Much of what the DML has been involved in is about the past: how to put mathematical works online so they can be accessed. A great deal of older, valued, published papers has been retrodigitized independently of the the DML, whether by publishers, or by societies, or by organisations such as JSTOR.

Much of this retrodigitized content is sold, rather than free, and libraries have been happy to pay for it, usually by a one-off payment for perpetual access, even when they own it in paper form.

They were willing to pay because, when done well (i.e. matching functionality of born-digital content) it was what their clients, i.e. mathematicians wanted, and because it's actually more cost-effective for them.

Even though there is much that is not retro-digitized well, or not at all, the principal journals are. So if the past is done and dusted What about the future?

One cannot ignore the fact that journal publishing models are in a state of rapid evolution and that the traditional one based on subscriptions is being eroded as new ones arrive.

One of the new models, which has in fact has been successfully co-existing with the subscription model for some years in life sciences is Open Access, in its various flavours.

By Open Access I simply mean that there are Article Processing Charges and these are usually paid by the author, or by the author's grant, or by the author's institution. OA has not yet been a success in mathematical science, and there are a number of suggestions for why this might be the case, the most obvious one being that mathematicians often don't have grants that are large enough to pay the publication charges, which typically in reputable journals are \$2000-\$3000. Moreover, for those so inclined, there are numerous free (to read and to submit to) journals that are reasonably well-regarded (and mathematicians aren't so bothered about things like Impact Factor). Plus there's the arXiv. Nevertheless there's been sufficient noise in the media and in the corridors of funding about OA that I think it's legitimate to talk about it.

By way of describing my view on Open Access I'd like to make a number of more general points.

1. Research content is not the whole story. It's also important to validate that research, to get measurable recognition for that research, to tell people about that research, to enable people to find, and to find out about, that research, to set that research in

a wider context. And to be able to do the above, reliably and consistently over a period of time.

If you accept that all these features have valid roles in the research/publishing life cycle, then it follows that in order to realise them all fully, it is important that the system for delivering the content has to have some functionality, and that this functionality needs to be paid for.

2. Publishing is competitive.

Authors are competing for journal space, journals are competing for papers, publishers are competing for library budgets. Authors are free to choose where they send their papers: if they want full service then they can submit to a traditional journal. If they are content to post on the ArXiv, then fine. Authors who do the latter might be more interested in making their work freely available than in validation or usability. Other authors might need to publish in a journal that has an Impact Factor, or they might want full-service editing. The choice is the author's: no-one is forced to submit a paper to a particular journal.

3. Publishing is not free.

Even so-called free journals are not free; even the ArXiv. Somebody has to pay: either time, in the case of volunteers, or with resource. Referees are also volunteers. Full service publishing costs more, and the more services that are demanded, the higher the publishing costs. Some services are demanded by authors, some by funding bodies, some by institutions. Who pays, and how?

4. The author or the author's institution is in general, the chief beneficiary of publishing.

Most papers are written to help one's career or to satisfy the requirements of funders. A great many papers are not much read or cited, except by the author. Now that journals are mainly accessed online, many are not even browsed, and papers are not found serendipitously. Many people regret this!

5. Practically everything can be read for nothing. Preprints abound, pdf versions of almost-final versions of papers are often available on an author's website, illegal copies of journals or books can readily be found on torrent sites, legal copies can be posted soon after publication. A publisher has to embrace these facts of life. One way of embracing it is to be overly protective: another is to admit that ownership of the content is just one aspect of publishing, as I have already stated. If you want subscribers to pay for your content, then you have to improve functionality, and to offer services that subscribers are willing to pay for. And if you admit that content is not everything, then it follows that copyright isn't either. It's not that important for a publisher to own copyright in the works it publishes: it just needs enough rights to enable it to publish a document legally.

6. What publishing model should I choose? There are basically four publishing models: Traditional subscription; Open Access with Advanced Payment charges, including hybrid (with the latter one pays for `replacement income', so the cost basis is higher than is needed); Journals that are free or partially free (i.e. subsidized or income raised in different ways); Repositories

As I have said, you get what you pay for. No free journal can really

offer the sort of service levels and functionality that one expects from a traditional subscription-based journal. Unfortunately the level of service one receives from OA journals is not always as high as one would hope (hybrid journals offer the same level for open papers as for 'closed' ones of course). Moreover, some OA journals

have a reputation for publishing anything as long as someone pays. Nevertheless OA journals do have a number of positive and laudable aspects. Papers are free for all to read, and they do offer some degree of functionality. The financial basis reflects better who benefits, and they also spread the cost of publishing: there are many institutions who want their faculty to publish more and more but do not subscribe to the journals in which they publish! Finally, APCs mean the author is choosing both the means of publication and the method of paying for it. 7. How to make OA publishing acceptable to mathematicians? I mentioned that mathematicians often don't have grants, or their grant makes no allowance for APCS. I believe that OA publishing has a future in mathematics. There is pressure from funders, from institutions, from faculty to break from the traditional subscription model without abandoning the functionality it offers. Researchers will be pushing at open doors if they request funds to support publication when applying for grants. Mathematicians just have to get used to applying for grants, and have to get used to spending it.

For this reason Cambridge is putting some money where its mouth is. We are to launch two OA journals in mathematics. They will be characterized by:

high-quality with very distinguished editorial boards; the decision to accept a paper will be independent of the means to pay, and will be based solely on the peer review process; they will offer full service (copyediting, uniform typesetting), and full functionality;

the cost basis for the APCs will be based on real and transparent costs and we estimate they will be no more than \$750 per paper at today's costs;

we will simply require a Creative Commons License from authors, not copyright; papers will be free to read in perpetuity.

And Cambridge will underwrite the publication charges for the first three years of operation, thereby providing a transition period so that mathematicians can indeed get used to APCs and OA publishing.