

PRESERVING THE POSITIVE FUNCTIONS OF THE PUBLIC DOMAIN IN SCIENCE

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ABSTRACT

Science has advanced in part because data and scientific methodologies have traditionally not been subject to intellectual property protection. In recent years, intellectual property has played a greater role in scientific work. While intellectual property rights may have a positive role to play in some fields of science, so does the public domain. This paper will discuss some of the positive functions of the public domain and ways in which certain legal developments may negatively impact the public domain. It suggests some steps that scientists can take to preserve the positive functions of the public domain for science.

Keywords: Intellectual property, Copyright, Patent, Database, Public domain

1 INTRODUCTION

Until relatively recently, scientists had little reason to pay attention to or be concerned about intellectual property rights or the inverse concept of the public domain (a domain unrestricted by intellectual property rights). Relatively few academic researchers patented their discoveries, and those who did shared the results of their work with others through patent disclosures, publication of research articles, and presentations at scientific meetings. Although scientific work may have been kept secret while in process, the norms of science strongly encouraged sharing of research data and results. Scientists can only earn the esteem of colleagues if they disclose their results. Members of scientific communities have typically belonged to scholarly societies, membership fees for which covered subscriptions to the journals in which important scientific results appeared. There was, in this environment, no need to articulate the positive values of the public domain, for this domain so pervaded scientific work that it was taken for granted.

Things have changed. This article will review several developments that have increased the significance of intellectual property law and policy for the scientific community, particularly for data-rich science conducted by CODATA researchers. More and more things of relevance to scientific work are now subject to patent and copyright protections and to other legal and policy rules. Some countries, notably in the EU, have created new intellectual property rights that protect makers of databases from unauthorized extractions and reuses of data from their databases. It has, moreover, become more common for research scientists to patent their discoveries. Some also start, join, or partner with firms to commercialize these discoveries.

While some scientists may view the increased significance of intellectual property rights in their fields with alarm, it is important to realize that intellectual property rights, properly configured, can contribute to continued advances in science. To ensure that intellectual property law is properly balanced to promote the progress of science, CODATA and other scientific communities must pay attention to intellectual property developments and be proactive in support of the positive values of the public domain as part of the balancing principles of intellectual property law that will promote the advancement of science.

2 INTELLECTUAL PROPERTY RIGHTS AND THE PUBLIC DOMAIN

In the beginning, there were no intellectual property rights and everything invented, discovered, composed, or sculpted was in the public domain by default. If someone observed a new plow design or musical score and wanted to copy it, there was no legal impediment to doing so. An important social cost of a no-intellectual-property-rights regime was that some people capable of investing time, money and energy in

the development of innovations declined to do so because recouping their research and development costs would be difficult insofar as the innovations were readily appropriable (that is, expensive to make the first instance, but cheap to copy thereafter). To induce investments in innovation, governments have found it useful to give innovators a limited period of intellectual property rights to enable them to control commercial exploitations of the innovations from which research and development costs can be recouped.

The concept of the public domain was, in a sense, a concomitant invention to that of intellectual property rights. By establishing a patent regime through which inventors could acquire a government-issued patent allowing them to control the manufacture and distribution of products embodying the invention, the government was signaling that inventors who did not apply for a patent would be ineligible for a grant of exclusive rights. Such unpatented innovations were in the public domain. Moreover, by limiting the period of time during which patent rights could be legally enforced, governments were also signaling that upon the expiration of the patent term, others were welcome to make or sell the previously patented invention. Expiration of the patent rights caused the invention to enter the public domain.

In addition, by restricting patentable subject matter to machines, manufactures, processes, and compositions of matter, patent law made sure that ideas, scientific methods and principles, and laws of nature were and remained in the public domain. Patent law requires inventors to disclose details about the invention and how to make it which provides key technical information to the public domain (although use of this information to make products embodying the invention may be restricted during the patent term). Many countries (although not the U.S.) provide for research exceptions to patent rights to allow scientists to further advance knowledge about the invention.

Similar rules exist in copyright law. The default rule of early modern copyright law was that works of authorship were in the public domain unless certain formalities had been complied with (e.g., proper copyright notices and registration of the work with a government office). Nowadays original works of authorship are protected by copyright law from their first fixation in a tangible medium, but many authors, especially in research communities, make their works widely available on an unrestricted basis, such as by posting articles on the Internet. Copyrights are also granted for limited times. Upon expiration of the term, works of authorship are in the public domain. Copyright law too regards ideas, concepts, discoveries, scientific principles and laws of nature to be in the public domain. Moreover, many scientific uses of copyrighted works are fair uses or otherwise lawful.

From these principles of intellectual property law, it is possible to distill several positive values of the public domain. First, information, ideas, scientific principles, and the like are essential building blocks for knowledge generation on an ongoing basis, especially in scientific fields. Intellectual property law recognizes this by, in essence, immunizing these items from proprietary control (unless, of course, they are kept secret). Second, by encouraging—and sometimes requiring—disclosure of innovations, intellectual property law ensures the widespread availability of these essential building blocks of knowledge. The public domain cannot add value to society unless it is accessible to the public. Third, by lifting restrictions on proprietary control after the statutory period of protection expires, the law reinforces the value of unrestricted access to and sharing of innovations from which new innovations are likely to arise. Fourth, the public domain minimizes transactions costs. It can be expensive to locate rights holders and negotiate licensing terms, as well as to pay royalty fees when informational works are subject to intellectual property rights.

3 INCREASED SIGNIFICANCE OF INTELLECTUAL PROPERTY RIGHTS FOR SCIENCE

In the closing years of the twentieth century, intellectual property rights became broader, stronger, and longer with considerable implications for scientific research. Genomic information, research tools, algorithms, and data structures are among the scientifically important discoveries that have in recent years been deemed patentable subject matter. Many universities and other research institutions are now eager for their scientists to patent discoveries, and these institutions sometimes derive substantial licensing revenues from patent portfolios. This has resulted in higher transactions costs of negotiating licenses and clearing rights and royalty payments that raise entry barriers to some scientific work.

Copyright protection has been extended to computer programs and databases, including those of scientific importance. This too may affect the ability of researchers to share information. Other copyright developments have also affected scientific work. In *American Geophysical Union v. Texaco* (US Court of Appeals for the Second Circuit, 1994), for example, an appellate court rejected an argument that Texaco's researchers were making fair and non-infringing uses of copyrighted articles when they photocopied the articles from journals to which Texaco subscribed (US Court of Appeals for the Second Circuit, 1994). Although unoriginal databases are unprotectable by copyright law, the EU has devised a new form of intellectual property protection for the data in databases that has considerable significance for data-rich science.

Also affecting science has been a transformation in the scientific and technical publication market. No longer do scientists mainly publish in journals published by scholarly societies attuned to the needs of the scholars they serve. Major international commercial publishers have vigorously expanded journal offerings on science and technology, in part by attracting well-known scientists to their editorial boards. Commercial publishers typically insist on the transfer of copyrights in scientific and technical articles they publish. Whether out of indifference or lack of bargaining power, scientists and other researchers have largely complied with these demands. Because scientists need access to these journals to be active in their fields, universities and other research institutions feel obliged to buy them on whatever terms are available. Commercial publishers have raised subscription rates dramatically in the past decade or so, and often insist on restrictive licensing terms. Combined with the trend in universities and research institutions to aggressively pursue patents and copyrights in the late twentieth century, science is affected by intellectual property rights as never before.

4 DATABASE PROTECTION AND COPYRIGHT TERM EXTENSION

The public domain in science is deeply affected by adoption of laws such as the 1996 European Union Directive on the legal protection of databases (European Commission, 1996). In addition to harmonizing EU member state rules about copyright protection for the selection and arrangement of data in databases, the EU Directive establishes a new form of intellectual property protection. Makers of databases in the EU now have fifteen years of exclusive rights to control the extraction and reuse of data from their databases. Making further investments in database development (e.g., by updating it) gives rise to renewed periods of protection, seemingly allowing database makers and publishers to enjoy perpetual protection as long as they update or maintain the databases. The EU Directive, in effect, creates an intellectual property right in the non-copyrightable data in databases. The EU thought that this protection was needed to induce investments in database development.

The EU is active in ongoing international discussions with the goal of exporting such legislation in other countries. Several bills to provide EU-style database protection have been introduced in the U.S. Congress (Reichman & Uhler, 1999). Thus far, the opposition has been strong enough to fend them off. Some of this opposition has importantly come from the scientific community, but proponents of strong database protection legislation have not given up in the U.S. or elsewhere.

Also impeding growth of the public domain has been legislation extending the term of copyright protection for twenty additional years. The Copyright Term Extension Act (CTEA) (105th Congress of the United States of America, 1998) in the U.S. extended the term of existing copyrights—from life of the author plus fifty years to life plus seventy years, and from seventy-five years from first publication to ninety-five years post-publication—thereby preventing many works from the 1920s and 1930s from entering the public domain during this decade and the next (United States Supreme Court, 2003). The CTEA thwarted the plans of online publisher Eric Eldred to publish works of early twentieth century American authors on the Web, so he decided to challenge the constitutionality of the CTEA.

Article I, Section 8, Clause 8 of the U.S. Constitution grants Congress the power “to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” Eldred argued that this Clause requires a *quid pro quo*: Congress cannot confer exclusive rights on authors without giving the public something in return for the protection, namely, a new work of authorship. Eldred also argued that the CTEA impeded the progress of science (by which the founders meant knowledge), rather than promoting it, by precluding Eldred and

others from drawing upon works that had already enjoyed the term of copyright that induced their creation. Eldred also argued that the CTEA burdened his First Amendment right to publish public domain works.

In the controversy over the *Eldred v. Ashcroft* case (United States Supreme Court, 2003), two opposite conceptions of the public domain vied for Supreme Court endorsement. Under one view, the public domain has no positive value. Jack Valenti, president of the Motion Picture Association of America (MPAA), for example, has characterized the public domain as “an orphan” (Litman, 2001). This view holds that no one is willing to invest in preserving or distributing public domain works, and so the CTEA provides a needed inducement to make these works available to the public.

The alternative view characterizes the public domain as a vast repository of raw material out of which new creations are made. Eldred’s lawyers pointed out how many of Disney’s motion pictures derive from public domain works and how many public domain works are available notwithstanding the expiration of copyright. In this view, the public domain has a very positive value. But for it, few creations would occur. The U.S. Supreme Court did not endorse either view in its decision in favor of Ashcroft in the *Eldred* case, although it upheld Congress’ power to enact this law (United States Supreme Court, 2003).

5 OPPORTUNITIES TO BE PRO-ACTIVE ON INTELLECTUAL PROPERTY ISSUES

Scientists and scientific organizations can provide valuable insights to courts and legislature to enable more informed decision-making. They can, for example, submit briefs as *amicus curiae* (i.e., friends of the court) in pending cases. (Clinical programs at the law schools of American University, UC Berkeley, and Stanford can provide talented students to write briefs on behalf of scientific organizations (Samuelson Law Technology and Public Policy Clinic, 2001). As the *Eldred* case made its way through appellate courts, many organizations—from library associations to technology firms to entertainment industry groups to senators—filed amicus briefs in the *Eldred* case.

It is unfortunate that no scientists or scientific organizations filed an amicus brief that might have articulated the positive values of the public domain for science. The Supreme Court might well have found this argument more compelling than the interest of Eldred in republishing short stories written in the 1930’s. Such a brief might also have pointed out the value to science in allowing scientific societies or groups of scientists to post classic scientific articles from this period on the Internet.

The Internet Archive and Project Gutenberg submitted an amicus brief (Samuelson Law Technology and Public Policy Clinic, 2002) in *Eldred* that pointed out that the Internet enables information to be widely available on a global basis for very low cost. In addition to the greater access that publication on the Internet can afford, the Internet enables new forms of publication such as preprint servers and home pages, and facilitates new kinds of services, such as the “Wayback Machine” of the Internet Archive which periodically archives pages of the Internet and allows researchers to search for content that may have been removed from the Web or modified after its initial posting. The Internet allows the public domain to be more robust and vital than it has ever been before. Unfortunately, many works stored in analog form that Eldred, the Internet Archive, and Project Gutenberg would have preserved in digital archives may no longer be available when their copyrights expire fifteen years hence (assuming no additional extension of the copyright term).

Scientists could have explained to the Supreme Court the important role the public domain plays in scientific research. The basic building blocks of science, such as data, methods, and principles, are and must be in the public domain if scientific progress is to continue. If discoveries and achievements in science are to continue to advance, the freedom to share data and replicate results must be protected as well as the freedom to analyze data to gain new insights. Beyond its significance for pure research, the implications of scientific advancement are critical to innovation, economic growth, and other social benefits that result from scientific work. The Internet, by making more works available in a more easily retrievable manner has enabled a more effective scientific public domain and has facilitated more rapid progress in science.

Scientists can influence legislative policymaking by offering to testify when intellectual property bills are under consideration and by encouraging scientific organizations with which they are affiliated to become

involved in educating legislators about the impacts of proposed laws on the scientific community. Paul Uhler, a well-known figure in the CODATA community, deserves the thanks of this community for his tireless efforts to educate scientists and legislators about database protection legislation. Others should emulate what he has done for the CODATA community in advising legislators about intellectual property rules that will promote science.

Several legislative proposals deserve particular attention. Scientists from non-EU countries should watch out for the introduction of EU-style database legislation and articulate concerns about this protection for the scientific community. Whether in Europe or in the United States, scientists need to work with legislatures considering anti-circumvention legislation to ensure that it contains appropriate exceptions for scientific research. Scientists can propose more precise and relevant exceptions to the Digital Millennium Copyright Act anti-circumvention rules (Samuelson, 2001). Scientists should also watch out for legislation such as that proposed by Senator Hollings in the last U.S. Congress that would have required all interactive digital devices to contain standard technical protections measures (Samuelson, 2003). Such legislation would, among other things, outlaw general purpose computers and much open source software. With sustained input from scientists about negative impacts on science, legislators will be able to make better informed decisions about intellectual property rules.

Scientists can also encourage governments not to propertize data they collect or to make propertized data available at reasonable cost (e.g., at the marginal cost of dissemination) and on reasonable terms (e.g., without restrictions on reuses). They can encourage governmental agencies to condition research funding on the researchers' willingness to make data generated under the grant available for reuse and study. They can urge the institutions with which they are affiliated to adopt open source policies or science-friendly copyright policies. In addition to making their views known in terms of policy, scientists can participate in the creation of repositories of scientific data that have reasonable use and open access policies

There are also ways of upholding values of the public domain and the dissemination of information in the course of scientific work. Making software or databases available under open source licenses is one concrete way to avert problems that proprietary ownership can create. Scientists can and do create resources such as preprint servers, archives, public databases, and digital libraries to serve the specific needs of their research communities. It is possible to negotiate with publishers about copyright assignments. Publishers do not actually need assignments of copyright; they only need to license the works they publish. Scientists should consider not publishing with firms that have bad copyright and licensing policies.

6 CONCLUSION

Intellectual property rights can play an important and positive role in the advancement of science and the dissemination of information. Most scientific work requires substantial investments of time, money and energy on the part of individuals and their institutions. These costs often have to be recouped, especially in times of declining government subsidies. The incentive system created by intellectual property laws and the licensing rewards that can be gained thereby can support scientific work. Some research might not be done without some prospect of financial rewards. The intellectual property system is designed to facilitate disclosure and the dissemination of information that benefits science.

Yet, intellectual property law, if not properly configured, can have a deleterious effect on science. With the well-informed advice from the scientific community, intellectual property laws can be balanced in such a way as to promote scientific progress and economic growth. Scientists have a sufficiently strong interest in balanced rules that they should contribute to public debate on the issues.

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