

# **“The end of the beginning, or the beginning of the end? A view from the twilight zone”**

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## **What are my qualifications?**

I have spent 37 years in publishing, in academic textbook publishing, childrens’ publishing, and in scholarly journal publishing for the last sixteen years, as a subscription agent, as a publisher and as a consultant.

I have also experienced other industries. I have been involved in consumer affairs in civil aviation for twenty-five years, and have seen that industry grapple with profound change – the shift from state ownership to the private sector, the emergence of new types of airline (the low cost airlines), and the troubles of the “legacy” carriers.

And I am approaching retirement. It has been “in two years time” since 1998! I am in my bath chair sitting by the electric fence at my rest home in the twilight. So I have a lot of baggage – my print heritage – but I have a lot of experience not just of scholarly publishing but also of other publishing sectors, and other industries. I have spent my life in my accustomed oily way, telling people what I think that they want to hear. But now I can stand back from the fray and look at what we do in publishing houses, and in libraries, and tell you how I see it, free from any concerns about my future career.

## **In order to understand where we are going, we need to understand where we have come from.**

Modern scientific enquiry, and the modern journal, have their roots in the sixteenth and seventeenth centuries, during which mediaeval explanations of the natural world, inherited from classical Greece, were challenged. Previously, all changes of matter could be explained by the interaction of the four elements, Earth, Water, Air and Fire, as the “self-evident” principles of solidity, wetness, volatility and heat endlessly mixed and separated.

The Greeks had devised a complete taxonomy of nature based on these principles by 350 BC, and for the next 1,200 years it proved capable of answering most of the questions that could be addressed to it. It saw its duty as recording and organizing what was known rather than exploring the unknown.

In the late fifteenth and sixteenth centuries this was overthrown, by:

- the discovery of America in 1492, discrediting ancient geography;
- Galileo, whose observations shook classical astronomy;
- William Harvey, who discovered in 1628 that the heart was a pump, and not a furnace.

All of these discoveries were physical discoveries. According to Sir Francis Bacon, one of the progenitors of the Royal Society, nature must be made to yield its reluctant secrets to the astute investigator, through rigorous experimentation.

The Royal Society was formally set up in 1662. Its ethos was practical. Founding members like Robert Boyle and Robert Hooke were dedicated experimenters. They did not construct abstract theories to which their results had to conform. Boyle preferred simply to report the results of his experiments, including negative results, and frequently lamented the lack of “histories”, or collections of experimental results and accurate observations.

In 1665 the Royal Society Council voted to allow Henry Oldenburg, the Secretary of the Society, to commence publication of Philosophical Transactions. In the same year, the Journal des Sçavants was first published in France, by Denis de Sallo, an adviser to the French Parliament. These two are the first scientific journals.

Philosophical Transactions set out the criteria by which new discoveries should be reported and published as the “minutes of science”.

- Registration: the establishment of the priority and ownership of research work by a particular author.
- Evaluation – certification: quality control through peer review and rejection, so that the better papers are published. Appearance of a paper in a particular journal stamps that paper and by implication rewards its author as being of the same quality level as the journal.
- Dissemination: the broadcasting of authors' claims to like-minded peers around the world through the channel that the journal represents
- Archiving: the establishment of a permanent record in the scientific literature for the work that was undertaken.

Philosophical Transactions was just the start. From the late seventeenth century onwards there is a steady stream of complaints about the mounting volume of print material that readers had to cope with. The number of book titles published annually in Britain increased four-or five-fold in the following century. The increase in the number of journals and periodicals was even more precipitate.

So scientific journals tended to become more specialized over the course of time, and to restrict access to their pages to qualified contributors. The tendency was brought to completion in the nineteenth century, when specialized technical journals became the preferred vehicles for detailed accounts of scientific research, at the same time that disciplines and faculties were definitively compartmentalized and professionalized. In 1833 William Whewell coined the name "scientist". Thereafter, it became common currency. From then until the Second World War journal publishing was dominated by the learned societies.

### **The commercialization of journal publishing**

What really makes me sick and tired of the debate about the future of scholarly journals is the puerile categorization of publishers into nasty money-grabbing commercial publishers, and the allegedly saintly non-profits. This is a distinction peculiar to the USA, and is driven by US tax law: non-profits don't pay tax! This distinction has tainted the debate, and is utterly irrelevant. My experience is that most publishers, regardless of their tax status, manage their businesses using the same commercial disciplines. The staff in publishing, regardless of the status of their employers, could not do their jobs unless they were committed to the value of what they do. There are much more remunerative careers to follow if money is the sole motivator.

Many think that the commercialization of journal publishing really only took root after 1945. But Philosophical Transactions was started as a private venture by Oldenburg, and was not taken over by the Royal Society until 1752. The world's first physics journal in English, Philosophical Magazine of 1798, was first published in 1798 by Taylor and Francis. The first clinical journal published in English, The Lancet was started in 1823 as a commercial venture. The first general science journal, Nature, has been published commercially since 1869 by Macmillan.

Nevertheless, commercial journal publishing accelerated after the Second World War. In the UK, Robert Maxwell saw that scientific societies were not keeping up with their growing disciplines. Maxwell was a publishing genius. He saw an unfulfilled need. He moved to meet it. He founded Pergamon Press in the late 1940s to publish specialized journals in emerging disciplines and new areas of research, because learned societies were not founding new journals. Pergamon journals were perfectly specialized for various emerging areas of science. In 1991 Maxwell sold Pergamon to Elsevier. Since then, Elsevier has grown to be the largest journal publisher in the world with 1,800 titles, followed by Springer with 1,400 and Informa, a recently formed conglomerate, with over 1,000.

### **Journals and research spending**

A slightly different historical perspective also teaches us some lessons for the future. There is a direct relationship between R & D expenditure in the economy and the volume of scientific literature that is published as a result. During the twentieth century, we can map three distinct phases:

- 1900 to 1945 is a period determined by low government funding on science, two world wars and the

learned societies as the major publishing force. For this period, the number of journals increased at a steady 3.3% per annum.

- The second period occurs from about 1945-1979: the period of the post war boom, the era of "big Science", the space race, unparalleled defense spending, and the Cold War. The number of journals increased at 4.7% per annum.
- From 1979, we entered a period characterized by a growing skepticism about the ability of science to solve the world's problems, and a public disenchantment about the quality and relevance of higher education. R & D spending was reduced, and the growth rate returned to 3.3% per annum.

This suggests, according to Michael Mabe, a self-organizing system where the rate of specialization of knowledge is the driving force, not economics, publishers or librarians.

### **Why is history important?**

Why is the history important? How does it inform what we do in the future? First, we can see a relationship between volume of published scientific literature and level of investment in our society in research. Secondly, the functions set out by the Royal Society three hundred years ago are fully embedded in the professional practice of research and do not seem to have changed over time. They are fundamental to scholarship and research. They continue to drive researchers' motivations to publish. The system of which we are all a part has served us well for 300 years.

### **So what is the size of our industry?**

Outsell's latest estimate is that the information industry is worth US \$ 384 billion in revenues. STM publishing – books journals and databases – is merely 5% of that, or just under \$20 billion. And it reckons that STM will grow more slowly than the sector itself. On the other hand, EPS has just published a report saying that the STM market will reach \$11 billion in 2008. They can't both be right! This shows the difficulty of documenting our own industry. But I think Outsell is closer to the mark, as serials publishing itself generates some \$10 billion a year.

The point is that it is tiny. We really have to understand how small our industry is. The serials business is smaller than the worldwide market for stamp collectors, or the UK market for chocolate. Its revenues are only a little more than double what BP made in profits in the first three months of 2006.

And size matters. Reed Elsevier, Thomson, Wolters Kluwer, Springer and Wiley are the five largest players, and they account for more than half of the market revenues. They have to be as big as that to make the investments in new technology – digitisation, navigational facilities, analytical tools and workflow solutions.

We are a niche. We are culturally and scientifically important. What we do provides a vehicle for research and innovation. But we are at the mercy of forces beyond our control.

### **Technology, expectations and opportunities**

The market for journals has been changed fundamentally by the adoption of online distribution of scientific journals by most publishers from the mid-1990s onwards. The use of the internet has grown exponentially. The scientific journal that is not available online is a rarity. Most important, technology has changed how faculty – our authors and readers - choose to work. Faculty are driving the demand for "one-stop shopping," "the complete workstation," etc. and that is requiring us to move from our traditional models to models that drive data to the desktop.

### **What has been the immediate impact? The big beasts in the jungle have started to notice us.**

- Google has been a player in the journal space for some years, with Google Scholar. But Google Scholar finds not only peer-reviewed papers, but also theses, books, abstracts and other material, from academic publishers, professional societies, preprint repositories, institutional repositories,

without differentiating between different types of content. It offers libraries two types of linking: through OCOC's WorldCat or via the library's link resolver. But it brings with it the potential to by-pass the library by providing the researcher with a powerful search mechanism direct.

Google has also launched Google Book Search. Publishers participate by signing up. Google also is digitising the collections of some major libraries. When the reader searches, the result is bibliographic information about the book plus a page before and after the search term. The entire book is available if it out of copyright. The reader can also buy the book via links to online booksellers. The reaction in publishing has been mixed. Many see Google Book search as playing fast and loose with copyright. It also drives more traffic to the Amazons and Barnes & Nobles, and puts independent booksellers at risk.

- This year, Microsoft has entered the fray with Windows Live Academic. Microsoft says that it is there to help the academic researcher. It goes to great lengths to reassure both publishers that it will work with them in conformity with copyright, and librarians that it wants to link to their Open URL resolvers. Microsoft has reached an agreement with CrossRef to assist in indexing and linking scholarly content so that the reader can research the literature across a range of journals. It is in beta test, and involves several publishers. Is Microsoft going to create an index, or is this to complement Scopus, Web of Science and the A&I services? It all sounds very comfortable at present.

But does anyone think that either of these companies is going to allow either publishers or librarians stand in their way if it is in their commercial interests to get to the reader directly? Both have immense market power, and the arrogance and insensitivity that go with it.

### **And what about Open Access?**

I want to reach beyond the sanctimonious claptrap of the Taliban of the open access movement. The much-vaunted revolution has not happened. Information should be free. Very seductive. Very sanctimonious. Of course librarians like the idea, because it relieves the pressure on the budget. Of course funding agencies like the idea, because they are rightly proud of what they sponsor and believe it should have the widest possible distribution. But...

- Overall access to journals has already improved, as library consortia and major publishers have negotiated "Big Deals" by which all libraries within a consortium have online access to all of the publisher's output. Despite some scepticism in libraries about the benefits of the 'Big Deal', they continue to buy into the idea. That access had improved immeasurably was confirmed by evidence given by faculty representatives at the House of Commons Select Committee enquiry two years ago. Evidence from organisations such as OhioLINK, the University of Toronto in Canada, the University of Warwick in the UK and Macquarie and ANU in Australia, supports that view.
- The Open Access journal is, as yet, unproven. Its business model has yet to be shown to be sustainable. Much of the demand for Open Access has arisen in the life sciences. The two most substantial Open Access publishers, Public Library of Science and BioMed Central, both publish exclusively within the biological and medical disciplines. Moreover, there is a steady convergence on the \$3000 per article cost of publishing that I discovered. BioMed Central has recently increased its fees to anything between \$675 and \$1730. PLoS has increased its fees for PLoS Biology and PLoS Medicine to \$2,500. The Royal Society – remember them? – has added an open access option for £225 or \$400 per page – \$4,000 for a ten page article. These fees are now within the range of publishing costs that I identified 3 years ago across a range of different publishers. Open access is not cheaper.
- While institutional repositories are on the increase, there is now plenty of evidence that only a very small proportion of authors are posting their papers to either subject-based or institutional repositories. I think that IRs have the potential to subvert the journal publishing process. But universities do not have an unblemished record in publishing – the proportion of successful and financially self-sufficient university presses worldwide can be counted on the fingers of one hand – and the institutional repository is a publishing vehicle. So I am sceptical.

And be mindful of the historical perspective. The current system is embedded in the way researchers – authors and readers – operate:

- University league tables, the academic reward system, and research assessment audits mean that authors, and their institutions, are reinforced in their desire to publish papers in the most prestigious journals. Authors are driven to publish in established journals of high repute – with high impact factors.
- Corporate and government library purchases comprise some 25 per cent of journal revenues while non-academic authors are much less significant as a proportion of total authorship. If open access journals establish themselves, the academic community will have to bear almost the entire burden of financing the publishing cycle.
- Many learned societies depend on publishing revenues to finance other member activities – seminars, conferences etc. Open access has the potential to undermine the financial underpinning of most learned society activities.

Sally Morris of ALPSP recently attended a meeting organised by the 'Science & Technology in Parliament' committee. She reported that little new was said about open access, and that the audience was small. Maybe we are beginning to see through the rhetoric and recognise it for what it is. Maybe facts are beginning to interfere with open access prejudices.

### **What do authors think?**

Frankly, academics don't care. In 2005 a report on author perceptions was published by CIBER, the Centre for Information Behaviour and the Evaluation of Research at University College London. It was based on a 2004 survey of 91,500 senior authors who had published in an ISI-indexed journal over the prior 18 months, yielding 3,787 fully completed responses from 97 countries and from every major discipline – a respectable response rate of 4 per cent – updated by a smaller more detailed survey of senior researchers in 2005. It revealed that:

- Authors' reasons for publishing remain the same; communication to their peers (not communicating to the public) is the principal driver.
- Only 30% feel they know much about Open Access;
- Most feel that access to the literature has improved in recent years, due to online availability;
- There is little enthusiasm for any form of author-pays model.

In my experience, and in the experience of other publishers, many authors do not want their unedited work posted. And the evidence is that they are not enthusiastic over self-archiving: an imposition and a waste of time and effort.

And authors don't seem to take communicating to the public very seriously, either. A recent UK study, funded by The Royal Society, Research Councils UK and the Wellcome Trust, found that a number of researchers saw public engagements as bad for their career and that it was done by those who were 'not good enough' for an academic career. The audiences scientists want to engage with are, in order of importance, policy makers (60%), schools and schoolteachers (50%) and industry (47%). Least important were non-government organizations (34%) and journalists (31%).

### **What are publishers in fact doing?**

In late 2005 Laura Cox and I undertook a survey for ALPSP of publishing practice of a cross-section of journal publishers in the UK, Europe, the USA/Canada and Asia. Of the 400 publishers surveyed, which included all the major commercial and society journal publishers whose output dominates the acquisitions of most academic libraries, 55 per cent responded, and their responses analysed. We found that 90% of journals are now online, compared with 75% in 2003. 93% of STM titles are now online.

### **What should publishers do in the future?**

Well, some are getting out. CABI has sold its 15 journals to CUP, so that it can concentrate on its indexing products. In other words, it is leaving the field to concentrate on information services with value added by CABI and under its control. Hodder Arnold has sold its 33 journals to SAGE, focusing on its book publishing.

Publishers need to develop the tools to search for and navigate the literature. They need to develop an array of tools that enable readers to analyse and manipulate the data. Two of the most creative applications of technology to conventional content are the OECD's SourceOECD and the Knovel engineering databases. It is almost as if the functionality is more important than the actual research papers. Readers are looking for ease of use and effectiveness: not just convenience, but efficiency, interactivity and applicability. They want to be able to apply the tools that come with the product to their own work. This is not just about saving time, but also about enhancing productivity. It is the creation of convenience, and the productive use of time, that will differentiate publishers from repositories.

### **Where does this leave libraries?**

Here I am on dodgy ground, because I am not a librarian. But I have many librarian friends, and I know what many research-based organizations are doing in re-engineering their information services. If you look at the corporate library world, things have changed already. GlaxoSmithKline has closed its library sites; its library services are now all electronic. BP hasn't had a library for years. Northrop Grumman closed their libraries three years ago and fired all their library staff; selection is made by the research departments, the legal counsel negotiates the licences and the IT folks knit it all together.

This may be extreme. But in the academy, the library has already changed. Research information is mostly online, and researchers don't visit the premises. The library has become an undergraduate hang-out. With the development of VLEs, how long will that last? The challenge is to ensure that librarians are seen to be critical to the provision of information services in the university. Take Heriot Watt's TechXtra web site as a good example. It means adding value to information in a way that is seen to require librarians' skills.

### **One view of the future**

Authors publish because they want to communicate with their peers. In choosing a journal, they are driven by a number of factors: speed of publication, the impact factor of the journal, quality of peer review and retrievability through abstracting and indexing services. The perceived reputation of the journal is a key driver of the decision where to publish, in all disciplines.

So the journal is clearly still a "brand" of significance to authors. But what about readers? It appears that, as online searching has become the norm, readers want to identify information of relevance at the article level. Nevertheless, the journal in which the article is published confers the imprimatur of quality that the journal itself has achieved. My personal view is that the journal as a vehicle for authenticated reporting of research is so embedded in academic culture that it will survive. There is an underlying threat that the academy could take back the scholarly communication and reporting process to itself and displace the industry to which this activity has been assigned for the past 300 years. That is what the open access religionists want. But the really big threat is from outside our cosy little industry. Watch Google, Microsoft and the other powers. Marx was right: if you want power, just follow the money.