**Open Access Scientific Publishing**

The subject of this talk, Open Access publishing of scientific papers, is rather straightforward; at first sight maybe a bit boring even, but certainly very important. And if you look at it in detail: not boring at all!

**The issue**

Let me explain the issue. This is my Ph.D. thesis, defended here in Nijmegen nearly 35 years ago. Pages 28 through 44 contain a reprint of an article that I had published a year earlier in one of the leading scientific journals in my field, Nuclear Physics B. The same journal in which Gerard ‘t Hooft had published, in 1971, the article that won him the Nobel Prize in Physics in 1999. I don’t want to imply that my article was of the same caliber as ‘t Hooft’s, but I do want to illustrate that Nuclear Physics B was an excellent journal. And it was precisely for that reason that I was keen on including a reprint of my article in my Ph.D. thesis. This article had been ‘peer reviewed’, that is: it had been ‘quality controlled’, approved and published by a renowned publisher. In return I had to transfer copy-right to the publisher. My article was no longer mine, or my employer’s, and I had to ask for written permission to include it in my thesis. This permission was granted, of course, but it felt strange to ask permission to use what was obviously my own, my intellectual property. If I want to download a copy of this article today I have to pay $35.95 to the publisher. That does not feel right. Yet, this talk is not primarily about money, it is about Open Access publishing. It is about preserving the invaluable contribution of scientific publishing to scientific culture and scientific progress whilst making the publications freely available to anyone.

**Why Open Access?**

Why is free dissemination of scientific results so important? For several reasons. One. It is a moral obligation to grant members of the public free access to scientific results that were obtained through public funding, through taxpayers’ money. I get particularly irritated when I read in my newspaper that new scientific results have been published on, say, sea level rise, to find out that I have to buy the latest issue of Nature Magazine to be properly informed. Two. Scientific knowledge provides a competitive edge to modern ‘knowledge based’ societies and economies. Educational research, research on public health, on informatics, genetics, energy, on anything: results should flow freely into society and into the private sector to find their way into our daily life and into economic growth. Three. Science itself will benefit from a borderless information flow between scientific fields. In order to face the ‘grand challenges’ of today scientific disciplines have to cooperate and new disciplines will emerge. In the next decades the world population will grow to 9 billion. Energy, food, ageing – three issues that are an enormous challenge. Urbanization, logistics are two additional ones. Addressing them requires effective collaboration of researchers in all fields: social sciences, humanities, life sciences, natural sciences. An optimal communication between these researchers, through Open Access publishing, is essential for this effective collaboration to happen. Moreover, the availability of a comprehensive body of quality controlled (peer reviewed!) publications in big ‘findable and searchable’ databases will allow scientists, helped by intelligent, new ‘search engines’ to make new and unexpected interdisciplinary discoveries.

So that is the goal of OA scientific publishing: a vast, comprehensive pool of findable and searchable high quality publications. Where are we on the road from the classical situation that I sketched in the beginning of this talk, to the ideal situation of this ‘vast, comprehensive pool of findable and searchable high quality publications’?

**How to achieve Open Access?**

Although Open Access publishing leads to free articles for the reader, the cost of Open Access publishing is not zero. A scientific journal has an editorial board, an editorial office, is run by a publisher providing support and infrastructure: all this needs to be paid for, of course. Therefore, if you want to publish a journal, you need a viable ‘business model’. If you want to publish an open access journal, the classical ‘subscription fee model’ obviously will not do.

Let me start with a recent example of a successful, although for the moment time limited, transition of ‘classical’ journals to ‘open access’. I say ‘transition’ because the existing, familiar titles were preserved, only the business model changed. These familiar titles include, I am happy to say, ‘my’ good old Nuclear Physics B, owned by Elsevier. The transition, to become effective on January 1 2014, was accomplished by SCOAP3, the Sponsoring Consortium on Open Access Publishing in Particle Physics. The sponsors pay and the publishers publish and the reader, any reader, has free access. The sponsors include the libraries and the rationale is that instead of subscription fees they now fill a fund from which the publishers are paid. If the subscription fees were fair to begin with, this transition should be cost neutral. The detailed model underlying the SCOAP3 agreement is somewhat complicated because the contract involves many partners, libraries and funding agencies from many countries and several publishers, but the result is there. It took more than five years to arrive at this point, by the way. Basically the contribution a partner has to pledge is proportional to the number of publications submitted by, or rather, accepted from the ‘constituency’ of that partner. In this particular case our country, the Netherlands, is a little bit worse off than under the former subscription regime. Apparently our scientists are relatively productive, and the subscription fees were well negotiated... Fortunately this has not been in the way of signing the agreement – the benefits of OA publishing will be immediate. Financial benefits will come too, with the enlargement of the consortium and because the publishers are forced to provide more transparency once they have to deal with a robust Consortium like SCOAP3.

The, still fragile, success of SCOAP3 illustrates two points: 1. it can be done and 2. in practice it is not easy to keep the ‘classical’ publishers on board. By the way, the American Physical Society, publisher of various important journals (Physical Review Letters for example), decided NOT to join SCOAP3. I have not managed to find out why. PRL had the privilege to publish several seminal papers on the discovery of the Higgs boson; I hope that from now on our colleagues will send their papers to SCOAP3 partners.

Other and earlier examples of high quality Open Access publishing initiatives are available. PLOS ONE is a very famous one, it publishes scientific articles in the life sciences. I am not aware of the details of its business model, but no doubt it is primarily based on ‘author pays’ (often synonymous for: ‘research funding organization pays’). Sometimes ‘charities’ contribute. In the life sciences the Wellcome trust is very well known and very active. The success of PLOS ONE is based on a rigorous quality oriented editorial policy and on a dynamic and modern approach to the assessment of the ‘impact’ of the articles it publishes. It sets an example that deserves following. It is, however, not realistic to assume that a whole new body of scientific open access journals can be set up ‘from scratch’ like PLOS ONE, to replace all the existing ‘classical’ journals. This does not mean that credible initiatives to start ‘ab initio’ Open Access journals should not be supported. They should, and the Netherlands Organisation for Scientific Research, NWO, in fact has done so, from a modest fund for supporting Open Access publications that it created a few years ago.

BioMed Central also is a successful and influential Open Access publisher. It is – now – a daughter company of Springer, illustrating that traditional publishers ARE serious about Open Access. Having a look at the BioMed Central webpage I noticed an intriguing title: The Journal of Negative Results in BioMedicine: it is an open access, peer-reviewed, online journal that promotes a discussion of unexpected, controversial, provocative and/or negative results in the context of current tenets. A remarkable and much needed initiative, and not only in BioMedicine! NWO has a prepaid membership contract with BioMed Central facilitating administrative procedures for authors enjoying NWO support.

But: we also need to invest in transforming existing journals – we have to support the transition to new business models, allowing Open Access publishing. Scientific Publishing represents a many billion Euro/dollar market – transforming such a huge market certainly is not easy and many opposing interests are involved – it is an operation that requires international cooperation.

Where are we now?

Some publishers are opening up to Open Access. Reluctantly maybe, carefully certainly, ultimately more generously and irreversibly, hopefully. There are a few very famous and strong ‘brands’ however, who feel no incentive to change, because their position is practically impregnable. Nature and Science in particular. But also: Cell, The Lancet, The New England Journal of Medicine, Brain. Perhaps you can add your own favorites? Some of these journals are owned by commercial publishers, but some of them are, intriguingly, owned by ‘not for profit’ organisations. Science, for example, is published by the American Association for the Advancement of Science, the AAAS. The argument the non-profit organisations put forward for defending their profitable business model is that they invest their profits for the benefit of the scientific community, for example by organizing scientific meetings and the like. This, of course, is a non-argument that (deliberately?) misses the point and I find it surprising that it is not vitiated more firmly every time it comes up.

Let us have a look at an example. ‘Science’ (as mentioned above, published by the AAAS) is a journal that ranks among the handful of uncontested top-journals. Its reputation is based on an extremely selective publishing policy and its reputation has turned ‘Science’ into a brand that sells; with additional journals springing from the Science stem. ‘Science’ is not only a medium for scientific publications, it also publishes global news, commentary and advertisements. The same is true, even *a fortiori* for Nature, Cell and other journals published by commercial publishers: scientific publications are only a part, not even the dominant part of ‘the business’, but the reputation of the journal is entirely based on innovative science emanating from publicly funded research. Conversely, the reputation of scientists is greatly boosted by publications in these top-journals; top-journals with primarily an interest in *selling* and not in, for example, promoting the best researchers. It has puzzled me for a while already that national funding organisations are not more critical about the authority that is almost automatically imputed to the (in some cases full time, professional, paid) editors of the top-journals. I think an in depth, objective study of the editorial policies, and the results thereof, commissioned by research funders, is highly desirable and in fact overdue. I intend to take initiatives along this line soon!

The model adopted by PLOS ONE, referred to above, Open Access only, Open Access all the way, is called ‘the golden road’. That is the ideal situation. It should be the model of choice for newly created journals. But for the transition of existing journals a more gradual route, referred to as the green road, is an, albeit not ideal, more realistic compromise. The green road allows the co-existence of Open Access and restricted access for a certain period. The obvious disadvantage is a phenomenon referred to as ‘double dipping’: the added costs, including overhead, of both business models are larger than for the initial business model only; libraries will still have to pay subscription fees whilst research funders already pay publication fees. In practice the green road can take several forms. A ‘minimal’ form of the green road is the submission of the PRE-print to a local repository. Or the submission of a REprint, accepted for publication by an official journal, to such a repository, often after a certain agreed embargo period of 6 to 12 months or longer. Such an embargo period I find certainly NOT a good idea.

The green road is only viable as a route to Open Access if the repositories involved are findable, searchable, reliable, sustainable. An example is provided by arXiv.org for publications in Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance and Statistics. It is supported by participating member organisations and the Simons foundation. The member organisations include five Dutch universities.

The definition of what we understand to be the green road is not entirely clear. If the green road involves local repositories we should make an effort to define standards for repositories to qualify for inclusion in the green road. In the Netherlands a common effort of the university libraries and SURF should be undertaken to achieve a robust and sustainable network of repositories.

An unwanted but unavoidable side effect of the emergence of Open Access publishing is the appearance of so called ‘predators’. These are individuals or organisations presenting themselves as publishers, whilst they offer no credible quality control. Well established and trustworthy publishers sometimes refer to this phenomenon of predators as an argument against Open Access. I don’t agree with that. It is relatively straightforward to unmask these predators and put them out of business.

What I have described above is a rather conservative approach to the introduction of Open Access publishing, preserving the basic strength of anonymous peer review that is customary also in traditional scientific publishing. In web-based Open Access publishing innovations with respect to quality control, relevance and impact are possible and will certainly become customary as well. Although new approaches certainly offer possibilities for future innovations I will not insist on them here. A gradual rather than a ‘disruptive’ transition to Open Access is possibly more easily achieved and accommodated. In that case newly founded Open Access journals have the disadvantage of an initial impact factor equal to zero. For those who are not familiar with this: the impact factor of a journal is a measure of how often the articles published in it get cited. For new journals in new fields an initial impact factor of zero is probably not a big problem, because by definition both the journals and the authors are pioneers, starting something new. For established journals making the transition to Open Access the impact factor is carried over automatically, so no problem either. For new Open Access journals entering into competition with existing non-Open Access ones there is a problem – I hope we can find intelligent ways of circumventing this problem. ‘We’ includes research funding organisations like NWO.

What is going to happen next?

For researchers working in the Netherlands, funded by public resources, a very significant new fact is a letter that statesecretary Sander Dekker recently sent to Parliament. It is an impressive letter – if it were in English I could have read it here. It explains the issue, Open Access publishing, and it clearly states Dekker’s, and thus the government’s, preference: the golden road. Meanwhile, that is: before this ideal is reached, he encourages hybrid options and tolerates the green road. He is not ready to make additional resources available to pay for this. In the UK, the authoritative Finch report on, and strongly in favor of Open Access led the government to strongly support Open Access (as the first government in the world, I believe; ours is the second!). The UK government did make available additional resources to help the transition, but this is now believed to have slowed down the achievement of the golden road, instead of accelerating it. The measures the statesecretary announces in order to make significant progress over the coming three years, are:

1. *Discuss and come to a common position with like-minded countries*

He mentions UK, Germany, Denmark, Finland, Belgium, France.

1. *Create conditions to allow Open Access to develop*

In particular by stimulating contacts between publishers and the scientific organisations. In the beginning of 2014 he will organise a round-table conference for representatives of both ‘sides’.

1. *Reporting*

In order to obtain insight into the state of affairs he will ask universities, Royal Academy and NWO to produce an annual overview of numbers of Open Access publications through various, clearly defined (!) routes. In addition, these organisations and the publishers will report, in May 2015, about the agreements they have concluded and about the progress and the activities they will deploy in the following years.

And then: if the parties involved make insufficient efforts, or if progress is insufficient, he will propose to enforce the obligation for Open Access publishing by law in 2016.

Well, this position does not lack clarity! NWO will certainly do its utmost to support this position. It is true that the Netherlands cannot achieve this transition on its own. NWO is a member of Science Europe, an umbrella organisation of European research funding and research performing organisations. Science Europe is also supporting Open Access publishing and offers an excellent platform for aligning strategies.

**Conclusion**

Ladies and gentlemen, time to conclude. I will do so by repeating what I consider the most salient statements of this talk:

* On Nature, Science etc.: I think an in depth, objective study of the editorial policies, and the results thereof, commissioned by research funders, is highly desirable and in fact overdue.
* On the green road: The definition of what we understand to be the green road to Open Access is not entirely clear. If the green road involves local repositories we should make an effort to define standards for repositories to qualify for inclusion in the green road. In the Netherlands a common effort of the university libraries and SURF should be undertaken to achieve a robust and sustainable network of repositories.
* On the position of the Dutch government: In order to obtain insight into the state of affairs he (the Statesecretary) will ask universities, Royal Academy and NWO to produce an annual overview of numbers of Open Access publications through various, clearly defined (!) routes. In addition, these organisations and the publishers will report, in May 2015, about the agreements they have concluded and about the progress and the activities they will deploy in the following years.
* And finally: if progress is insufficient it will be enforced by law.

And I would like to conclude this lecture by wishing the students and starting researchers present here every success in their careers; publish your findings in the Open Access literature and convince your supervisors to do the same!

Thank you!

Lecture given by J.J. Engelen in the framework of the honors programme ‘Ethos in Science’, Nijmegen, December 11, 2013.