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Access to scientific and technical information - between social needs and private interests

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I. Introduction

Knowledge is vital to the development of the person, crucial to the ability of individuals to lead conscious lives and shape their own environments. This notion of individual development was a central plank of the Enlightenment, driving the early and remarkable commitment to universal education and access to knowledge which led to the compilation of the "Encyclopédia française" by Denis Diderot and Jean-Baptiste le Rond d'Alembert between 1751-1780¹.

As was clear even then, however, knowledge is never purely knowledge. The French *encyclopedistes* were engaged in constant battles with the censors of church and state, and their work was not even complete before a rival English company had begun selecting and ordering material according to quite different criteria in the "Encyclopaedia Britannica"². Almost every emerging nation state went on to produce one or even several encyclopedias to suit their own national interests. The partisan nature of supposedly objective information was exemplified by the ideological turf-wars over rival encyclopedias in 20th century Germany - with the liberal Brockhaus, the Catholic Herder, and Meyer aligned with the National Socialists.

That access to knowledge allows individuals to flourish is a qualitative matter too: it is not only the quantity of information and its accessibility that counts, but also the ways in which that information is presented, organised, and subject to verification. With its claims to objective truth and universal validity, all this is particularly relevant to information of an academic nature.

II. Scientific and technical information: from state centres to privatisation

1. The 1974 German IuD Programme

In the early 1970s, the German federal government drew up plans to create a new kind of "encyclopaedia" by establishing specialised national information centres for science and technology. The project was launched at a time of widespread discussions of "information overload" (Toffler 1970) and the accompanying difficulties of identifying material of scientific and technical relevance amidst floods of potentially useless information. Under the auspices of the then Federal Ministry for Research and Technology, the German government established the IuD Programme to provide information and documentation services in response to this challenge (BMFT 1974). The programme was to merge the activities of Germany's libraries and documentary services to form a nationwide coordinating body for every major subject, a "specialised information centre" which would centralise the provision of information for each field and offer the scientific and technical information required in order to keep abreast of a growing body of knowledge and society's increasing information needs.

At the time, discussions of information law and politics related mainly to the need to ensure that such an information centre was organised on constitutional lines. The starting points for these debates were consequently government objectives which made the following stipulations in relation to content:

- "- The existing plurality of opinion must be guaranteed in the collection, analysis and presentation of information, especially in subjective areas of scholarship;
 - the presentation of information must be objective and faithful to its content;
 - information must be fully accessible to all;
 - interested professionals must have the opportunity to participate in the design of information services;
 - information services must not be governed exclusively by commercial interests"
- (BMFT 1974, 31).

In essence, therefore, the programme concerned the rights to the free development of the individual, scientific independence, academic freedom, the right to the free pursuit of professional life, and other fundamental legal principles designed to guarantee access to scientific and technical information. It also sought to secure the rights of professionals to participate in its development, and to protect the range and diversity of academic information in the face of political, commercial, and other outside influences and constraints.

2. Information exchange on the internet

The IuD programme was never fully realised. Although a few specialised information centres were developed along its lines³, a comprehensive documentation system dealing with all areas of scientific and technical knowledge was not, it turned out, to be created by the state, but would instead assume the very different form of the internet. It is here that the information necessary to the conduct of scientific work tends now to be found. While Google itself indexes only a third of the world's websites, and although a great many links lead nowhere for a variety of technical and other reasons, a huge amount of the data crucial to scientific and technical research is now attributable to the internet. This development has more or less rendered the idea of constructing a national information centre obsolete.

The internet is, however, a very different kind of system which makes for very different kinds of working too. Processes of selecting information, which are vital to protecting the range and diversity of information, are now performed not by information specialists who are publicly employed and so democratically accountable, but are instead conducted by privately owned search engines. These bodies analyse the contents of websites and secondary search engines, rank search results according to their own very specific criteria, and also determine which websites will be analysed in the first place. This leads to evaluations which are not primarily content-led, but are instead based on self-referential systems which determine search result rankings by evaluating the nature and quantity of website links. The precise workings of these selection processes are Google company secrets.

Nor is it now the case that the organisational structure of information networks is determined by the German government or any other democratically accountable public body: responsibility for the network lies instead with US based providers who decide whether and to what extent users can access and use information by establishing *de facto* access thresholds and asserting their intellectual property rights.

These developments have made it impossible to assert access to information as an aspect of the right to the free development of the individual, of scientific independence and academic freedom. Where such claims are now made, they are no longer brought against the state, but against private interests. The main threat to the range and diversity of the information on offer is no longer posed by politically motivated state censorship, but comes instead from the commercial interests of information providers and the leading search engines. The right to access information is no longer a matter for public law, but has shifted to private law, specifically that relating to intellectual property.

3. The de facto privatisation of information

That there has been a gradual amassing of information by private companies and a creeping subordination of access to this information to commercial interests is clear. Unlike access to information in state libraries, archives, and other such public institutions, access to online information is not free, but must often be paid for. Publishers of scholarly journals and books allow their publications to be retrieved only in exchange for substantial payments, and this makes access to specialised information dependent on the willingness and ability of potential customers to pay.

That this development is an increasing hindrance to the accessibility of specialised information in non-traditional forms is clear from German discussions of the so-called "serials crisis" (Heckmann/Weber 2006; 995 ff.; Sandberger 2006, 818 ff.; Lutz 2012, 165 ff.). Spending cuts have left many libraries with reduced acquisitions budgets. This has led to them cancelling subscriptions for existing journals, holding only a few copies, not acquiring newly published periodicals at all, or acquiring them only in conjunction with other institutions. (Hilty 2006, 184). Print runs for scholarly journals have declined as a result, and it has become difficult to launch new periodicals in new areas of research. The publishers' response to these developments has been to increase prices and establish cartels obliging subscribers to take a whole package of journals or linking print subscriptions to the purchase of much more expensive online editions. All this has served in turn to accentuate the financial strain on libraries.

As a result of these developments, academic libraries and other information services find it increasingly difficult to hold a comprehensive range of publications in each area of work and to make these publications accessible and available for consultation. Users of such institutions can no longer rely on traditional information services to give them comprehensive access to specialised material. And where this kind of access to information does persist, users – as will become clear – are severely restricted in terms of the ways in which it can be used and, in particular, the forms their work can take.

III. Legal changes ensuing from the privatisation of specialised information

1. Ownership of information?

What makes these developments all the more disconcerting is that in principle the law does not recognise property rights over the content of information. Contrary to popular notions of

"intellectual property", there is no notion of information ownership even in intellectual property law. Copyright grants certain rights to works, that is to the concrete ways in which content is presented, but not to the content itself. Patent and trademark law protects against the commercial exploitation of information by unauthorised parties, but not against the simple apprehension of that information. Legal protections apply to information only if it is already published : trademarks are unprotected until they are registered; patents are not protected until patent documents have been made publicly available. And in many jurisdictions, copyright only applies to published works.

Assertions of copyright on scientific data, technical information and other such content are therefore often without any legal basis. This is particularly true in the Anglo-Saxon world, where almost every text, database, and scientific illustration is accompanied by a © sign or a Creative Commons Licence, even when it is clear that the corresponding publication cannot be characterised as a work from a continental point of view. Scientific publishers are also fond of asserting rights to publication layouts all around the world, regardless of the fact that they have no legal basis outside the UK.⁴

Access to information is often denied not because of exclusive intellectual property rights but, as long as no legal issues of data protection or security are involved, merely on the basis of *de facto* barriers. Once these practical obstacles have been overcome, there is nothing stopping the information being freely used, even against the will of the parties or institutions this affects.

It is also the case that the opportunity simply to apprehend information, even when it is in a form protected by copyright, is not restricted by copyright law. As far as copyright is concerned, the statutory exclusive rights enjoyed by the beneficiaries of protected works do not apply to the enjoyment of a work, such as reading an academic publication, looking at a published item on a screen, studying plans or other technical information, or any consultation of published materials of this kind. The enjoyment of a work is free, and cannot be forbidden or restricted by the instruments of copyright law. Copyright is only relevant to the use of a protected work when the work is reproduced or made available to an audience beyond the private sphere.

However, new technologies mean that much of what in the analogue world was understood as the enjoyment of a work becomes a matter of its utilisation in the digital world. Someone who opens a work on a screen in order to read it, makes a copy of it too. When a library shares a file, rather than lending a journal or a book, it creates a copy. If the shared file is then downloaded, another copy is made. This means that in the digital world, the enjoyment of a work is suddenly subject to copyright. The reading of texts which have been downloaded from the internet or made available in

digital libraries is no longer merely a matter of reading, but because it is inseparable from countless acts of reproduction, is always a matter of exploitation too.

2. The legal protection of technical measures

The ownership of information underwent a paradigm shift when legal protections for effective technical means of protecting information were introduced as required by the 1996 WIPO treaties and implemented by the EU Harmonisation Directive of 2001. Although they were designed to improve the protection of copyrighted works and services against unauthorised use, they have in fact made access to information more difficult and sometimes impossible, not least in relation to scientific information and technical data. In the case of an electronic journal, technical means of protection do not merely prevent the unauthorised use of copyrighted materials, but apply to the use of the journal as a whole. Technical protection measures can also be installed in files containing absolutely no copyrighted content, such as simple collections of scientific data (Lutz 2012, 26 ff.). Experience has shown that these technical means of protection have a marked tendency to go too far (Egloff 2007, 711).

Article 6 of EU Directive 2001/29 does attempt to curb their excessive effects, but the fact that its provisions are virtually incomprehensible suggests that no one involved in designing them ever considered quite how they would work. In the meantime, standards have been incorporated into national legal frameworks in very different ways. In Germany, § 95b of the Copyright Act allows restrictions to be enforced in certain cases but, not least because it does not apply to the internet, this has not produced effective safeguards against the excessive impact of the protection of technical measures. The wording of § 95b of the Copyright Act pays great attention to the interests of the music industry and publishers, but far less to the evident interests of education, science, and research. As a consequence, the legal protections afforded to technical means of protection continue to extend far beyond the capacity of intellectual property law to protect copyrighted works or services from unauthorised use.

Particularly problematic is the fact that these technical means of protection make it impossible simply to read the content of online journals, regardless of whether the text is copyrighted or not (Hilty 2006, 179). The ownership of information, which does not exist in law, suddenly becomes legally enforceable. Contrary to the law, the copyright-free enjoyment of a work becomes part of the beneficiaries' exclusive rights. Access to scientific and technical information is socially desirable and a basic legal right, but now it is severely curtailed.

3. The sui generis protection of databases

The *sui generis* protection of databases, which was introduced by the EU Directive 96/9/EC of 11 March 1996 and subsequently passed into the national laws of EU member states, had very similar effects. This *sui generis* protection also applies to the content of information, and not merely the form in which it is presented. This makes it a means of preventing the re-use of information, which puts it in direct contradiction to the basic principles of copyright law. Fortunately, the scope of this database protection has been greatly diminished by the European Court of Justice, with two landmark decisions in 2004⁵ which made it clear that the notion of "a substantial investment in the acquisition, verification, and presentation of content" relates only to the costs of systematising and verifying existing data, and not to those of acquiring it. Such investments include only the use of private capital, not funding from public subsidies or similar sources. These clarifications have largely reduced database protection to exceptional cases within the sciences. This does not however alter the fact the protection of databases is based on the privatisation of content and a monopolisation of knowledge which are anathema to an open society.

It is not even obvious that European database protection is effective from an economic point of view. The European Commission introduced it because Europe's information systems were thought to be lagging behind those of the U.S. and Japan, and it was felt that the investments necessary to improve the situation would not be made without effective legal protections being in place. Ten years later, however, the same European Commission found that the ratio of database investment between the EU and the US, where there is no such protection, actually decreased from 1:2 in 1996 to 1:3 in 2004, and that the Directive had even had a negative impact on access to data and information⁶. The hope that legal protections for databases would encourage investment in private databases had completely failed to materialise.

4. The inadequacy of statutory licences

The statutory licences enshrined in copyright law should be used to counteract the increasing privatisation of specialised information. They should enable copyrighted works to be exploited even without the author's permission where there is a public or overriding private interest in their unrestricted use. Germany had such statutory licenses for private use, for the use of protected works in schoolbooks, and so on, for some time. Despite the fact that they did not apply to scientific research, it was possible to conduct academic work using analogue texts without major difficulty on the basis of existing exceptions and the freedom to enjoy a work. This applied only to analogue

texts, however. In the digital context these rules were more or less useless.

True, German copyright law has since been amended to take account of digital works, and statutory regulations have been put in place to deal with ordering and dispatch of electronic copies, and the reproduction of works on electronic readers in public libraries, museums, and archives. These provisions are however secondary to any contractual agreements, as well as being so detailed and so specific to particular cases that they are too expensive to be implemented by libraries and documentation centres (Lutz 2012, 134 ff). Worse still, the ways in which they stipulate particular ways of working are almost grotesque: those who study or engage in research are kindly requested to do so at their university desks, not at home or at an external research institution, and certainly not on some network node that might be anywhere. Texts and other documents may be installed, viewed and printed on the particular digital readers based on an institution's premises, but they cannot be copied to mobile devices or even read together with colleagues if the library in question holds only one physical copy. These provisions place enormous obstacles in the way of academic work which finds itself denied all the advantages of the digital world and thrown back into the Gutenberg age.

These limitations do nothing to counteract the privatisation of scientific and technical material but, on the contrary, serve only to recognise and protect this privatisation in law. Regardless of any claims to academic and professional freedom and other fundamental rights, access to specialised information and its simple apprehension remain subject to the consent of its providers and so largely dependent on financial recompense. The freedom to enjoy a work is lost, and academic teaching and research are conducted in line with the commercial terms agreed by the providers of information. Any hope of fulfilling the IuD programme's goals – ensuring plurality of opinion in the collection, analysis and presentation of information, providing universal and comprehensive access to information, not being confined to commercial interests, etc. - now seems far away. German copyright law has completely sacrificed social need to private interests.

IV. The demand for access to scientific and technical information

1. The Open Access Movement

The emergence of a movement to counter this subordination of scholarly information to commercial interests comes as no surprise. The opposition of development organisations, academic bodies, and research circles has grown into a world wide Open Access Movement.

The call for "Open access to knowledge" was first formulated in the UN Economic and Social

Affairs Council's Millennium Declaration, "Development and Cooperation in the 21st Century: The role of information technology in the environment of a knowledge-based global society". Item 15 of this declaration stressed the importance of universal access to knowledge and information to the promotion of development⁷, The declaration was joined by the Budapest Open Access Initiative, in which researchers from various fields across the world publicly required that research results should be freely available on the internet⁸. These demands culminated in the Berlin Declaration of 23 October 2003, which defined Open Access as "a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community", and based it on two criteria. One is that there should be an irrevocable and worldwide right to access publications, to copy them in any medium for any responsible purpose, to use, distribute, transmit and publicly reproduce and create derivative works from them and distribute these as long as authorship is correctly attributed. The second is that a complete version of the work and all supplementary materials should be deposited in an online archive maintained by an academic institution or a similar body in order to enable open access, unrestricted distribution, inter-operability, and long-term archiving⁹.

Since then, demands for Open Access have been repeated and developed in many different ways and in numerous declarations made by national and international bodies and interest groups. Many journals and repositories are now organised on "Open Access" principles, and some significant funding bodies, including the EU itself with its research programme "Horizon 2020", have taken the decision to make funding conditional on research results being publicly available on at least one Open Access platform. Argentina was probably the first country to pass a specific law obliging state-subsidised scientific and technical research institutions to establish a digital repository in which their research results are accessible to the public and at no charge¹⁰. The implementation of this new policy has however met with fierce opposition from scholarly publishers. Elsevier, the world's largest scientific publisher, initiated legislative moves in the US to make it impossible for funding to be conditional on Open Access publication¹¹, and in Germany this requirement was denounced as a violation of the constitutional freedom to publish¹². To date, such resistance has been largely unsuccessful: The motions in the Senate and U.S. House of Representatives have been rejected, and the accusations of unconstitutionality levelled in Germany were dismissed out of hand in the "Joint Statement by German Science Organisations" published by the Alliance of Science Organizations on 25.3.2009¹³. The joint declaration on "Open Science for the 21st Century"¹⁴, which was published by the European Academies of Science and the EU Commission on 11./12.4.2012, makes it clear that the demand for public access to scientific and technical information now has a solid political foundation.

2. The secondary exploitation right of § 38 paragraph 4 of the Copyright Act

Key to the efforts of scholarly publishers to monopolise their published content is the acquisition of the copyright to the relevant publications. Those who wish to publish in the most prestigious journals of the world's biggest houses have to agree to a comprehensive surrender of the copyright on the published work. The creators and originators of essays and other works thereby lose the chance to make them accessible to a wider public by republishing them elsewhere. At the most, they can present the results of their research again in a form quite distinct from that in which they first appeared.

In 2005, Gerd Hansen of the Max Planck Institute in Munich published a statement recommending that this practice should be made unlawful, and that authors should be granted the inalienable right to republish their works in their own professional contexts as well as in academic journals (Hansen 2005, 378 ff.). This would at least guarantee authors the opportunity to put their work into their own professional repositories or on their own websites and the websites of the institutions where they work, to make it accessible to the relevant circles. This advice was taken on board by German legislators who, again in the face of massive opposition from publishers (Krings/Hentsch 2013, 910), enshrined it in the new limitations of copyright law which came into force on 1.1.2014. This amendment gives authors of works which have been produced with public funds the inalienable right to publish their work again after a 12 month embargo¹⁵, and the thinking behind it mainly concerns secondary publication in online repositories designed on Open Access principles.

This amendment is, however, half-hearted. It applies only to publications in journals which appear at least twice yearly, and only to research work which has received at least half of its funding from the public purse. The period of 12 months is extremely long, particularly in scientific fields. And it is utterly incomprehensible that only the accepted version of the manuscript, and not the published edition, can be exploited again (see also Lutz 2012, 240 f.). No one seems to have been bothered by the difficulties this poses, not least to accurate citation.

3. A clear need for legislation

With some significant refinements, these secondary exploitation rights could doubtless become an important legal instrument. Fundamental reforms would however be necessary to secure open access to scientific and technical information in line with the original idea of the *encyclopedistes* and the promises of the old German IuD programme. Such reforms would also have to deal with the

structure of the internet itself. How secure is access to this network? Who can guarantee that access to the internet of the future will be free and more or less unlimited? Where is the guarantee that today's plurality of opinion will be there tomorrow too? How can we avoid the possibility that Google will one day start to charge for favourable search result rankings?

It is astounding that while we have a plethora of rules for the press, radio, TV and other media, we take an infrastructure as important as the internet as a given, and pay so little attention to the information it provides. We leave whole swathes of private and public communication unfiltered, unverifiable, and in private hands.

In terms of scientific and technical information, any improvement must aim to open up access to scholarly publications and restore the freedom to enjoy a work. This could most effectively be achieved through the creation of new statutory licenses and the expansion of existing licenses to cover the use of works in the sciences and other areas of research. EU Directive 2001/29 provides for such restrictions, and their implementation would be easy if the political will was there. They should - and could - be designed to facilitate digital research using copyrighted materials regardless of individual permissions. And unless the very problematic protections enjoyed by databases are not simply removed, the same restrictions should also be applied to the use of databases for research purposes.

V. The particular case of text and data mining

1. New forms of information processing

No discussion of access to specialised information can ignore the extent to which the political debate continues to rely on a very traditional understanding of scientific work. According to this view, existing material is first collected, extracts are made and new data is developed, the results are filtered, and new texts are produced. The work is done alone, with assistants, or by a whole team. In each case, the potential scope of the information processing depends on the capacity and the number of people involved.

Such ways of working are far too limited for many academic areas. The sciences in particular are seeking to evaluate existing research results automatically, and for this the literature needs to be searchable by specific keywords, or more often combinations of keywords, so that researchers have only to deal with those results in which the keywords actually appear. Searches are often performed

using ontologies, which represent particular concepts in subject-specific contexts and thus allow the automatic search to be refined. Such automated analysis can also be used to determine previously unknown relations between data or events and therefore to discover new causal connections. All this is only possible if such search methods are legal, and if the material is available in a form that is computer-readable and designed to make them possible.

A good example comes from the field of climate research. Changes to biodiversity are an important index of climate change, and questions about where and when species have existed, still exist, or no longer exist are therefore of enormous interest. To answer these questions it makes obvious sense to make use of the scientific literature which has accumulated over the centuries. In practice, however, this turns out to be a Herculean task, even in quantitative terms. Some 12,000 species of ants are known today, and the scientific literature on ants comprises at least a million sites. There are 28,000 different species of spiders; in botany, the numbers are even greater. Any meaningful analysis of such data depends on the ability to make a complete and thorough assessment of the literature. No individual or single research group can read and evaluate such material. But a machine can do so. Were the relevant publications to be presented in computer-readable formats and open to automated text and data mining, it would immediately be possible to determine where the ants or spiders of interest appear in these millions of publications, and so to reconstruct their geographical distribution at specific points in time.

It is clearly a matter of public interest that such forms of information processing should be practically possible. But if the compilation of the literature to be prepared for automated text analysis depends on licences being obtained for each individual publication and on the basis of conditions varying from publisher to publisher, this kind of information processing is simply not technically feasible¹⁶. As long as payments have to be made in order to compile and consult every single text, regardless of whether or not it will be used for concrete research work, it is also financially unrealistic. Automated text analysis of larger data sets is only possible on the basis of consistent rules for accessing information, independent of individual permissions.

2. "licenses for Europe "

It was on the basis of this public interest in modern text processing and data analysis that the European Commission gave one of four working groups set up in connection with its "Licences for Europe" programme the task of developing practical regulations to facilitate text and data mining.

The group was to look for forms that would facilitate text and data mining for academic purposes on a Europe-wide basis at least.

Little of practical value emerged from this work, however. The academic publishers participating in the working group refused from the outset to discuss any solutions other than the granting of individual licenses, while the academic representatives tried in vain to show that licensing should depend neither on the amount of work involved, the nature of the funding, nor the results of the research. In the face of the publishers' blanket refusal to even discuss other approaches, the academic representatives were compelled to leave the working group after only a few sessions. This has meant that text and data mining continues to be greatly restricted within the EU, where the only forms it can take are those governed by agreements made between scholarly publishers and individual researchers.

3. The demand for new statutory licenses

That great swathes of academic literature are in principle accessible on the internet therefore belies the reality of the situation: large parts of this information are inaccessible for technical reasons, and still more is hidden behind innumerable barriers removable only by payment. The freedom to enjoy a scientific work is very limited, and automated text analysis of the kind necessitated by the sheer volume of academic publications is highly restricted or quite impossible in the context of privatised specialised material.

This situation can only be improved through legislation. Statutory licences should be used to re-establish the right to the free enjoyment of a work and secure the unrestricted use of academic literature for academic research (Egloff 2009, 16 ff.) This would reiterate the principles of access which the IuD programme sought to enshrine in law: to protect the existing range of opinion in the collection, analysis and presentation of information, to make information fully accessible to all, and to ensure that the provision of information is not beholden to commercial interests. These conclusions were reached 40 years ago. Statutory limitations of copyright law would be the way to make them a reality at last.

Bibliography:

Bundesminister für Forschung und Technologie (BMFT): Programm der Bundesregierung zur Förderung der Information und Dokumentation (IuD-Programm), Bonn 1974.

Egloff, Willi (2009): Wissenschaftliche Forschung und Urheberrecht, in: *medialex* 2009, 11 ff.

Egloff, Willi (2007): Das Urheberrecht und der Zugang zu wissenschaftlichen Publikationen, in: *sic!* 2007, 705 ff.

Hansen, Gerd (2005): Zugang zu wissenschaftlicher Information – alternative urheberrechtliche Ansätze, in: *GRUR int.* 2005, 378 ff.

Heckmann, Jörn / Weber, Marc Philipp (2006): Open Access in der Informationsgesellschaft, in: *GRUR int.* 2006, 995 ff.

Hilty, Reto M. (2006): Das Urheberrecht und der Wissenschaftler, in: *GRUR int.* 2006, 179 ff.

Krings, Günter / Hentsch, Christian-Henner (2013): Das neue Zweitverwertungsrecht, in: *ZUM* 2013, 909 ff.

Lutz, Alexander (2012): Zugang zu wissenschaftlichen Informationen in der digitalen Welt, Tübingen: Mohr Siebeck.

Sandberger, Georg (2006): Behindert das Urheberrecht den Zugang zu wissenschaftlichen Publikationen?, in: *ZUM* 2006, 818 ff.

Toffler, Alvin (1970): *Future Shock*, London: Bodley Head.

¹ Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers. Mis en ordre & publié par M. Diderot, de l'Académie Royale & des Belles-Lettres de Prusse; & quant à la Partie Mathématique, par M. D'Alembert, de l'Académie Royale des Sciences de Paris, de celle de Prusse, & de la Société Royale de Londres, Paris 1751 – 1780.

² The first edition of just three volumes appeared 1768-1771; the second, ten volume edition was published 1777-1784.

³ For example the Fachinformationszentrum Karlsruhe (today known as FIZ Karlsruhe – Leibniz-Institut für Informationsstruktur) which was established in 1977, or the Fachinformationszentrum Chemie in Berlin (now partly taken over by Wiley-VCH), founded in 1981.

⁴ British copyright law once protected not only "works", but also "typographical arrangements". These additional legal controls are no longer in place, but survive in the form of "design of typefaces" (for comparison see for example sections 54 and 55 of the 1988 CDPA)

⁵ European Court of Justice decision, 9.11.2004 C-203/02 (British Horseracing Board) and C-46/02 (Fixtures Marketing Ltd.).

⁶ EU Commission, First evaluation of Directive 96/9/EC on the legal protection of databases, Brussels, 12.12.2005.

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- ⁷ United Nations / ECOSOC, Ministerial declaration of the high-level segment submitted by the President of the Council, 11.7.2000.
- ⁸ <http://www.budapestopenaccessinitiative.org/>.
- ⁹ Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, 22.10.2003.
- ¹⁰ Ley Nacional 26.899 vom 13.11.2013, published in the official bulletin of 9.12.2013.
- ¹¹ In the US House of Representatives a "Stop Online Piracy Act (SOPA)" was introduced; in the US Senate a "Protect IP Act (PIPA)". Both motions were dismissed by the respective chambers.
- ¹² See in particular the so-called "Heidelberger Appell", initiated by the Heidelberg Professor of Literature Roland Reuss and supported by numerous publishers.
- ¹³ Hochschulrektorenkonferenz, Open Access und Urheberrecht: Kein Eingriff in die Publikationsfreiheit, Bonn, 25.3.2009.
- ¹⁴ ALLEA (All European Academies, The European Federation of the National Academies of Sciences and Humanities), Open Science for the 21st Century, Rome, 11./12.4.2012.
- ¹⁵ § 38 Abs. 4 UrhG,
- ¹⁶ The following figures show the scale of the problem: the world's largest, but by no means complete directory of publications, "Ulrich's Periodicals Directory" lists some 340,000 journals, in 215 countries, from 90,000 different publishers. It is estimated that around 2 million scientific publications appear each year.

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