

# Pricing of Scientific Publications: A Commercial Publisher's Point of View

*Edwin F. Beschler*

When Jack Cade, a rebel vowing to lead the people in opposition to Shakespeare's King Henry VI, declared that he would "apparel them all in one livery, that they may agree like brothers," one of his loyal supporters proposed as a beginning, "The first thing we do, let's kill all the lawyers." Some members of the library community have responded in kind to recommendations by some mathematicians for homogenization of the scientific publishing process, in particular through the "one livery" of  $\text{\TeX}$  and other digital information technology tools, with a plea to return scientific publication to the "circle of the academy". To some of us this sounds like "First, let's hang all the commercial publishers."

This mildly provocative literary parallel may not carry the startling effect of "Mathematics Journals Should Be Electronic and Free", which appeared in the opinion column of the *Notices*, but I offer it as a tone setter for a view from the other side of the noose. The argument is made by Branin and Case in their *Notices* article [1] that "commercialism" is at the core of the current serials crisis and that scholarly books as well as journals would be more efficiently managed and less expensive if published by nonprofit publishers, i.e., the "circle of the academy" as opposed to commercial publishers. The charge carries several counts, discussion of which forms the core of this article.

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**Editor's Note:** Edwin Beschler received an undergraduate degree in mathematics at Columbia University's School of General Studies in 1961. He spent twenty-five years with Academic Press in varying roles from acquisitions editor in mathematics and related fields to president of the company. He has been a consulting acquisitions editor for the American Mathematical Society, and he served ten years as executive vice president and editorial director of Birkhäuser Boston. He is now retired from the profession and works part-time.

Branin and Case have laid out the problem with admirable clarity and thoroughness. They have touched upon many related issues and have referred to much of the relevant literature. I will not in this article attempt to rebut their facts, but rather their main conclusion. The price tags on scientific literature have been rising and will probably continue to do so. The reasons are complex and involve a growing body of literature, an increasingly complex communications system, and differences of opinion about how scientific research communication should be funded. I will address only the narrow question of how commercial publishing's profits relate to the problem. In the following I construe the "academy" referred to above as being all nonprofit publishers, mainly professional societies, universities, university presses, various ad-hoc consortia of scholars, and even individuals with personally created and maintained Web pages, the common bond being the absence of a "profit" factor in the pricing equation.

The point of view of the article is that of one member of the world of commercial publishing. This point of view, by virtue of the competitive nature of commerce, is perhaps more idiosyncratic and personal than what might be expected from a librarian, an individual scientist,<sup>1</sup> a director of a funding program, an executive director of a society, or a head of a university press—all entities having more in common with their individual groups than do commercial publishers with each other. The chief exception of course is that we all need to operate our businesses at a profit. This view is expressed with some sense of discomfort, engendered by years of a common understanding that sharing information on pricing issues with one's competitors not only was bad business but also was possibly in violation of antitrust laws. Nevertheless, I feel strongly about the crucial role that commercial publishing has played over the past half century in the development of scientific publication in the United States and disagree with the notion that improvements will come about by withdrawal from the arena of the trained publishing personnel found there and the investments that are available.

### The Charges

There are two major counts to the charges against commercialism and for-profit publishers:

**COUNT ONE:** Profits made by commercial publishers are the fuel for rising prices.

**COUNT TWO:** The superstructure of commercial publishing generates unnecessary cost, whereas the technology is available to create less expensive and more efficient researcher-to-reader channels of communication without publisher intervention.

There is a third count charging that the commercial publishers' need to protect their profits leads them to restrict availability of information by setting prices that are unaffordable and by placing other limitations on usage. This is a complex and contentious issue and will not be addressed in any detail in this article. I will, however, make one comment. Publishers by nature try to maximize their market penetration, not place restrictions on it. They invest resources to do this, and they must indeed protect those investments. The technology exists to download all types of information freely, whether text, graphics, audio, video, or any other imaginable form, and to subsume that material into forms of the downloader's choosing. All publishers, whether commercial or not, share the need to exercise some limitations on this ability, whether to protect revenue or maintain integrity of the material. Commercial publishers do not seek ways to prohibit access but to be paid fairly and honestly for their investment in packaging it.

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<sup>1</sup>I use "scientist" to mean scientist or mathematician in this article.

In brief, the claim behind the charges is that if scientific publication was removed from the commercial arena and returned to the "circle of the academy", costs would be significantly reduced, prices would decline, and access by individuals would be simpler and more affordable. As an active editor (i.e., one who reads and edits manuscripts) and an ex-publisher in the commercial world, I take issue with much of all three counts. The reasons for the crisis are varied and complex, and if commercial publishing is part of the problem, it is also a part of the solution. Both history and a close examination of the dynamics of publishing will, I believe, support that statement. The simple facts are that publishing costs money whether directly or indirectly, that someone must be responsible for paying those costs, and that our real need is to determine who that will be and how it can be done. In other words, a central question in science publishing is, and always has been, how the support money flows rather than whether or not it should flow. Costs can be hidden, but they cannot be wished away.

On Count One the profession has to plead guilty to the charge that profits do contribute to rising prices, as do the surpluses that all publishers, profit and nonprofit alike, require to cover their overheads. But I intend to argue that profits are a relatively minor part of the problem. On Count Two I feel no need for a plea. The charge is simply wrong and should be dismissed.

Before going further, let me dispatch a straw man implied in my opening. Complete homogenization of the publication process will not happen, and there is no authority on earth with the power to remove scientific publishing from the commercial scene to the "academy". To be sure, SOME of everything that is predicted and seen as desirable will happen. Free journals will be established and will be available for some period of time. Marginally edited and controlled journals will come into existence where there is a perceived need, and some will serve their purpose and survive. Some commercial journals will spiral themselves out of existence in the price/subscription struggle and either close down, be adopted elsewhere, or be replaced by alternative media. None of the editors and authors who provide the intellectual input or the librarians who provide the core of subscriptions are captive to the publisher. They all have choices, but the scientific community has too much vested interest, both at an institutional and personal level, to want to see the commercial publishing industry withdraw completely. At the institutional level the community can ill afford to refuse private investment in the scientific communication system, since this implies, among other things, a limitation on choices. On the individual level numerous individual editors derive professional satisfaction, support for related ac-

tivities, and in a few cases some personal income from their editing activities. All of these are legitimate returns for the exercise of professional expertise and editorial skills and are as justifiable as returns for teaching, consulting, or writing. And they are an integral part of the cost of publishing.

## Some History

### The Commercial Publishing Industry

It may be instructive to consider how the commercial publishing industry became involved in scholarly publishing in America in the first place. In the early part of the century almost all serious scholarly scientific publishing in the United States was in the hands of the societies and university presses—the “academy” to which we refer<sup>2</sup>. Their capabilities were inadequate to handle the growing mass of publications arising from that era, and they were unable to provide the speed and acceleration of publishing schedules that were demanded. Thus the community turned to commercial publishers, in particular to those of European genesis, mostly founded by publishers who immigrated to the United States along with the wartime wave of scientists and scholars. Then, as now, they were a diverse group who brought to the profession of science publishing their imagination, enthusiasm, and individual perceptions. They considered themselves to be members of the scientific community even more than they identified themselves with the mainstream of commercial publishing. They created channels of publication that would not have existed otherwise. They provided a freedom of choice about what and how to publish, thus giving voice to many who, in a more controlled setting, would not have been heard. Perhaps the profession would have been better off without some of these voices. But who among us can make that judgment, even in hindsight, much less in the middle of our fast and furious “research and publish” society? The fact is that they identified needs, invested in scientific publishing, and were rewarded for it.

### The Funding Agencies

In addition, the reality of publishing costs was recognized by funding agencies and various institutions that supported scientific research, resulting in their commitment to support the distribution of information as well as its creation. This support took the form of subsidies to libraries, publication grants, page charges, and the like. The idea was to make all information easily and cheaply available without regard to its comparative “popularity”. The cost of this distribution was considered a legitimate part of support for scientific research, and it led to an era of health

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<sup>2</sup>Some notable exceptions existed, such as the MacMillan Company’s publication of the first volumes of *The Physical Review*.

and prosperity in the publishing industry, as well as to the physical growth of the literature. Indeed some of us, while basking in this growth through the 1960s and 1970s, bemused ourselves with such lunchtime ruminations as to what happens when the most recent wing of the MIT library abuts the most recent wing of the Harvard library. This was not a truly serious and short-term concern, but a useful visual model for the implications of growth. In the days of which I speak the “electronic solution” was only a dim gleam in someone’s eye and the physical storage problem loomed large, at least with respect to capital expenditures on expanding space. The “microform solution”, though still a partial solution, never proved the panacea that was hoped.

### Will History Be Reversed?

If reversion of science publishing to the academy cannot be realized by fiat, will the academic community, as individuals, gradually effect such a change by resigning as editors of commercial journals, declining to submit papers to them, and denying even paid-for facilities for editorial offices within universities? This suggestion has been made by a number of individuals, but there seems to be yet no empirical evidence that this will happen en masse. Should it happen, it would mean a return to a universe of fewer editorial programs, fewer individuals making publishing decisions based on their own tastes and interests—in short, fewer choices for both authors and buyers. Concomitantly it would remove a primary source of investment. It is difficult to see how this would be in the best interests of the scientific community.

I retain complete faith that under any system, however it came about, that places restrictions on commercial publishing of scientific research, it would not be long before an impatient scientific group—very possibly representing a subspecialty of mathematics—would approach a publisher or respond to an approach by a publisher with a proposal similar to one heard often over the years: “We know there are too many journals, and we know the economics are not favorable, but the needs of THIS community are not being filled, and we have set up this publication, but our institution will fund it only for a short time, so we need a partner in the enterprise. So here’s our plan!” And a new journal, or book series, or other publishing context will be born outside the academy. Publishing is, and should be, a rebellious profession.

### The Pricing Process

Those of us who have spent their careers in the commercial publishing field—and this may be true of all publishing settings—can attest to the fact that the most vociferous, often bruising, arguments that take place are centered on the question of pricing and print run. Questions of what to publish, how to publish it, and how to market it, though

often spirited, rarely generate the heat of the price/print run debate. Egos are bruised, friendships destroyed, vendettas established, illusions shattered—and in the end pragmatic decisions are made that are miles away from the often suspected “what-the-market-will-bear” attitude.

### Journal Pricing

Let us talk about some of the practical considerations that guide journal price setting. Although the basis will be the print media with which I have been familiar over the years, I believe that most cost savings from a reduced need for hard copy will be more than offset by other costs to support electronic systems. Even the university presses are under this kind of financial pressure, as noted for example in [2], where the author cites a number of rising cost factors such as paper, postage, creation of electronic versions, new hardware and software, and staff training. At the same time she cites the fact that universities are lessening their support for editorial costs and offices and libraries are not supporting the experimental electronic journals that are being demanded by the community.

The arithmetic of a pricing calculation is almost embarrassingly simple and perhaps even obvious. Nevertheless, I will say some words about it since it lies at the core of how a commercial publisher views pricing, which is in a very pragmatic manner. Over the years, the economic model that produced in the 1960s a \$20 subscription price for a new quarterly mathematics journal and in the 1990s a \$200 subscription price for a similar item has changed very little, and the same debate takes place in the various “publishing committees” that meet in a publishing house and make such decisions. Antitrust considerations make it difficult to provide supporting evidence. However, we can risk stating a basic simple formula:

$$(EC + PC + MC)/ES = CS,$$

where EC = editorial cost, PC = production cost, MC = marketing cost, ES = expected number of subscriptions in five years, and CS = cost per subscription. This is the “fixed” cost that must be recovered on average for each subscription. It remains to determine the potential for individual subscriptions, subsidiary rights income, and anything else that might impact total revenue, including potential income from electronic subscriptions. By the same token, it must consider the impact on cost if the electronic version is to be free! It has been generally standard practice to hold the initial price for at least the first three years of publication, regardless of subscription level, and sometimes for up to five years, engendering losses that must be made up in time. It is an investment containing the risk of never being recovered or of making a profit only in the long run. Even though all the categories of cost may change significantly

in their makeup, they will still exist and will still be required investment factors. Each journal with which I have been personally involved over the past ten years has encountered a different configuration of additional costs related to electronic delivery, and in no case was the new format in place long enough to attain a cost/revenue balance. One graphic example of the dilemma was described by a committee of the American Astronomical Society in 1995 as they looked at extending the *Astrophysical Journal Letters* to an electronic version. “It is important to realize that the production of an electronic version of a journal requires additional steps that are not required in production of a paper version.” This statement and other details about costs for electronic journals can be found in [3]. It calls into question the assumption that new electronic capabilities will dramatically reduce costs. There seems to me no evidence yet that this can be done AND sustained over time.

In the growth years of the 1960s and 1970s, when a mathematics journal of sufficient quality (guaranteed by a first-class editorial board and a publisher with good editorial support services) could easily attain 1,000 subscribers worldwide within a five-year period, the pricing decision was relatively easy. The individual publisher needed essentially to apply to the formula above its own overhead factor—something that obviously differs widely in absolute percentages as well as interpretation of what “overhead” means—in order to reach a subscription price that would generate the required revenue. In the 1980s and 1990s, when that “guaranteed” figure has dropped to 300 or lower and the overhead factor has increased to include funds to keep up with technological development, it is not difficult to see how the revenue-to-cost ratio changes and results in the need for higher prices.

Prices for succeeding years are adjusted to the actual number of subscribers once a maximum is judged to have been reached, a point that can be 5–7 years after inception. A formula found in [4] for predicting journal price increases is, though somewhat simplistic, still serviceable for a journal that appears to have reached its equilibrium in subscriptions. It is based on historical data indicating that for a scholarly research journal, 70% of its costs are fixed. On average, 75%–90% of its income is derived from subscriptions, the rest coming from offprints, reprints, back volume sales, and advertising. The price increase formula must therefore include a ratio of lost (or gained) subscriptions to total achieved subscriptions to date and a ratio of fixed costs to total costs. (For a fuller description of the calculation, see [5].) One of the questions we cannot answer at this point is whether this formula, minus the cost of paper, printing, binding, postage, and storage, plus costs for technological support, will still apply. My conjecture is that



it will still be used in much the same way as today, continuing to contribute some objectivity to what will always be a subjective and market-aware decision.

### Book Pricing

Book pricing is also a topic of great importance, though of less uniform impact than the more centralized journal pricing question. Those of us who have published mainly at the upper-graduate to research level know that a book and journal program are intimately linked, a legacy perhaps of the European tradition mentioned above. Many editors and publishers believe that a book program cannot exist at the research level without a supporting journal program. Sales of scientific monographs continue to decline, helped in the decrease by librarians' need to transfer funds from the book budget to the journal budget, and those sales take place over a long period of time. Responsibility to authors and potential users dictate that such books must be kept in print, albeit in low quantities, for many years. This was at one time a minor problem involving mainly some marginal warehousing cost, until the landmark Thor Power Tool decision required commercial publishers to begin carrying full inventory costs for any books not pulped and pay relevant taxes while these items sit undisturbed for many years [6]. The result has been to force ever smaller print runs, putting pressure on unit cost and therefore, regardless of the specific pricing formula used, on the price as well. There are more universally accepted formulas for book pricing than for journal pricing, even though each publisher seems to develop its own variation. A publisher's own variation is usually referred to as "The Calculation". Whatever the form of the equation, it must include the same variables—fixed production costs, variable printing and binding costs, royalties, dealer discounts, overheads for marketing and administration, and profit margin. For determining print quantities, there is a well-known formula called the "Optimal Print Quantity", (OPQ) that relates the price and print run. A variation of the OPQ, as found in [7], is

$$N_{\text{opt}} \geq P[R + N(p + w) + O]/SD,$$

where

- $N_{\text{opt}}$  = Optimum Print Quantity
- $P$  = 1.00 + percentage of profit expected
- $R$  = fixed production costs (sometimes increased to allow for reprints and inventory costs)
- $N$  = total number of copies actually printed (some percentage is not available for sale)
- $p$  = unit manufacturing cost
- $w$  = unit order processing cost (varies with single and multiple quantity sales)

- $O$  = overhead (calculated as a percentage of net income, depending on publisher's method of accounting)
- $S$  = list price
- $D$  = net income (calculated as a percentage of list that allows for dealer discount and royalty, usually about 55-60%)

I need hardly say that the mathematical model leaves much to be desired for an exact calculation. Many of the variables are more than a little fuzzy, and the need to vary both price and print run simultaneously is a source for much imaginative thinking. I include it more as an indication that publishers do look quantitatively at their pricing decisions. However, these formulas are used more as benchmarks or first approximations than as decision tools. The nonarithmetical factors at this point loom large and depend greatly on the individual editor's vision of the book and that editor's ability to convince marketing and administration.

How will the price of a book be set when the typical monograph is available on a Web site? Such books are less likely than journal papers to be read in their entirety on screen or even printed out on individuals' printers, since they can easily extend to 500-600 pages, whereas printing out anything over 50-60 pages would seem problematical. Even a 200-page book (printed on one side of a piece of paper and unbound, perhaps with some color illustrations?) is currently a nontrivial downloading task, to avoid which the individual might be willing to pay a reasonable amount of cash to have the service provided.

### Count One: Profits Are the Culprit

The first count of the charges is that this pricing process, in the interests of the commercial publishers' profits, is a major underlying factor in the current library crisis. If profit could be removed from the pricing equation, would prices not decrease significantly? I do not think so. Although some items of any publisher's list are indeed profitable, there is ample evidence that most publications are only marginally profitable. Remove profit from an individual calculation and in most cases the formulas discussed in the pricing process will not change by much. Remove all journals from the commercial setting and invest them in the nonprofits, and in short order all the costs, all the development investment, and even many of the people involved would migrate TO the "academy" and continue the dynamic practically unchanged. The "profit" would be subsumed by various needs of the institutions assuming responsibility. They would be no more able to support administrative and development costs on a purely "break-even-journal-by-journal" basis than can commercial publishers. I would predict that:

1. The same cadre of designers, copy editors,  $\TeX$  formatters, proofreaders—all those people who will NOT be made obsolete by the increased ability of authors to deliver coded text—will be making their living doing what they have always done. Publishing is a very labor-intensive business. Even the editors, marketers, executives, and other personnel of the industry would eventually surface as employees of the nonprofits. Many people in various nonprofit publishing institutions began their careers and received their training in the commercial world and have carried over entrepreneurial, competitive, and market-sensitive attitudes, along with personal dedication to a profession of meaning to them. People like this are needed, and they will find their profession wherever it exists.

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2. The need for continuing innovation and experimentation with new knowledge and technology would still exist. It would require continuing investment of both money and time, and there is a limit to the amount of hidden subsidy and volunteer time that can be expected. Investment funds from the commercial sector would not be there and would have to be found elsewhere. Where? Additions to research grants? Society member dues? Perhaps from consumers through increasing subscription prices or charges for services? The dynamics of cost versus income will not be defeated

by removal of one factor, called profit, and replacement by another, called perhaps “developmental costs” or some other euphemism.

The robust rate of publication of scientific monographs and advanced texts should be mentioned as an important part of the commercial publisher’s contribution to diversity in the literature. Such publications form an integral part of a journal publishing program and arguably would not exist without such an umbrella of journals. That the scientific monograph is “dead” has been bruited about for the past ten or more years. Yet in the pages of this endangered species exist distillations and surveys of some of the most important work being done, expressed from the individual point of view that one person has brought to the field, and a potential inspiration to readers who become interested in the subject. It is more often the commercial publisher who is willing and able to

publish such books, since decisions can be made that are not subject to the same constraints as societies or university presses. If a commercial publisher decides to take a chance on an unknown author or a book of undetermined or peripheral interest, the punishment may be bad reviews of that book and probably (but not always) low sales. Such books are looked at with increasing skepticism by nonprofit publishers, and authors are often referred to a commercial publisher, quite the reverse of previous days when the nonprofits were assumed to exist for the convenience of their sponsoring institutions. Thus many useful books are more likely to see the light of day in a diversified, commercially competitive publishing industry, peopled by a wide range of editors and publishing intuitions, than in a restricted “academy only” setting. Centralization of decision making and removal of choices lead to control by some elite, and I doubt that anyone is arguing for that.

#### **Where the Revenue Comes from and Where Some of the Profits Go**

All the costs involved with publication have to be recovered through pricing and on a shrinking customer base. It is undeniable that this has led publishers with large agglomerations of journals and wide-ranging programs to push up prices of many journals and books that could individually be lower-priced if not loaded with that publisher’s expenses and overheads. On the other hand, a significant portion of that overhead is devoted to overall quality maintenance and system development that must be maintained even with a shrinking subscriber base. To be sure, some of the journals published by the larger companies like Elsevier, Kluwer, Springer-Verlag, and Academic Press are individually overpriced. Even smaller publishers are not immune from the need to spread overheads and share costs over a program rather than journal by journal. But if a product is continually priced beyond its value, it will eventually price itself out of the market. If, however, it maintains its value, then the question becomes how the customer can afford it, and this raises the question of who is to be responsible for paying the bill. I will return to this question in a later section.

When more funds were available for support of publication, less profit was required to take advantage of new ideas and new technology. Wide distribution of publications resulted in sufficient revenue flow to support the creative skills of both academia and industry in fashioning solutions to the publications problem. As technology became more complex and sophisticated and the amount of information became more massive and complex, prospective solutions to the problems—e.g., the Red Sage project of Springer-Verlag, Bell Labs, and the University of California at San Francisco and the Tulip project of Elsevier with eleven universities [8, 9]—were possible only because there

were profits to be invested. A basic principle of free enterprise is that where profits are taken out, investment must be returned if the enterprise is to grow and remain healthy. Without those profits, and in the face of diminishing funding support, investment would be impossible. To look at profit without consideration of how it is reinvested shortchanges the whole idea of entrepreneurial business and free-market dynamics as an engine of social and economic good.

If all this publication was relegated to the “academy”, what would be the gain? I have maintained above that costs involved for editorial work, technological development, distribution (whether hard copy or electronic) will remain. It is easy to realize economies of scale when increasing print runs to the thousands for individual titles. It is more difficult when increasing the number of titles, each of which requires some professional attention. The rate of growth in sponsored research will continue to generate more publishable material, and the material will require publishing services, the new technology notwithstanding. As the mass of publication increases, investment will also need to increase, and someone somewhere will have to pay the bill. To a great degree the various segments of the community that care about scientific communication differ only on who that someone should be. The bottom line for society remains the same.

In preparation for this article I browsed through the last two years’ issues of the *Newsletter on Serials Pricing* [10], and I highly recommend it to anyone interested in the complex problems we are discussing. I have used it as a source for a number of references that might have originally appeared elsewhere because it is such an easy “one-stop-shopping” site for many of the items of interest here. And it is free, which should please almost all readers. As examples of the ambiguity of many arguments about pricing, the reader will find a perfectly sensible complaint from Robion Kirby about the pricing of his favorite journal, *Topology*, which is a commercial publication. He compares it with the new e-journal *Geometry and Topology*, which is published by the University of Warwick and supplied free. But he goes on to point out hidden subsidies in the form of computer and staff support that make the journal possible, begging the question of what happens in the future if that subsidy no longer exists [11]. In addition, the reader will find a well-stated and spirited defense by Karen Hunter of Elsevier of the relationship between price and size for chemistry journals such as *Tetrahedron*. Her comments are in response to a previous *Pricing Newsletter* concerning Elsevier’s recently launched *Inorganic Chemistry Communication*, complaining that although it had an excellent editorial board and the price was reasonable, there is no telling what the price will become in

twenty years. Hunter’s argument is somewhat weakened by generalities implying that price is always directly related to size, which in the case of a highly specialized, low-circulation journal is often not as clear as all that [12]. I offer these references as examples of the complexity of the cost/income problem and the ambiguity that exists in all arguments on one side of commercial publishing or the other.

When attacked with charges that put the entire blame for the cost of science publishing on the commercial publishing companies, it is not surprising that a spirited entrepreneurial defense will be mounted. Speaking as a private individual, I wish Elsevier had taken a less aggressive stance in their 1998–2000 pricing proposal as detailed in [13]. The basic proposal as presented there was 7.5% over the regular subscription price for access to the electronic versions of all Elsevier journal titles (including those not now currently subscribed to), a 9% increase in each of the next two years with a no-cancellation clause, and a 10% discount for electronic versions in lieu of print subscriptions.

On a related issue, and while I am uncharacteristically naming names, I wish that Gordon and Breach had not undertaken their famous lawsuit [14], in which they challenged the validity of a study done by the American Institute of Physics. At issue were price comparisons based on such factors as cost per page or per 1,000 characters or cost per character divided by impact factor as measured in citation counts. I think they are both examples of wrong decisions for reasons that had a basic validity at the time. Nevertheless, the industry as a whole and the cause of scientific communication have benefited from Elsevier’s development investment and from the debate that Gordon and Breach generated over how we measure value. Publishers from midsize to small have received the benefit of these companies’ actions, even the ones with which I as an individual have the luxury of disagreeing. On the other hand, smaller publishers are also required by the new dynamics of publishing to follow industry leaders without necessarily having the underlying support and expertise to do so. These publishers often fight a successful battle against allowing new costs to impact prices radically and thus accept a minuscule or nonexistent profit in hopes that future costs will be lower, the

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publications will survive, and they will be able to perpetuate their business. Many readers of this article who are journal editors will recognize their own publishers among this group and can attest to yearly analyses of page allotments, changing editorial and production costs, and the impact on price of these costs and the impact on subscriptions of those prices.

Thus, on Count One, as admitted earlier, the profession has to plead guilty to the charge that profits do contribute to rising prices. In a free enterprise system this is no crime. And some of this profit returns to the community as investment without which other funding would have to be found. From where is it to come? “Commercialism” is simply the wrong target, and “profit” is not the main culprit.

### **Count Two: Added Value**

The value added by publishers is being judged by our critics as unnecessary. Cannot much publishing be done WITHOUT the involvement of a publisher, commercial or otherwise? Is this not just adding unnecessary costs and overhead? Is the technology not adequate to handle smaller and smaller “publishing units”, down to the self-publishing level where the author IS the publisher and provides personally all the “value added” that is required—the ultimate homogenization? Some argue that the value added by publishers is becoming less important, others that without such value added the literature will explode into an incoherent mass of unprocessed data. The former attitude is inherent in the new LANL Mathematics E-print Archive [15], in which authors are encouraged to deposit their articles as they have prepared them, assumedly without regard to whether they have been refereed, edited, or provided with any value other than what the author has written. This should be an interesting experiment with input of the myriads of variations on  $\text{T}_{\text{E}}\text{X}$  and  $\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ . My opinion as a hands-on manuscript editor who has proofread  $\text{T}_{\text{E}}\text{X}$  output is that anything can happen in the transfer from the author’s system to the publisher’s. My suspicion is that, as valuable as the Archive is likely to be, it will become palpable proof that editing intervention is required.

Experience even in trade publishing, as widely discussed in the popular press, indicates that literature will not stand alone on a person-to-person basis. The general level of writing skills in our students is seen to be eroding, and the removal of professional support to maintain standards will in due course negatively affect our level of discourse and the precision with which science and mathematics must express themselves. It is relatively simple to conjecture technological solutions that will handle most editorial problems. But it will be some years before authoring systems have been devised that can do such things as correct spelling,

grammar, and context; check bibliographic databases to identify references properly; firmly codify notation so that ambiguities are “automatically” resolved; and handle other such refinements as creating identification systems that will uniquely mark a “piece of information” as to who first published it, who refereed it, who commented on it, who amplified it, etc. A control system will continue to be required continuously, from conception of a journal to organization of the editorial board, establishing of standards for acceptance of papers, application of editorial rules, and marketing of the product to the people who need it. (I leave aside two questions: What might be meant by “a journal” when “one universal journal with infinite branches” is conjectured? What may come to be meant by “marketing” when audiences are permanently and totally connected to everything they need?) The skills required are professional ones, demanding training and experience, and their punctilious application is essential to a high standard of publishing. Silvio Levy has made some cogent observations on this point in [16]. In particular he attests to the fact that the practicalities of publishing would be much more difficult without a publisher and that the quality of the product would not be as good without editorial input.

And who can better provide this input than publishers who have, as business people, chosen to invest time and money in an enterprise that has an undeniable public good? It is to be expected that in the process some publishers will make an undue profit on some of the products. However, it is rarely the case that pricing decisions, which are generally reached through excruciatingly detailed discussions among editorial, marketing, and finance, focus solely on the question of how to maximize the profit from any one publication. Rather, the discussions revolve about how one can, in the context of one’s own economic model, price this publication so that it fairly reflects its costs and will be acceptable to the market. The arguments tend to be objective and pragmatic, guided by the formulas discussed earlier but informed by knowledge of the individual publication and its value.

So to Count Two, as I stated earlier, I feel no need for a plea. The charge is simply wrong and should be dismissed. More efficiencies must indeed be realized and technological tools must be used. But it will not alter costs to shift them from one venue to another.

### **Who Should Be Responsible for Paying the Bill?**

Commercial publishers deserve a return on their investments in scientific publishing. The enterprise of scientific communication has been furthered by its participation. Branin and Case in their cited article quote the consultant Al Henderson to the effect that if library budgets matched



the growth of research expenditures, there would be no crisis. If funding agencies perceived that wide availability of information was still worth supporting, then it would be possible for the commercial publishing industry to provide more material at lower cost; i.e., it could continue with the job it is trained to do and be a vital support of the scientific community. Such a perception might be strengthened if scientific societies exercised their considerable influence in support of library funding.

In the absence of such direct funding, what is the responsibility of the institutions where scientists and researchers work? We do not consider it unreasonable that the institution must pay to maintain the physical plant, paint the walls, repair the heating system, shovel the snow from the sidewalks, buy telephone systems, build cafeterias, etc. Why should it not also pay to support library collections, the intellectual part of the physical plant that has been one of the most fundamental measures of the true greatness of any university? Does the faculty need easy access to as many resources as possible? Should the people who provide those resources not profit reasonably from their activities in doing so? Is the maintenance of adequate literature collections not as clear a responsibility as fresh paint? Indeed, much research money goes to commercial organizations who manufacture equipment, produce computers and chemicals, service communication systems, provide amenities for conferences, and provide a host of other commercial, profit making activities. It is difficult to see why the publishing industry should be singled out for criticism of making a profit on its conduct of business. It seems to me that library collections should be seen as a responsibility of the university and that the funding sources should recognize this and make the money available for the librarian to exercise free choice in deciding how it will be used. The amount involved, as large as it has become, is still only a fraction of that committed to research, and the percentage increases chronically less than the increase for central administration.

The suggested alternatives to recognizing costs and paying them involve a shift of responsibility from direct payment to such strategies as hidden subsidies and more volunteer input, all in the interests of holding prices below the true value of the product.<sup>3</sup>

Steven Weintraub's 1998 letter to the *Notices* [19] deplores the loss of typing services in many mathematics departments. It lends authority to a comment I have heard, but whose source I do not

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<sup>3</sup>For some historical background on the shifting of financial responsibilities, see Albert Henderson's article [17] commenting in 1995 on the 1989 Report of the ARL Serials Price Project [18]—an earlier attempt to march the commercial publishers to the gallows.

know, that Donald Knuth, the creator of  $\text{\TeX}$ , has succeeded in converting a generation of mathematicians into typesetters. We cannot blame Knuth for this unintended side effect of his magnificent creative achievement, but it does exemplify some of the smoke screen that obscures questions of who is really responsible for what. Perhaps in this age when businesses outsource all sorts of services to the user—data entry into ATM machines, self-service at the gas pump, build-it-yourself furniture—we are all fair game. But do we really want to put research money into paying professional scientists to do what professional publishers and publication support people are trained to do? What then is the actual cost?

If my contention above is correct that the main point on which many of us differ is the question of who is to bear the expense of providing cheap or free information to individuals, then it is fair to pursue this question of where the responsibility lies. Scientific publishing, both for profit and for nonprofit, is rife with free labor contributed by hundreds, perhaps thousands, of academics who see this as part of their responsibility to the profession. Inherent in the "return to the academy" argument is that this will continue and that it ought to. I wonder if that point is so clear. Would it not be fairer for the expected savings from technology to be used to help support those editors who are the guarantors of a quality literature? I do not go so far as to suggest a paid referee system, although even there I can conjecture an honorarium system that recognizes the individual's sacrifice of time and resources for the good of all. This time is currently paid for by the individual contributing it. In a new model, should payment not come from the revenue of the journal? Again, it is a matter of who takes the responsibility for support. Who pays the bill?

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*In the absence of such direct funding, what is the responsibility of the institutions where scientists and researchers work?...Is the maintenance of adequate literature collections not as clear a responsibility as fresh paint?*

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## Summary

The commercial publishing industry shares the scientific community's concerns over the prices of scholarly publications. The viability of the industry depends on the health of the scientific communication system. But publishing companies must generate sufficient revenues to pay costs and overheads and return a reasonable profit to the owners to reward their investment. No industry that is not a monopoly can live indefinitely on a policy of overpricing, and the dynamics of publishing will always mitigate against domination by monopolies. Competitive pressures will always exist, even when so-called captive markets are at issue. In this respect, all publishers, commercial or nonprofit, have more in common than may be apparent and are subject to more of the same economic pressures than implied by much current argument. The competitive marketplace will right itself in ways that no authority can dictate.

So I return to the central question of where the money comes from, how it flows, and where it goes. This is a societal issue, not a "commercialization" problem. It is unfair, and ultimately futile, to label commercial publishers as the culprit. This is attested to by the fact that none of these commercial enterprises would be possible without the willing cooperation of the academics who make up our editorial and advisory boards and the support of the community for their efforts. Indeed, many of these journals exist because those academics and the groups around them realized that their aims for their professions could not be achieved entirely through the academy, but required the imagination and entrepreneurship of an establishment-defying, risk-taking commercial publisher to push the boundaries.

## Acknowledgements

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## References

- [1] J. J. BRANIN and MARY CASE, *Reforming scholarly publishing in the sciences: A librarian perspective*, *Notices Amer. Math. Soc.* **45** (1998), 475–486. (As mentioned in my introduction, this is a well-researched and thoughtful article that covers many of the complex problems that have been created by growth in the literature and the various issues relating to its cost and ownership.)
- [2] S. WHISLER, *The economic realities of journal publishing*, *Pricing Newsletter* **172.3** (1997). (The author of this communication is with the University of California Press and responds to a previous communication entitled *Why are librarians talking to pub-*

*lishers?* as an example of why librarians and publishers NEED to talk with each other. She details the many financial pressures that her journals are under and the need for understanding that their problems are shared by everyone.)

- [3] AAS Publications Board Meeting Minutes (1995), American Astronomical Society, Washington, DC. (These minutes discuss the impact of costs for e-journals on the regular subscription prices for the hard copy of several AAS journals.)
- [4] D. W. KING, D. D. McDONALD, and N. K. RODERER, *Scientific journals in the United States: Their production, use, and economics*, Hutchinson Ross, Stroudsburg, PA, 1981. (This was a landmark study of the entire spectrum of journal publishing in which statistics on costs, circulations, usage, growth rates, and other relevant parameters were compiled for perhaps the first time on such a wide basis. It continues to be a standard reference and a source of useful and reliable information for the period it covers.) See also C. Tenopir and D. W. King, *Trends in scientific scholarly journal publishing in the United States*, *Journal of Scholarly Publishing* **28** (1997), which contains a considerable update of this study.
- [5] A. HENDERSON, *Forecasting changes in periodicals prices*, *The Serials Librarian* **21** (1992), 33–43. (This article discusses the various indexes that librarians can use to project price increases and thus make appropriate adjustments in their budget requests. It also discusses factors impacting on foreign and new periodicals.)
- [6] *Thor Power Tool Company, Petitioner-Appellant vs. Commissioner of Internal Revenue, Respondent-Appellee*, U.S. Court of Appeals, Seventh Circuit, No. 76-1476, September 29, 1977, or *Thor Power Tool Company v. Commissioner*, 439 US 522 (1979). (The Supreme Court ruled that an inventory writedown was not allowed where it was based on subjective estimates rather than objective evidence and the inventory items continue to be held for sale at their original prices. Although this ruling was not initially meant to apply to publications, it swept them into the net.)
- [7] H. S. BAILEY JR., *The Art and Science Book of Publishing*, Ohio University Press, Athens, 1990. (This book was first published by Princeton University Press in 1970 and is still considered to be one of the classic treatises on how publishing actually works, whether profit or nonprofit. The author was head of Princeton University Press for many decades.)
- [8] *Red Sage final report*, <http://www.springer-ny.com/press/redsage/>. (The primary goal of the Red Sage project was to develop an understanding of the issues associated with electronic delivery of primary journals to scientists in their working environments.)
- [9] *TULIP (The University Licensing Project)*, <http://www.acn.net/au/resources/ip/tulip/htm>. (This was a cooperative research project in which Elsevier Science Publishers and eleven universities, each with strength in the physical and engineering sciences, tested systems for networked delivery and use of journals. Several Web sites have full information, e.g., <http://www.acn.net/au/resources/ip/tulip/htm>.)

- [10] *The Newsletter on Serials Pricing* is free and can be subscribed to by sending a message to [listproc@unc.edu](mailto:listproc@unc.edu) saying "SUBSCRIBE PRICES [YOUR NAME]". Back issues from its inception in 1989 to the present are archived at <http://www.lib.unc.edu/prices/> and at <http://www-mathdoc.ujf-grenoble.fr/NSPI.html>.
- [11] R. KIRBY, *Letter to Elsevier officers*, Pricing Newsletter **199.1** (1997). (In addition to the comparison between a commercial journal and an electronic journal, the author of this article supports the concept of preprint servers, makes some comparisons of journals by cost per page, and predicts "So where you (the commercial publishers) see boom, I see bust.")
- [12] K. HUNTER, *Comparing serial prices*, Pricing Newsletter **208.1** (1998). (The author raises the rhetorical question of whether it would seem more palatable to librarians if a large weekly journal should be divided into thirteen separate quarterlies, thus reducing efficiency but winning the statistical battle by reducing dramatically the individual cost per title.)
- [13] E. MOBLEY, *Meeting with the president of Elsevier*, Pricing Newsletter **197.3** (1997). (This meeting was held between the president of Elsevier and the president of Purdue University, accompanied by a number of administration and faculty members. It was prompted by Purdue's announced decision to cancel \$600,000 worth of subscriptions rather than accept the offer made by Elsevier and described in the article.)
- [14] A. HENDERSON, *Lawful misconduct*, and M. BRODSKY, *Valuable analysis*, appearing as parts of an article entitled *Decade-long legal battle focused on journal cost, impact*, The Scientist **12** (1998), 7-8. (This article provides condensed views from both sides of the lawsuit brought by Gordon and Breach against the American Institute of Physics, which dragged on for a decade. As of January 1998 Gordon and Breach had won their battle in the French courts, but lost it in the United States. Henderson uses this article to challenge the physics societies to use their influence to reform allocations of resources to libraries. The article refers the interested reader to the Web site <http://barschall.stanford.edu/> for a complete history.)
- [15] G. KUPERBERG, D. MORRISON, and R. PALAIS, *Mathematics journals should be electronic and freely accessible*, Notices Amer. Math. Soc. **45** (1998), 845. (This opinion article is by the Steering Committee for the Archive and is written to encourage its use as widely as possible.)
- [16] S. LEVY, *Remarks on math journals and libraries*, Pricing Newsletter **202.1** (1998). (This is a written version of remarks made at a panel discussion during the January 1998 annual meeting of the AMS. The author makes the point that the issue of journal prices is independent of whether the journal is electronic or paper and focuses on our current system of tenure and promotion decisions as at least part of the fuel for the growth in number of publications.)
- [17] A. HENDERSON, *Solving the paradoxes of journal prices: An editor's response to the serials crisis*, CBE Views **18** (1995), 31-35. (Albert Henderson is a consultant to publishers and editor of the *Publishing Research Quarterly*. He has written widely on the "Serials Crisis" and in this article urges the participation of publishers, librarians, and university administrators in sharing information and seeking solutions together.)
- [18] *Report of the ARL Serials Prices Project*, Association of Research Libraries, Washington, DC, 1989. (This article was the result of a consulting study that attempted to analyze the profits of four large commercial publishers. The author of [17] criticized it for speculating on circulation and cost figures and for being unsigned.)
- [19] S. WEINTRAUB, *Departments should provide manuscript typing*, Notices Amer. Math. Soc. **45** (1998), 7. (This letter dealt with just this one issue, which seems to be a ubiquitous development in mathematics departments.)