

Open Access – Four Opinions

In the last few issues of the newsletter, we have published more than one article on publication-related topics. The editorial board wishes to push the debate forward. To this end, we have asked some colleagues to express in at most 1000 words their opinions on the evolution of the scientific publication system. We have “selected” the potential authors of those articles not on the basis of their opinions but on the basis of their professional experiences. Therefore we are not claiming that the articles be-

low give a good account of the whole range of opinions mathematicians can have on the subject. Nevertheless, the articles below express opinions of colleagues with a wide range of experiences, having collaborated with academic editors and learned societies as well as commercial ones. We hope that this will be a starting point for the debate and that the Discussion and the Letters to the Editor sections will help to develop it with our readers.

A few words about “open access”

In the ‘old’ days, the process of publication of a paper after acceptance was rather technical: the author’s *manuscript* (in the etymological sense of the word) was printed by experts, who had to assemble the *typeface*, including the mathematical symbols. They were able to check and make corrections directly themselves, which meant in particular that they had to be able to deal with different versions of texts with comments sent by the authors, and they had some mathematical expertise. The subsequent process of printing was not immediate. All these points were supposed to justify the price of the final journal.

When new technologies began to be widely used, the process described above became drastically simplified. At the same time, the prices of journals increased in an alarming way. We remember that at the end of the 1980s several ‘official’ reasons were given to ‘explain’ the increasing costs, one of them being the increase of the cost of paper at that time! Of course almost all mathematicians were naive enough to believe this claim. The cost, already barely acceptable for academic institutions, continued to increase, while, simultaneously, a desire to make ‘older’ publications freely available began to emerge. At the same time, the use of TeX (and LaTeX, etc.) and of email permitted an enormous development of ‘grey literature’. Authors were exchanging lots of preprints, progressively reducing the rôle of official journals to the validation of results by referees. Furthermore, acceptance of a paper by a prestigious journal gave a certain imprimatur to the work.

When it became clear that not only researchers and their institutions but also governments wished to reduce costs and/or wished free access to the research articles, the commercial publishers, perhaps fearing a loss of their substantial profits, perverted the words ‘open access’, which meant that the reader does not pay, into an economic model in which the author or their institution pays. This process was smoothed by the various colours that were invented afterwards (from ‘green open access’ to ‘gold open access’, not to mention ‘diamond open access’, ‘platinum open access’ and their sisters). But the definitions are still not clear (e.g. for some editors ‘gold open access’ means that the author or their institution must pay, while for some academics or governments, this

only means that ‘someone pays but not the final reader’). Some amelioration of the original doctrine has occurred recently; for example, the UK Science Research Councils seem to have backed off from their apparent earlier insistence that all papers submitted for the assessment of 2020 should have gone through ‘gold access’; now they will allow ‘green access’, which does not require a payment. This is a major improvement but it may be only a transient relief. Of course one possibility (not the only one) is that neither the reader nor the author pays, but that a university, learned society or generous benefactor creates, runs or sponsors a journal.

Why is it unacceptable that the author or their institution pays for publishing?

Although this seems quite evident, many colleagues do not seem to see clearly the serious dangers of this model. Let us list a few of them. Should a ‘rich’ university succeed in publishing more papers than a ‘poor’ one? Inside a given department, with a necessarily finite amount of money, who is going to be financially supported: a famous colleague for their inestimable contribution; a young colleague who needs to publish for the sake of their career; someone who already has many papers in a given year; or some colleague who has written only one paper? And who is going to decide? We pity the Head of Department if the decision falls on them. What happens to talented mathematicians at ill-funded universities in the third world? What will the publisher’s point of view be: how can we hope that the commercial publishers will make efforts to disseminate papers for which they have already been paid? (Arguments such as ‘for the sake of the reputation of the journal’ do not hold in a world that is chasing short term profits.) We should not forget either the transition period where publishers would simultaneously receive money from institutions accessing the non-free issues **and** money from authors/institutions willing to pay for open-access.

Some people believe that the publishers will reduce the prices of their journals to libraries when they receive open access payments. We are very sceptical of this. What mechanism would force them to do this? In the same vein, publishers claim that the global price will decrease,

but who can seriously believe this claim: publishers moving to a model where they will earn less money!

By the way, it is worth noting that authors already provide publishers with formatted files and that editorial boards and referees do not receive any money for their work. In other (crude) words: ‘Do scientists need publishers or do publishers need scientists?’

Another argument comes from a comparison with novels: authors publishing at their own expense are not considered real writers.¹ Curiously enough (but is it that curious?), commercial publishers claim that publishing is a service to authors that will help them in their careers and THUS authors should pay for this! And nobody seems to burst out laughing...

Last but not least among the dangers of gold open access is the present rapid development of ‘predatory

¹ Pierre Dac (or was it Francis Blanche) was joking about authors publishing ‘à compteur d’eau’, which is a spoonerism of ‘à compte d’auteur’.

journals’ and/or plagiarism: an enormous number of new journals (with people on editorial boards not even knowing that their names are there) has recently proliferated; many appear to publish papers of very questionable scientific value and/or papers plagiarised from another source. They are the work of those using ‘open access’ only to generate a quick and unscrupulous profit. But going into this matter would need another article.

Jean-Paul Allouche is introduced as a newly-appointed editor of the EMS Newsletter on page 6.



H. Garth Dales retired in 2011 from his position at the University of Leeds, and now has a part-time position at the University of Lancaster, UK. He works in functional and harmonic analysis, and is the author of “Banach algebras and automatic continuity”, OUP, 2000. He is currently Vice-Chairman of the Ethics Committee of the EMS.

Recent developments in the field of Open Access Journals and zbMATH indexing policy

A lot of new mathematical journals have been founded over the last few years and many of them are Open Access (OA) journals. Generally, the idea of OA publishing is welcomed by the mathematical community. Recently, prestigious publishers have launched high quality OA journals, in particular to cater for authors whose grant agencies require OA publishing – we are not going to talk about those journals here.

The number of OA journals indexed in the Zentralblatt MATH database (zbMATH) has soared from 180 in 2005 to just short of 500 in 2012. We receive requests from editors of new journals that their series be included in zbMATH practically every week. In the past we responded positively to these requests if the contributions were peer reviewed (for which we had to take the corresponding statement by the editor or on the journal homepage on faith) and if – in the case of interdisciplinary publications – there was a substantial amount of mathematics at the research level.

While some of these new journals have found their place in the mathematical community, it’s probably safe to say that readers of the Newsletter won’t be familiar with the majority of new OA journals (*International Journal of Mathematical Research & Science*, *Scientific World*, etc.). By contrast, most of us receive spam emails on a daily basis with invitations to contribute to journals or even to become members of editorial boards. So, many new journals do not really seem to respond to the needs of the mathematical community.

Our main concern with certain publishers is quality. We have observed that quite a number of papers from OA journals tend to be rather weak. Unfortunately, we do not have enough reviewers on our roster to have every mathematical article reviewed, especially those that do not appear to have much substance, but occasionally

we are in a position to solicit an expert’s opinion on a paper that is deemed insignificant by the zbMATH editors. Often, our first impression is corroborated by the reviews; for example, one reviewer has written: “The presentation of the paper is very poor. The statement of Theorem 3.1 is wrong.” Another one has said: “The poor reference list and the partly less than stringent mathematical formulations (cf., e.g., the text of Theorem 1) indicate that the author is not very familiar with the recent literature on...” One more example: “The authors ... conclude the article with a fixed point theorem that is, essentially, Banach’s contraction mapping principle. Unfortunately, this article contains a plethora of typographical errors, which makes it somewhat difficult to read.” Actually, some reviewers refuse to write at all on papers without any substance and return the manuscript to us right away. All the above examples refer to articles published by the same publishing house. This publisher also released a paper entitled “A complete simple proof of the Fermat’s last conjecture”, which needs no further comment.

The existence of such papers makes it questionable whether there has been a proper peer review process or any copy-editing on the part of the publisher. An extreme case is certainly the paper accepted for publication in the OA journal *Advances in Pure Mathematics* that just consists of a random collection of mathematical phrases generated by the software mathgen (<http://thatsmathematics.com/mathgen>); not a single sentence in this paper makes any sense. For the record, here is the abstract of this nonsense paper: “Let $\rho=A$. Is it possible to extend isomorphisms? We show that D' is stochastically orthogonal and trivially affine. In [10], the main result was the construction of \wp -Cardano, compactly Erdős, Weyl functions. This could shed important light on a conjecture of Conway-d’Alembert.” (Please see <http://thatsmathematics.com/blog/archives/102> for the whole story.)

Of course, lack of editorial standards can also be found in subscription-based journals, one of which accepted another mathgen paper. The mathgen cases are the most obvious examples of non-existent quality, indeed non-existent content, in a scholarly publication. There are other indicators, too; for example, one publisher boasts of a seven day period from submission to acceptance. In those and similar cases where we think there is enough evidence for no peer review – despite the publisher’s claims – we discontinue indexing in zbMATH.

The fact that OA journals which do not offer any quality control or copy-editing services exist at all can be traced back to one central argument. Publishing houses specialising in OA publishing, which, by definition, means they do not charge readers any subscription fees, generate revenue from the authors’ article processing charges, typically ranging from €25 per page to €500 or more per article. Given our experience of a deluge of weak papers from certain publishers, one is reminded of Frank Zappa’s album title “We’re only in it for the money”: every accepted paper, never mind its quality, means revenue for the publisher. Clearly, there is a danger that quality is

1 See also Gert-Martin W. Greuel, “Changes and Enhancements of the Publication Structure in Mathematics”. In: K. Kaiser, S. Krantz, B. Wegner (Eds.): *Topics and Issues in Electronic Publishing*, JMM, Special Session, San Diego, January 2013, pp. 41–56.

2 A helpful internet site is maintained by Jeffrey Beall, a librarian at the University of Colorado, Denver, who has set out to identify “potential, possible, or probable predatory scholarly open-access publishers” at <http://scholarlyoa.com/>.

sacrificed for turnover. One publisher invites prospective editors, saying: “We do not intend for our editors or reviewers to judge an article on its perceived level of interest... Our readers will then decide which articles they are interested in by reading and citing them after publication.” It is clear that this kind of “peer reviewing” policy opens the door for low-quality work.¹

In the future we will have to monitor publishers with a dubious track record more closely² with the potential, possible, or probable conclusion not to index their periodicals any more.



Gert-Martin Greuel [greuel@Zentralblatt-MATH.org] is a professor at the University of Kaiserslautern. His research interests are algebraic geometry, singularity theory and computer algebra and applications. He is one of the authors of the computer algebra system Singular. Until March 2013 he was the Director of the Mathematisches Forschungsinstitut Oberwolfach (MFO) and he is still the scientific adviser of IMAGINARY, the open source platform for collaborative mathematics of the MFO. Since January 2012, he has been the Editor-in-Chief of Zentralblatt MATH.



Dirk Werner [werner@math.fu-berlin.de] teaches mathematics at Freie Universität Berlin. His field of specialisation is functional analysis. Since 2009, he has been the Deputy Editor-in-Chief of Zentralblatt MATH.

Open Access and the evolution of scholarly communication

The current and prominent issue of Open Access is just one aspect of the ongoing evolution of scholarly communication. It is not necessarily the most interesting one but it is the most pressing because the growth in Open Access mandates could lead to a disruptive change in journal publishing. At present, the momentum seems to be towards Gold Open Access in which authors, or authors’ institutions or funding agencies, pay existing publishers. While this may not be ideal, it may represent the most practical step towards a more effective and efficient scholarly publishing future.

Over the last two decades, ever since electronic publishing became a subject of wide discussion, the scholarly communication system (interpreted broadly and so going beyond just journals and books) has undergone extensive evolution. There has been growth in the intensity, variety, speed and nature of the exchanges that take place among researchers. The extent of collaborative work (as measured by the average number of authors on a paper, for example) and the volume of multidisciplinary research have continued growing, in a trend that predates the internet (and is shared with other disciplines). Preprints are now widely distributed through email, personal webpages and preprint archives, and are often located using search

engines. Even more strikingly novel are the ongoing, massively collaborative mathematics research projects, and the many efforts in genomics and other areas where much of the activity involves curating large datasets. (While not in what used to be considered the core of mathematics, these efforts increasingly involve mathematicians.) Developing mathematical software is yet another area that is growing in importance. Many of these activities cannot be accommodated, at least not easily, and often not at all, by the traditional journal publishing framework.

Still, the one element of the scholarly communication scene which has not changed much in the last two decades, at least on the surface, is the journal. Most results are still published there (with Perelman’s proof of the Poincaré conjecture one of the relatively few exceptions) and promotion, tenure, research grants and the like all depend primarily on journal publications.

There have been changes in the journal system. The one that is most noticeable is that most journals are available online and paper copies are beginning to fade away. (*Mathematical Reviews* has finally, but only recently, stopped producing a print version, for example. Major savings, in production costs, and especially in library costs, will result when this step is taken by most publications. Two decades ago, in contrast, there was widespread scepticism as to whether electronic versions of journals would

ever be significant!) What is less visible to most scholars is that the journal price escalation that was already being claimed as being unsustainable some decades ago has been sustained. What is even less well known is that for most readers at higher education institutions, the availability of journals has greatly increased. The “Big Deal” packages from publishers, consortia licensing, special deals for underdeveloped countries and the like (all enabled by the technological developments of the last few decades, which have lowered the marginal costs of distribution) have led to a greater fraction of current journals being subscribed to by university libraries [2]. Furthermore, the digitisation of print papers has made much of the older literature easily accessible (either freely, or through low-cost providers such as JSTOR). Together with the other developments cited above, such as the spread of preprints, preprint archives and search engines, these developments have brought us closer to the ideal of a freely accessible online “World Library of Mathematics” that has everything relevant in it. However, we are still far from that ideal and the barriers imposed by journals supported by subscription fees are a major hindrance.

Why has the traditional journal continued to thrive? It is still the repository of the “publication of record”, and it is the community’s desire for traditional peer review that keeps it afloat, with all its unnecessary costs and encumbrances. Novel forms of peer review have been slow to emerge and even slower to be accepted. However, they appear bound to grow in importance and the role of the traditional one, based on journals, appears bound to shrink. Not only is there an increasing range of activities that don’t fit the journal publishing framework but the defects and deficiencies of this framework are becoming ever more apparent. Peer review is indispensable, as otherwise the “noise” generated by a spectrum that goes from crackpots to careless scholars to those who are diligent yet make mistakes (and who does not?) would be overwhelming. But traditional peer review is not foolproof, as many studies have shown. (Most of the thorough studies have been in areas such as medicine but almost surely reflect what happens in mathematics as well.) There is also a wide perception that the problem is getting worse. To some extent this may be due to the pressure on scholars to publish so that, in the rush to write, they are less willing to referee carefully. But it probably also reflects the growing complexity of the research enterprise. Arguments are increasingly often not simple but complex amalgams of results and techniques from a variety of areas, so that no single individual understands everything. This changes the nature of what we accept as valid mathematics. There has been rigorous debate about the validity of computer-assisted proofs (which help cope with some aspects of the complexity of modern mathematics), such as those of the Four Colour Theorem and Kepler’s Conjecture. But there are also questions about the validity of the classification of finite simple groups, with some published results explicitly making the caveat that they depend on the correctness of this great achievement of mathematics.

Examples such as these demonstrate that we are moving away from the model where a result that is published

in a reputable journal is regarded as trustworthy unless shown otherwise. Instead, we will have to work with a continuum of peer review, where everything is regarded with some suspicion, with the strength of the doubt dissipating with time as more people read it and apply it. This necessarily implies a declining role for the traditional journal. However, this evolution is proceeding at the glacial pace of most changes in academia, and will likely take decades to play out.

In the meantime, mandates are likely to be the main impetus towards Open Access. Whichever form (or, more likely, mixture of forms) of Open Access is adopted is hard to foresee but, right now, it appears that Gold Open Access will be the most important. One can argue that a more desirable path would have been through Green Open Access and with libraries and researchers collaborating to establish new, lower-cost, electronic-only journals. However, the usual inertia of academia has prevented this from happening on a large scale and, in the meantime, publishers have moved faster. Recent developments in scholarly publishing are best seen as a competition between libraries and publishers for resources, and publishers have been winning this tussle. What has helped them, more than anything else, is that most of the costs of the academic publishing sectors are not those of publishers but are internal to libraries, and can be decreased with the move to digital information [1, 2]. In particular, the frequently asked question as to where departments can find money to pay for Gold Open Access fees has an easy answer, namely library budgets. (Such a move is facilitated by the fact that the current journal system is unnecessarily expensive and much of its complexity and cost can be eliminated.) In practice, of course, the answer is not all that easy, because of the convoluted money flows in universities. But universities do have incentives to support publications by their staff, so should be able to shift the funds around. Hence, it is to be expected that there would be some disruptions if a sudden shift to Gold Open Access were to occur but it should not be expected to last too long.

In the long run, whether we move to Gold or Green Open Access, it seems almost inevitable that Open Access will prevail and will be just one phase of a more thorough change in scholarly communication, in which peer review itself is changed.

[1] A. Odlyzko, Tragic loss or good riddance? The impending demise of traditional scholarly journals, *Intern. J. Human-Computer Studies*, 42 (1995), pp. 71-122. Preprint available at <http://www.dtc.umn.edu/~odlyzko/doc/tragic.loss.long.pdf>.

[2] A. Odlyzko, Open Access, library and publisher competition, and the evolution of general commerce. Preprint available at <http://ssrn.com/abstract=2211874>.



Andrew Odlyzko has had a long career in research and research management at Bell Labs, AT&T Labs and, most recently, at the University of Minnesota, where he built an interdisciplinary research centre and is now a professor in the School of Mathematics. He has been involved in electronic publishing for over two decades

Open Access: An Editor's View

Open Access is just one facet in the rapidly changing nature of publishing. Others include E-Publishing, Self-Publishing (no longer nicknamed Vanity Press) and growing piracy through free access to copyrighted material. Historically, such changes have been driven by new technologies and access to the means of production afforded by these technologies. One of the major changes: from manually produced copies to printed books, occurred with the invention of the moving type by Guttenberg, and those who built or could afford to buy printing presses were the publishers of their time. With the broader availability to printing equipment, printers and publishers became separate professions, putting the emphasis of content and dissemination on the publisher (Éditeur, Verlag). The development and "open access" to the sophisticated typesetting software TeX shifted the emphasis from production to marketing and distribution within the publishing industry, and the more recent and growing access to the internet, including social media and blogs, puts all the tools for creating, marketing and distributing content in the hands of the author.

As always, what is technically possible and intentionally desirable will ultimately prevail and the different forms of open access publishing: "gratis open access" and "libre open access" (including some additional usage rights), affect the publishing industry and have elicited different responses. "Green Open Access", through self-archiving (with the publisher's consent), and "Gold Open Access", through journals that make their content available free of charge, are the two most common versions, the latter restricting open access to such papers that pay an "open access fee". We are also witnessing an increase in papers posted on subject specific archives or published in electronic journals set up by independent editorial boards and not connected to a traditional publisher. Such journals are often created in response to the perception that publishers, while using the free service of expert editors, no longer add value and can be eliminated from the process without loss to the scientific community.

As an editor and long-term publisher and former member of the community, I want to share some experience and comments on the, supposedly diminished, value added that publishers have provided for a long time and sometimes still provide.

1. Based on a symbiotic and often friendly connection to the scientific community, publishers are sometimes able to anticipate the need for outlets (journals, monograph series and new media, such as instructional movies) and develop them, at their own risk, with respected and open-minded members of the community.¹

¹ To make my remark more concrete, I will give a few examples:

- The journal 'Experimental Mathematics' grew out of conversations with David Hoffman, David Mumford and David Epstein.
- The series 'Ergebnisse der Mathematik' was founded by Springer Verlag in 1932.
- The AO orthopedic surgery method, using screws, which was controversial but is now firmly established, was introduced with instructional movies by the Swiss orthopedic surgeon Al Göwler through Springer.

2. Editorial activities: soliciting and selecting material, technical reviewing, copyediting, formatting for optimal presentation, and optimisation of illustrations are major elements of the publishing process.

While the first point concerns the value added that is mostly recognised and beneficial to the publisher and the community, the second, in my experience, is less and less appreciated, except by the best and brightest.

"Soliciting and selecting" includes friendly persuasion of busy researchers to write monographs, surveys and textbooks that ultimately benefit colleagues, students or sometimes the perception of a field by the general public.

"Technical reviewing" as a confidential process, while considered unnecessary by some authors, leads to substantial improvements and in some cases to very successful co-authorship.

"Copyediting" and other organisational improvements are a sine qua non in my experience and, while good authors expected them in the past, many "Young Turks" now seem to feel that they are an intrusion into their domain.

My concern is that Open Access Publishing will negatively affect the quality of publications for several reasons:

1. Publishers will not provide permission for "green open access" after they have invested in the expensive editing process or will further diminish the process, as has already been the case.
2. Self-archiving without a publisher will reduce or eliminate altogether the editorial activities that are essential for quality publication.

While Wikipedia restricts its description of Open Access to peer reviewed publications, there has been from the beginning and there continues to be a substantial amount of material that is placed on the internet without a critical filter [reviewing process]. When I asked a highly respected mathematician and strong proponent of Open Access how he would prevent the proliferation of sub-standard material on established archival sites, his answer was a simple rule: material, once placed, cannot be withdrawn. This rule would prevent everybody from posting stuff that might not be of good quality. I am afraid his rule was based on his own personal standards.

I hope that my comments will increase awareness of some of the pitfalls of Open Access without affecting its benefits for scientific research, particularly in areas that face economic and other obstacles. Of course, these benefits only affect access, while the so-called Gold Open Access will restrict publication opportunities for scientists without the funds to pay for it.



Klaus Peters is a mathematician who turned publisher in 1964 when he joined Springer Verlag as the first in-house mathematics editor. He is the founding editor, together with Walter Kaufmann-Bühler and Alice Peters, of the Mathematical Intelligencer and served as publisher and editor at various companies, including Birkhäuser, Academic Press and A K Peters, which he founded with Alice in 1992.