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The De-Commercialisation of Scientific Publishing — Some Thoughts Against the Grain

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NB: Please note that British spelling has been retained.—KS

Introduction

There are signs that the electronic era is beginning to cause a shift in traditional practices with journals such as *Living Reviews in Relativity*, an elegant electronic journal, available free of charge. There is also the database of **Paul Ginsparg** at Los Alamos, and there are new enterprises in purely electronic publishing, from people with academic backgrounds who are searching for a less costly means of scientific communication and others are searching for a more complete form of communication using the facilities now available. Librarians are finding that the records of library usage for science journals no longer reflect the use and importance of an individual journal title, as access made directly via the Internet is without a library record. It is also true that some librarians are finding the changes difficult to accommodate. There have been expressions of distaste about the new electronic publishers using electronic means for publicising their journals, also distaste for CD-ROMs as archive material.

There is a growing recognition by libraries both in Europe and the USA that the commercialisation of science journal publishing is affecting the freedom of the system of communication which is using, increasingly,

distribution through the Internet, but the opposite idea that the Internet should make available everything and anything for publication simply makes a great turbid sea, hardly a limpid pool. Scientific and editorial standards would have to be maintained in any alternative. The refereed article is an essential part of searching if time is not to be wasted looking through literally hundreds of papers which have no guarantee of basic quality.

The importance of refereeing

Refereeing has always been a requirement of recognised scientific communication and such work is usually performed by academics free of charge. There is here an area of donated costs, by academics, which disappears within the costing procedures of commercial publishing, and which, if identified at source, could make a direct contribution to costs. Authors could prepare typeset text with modern Desktop Publishing systems (DTP) and, with some assistance, could prepare files for the Web site. There is, in this, the possibility of a movement away from traditional practice and towards academic control over the processes of production.

So, are we seeing a reversion to the eighteenth century, with science publishing by the individual within the learned community? If so, what would be the effects of such a change, on standards of editing and refereeing, on presentation and access, and on archiving? In the

eighteenth century a paper was read to one's peers and held in the society's archive for reference. Wider publication followed, of necessity for access at a distance, but was limited by the technology

Traditional versus Internet publishing

Ink on paper presentation has special production needs—ink, paper, machining, postage, storage, marketing—all expensive items, marketing in particular, as this is an open-ended need. How much marketing is needed to obtain a circulation capable of reducing the selling price of a journal? By contrast putting material directly onto the Internet is relatively cheap: a CD-ROM for archive, costs about ten dollars to produce.

At present we go from distributed author/reader to centralised publishing services, decentralised again to author/reader. It would be possible, with Internet, to go from distributed author/reader to centralised access by author/reader, but it would take an enormous change in traditional practices to achieve.

The ink on paper journal has several demands made of it. It is the database, in that all papers have to be there despite the need for access to any given paper. It is the file

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mately 10% of societies in this group sold the print edition by subscription, but allowed free access to the electronic edition (model 1). Another 27% provided institutional subscribers with some kind of option (models 5 to 9). The second most popular pricing model overall was the freely accessible, electronic-only journal (model 10). Only a few societies (all in the sciences) charged for access to their electronic-only journals (models 11 and 12). Two societies, both in the biomedical sciences, restricted access to the electronic edition to their members (model 13).

The overall picture combines standardization with continuing experimentation. Most scholarly and professional societies continue to publish in print, providing access to the electronic edition as added value for institutions or, occasionally, for members only. Nev-

ertheless, a significant number of societies are trying alternative pricing models that give institutions more options for purchasing online access in addition to, or instead of, the print edition. Societies publishing electronic-only journals

show a marked reluctance to charge subscription fees for access: most of the electronic-only journals in this survey were supported financially by author fees, society contributions and/or volunteer labor. While 1998 saw the introduction of many of the online journals, especially the electronic-only journals, included in this survey, the explosion of freely accessible, so-

ciety-sponsored online scholarly journals promised by some pundits has not yet occurred. I believe that 1999 will continue to see scholarly societies making inroads in the online publishing world; the further develop-

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ment of electronic-only journals will depend primarily upon the acceptance by scholars of the journals that now exist, and also upon the success of the financial mechanisms used to support them. I also anticipate that the current broad range of pricing models will start to be replaced by a few dominant models, as libraries continue to express their pricing preferences to societies and publishers.

<<http://www.against-the-grain.com>>

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index, title, year of publication, issue number, page number. It is the archive in that it stays on the library shelf, hopefully for many years and lies in the catalogue. It is not easily searched by subject in detail; this requires the memory of specialists. It is not easily accessed after the current year as it descends deeper and deeper into the physical archive, the stacks in the lower basement. It is also vulnerable in that it takes up a lot of space.

The ink on paper journal also has a long tradition, which has accumulated cultural necessities. The sense of achievement of an author seeing his work in print, is not an insignificant one. There are also the requirements of proof of publication for patents registration, for job applications, for higher degrees, for peer esteem and recognition. These matters will have to be accommodated by any system if change is to occur in an orderly fashion and is not simply driven by technology. So will the essential problem of the archive. And yet more, the electronic version is no longer just a clone of the ink on paper journal—there are new opportunities for presentation such as video and interactive molecule structures, and large databases of basic technical information. These things cannot be viewed nor archived in the traditional way.

The Internet: The new library?

But if the library ceases to be the central point for access to information, then there has to be an alternative. The Internet is becoming more and more cluttered; searching for specific scientific information without a guide will be difficult. There need to be a few search sites with good access, and a very good search engine, and they should be free of charge. There are agglomerations of information developing but they are around the subscribed journal, without the free and ranging access necessary for a search of the literature. Technically all this is quite possible; the problem lies in finding the revenue for maintaining such sites and in establishing a reputation for the quality of information stored. There would be the further problem of the abstract, which would be one of the first search levels. The ab-

stract would have to be the responsibility of the author and not some specialist in writing abstracts to avoid complex copyright problems, facilitate speedy publication and reduce costs. It would also need a new tradition for authors to write good abstracts which are effective search tools.

Institutional publishing: The Moscow experience

We are still looking at what is essentially an academic function rather than an admin-

istrative one, but once past this academic function then the operation is essentially administrative and technical. The authors of this article have been involved with the development of institutional publishing in Moscow. There the traditions and problems are very different from the West. The route taken was for editorial freedom with a cooperative publishing structure. This has imposed large technical and administrative problems for which a solution had to be found. We have developed a prototype suite of programs to approach the problems of administration and technical standards within small, essentially academic units, which wish to publish for an academic community. Many of the procedures are automated to reduce the administration and to make the technical facilities available to the non-technical. Also there have been experiments in author generated abstracts in mathematics, physics and chemistry, together with the procedures for accepting material from several editorial offices in many formats, and being able to make a single search base from TEX, 3D, other DTP formats, HTML and PDF files.

The centre of the group of programs is a local database written using FoxPro 5. This enabled an editorial processing system to develop for the particular requirements of the Russian experience—in particular that the system could run in parallel in Cyrillic and Latin scripts. Considerable detail was necessary on personnel working under Russian traditions and laws which required the payment for all services rendered—authors, referees, translators, typesetters, editors, in fact everyone, and as it was an international as well as a national operation there were complex tax laws to be followed. The Russian edition was “sold” at a cost which barely covered the postage, so it was in a tradition of free access to scientific information. The English edition had to carry the burden of the Russian traditions in a Western world. Then all of this had

to be managed so that papers arrived at the electronic clones of the English edition without technical assistance

being available in the next room. Later it was used to develop a system of electronic information in a union catalogue for the Russian academic libraries.

Such a specification produced some imaginative solutions to problems.

A local database provides the control over all stages of the publishing process—refereeing, typesetting, editing and printing—and accumulates data for further use in non-paper publication. The usual Internet search

engines are based on indexed files, which are linked to the corresponding PDF or other fulltext. This local database automatically generates indexes for any search engines—SGML, HTML, etc. The search engines with FoxPro for Windows, written in-house for UNIX/Internet, use these indexes for advance searching through online publications and CD-ROM archives. The same database has been used for the annual archival CD-ROM interface. Because FoxPro produces SQL compatible database files, the journal can be in Russia, the editor in Jamaica, and the printer in Antarctica. All staff, as with all end-users, can treat the same database files using SQL enquiry, (of course, with different security privileges). The full process of preparing the electronic version can be done by the secretary who knows where the Space and Enter

keys are on the keyboard.

“Electronic publication has two problems, transience and an interactive relationship.”

The present idea is to provide this set of programs free to institutions and

universities who wish to combine internal and external publication for access to the Internet, with access to a common search site. The development of the software is to be a shared exercise with some sort of central management control so that all participants would have equal access to the developments. The potential seen so far seems to indicate that this would be effective within particular departments making published and grey literature equally available as wished, together with the development of personal library lists with downloaded material in a local information base. This local base could also be integrated with the central library/information services. Outside of the university environment this suite of programs could provide a good working base for small specialist commercial publishers and learned societies.

All these developments were in relation to a commercial publishing programme. It was the work done on the Russian libraries which highlighted the relevance of this work to the expressed ideas of scientists in the West about de-commercialising publishing. The first clarity was the need to identify dispersed publication and to ensure standards of quality. The other clarity was the need for a mechanism which would replace the marketing, distribution and library functions of such dispersed publication. The All Russian searchable union catalogue suggested that the easiest way to achieve the second requirement was to have a single search site on the Internet. The search would be made on author, institute, title, abstract, text and date. The first requirement would need such a fundamental change in tradition that it was essential that the search site should be able to accommodate both traditional journal title publication as well as direct publication for many years.

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“... where there is necessity the impossible is possible.”

An examination of the more obvious problems of a de-commercialised science publishing programme indicates that with a developed "expert" system available at a reasonable cost, and one which could be used internationally by users in the developed world and the not-so-developed world, irrespective of language or script, the problems of publishing would be a question of culture rather than economics, though the culture may include economics if there is a tradition of payment for services such as authorship or refereeing, as for instance, in Russia.

The question of copyright in a non-commercial system seems to raise no problem if everything is given free. Payment implies ownership. If the author, the referee, and all the internal production costs such as typesetting were donated, so that the paper arrived at the "publishing" site free of costs or charges, then there would be no ownership beyond the copyright of the author. This would require that the paper should have the co-ordinates of publication for verification in case of commercial use of the ideas or against plagiarism, which would require some form of recognised integrity in the "publishing" site.

There would be limits as to what could be published in this way and what would continue in the traditional commercial form. There are authors who live by the commercial exploitation of their writings. This would define whole areas such as fiction and literature in its many forms: theatre, popular science, philosophy, politics, etc. On examination of this division it appears that the area of work suitable for an intensive use of this type of publication is relatively small, but it is also the most expensive to purchase, i.e. the so-called "hard sciences," extending perhaps to the clinical sciences and maybe some of the humanities or the science/humanities interfaces such as archaeology. The economic effect on academic library budgets would be considerable whilst on the world in general it would be relatively small.

The effect on the concept of the academic librarian would be interesting. Were this idea to be in complete operation, the science collection would cease to exist as at present. The budget allowance for the library, including the staffing would be challenged. The question would inevitably arise, "should the librarian reduce the role to that which remains of commercial publication in the academic library?" or should the role of the librarian change, as is being suggested now, to an "information manager" overseeing the processes and administration of the central and departmental library/information function? The total effect on the larger public libraries or on the great national libraries would be limited, the heaviest effect would be on the university library.

The question of archiving

Then arises the question of the archive. Who would be responsible for the archive? Certainly the electronic archive will bear no resemblance to the traditional ink on paper archive. Electronic publication has two problems, transience and an interactive relationship. The only organisation that would be able to clearly identify the whole archive would be the publisher, who would be aware of all the features. The interactive relationship would require an electronic archive. The CD-ROM seems to be the most effective way of distributing such an archive in a substantive way. The archive could be downloaded by a library or other persons, but the transience would make this inadequate as a true archive. The CD-ROM has a life of perhaps twenty years, but it is cheap and could be refreshed regularly from the publisher's own records, and in doing this any developments in technology could be incorporated, thus maintaining a live archive.

The problem here is that the true archive would be wholly dependent upon a commercial company which may or may not continue to exist. There could perhaps be a scheme for national libraries to maintain a full archive based upon the records, particularly the final record, of publishers but this could be costly and so likely to be in conflict with budgetary requirements. If, then, we consider the concept of a central search/publishing site for the sciences in the light of these questions, there does appear to be a route for some solutions.

Let us assume a site called *sciencesearch.org*. This site would be searched by author, title, institute, date, and by any string to identify subject within the

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abstract. The search could also be transferred to the fulltext. The site would make available, free of charge, all information except for fulltext. Fulltext is a sensitive area for commercial publishers who make their income from charging for information presented as commercial product in several forms. If this site were to be available for free publishing access then the fulltext of that material would be available free of charge. Where the fulltext is not available free of charge the site could provide links with the commercial publisher for further enquiry and access. Technically this raises few problems; the quality of the search engine and the availability of all formats, PDF, HTML and TEX would be essential.

Such a site would have to be self-financing, that would include start up risk, technical and hardware developments, staffing and management. It would also have to be seen both as independent and well regulated. There

are models for such an organisation. **Turpin Distribution Services Ltd.** for instance is well known in this business and runs as a commercial, self-financing organisation, within the **Royal Society of Chemistry** and is overseen by the **Publications and Information Board** of that organisation. There are other organisations like this, operating effectively, which would indicate that this Learned Society model could be a useful one. The question of the overview and regulatory committee, whose concern would be integrity and proper practice, together with the maintenance of common standards, is another matter. This organisation should be completely international with concerns for multi-lingual and multi-script science, from advanced and less advanced societies. A committee dominated by America and Europe would not be satisfactory, but then a committee looking like the United Nations may not hold out a satisfactory solution either. This is a matter for later consideration, but the experience of one of the authors as chairman of an *ad hoc* international committee of publishers and subscription agents which established the system of electronic transfer of subscription orders would indicate that where there is necessity the impossible is possible.

Conclusion: more opportunities

What is necessary now is the political will. There are so many special interests involved that moving in a straight line will be virtually impossible. Librarians will find their influence diminishing; commercial publishers will find their flow of papers and eventually their profits diminishing; Learned Societies relying on the income from publishing will also find problems in finance. There will be no

historic reference for establishing the division of budgets within universities; there will be no model for an economic stability for the future. Authors will still want to see their work in

their hands, and will, at first, be suspicious and will consider such a scheme as second level publishing. There will be much nervousness about the technical ability outside the Departments of Computer Science. But a start has been made.

"*Sciencesearch.org*" exists, and on this site can be found the first experiments with such a search site. The software suite providing the "expert system" is being used to make available the information. There is on this site explanations and demonstrations of what is being done. All this can be made available to any organisation which feels that it can and wishes to cooperate, but what is really necessary is a concerted research project to consider all the problems and to develop a model for the future. That is if there is a real wish to "de-commercialise" (a most unpleasant term) scientific publication.