



REDRESSING THE INVERTED PYRAMID OF SCIENTIFIC PUBLISHING

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Scientific publishing is currently undergoing a progressively rapid transformation away from the traditional subscription model. With the Open Access movement in full swing, existing business practices and future plans are coming under increasing scrutiny, while new “big deals” are being made at breakneck speed. Scientists can rightfully ask themselves if all these changes are going the right way, and if not, what can be done about it.

Fortunately, in this day and age, some spheres of human activity remain anchored in rational thinking, evidence-based debate and error-corrected progress. Scientific research undoubtedly fits in this category: few scientists doubt that reason should prevail over nonsense. Yet, when it comes to publishing, the scientific world seems to be bathed in a maelstrom of irrational hogwash. What is going on? What can we do about it?

A business unlike any other

Scientific publishing, as a business, has become a truly unique inverted pyramid construction in which the “customers” pay dearly for accessing the product after actually performing themselves all the irreplaceable, not-doable-by-others steps in the manufacturing process. Historically, this tour-de-force of business abracadabra has been achieved in no small part by exploiting the other dubiously-implemented aspect of publishing,

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namely impact assessment. The often-heard complaint that where you publish matters more than *what* you publish underlines the undue influence publishers now have on the lives of scientists (especially younger ones). What could be called the "impact of the impact factor" has greatly curtailed the liberty that scientists should enjoy to author their papers and evaluate their importance in a rational and collected manner. Publishing has thus become a kind of three-headed hydra which generates profit out of scientists' daily achievements and holds their career development prospects hostage, whilst discouraging them from presenting the fruits of their work in a cool, detached, scientifically professional manner.

Open Access and drifting business models

It is no wonder, then, that we have recently witnessed a great many discussions concerning reform of the whole scientific publishing edifice. Though much needs to be done, the Open Access "movement" has been at the forefront of discussions, as exemplified by a string of statements (including Budapest [1], Bethesda [2], Berlin [3] and most recently Amsterdam [4]) underlining involvement and desire for reform from interested parties at all levels. Strangely enough, the growing cacophony of voices has blurred even the very definition of "Open Access". In its simplest and most common form [5], OA simply signifies that

readers can access published material without having to pay subscription or per-view charges; but to some, it means much more. That said, much of the attention recently devoted to OA has in fact been diverted towards financial matters, with vitriol often being poured on the undeservedly high profit margins that a number of corporate publishers have historically managed to get away with. A new payment model has been developed and mandated, deprecating the journal subscription model and replacing it by an "author pays" model in which publishers require authors (or, in practice, their funders, institutions or societies) to pay an Article Processing Charge (APC) typically ranging from a thousand euros up to a large multiple of this figure to make the contents openly accessible upon publication ("Gold" OA). To facilitate rapid implementation of OA, a softer version, "Green", has also been introduced. In this version, authors deposit (after respecting eventual embargo impositions from the publisher) a version of their paper in an openly-accessible repository (institutional, or community-run like arXiv). Although solving the accessibility problem, Green OA implementations fall short of representing a full substitute and deprecator for the services publishers offer, leaving the desire for publisher reform adrift and unfulfilled.

Sportscars, jewels, rare stamps and failed markets

One of the often-mentioned rationales behind the introduction of APCs is that "opening up the market" would help drive publication costs down. However, there is a simple yet fundamental problem here, namely: scientific publishing is an industry in which prestige and reputation are at stake. Publications are not dissimilar to sportscars, jewels or rare stamps: their market price has nothing to do with their production costs. As a researcher, if I estimate that publishing in a specific journal gives me, say, 5% more probability of getting a million-level grant, then being asked to pay 1500 euro APCs seems like a bargain, since I would still evaluate it as worthwhile to pay an order of magnitude more. Of course authors cannot "buy" their way into premium journals, so this pseudo-economic calculation actually makes no sense whatsoever. As a scientist, I don't actually care what the APC is (I'll pass the bill to my funders or institutional library); I only care about the quality and reputation of the publication venue. The problem is thus that the APC model has opened a Pandora's box of potentially diverging publication costs at the high end of the market, with no mechanism to bring them down. This damaging dissociation of quality with price level has in fact had the counterproductive effect of driving some publishers to increase their APCs in order not to be viewed as lower-quality [see e.g. the Finch report [6], while fueling the proliferation

BOX 1: KARAT-LEVEL RESOLUTION FOR DEGREES OF OPENNESS

10-karat (*openness to readers: open access*):

- make full text of publications freely available to readers (Creative Commons license)

14-karat (*openness to authors: copyright, embargo*):

- copyright is given to the authors without restrictions
- publishing occurs without any embargo period

18-karat (*openness to users: reuse, remix, crawl, citations*):

- publication license allows reuse and remixing of content (Creative Commons Attribution (BY), Share-alike (SA) or Non-commercial (NC) licenses)
- publisher allows text mining (software/spiders can automatically crawl journal content)
- publisher makes its citation data publicly available (ideally via participation in I4OC)

22-karat (*openness to reviewers: open reports*):

- refereeing reports are openly visible and citable

24-karat (*openness to community: academic ownership*):

- the responsibility for publication decisions is entirely in the hands of active professional scientists.

of so-called "predatory open access" journals in which editorial processes are curtailed in order to quickly cash in on artificially-inflated APCs. When markets work, they work. When they don't, they can turn a whole industry into a disastrous and nonsensical comedy.

Big Deals and cost consciousness

Another oft-forgotten point is that markets can only work when openness reigns. One of the most criticized aspects of the old and current systems is that the actual costs of subscriptions were often negotiated and kept hidden behind closed doors due to the imposition of non-disclosure agreements on institutions by publishers. Scientists in particular were (and still are) more or less totally unaware of the sums paid by their institutions to give them access to literature. The introduction of APCs thus had some positive impact by suddenly making researchers more cost-aware, albeit in a very incomplete, incorrect but still shock-inducing manner.

On the broader economic side, much has been discussed about the non-scalability of APCs. Institutions, even top ones, will not be able to afford the sums involved in an eventual sudden transition to APCs if these remain at current levels (let alone increase!). On the other hand, the very transition from subscriptions to APCs has led to the appearance of the "double dipping" phenomenon, whereby journals that still charge subscription fees nonetheless also charge APCs to subsets of willing authors to make their particular publications openly accessible, thereby putting even more financial pressure on university libraries than in the subscription era. "Big Deals" between institutions and publishers are also often in the news these days, in which whole swathes of academics suddenly learn that they can publish "free of charge" in particular journals. Although making researchers' administration work simpler, it also makes them blind to the financial realities involved in publishing. I have often reminded colleagues that this or that journal, while perhaps "open access", is certainly not "free of charge", and that through all their Big Deals, many institutions are repeating history and condemning themselves to face increasingly severe budgetary restrictions through their lack of power in forcing reform of publishers' practices (and thus of their finances).

A better model

In a very encouraging development, alternatives to current business practices are rapidly emerging. In physics, we have for the best part of three decades benefitted from the arXiv preprint server, which is funded according to a consortial model in which many institutions provide small-scale funds that (when added to some larger institutional grants) allow the whole infrastructure to be maintained and developed. This consortial funding model is now starting to be applied with success to the

BOX 2: METALLURGY FOR OPEN ACCESS BUSINESS MODELS

Gold [Au]:

- APC-based financing

Platinum [Pt]:

- publisher does not apply any charges to authors (APCs, submission charges or any other), and is funded through a consortial model or equivalent

Palladium [Pd]:

- publisher runs a purely not-for-profit public enterprise: none of its activities generate any profit, and all financial statements are publicly disclosed.

Combinations: In this scheme, Au and Pt are incompatible; Pt naturally binds with Pd, while Au and Pd can also mix consistently.

business of publishing, the best-known example being the Open Library of Humanities [7], which gathers institutional contributions to cover publishing costs (no APCs being charged). Looking at the figures [8] makes it patently clear that overall, this model is much more economical than either subscription or APC-based ones, and is the most credible way of applying downwards price pressure in the publishing market. The real question is why this has not been implemented more broadly.

Noble metals for a noble cause

Let us briefly change tack and perform a small but worthwhile exercise, which consists of resolving the developing confusion of what Open Access actually signifies, precisely what "Gold" entails, and whether one can actually try to differentiate between its different sorts.

First, the obvious: to call itself a publisher, an entity should perform at least basic tasks, such as running a strict quality-controlled peer review process, ensuring ISSNs for its journals, running professional-level post-acceptance production, operating an online platform for its content, providing metadata handling (registration of DOIs), providing linking of funding information back to funders and ensuring perpetual availability via a dedicated, digital archiving and preservation service. None of this qualifies as rocket science.

Turning now to Open Access, expectations scale up. Since gold (as a commodity) comes in different levels of purity, let us be inspired by metallurgy and adopt karat-level resolution for Gold content¹, in order to

¹ A more technically correct and modern scheme would be to use fineness (parts per 1000), but this leaves out all the desirable poetry.

differentiate the levels of open accessibility being delivered. One could propose the requirements in Box 1. One could perhaps debate the precise contents and ordering of this list, which in any case does not include all requirements one might think of. Still, it's a good start; but is it possible to go even further? What about more details on the business model? One commonly used label is to call non-APC publishers "Platinum" instead of Gold. Box 2 extends this even further by introducing "Palladium" to denote consortial-financed, not-for-profit publishers. Possible material combinations are also given.

Though karats are not traditionally used for precious metals other than gold, let us bend the rules and characterize publishers according to their business model (Gold (Au), Platinum (Pt) and/or Palladium (Pd)) together with their openness karat rating. One can then identify some publishers as Gold 18-karat, Platinum 22-karat, etc, allowing for a simple "lifting of the degeneracy" in the current nomenclature which packs too many things under the simplistic "Gold" label. Abbreviation fans can thus argue about whether they find Au10k publishers acceptable (some would call this category "Fool's Gold"), or whether they insist that Pt/Pd24k is the *crème de la crème* and the only model worthy of their support. Funders and institutions that are sufficiently forward-thinking about meaningful mandates could decide to reimburse APCs (up to a cap) only for 18-karat and above publishers, with a lower cap for non-Pd ones. On the workforce, scientists could decide to not do any unpaid refereeing or editing work for non-Pt/Pd publishers.

For talking about Open Access to doing it: SciPost

About two years ago, after much thinking on these issues, I decided to heed my colleagues' retort "if you care so much about it, why aren't you doing anything?" and founded SciPost, a nonprofit foundation whose online portal SciPost.org (launched in 2016) offers a complete framework for publishing (according to the classification proposed here, SciPost is a fully-featured Platinum/Palladium 24-karat publisher). For many people, this has rapidly become a demonstration of the fact that scientists are most often best served by themselves. With a strong start to its publishing activities in its first year, the first journal SciPost Physics is rapidly gaining recognition as a force for innovation. The results obtained until now amply justify the interminable hours of pro-bono work that I and many others have put into it, and pave the way towards a better and healthier publishing system. With its operating costs estimated at around 300 euros per publication (about a factor of 5 lower than the current norm), SciPost is in a position to be an alternative in

the publishing industry. Having managed to convince scientists that our services constitute a proper alternative to existing practices, our next challenge is to convince funders, universities and libraries that it is in their interest to support and join our cost-slashing consortial funding model.

The driver for change

Although we are far from done (we haven't even begun discussing impact assessment!), let us end here by performing a simple thought experiment. From next January, for a period of 3 years, imagine that all scientists agreed to exclusively submit their manuscripts to new emerging not-for-profit publishers fulfilling Platinum/Palladium 18-karat and above open access criteria (simultaneously, they would exclusively perform refereeing and editorial work for such publishers). What would happen then? By simply voting with their feet, scientists could exert overwhelming influence and drive the necessary transition to open access through all currently existing or perceived obstacles. Ultimately, the power to enforce change resides in the hands of us scientists: it is up to us to decide the future we want to see in publishing, and to make it happen in the way we want; namely, in the interests of what we love the most and is only too often forgotten in Open Access discussions: science itself. ■

About the Author



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