

## Intellectual Property Rights and the Scientific Information Chain

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### Introduction

The concept of intellectual property rights (IPR), which in the academic and research context are mainly concerned with patents and copyrights, has broadly speaking served society well in nurturing economic developments and an improved standard of living. They stimulate innovation by balancing creative work and investment, and by encouraging the ordered exploitation of scientific discoveries for the good of society. Broadly speaking they seek to maximise the public good by protecting monopoly rights (for 20 years in the case of patents but much longer in the case of copyright) to allow adequate reward for initiators while ensuring that the benefits pass eventually into the public domain. But while IPR's can aid conversion of good science into tangible benefits, the fact that they are monopolies can create a tension between private profit and public good in the short term. There are normally extra safeguards which allow these monopolies to be overridden in extreme circumstances such as national security, and also, importantly in the academic sector, to allow limited use for teaching and research so that new results and ideas can be passed on to provide the basis for future development. However, if this balance is not correctly set IPR's can hinder the free exchange of ideas and information on which science thrives. There is strong evidence that the balance has shifted in recent years due to social and political pressures on the one hand and to changes in technology on the other, in ways which threaten the well-being of the scientific enterprise.

The importance of these intellectual property rights has increasingly impinged on the academic community in recent years for a number of reasons. The greater emphasis on wealth creation, even in academic research, has distorted the old norms of academic behaviour so that everyone is now encouraged to consider the potential financial rewards that may be derived from their work. This can come from the funding agencies because Governments seek immediate returns, from Universities and other employers

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who are encouraged to look for funding outside the traditional state grants, and the academics themselves who are tempted by monetary rewards beyond those derived from professional recognition. This focus on research most likely to lead directly to IPR's is likely to damage the health of science in the longer term. Moreover evidence shows that, while there are a few big wins, most academic institutions draw little financial benefit from the exploitation of the IPR's. These issues have been broadly addressed by The Royal Society in a report called 'Keeping Science Open: The Effects of Intellectual Property Policy on the Conduct of Science', which can be found on their web site.<sup>1</sup> Much of what I have to say today relates to parts of that report.

The overall effect of recent changes has been to restrain the free-flow of information about new research and therefore reduce the benefits to the community in general. In an ideal world it may be argued that publicly funded research, particularly in universities, should be driven by the general spirit of enquiry, and based on the merit of the proposal from the point of view of science, rather than its potential for short term exploitation. Moreover, the merits of universities actually obtaining IPR's, as opposed to disseminating knowledge and allowing industry to develop these ideas in practical ways is not clear. The free-flow of information is vital to the research endeavour and any impediment is bad for science and bad for society as a whole.

The legal framework governing IPR's has been strengthened in recent years in a number of ways, usually by strengthening monopoly rights, *e.g.* by the restriction of exemptions, in the face of perceived threats to the rights holders from new technologies. An important component of this has been the international agreement TRIPS (Trade Related Aspects of Intellectual Property Rights) which is intended to harmonise IP laws and facilitate world trade. Improved international enforcement can have a disproportionate effect on poor and developing countries who are effectively denied access to information and patents (creating the so-called digital divide). At this point it is unclear whether the flexibilities within that agreement are sufficient to make the benefits that it brings to developing countries outweigh the disadvantages, and they need to give careful consideration to their IPR legislation.<sup>2</sup>

My colleagues in this section will concentrate on patents, on the recent changes in their interpretation and the legal framework on which this is

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<sup>1</sup> [www.royalsoc.ac.uk](http://www.royalsoc.ac.uk)

<sup>2</sup> [www.iprcommission.org](http://www.iprcommission.org) Policy Document 02.03 'Integrating IPR and Development Policy'

based, and in particular on their impact in the area of biomedicine where these changes have had the greatest effect. They are distinguished lawyers and will bring that focus and expertise. I am a scientist with expertise in publishing and will concentrate on copyright, from a scientists point of view.

## Copyright

Copyright is designed to stimulate creativity (*droit d'auteur*) and the investment required to make it available to the public (*i.e.* to publish) traditionally through the printed word. For a long period we have had an established paradigm for scientific publication through journal articles which was thoroughly understood by all concerned. Its halcyon days stretch from the 1950's to the 1980's when research was well-funded by the expectations of the time and libraries were separately endowed. The average researcher was not particularly concerned about the facilitators in the chain, the publishers and the librarians, as long as the job was done efficiently (and paid for) by someone else. But recent pressures have made this system untenable. There has been a vast increase in the amount of publication, driven in part by the 'publish or perish' syndrome where an academics career depends largely on his output of publications. In addition there has been extensive twigging of scientific disciplines and small specialised communities have found it convenient to have their own specialised journals. This has led to a dramatic increase in costs although the academic (who is both author and user) has until recently been shielded by the illogical funding structure of the scientific information chain which derives library support from outside the research budgets, leaving them dangerously exposed. While a potential solution to this problem is available through the new technologies, namely through electronic publishing, an accepted paradigm has yet to emerge.

Scientific journals, like other publications, are of course protected by copyright and traditionally this was transferred from the author, in whom it initially resided, to the publisher in exchange for the substantial value added to the material received through refereeing, printing and distribution. The publisher charged the libraries for the journals, and in some cases appeared to make excessive profits, but researchers traditionally relied on a 'fair dealing exception' to reproduce modest amounts of information. New digital storage and delivery technologies have provided opportunities for easier and cheaper delivery but the ease with which material can be disseminated over

the internet can prove a significant economic threat to the original publisher. This has been most obvious in the entertainment industries, particularly for music but also for film. The response of the rights holders has been to press for tighter legislation in which the special needs of the scientific community has been largely ignored. Fair dealing exemptions are being restrained in a number of ways. For example the optional exception allowed in European legislation following their Directives on Copyright and Database Laws allows limited copying "where there is use for the sole purpose of illustration for teaching or scientific research as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved". This is significantly different from the statement in the Berne Convention which allowed copying "for the purposes of private study and research". The lawyers will have a field day when it comes to the test in deciding whether the word illustration applies also to research and if so what illustration for research actually means and in particular whether there are other traditional uses in the research environment which are thus forbidden. Also while it is understandable that one might support a different regime for say a drug company to a university the definition of what is commercial research, particularly in the environment where wealth creation is being encouraged, will be extremely difficult to define. Much fundamental scientific research has a potential for later commercial advantage and it will be very difficult to decide when this line has been crossed.

One reaction from the Rights Holders, notably again the record companies, has been to introduce technical measures to prevent access to their material. The legislation provides for serious penalties for those who circumvent such technical measures. If this is applied to scientific journals it effectively negates the possibility of fair dealing. Moreover the legislation appears to allow fair dealing to be overridden by contract, and since most electronic journals are supplied by a direct contract between the publisher and the library this again has the potential to prevent the fair dealing rights on which we have all traditionally depended.

### **Alternative publishing models**

Faced with these changes, and the increasing expense of the current system, the scientific community has begun to react by investigating alternative models for the scientific information chain. This is of course more of a loop since the authors and the users are drawn from the same community and if

the costs of facilitating the information transfer can be reduced through restraint on the intermediaries it has a double advantage. One possible step is for the author, or his employer, to retain copyright giving only a licence to publish in a journal and retaining the right to use the material for example internally, and even disseminate it separately through the institutions own web site. Some disciplines like physics have developed a culture which uses preprint servers where research material is posted, unrefereed, for all to use. It is now so well established that most research physicists would regard this as the primary vehicle for informing their colleagues of their results, while its eventual publication in a refereed journal is more significant for their curriculum vitae and career prospects. But this model does not necessarily transfer to other disciplines. Many journals in chemistry have, for example, refused to accept papers which had previously been disseminated in this way. In the biomedical area, where there is more general and less well informed public interest in the material, it has been thought that unrefereed material might be positively dangerous to the general public.

A further development which is now the subject of much debate is the use of open access journals. This term is used a two levels. At one level traditional journals, particularly those from learned societies, agree to make their material freely available electronically after a time delay, typically one to two years after publication. This ensures that provided they have the connectivity even poorly funded researchers have access to the literature. This idea was first promulgated in the concept of Pub Med Central<sup>3</sup> by the National Institutes of Health (NIH) which would provide a repository for a large number of such journals in the biomedical field. In the event few publishers have been willing to place their material on that site but some do provide access by other means. A further development of this concept has been the attempt to create new journals which would be free *ab initio*. This of course requires an adequate funding model in which the most obvious solution is to require the author (or obviously his funders) to pay the equivalent of page charges. An older idea from the library community created journals under the SPARC programme which were funded in the traditional way but which were not for profit.<sup>4</sup> But providing the costs of publication, variously estimated as 1000 - 2000 dollars requires a radically different funding structure. It can be coherently argued that the agency which pays for the research should also pay for its dissemination since its cost is a tiny fraction (on average probably one per cent) of the cost of the research

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<sup>3</sup> [www.pubmedcentral.nih.gov](http://www.pubmedcentral.nih.gov)

<sup>4</sup> [www.arl.org/sparc/](http://www.arl.org/sparc/)

itself, which, assuming it was done for the public good is pointless unless it is properly disseminated. But this requires a redistribution of funds within an institution which is not easy to achieve in the short term. Moreover it would discriminate against those whose research, while of high quality, was poorly funded and make potential difficulties for the visibility of research derived in poorer countries. No doubt it would be possible to devise ways of supporting the dissemination of such research but this requires further development of the model. Recent experiments with this model by the Public Library of Science<sup>5</sup> and the Open Society Institute<sup>6</sup> have been given funding by the Moore and Soros Foundations respectively, but this is presumably not a long term solution. The present situation is the subject of an inquiry in the UK parliament by the House of Commons Science and Technology Committee.<sup>7</sup>

Such a change clearly represents a threat to the business of traditional publishers and is therefore particularly worrying for learned societies, several of whom make substantial profits from their publishing activities which they devote to other services to their community. Whether this is an appropriate way to fund such activities is a matter for debate and is a dilemma which several learned societies will inevitably have to face in the near future.

## Databases

Another change in the legislative structure which seriously affects the dissemination of scientific research are the new so-called *sui generis* rights relating to databases. The European Union decided that the traditional *droit d'auteur* did not cover compilations such as databases and introduced a new right like copyright to deal with this. It then attempted through the World Intellectual Property Organization (WIPO) to persuade other nations to adopt similar legislation but to date the United States and Japan have not followed suit. In the common law tradition of the UK and the USA some databases were already covered by copyright and a series of high profile cases established a threshold for the level of creativity required to obtain that. In the event the new European legislation was much more tightly drawn than that of traditional copyright. In particular it gave protection to the facts

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<sup>5</sup> [www.publiclibraryofscience.org](http://www.publiclibraryofscience.org)

<sup>6</sup> [www.soros.org/openaccess](http://www.soros.org/openaccess)

<sup>7</sup> Details of evidence are to be found at [www.parliament.uk/parliamentary\\_committees/science\\_and\\_technology\\_committee/scitech111203a.cfm](http://www.parliament.uk/parliamentary_committees/science_and_technology_committee/scitech111203a.cfm). The Royal Society response-Policy Document 04/04 is at (1)

themselves included into the database and while there were voluntary fair dealing exemptions for extraction they did not cover re-use. Hence the traditional way in which scientists take data from other publications in order to develop and compare it with their own is technically forbidden under the new database laws in Europe. The scientific community has been largely oblivious to these developments which I suspect have not impinged very directly because people have continued to operate in the old way in ignorance of the law, and to date there have been no relevant legal cases which have been largely confined to data in areas like horse racing and real estate.

Although the European Database Legislation is currently under review, indeed a report should have been sent to the Parliament by now, there seems little likelihood in spite of representations by ALLEA and individual academies, that there will be major changes. Instead the Community has begun to concentrate on circumventing these restrictions by making sure that key scientific data remains in the public domain. The most obvious case has been in the area of the human genome where the HUGO Project and EMBO have maintained the key database in the public sector while the threat from Celera of creating a private database has receded. It is important that scientists are aware of these issues and take steps to ensure that their data remain accessible to others and to encourage funders to ensure that databases are available that allow free or cheap access to and manipulation of the data.

## **Conclusion**

There have been a number of steps in the direction of making sure that the results of scientific research, both the data and the published articles, remain in the public domain. The Berlin Declaration<sup>8</sup> from German funding agencies and others encourages people in receipt of publicly funded grants to seek publications in open access journals and readily available databases. In the US there has been draft legislation submitted to Congress that would require those in receipt of public funds from US agencies to publish in this way, though there appears little likelihood that it will reach the statute book. In any case the culture enshrined in the US Constitution and its Freedom of Information Act requires more open access to public information than is traditional in our part of the world. Recently the World Summit on the Information Society has declared its support for open access to public

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<sup>8</sup> [www.zim.mpg.de/openaccess-berlin](http://www.zim.mpg.de/openaccess-berlin)

information<sup>9</sup>, and the Inter Academy Panel (IAP) has issued its own statement on 'Access to Scientific Information'.<sup>10</sup>

I believe that these initiatives, while they do not provide a full and final solution to the problem besetting the scientific information chain, do herald a significant change in the way in which the results of research are disseminated in the community, and they present real issues which must be addressed not least by academics and learned societies. The illogical funding of the scientific information chain means that library budgets pay for the journals and databases and hence the publishers profits. Even though these may be used by the organisation for the benefit of the community it is hard to justify this method of funding. A move towards a more radical form of author pays/open access could seriously erode the finances of these bodies.

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<sup>9</sup> [www.itu.int/WSIS-Document](http://www.itu.int/WSIS-Document)

<sup>10</sup> [www.interacademies.net](http://www.interacademies.net)