers. More and more journals entered the marketplace to absorb the additional demand for pages and accelerated the need for editors and referees. The competency of both suffered. Of course, many journals kept or even elevated their already high standards. Journals quickly stratified into elite and second- and third-tier publications.

My own area of fluid mechanics, as an example, has at least 250 journals published in English.⁴ As important as I like to think fluid mechanics is, it is a mere branch of continuum mechanics, itself a branch of mechanics, which is part of classical physics, and so on. Not considering the multitude of other languages for a moment, who can keep up with 250 journals? Perhaps five of those journals have reasonable impact factor: *Annual Review of Fluid Mechanics*, *Journal of Fluid Mechanics*, *Physics of Fluids*, *European Journal of Mechanics B Fluids*, and *Journal of Fluids Engineering*. These journals, not coincidentally, all emanate from not-for-profit organizations. Note that the list does not include prestigious journals that contain, but are not exclusively dedicated to, fluid mechanics: for example, *Physical Review Letters*, *Nature*, *AIAA Journal*, *Journal of Applied Mechanics*, *SIAM Review*, and so on.

The other element of academic publishing is books, particularly research monographs. I will not discuss textbooks, which are governed by different dynamics. Pressure to add books to one's resumé parallels the pressure to publish journal articles. Junior faculty members have started to publish books, a privilege that was traditionally intended to cap years of accumulated wisdom in a particular field. Book acquisition editors working for certain for-profit publishers showed up in scientific meetings and, swarming like timeshare condominium salesmen, convinced unsuspecting potential authors of how easy it is to publish a book based on a thesis or an internal report. With computers, a camera-ready manuscript can be prepared mostly by cutting and pasting from one's prior publications, and in a few short months or even weeks, a book is born, to be purchased



**"Welcome to the co-author's party!
You're number twenty-one!"**

by blind library contracts and by a few innocent souls. Because the costs to publishers were minimal, profits rolled in, even when only a few hundred copies were sold. Other than a casual review of a table of contents and perhaps a one-page summary, the completed manuscript is never reviewed or copyedited. Having no peer review makes it easier to publish a book than to have a journal article accepted. Witness the recent book by Stephen Wolfram, *A New Kind of Science*, in which the author, who has not published a journal article in more than a decade, advances a new science that will stand existing science on its head. See, for example, the book review by Leo P. Kadanoff (PHYSICS TODAY, July 2002, page 55) and the book review by me in *Applied Mechanics Reviews*.⁵ Wolfram's grandiose claims would be unlikely to pass the peer review process of journals, even that of mediocre ones.

Cures for an ailing mantra

How did we get ourselves into this mess? The more important question is, how do we get out? I list below a few modest suggestions, if only to encourage further debate.

► Resumés submitted to promotion and tenure committees should be limited to listing only 5–10 significant

publications. This suggestion goes beyond the present practice of asking for reprints of, say, five papers while allowing a listing of all publications in the resumé. Proposals sent to NSF are limited in the number of listed publications.

► Coauthors should contribute meaningfully to a publication. No name should be added merely because he or she is a member of a research group, or worse, the head of the group.

► Researchers should decline to review or to serve as editors for what they suspect to be mediocre journals. More importantly, researchers should only review what they can review thoroughly.

► Journals should publish their impact factor. The ones who don't may have something to hide.

► Impact factor should be an important consideration when libraries decide which journals to drop.

► Completed book manuscripts should go through peer review before publication.

► A camera-ready manuscript should be a red flag for evaluating the quality of a book.

► With exceptions made for the few brilliant ones, junior researchers should not be encouraged to write books.

► Libraries should exercise the approval option when contracting with book vendors. They should return inferior, low-quality books.

► Consumers should boycott overpriced books. Be choosy, perhaps even snobbish.

The publish-or-perish mantra is not dying, it is merely ill. Academic publishing is a great enterprise and any malady it may have recently contracted can be cured with a dose of common sense.

This opinion would have been even more acerbic had it not been for the wise, calming counsel I have received from the many friends whose names I shall protect. Scientia est potentia.

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