

Intellectual Property's Problems: How Far is the U.S. Constitution to Blame?

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INTRODUCTION

The first section of this article lists a number of problems of contemporary intellectual property. Section 2 identifies the common element in these as the system's inability to respond to the different protection needs of new kinds of information. Section 3 claims that an important cause of this is the influence of the exclusive rights clause in the Constitution of the United States. Section 4 lists several topics of concern due to this influence and discusses specific illustrations of its effect. Section 5 focuses on the particular strains caused by the change from individual creative work to works produced as a result of investment. Section 6 shows how reverence for the exclusive rights clause of the Constitution has prevented development of appropriate arrangements to protect information in digital form, and Section 7 shows how the same happened in respect of biotechnology. Section 8 explains why and how the rigidities originating from the U.S. constitutional provision have been replicated in other countries. Section 9 discusses how intellectual property laws are increasingly shaped by interests which benefit from them, rather than by any vision of the public good. Finally, Section 10 suggests that adding a financial dimension to the traditional time measure of intellectual property grants could alleviate the problems identified.

1. INTELLECTUAL PROPERTY IN TROUBLE

Intellectual property has never been so widely used as it is to day, and yet it has never been so strongly criticised. The patent system is "in crisis"¹; too many patents are being granted at too low a standard²; patents deliver far less protection than they promise³;

¹ D. Vaver, Inaugural Lecture, University of Oxford, published as "Patently Absurd" (2000) *Oxford Today* at 21-2.

² J. Barton, "Reforming the Patent System" (2000) 287 *Science* at 1933.

³ W. Cohen, R. Nelson and J. Walsh, "Appropriability mechanisms: use and change over time." Paper presented to the Swedish International Symposium on Law, Economics and Intellectual Property, Gothenburg, June 26-30, 2001.

they are inappropriate for protecting publicly-funded research⁴; they can "hamper, rather than promote, technology transfer from Universities to industry"⁵; in biotechnology, they can be an impediment rather than a stimulus to innovation⁶; their costs of dispute resolution have been growing so much faster than investment in R&D that "the problems of cost and delay . . . may prove a threat to the very existence of the patent system . . ."; applying traditional patent law to business methods is "a very poor idea"⁸; Copyright protection of computer software is "30 years of bad logic and bad law"⁹; Database protection as in the EU Directive is "a monstrous caricature of intellectual property laws"¹⁰; The public domain is being encroached upon so much that *bona fide* users of information are "drowning in a sea of intellectual property"¹¹; As for TRIPS, described as "a Polite Form of Economic Imperialism"¹²; and "Imperialistic, Outdated and Overprotective",¹³ the violence of demonstrations against the World Trade Organization around the world speaks volumes. This reaction is intensified by activities such as world-wide searches for traditional native remedies to patent,¹⁴ and moves to prevent farmers from sowing their own saved seed, which negates something as old as agriculture itself, and is resented correspondingly.¹⁵

2. INABILITY TO ADAPT

The common thread which runs through all these problems with intellectual property is its inability to adapt to new sources and new kinds of information as these have arisen:

⁴ R. Mazzoleni and R. R. Nelson, "Economic Theories about the Benefits and Costs of Patents" (1998) 32/4 *Journal of Economic Issues*, 1031.

⁵ D. C. Mowery, R. R. Nelson, B. N. Sampat, A. A. Ziedonis, "The growth of patenting and licensing by U.S. universities: an assessment of the effects of the Bayh-Dole act of 1980" (2001) 30(1) *Research Policy* 99.

⁶ M. A. Heller and R. Eisenberg, "Can Patents Prevent Innovation? The Anticommons in Biomedical Research" (1998) 280 *Science* 698.

⁷ Advisory Commission on Patent Law Reform (1992) at 78. United States Government Printing Office.

⁸ Vincent Chiappetta, "Defining the Proper Scope of Internet Patents: If We Don't Know Where We Want to Go, We're Unlikely to Get There" (2001) 7 *Mich. Telecomm. Tech. L. Rev.* at 289.

⁹ G. Aharonian "Deconstructing software copyright—30 years of bad logic" (2001). Available at: www.bustpatents.com

¹⁰ J. Reichman and P. Samuelson "Intellectual Property Rights in Data?" (1997) 50 *Vanderbilt Law Review* at 164.

¹¹ P. Bernt Hugenholtz, "Copyright and Freedom of Expression in Europe," in R. Dreyfuss, D. Zimmerman, and H. First (eds.) *Expanding the Boundaries of Intellectual Property* (Oxford University Press, 2001) at 344.

¹² A. Samuel Oddi, "TRIPS—Natural Rights and a Polite Form of Economic Imperialism" (1996) 29 *Vanderbilt Journal of Transnational Law* 415.

¹³ M. Hamilton "The TRIPS Agreement: Imperialistic, Outdated and Overprotective" (1996) 29 *Vanderbilt Journal of Transnational Law* 613.

¹⁴ Peter Drahos, "Indigenous Knowledge, Intellectual Property and Biopiracy: Is a Global Biocollecting Society the Answer?" (2000) *E.I.P.R.* 245.

¹⁵ As in a provision of the UPOV Convention, which the Food and Agriculture Organization of the U.N. has pledged to have revoked.

"The nineteenth century vision that subdivided world intellectual property law into discrete and mutually exclusive compartments for industrial and artistic property has irretrievably broken down. The theory that the classical patent and copyright models coherently address the way intellectual creations behave has been discredited by its inability to deal adequately with the behaviour of many commercially valuable, cutting-edge intellectual creations".¹⁶

What is new in these "commercially valuable, cutting-edge intellectual creations" frequently comes in the form of quite different kinds of information to those of the inventions and literary works which the original arrangements were set up to protect. Intellectual property has been strikingly unable to produce correspondingly new and appropriate ways of performing its function of protecting these. Instead, it seems to be "frozen" into a dual patent-copyright paradigm, into which new ways of inventing and new kinds of information have to be forced somehow if they are to receive protection. There is no shortage of evidence that this process is becoming more and more difficult, and that the results are correspondingly less satisfactory. From an economist's standpoint, Lester Thurow's summing up has been that:

"The world's one-dimensional intellectual property system must be overhauled to create a more differentiated one. Trying to squeeze today's developments into yesterday's system of intellectual property rights simply won't work. One size does not fit all".¹⁷

3. THE CONSTITUTIONAL BACKGROUND

The primary reason why there is only "one size" is a Clause in the U.S. Constitution. This has its effect within the United States through the reverence which Americans have for that document, and in the rest of the world through the readiness of other countries to endorse American intellectual property arrangements uncritically.

The framers of this Constitution were very cautious about property rights, and left these to the individual States, with intellectual property rights as the only exception, by giving Congress power, in Article 1, section 8, clause 8.

"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".

Although this Article gives power to Congress which resulted in laws of copyright for authors and patents for inventors, it "is generally understood to serve as a limit on

¹⁶ J. H. Reichman, "Legal Hybrids Between the Patent and Copyright Paradigms" (1994) 94 *Columbia Law Review* at 2500.

¹⁷ Lester C. Thurow, "Needed: A New System of Intellectual Property Rights." *Harvard Business Review*, (1997) September/October 95.

Congressional power, not simply a grant thereof".¹⁸ To this extent, it is analogous to the English Statute of Monopolies of 1623/4. That Act of Parliament did not give power to grant patents, but limited the monopolies that could be lawfully granted by Letters Patent to those which led to "new manufacture within the Realm".

There are three roots to the exclusive rights provision in the U.S. Constitution. One goes back through the Venetian patent system to medieval alpine mining grants. These gave temporary monopolies to encourage individual investment of time and effort, as did the various arrangements in European countries up to the time of the French revolution, to encourage importing new technology from abroad. This is held to be why Article 1.8 gives as the justification for protecting authors and inventors, "To promote the progress of Science and Useful Arts". A second root was through the monopoly grants which followed the invention of printing, largely to try to control it, such as that of copyright to the Stationers' Company in London. A third root was the philosophy of the Enlightenment, with its emphasis on individual human rights, leading to the idea that since the State had a duty to protect individual personality in its physical aspect, it also had a duty to protect its extensions in the form of ideas or creative work. This was the intellectual basis of the copyright and patent acts which were passed by several of the American States even before Federation.¹⁹

3.1 Reverence for the Constitution

Faithfulness to the text of the Constitution and to the intent of its Framers has a unique value in the United States. It genuinely reflects Jefferson's observation that for Americans this document should be akin to "the ark of the covenant, too sacred to be touched".²⁰ Although in the comments which follow, a modern writer is referring to U.S. politics generally, what he has to say is uncannily relevant to the effect Article 1.8 has had on intellectual property:

"Americans do not merely live under the constitution; they live in the constitution, inhabiting its recesses, shaping their lives according to its needs and dictates, absorbing its logic and making it their own. There is nothing in American society that does not bear the Constitution's stamp in one way or another . . . [T]he attitude in the U.S. is almost defiantly pre-modern. Rather than people like ourselves, the constitutional system, Americans persist in believing, was made by a race of giants that was infinitely superior . . . By imposing a set of static supra-political values on society, it wound up freezing politics in place. Regardless of what particular argument he or she was making, every constitutional lawyer who appeared before the Supreme Court helped strengthen this paralyzing constitutional orthodoxy. By basing their argument on a close reading of the sacred text, they wound up reinforcing the view that the founders' teachings were 'controlling' . . . The very idea of an unchangeable

¹⁸ R. P. Merges and G. H. Reynolds "The Proper Scope of the Copyright and Patent Power" (2000) 37 *Harvard Journal on Legislation* at 63.

¹⁹ Bruce W. Bugbee, *Genesis of American Patent and Copyright Law*, (1967) at 67–68. Washington, D.C. Public Affairs Press.

²⁰ Paul Leicester Ford (ed.) *The Works of Thomas Jefferson*, Vol. 12 at 11. (New York, Putnam, 1905) quoted in Lazare n. 21 below at 8.

plan of government resting on unchallengeable eighteenth-century beliefs was a powerful conservative influence . . . [It] tethered us to the pre-industrial past and led to repeated spiritual crises".²¹

If "spiritual crises" is replaced by "legal crises" in this quotation, it is a remarkably apt diagnosis of the source of the contemporary problems of intellectual property. Because there is an exclusive rights clause in the U.S. Constitution, the founders' teachings are controlling, and the quite exceptional reverence with which Americans treat them greatly limit possibilities of flexibility and change—"freezing intellectual property in place". It is precisely because of this that the relevant laws are tethered to the pre-industrial past, making them correspondingly unsuited to control the industrial present, much less the future.

3.2 "The Article 1.8/1790 mindset"

The Patent and Copyright Acts were passed in 1790, so soon indeed after the coming into force of the Constitution itself as to be confused with it subsequently. It is even possible to speak of an "Article 1.8/1790 mindset", because of the extent to which the combination has influenced the U.S. authorities to try to fit protection of new kinds of information into either patent or copyright as defined by these laws, and to ignore alternative possibilities.

Ostensibly, there is an alternative legal basis in the Constitution for protecting information, which is the Commerce clause. This gives Congress power to regulate trade between the States, with the Indians and with foreign countries, and is almost unlimited in its extent. It prompts the question, why has the Commerce clause not been used whenever there is need to escape from the limitations of Article 1.8? The answer, according to Heald and Sherry, is that in the relevant circumstances the intellectual property clause is an *absolute* constraint on Congress: "We emphasize that these limitations entail positive prohibitions on congressional conduct, not merely lack of authority to legislate".²² Further, as is pointed out by Merges and Reynolds:

"To allow Congress to do things under its general commerce power that it is forbidden to do under its specifically applicable copyright and patent power would in essence read the Copyright and Patent Clause out of the Constitution. Such an approach could hardly be said to be faithful to the text of the Constitution or the intent of the Framers".²³

Such faithfulness, of course, is the essence of the Article 1.8/1790 mindset. It is reflected in the decisions of the Supreme Court as the guardian of the Constitution, which have been strict in keeping intellectual property from breaking out of its

²¹ Daniel Lazare, *The Velvet Coup: the Constitution, the Supreme Court and the Decline of American Democracy* (Verso, London, 2001) at 11, 82, 91.

²² Paul J. Heald and Suzanna Sherry, "Implied limits on the legislative power: the intellectual property clause as an absolute constraint on Congress" (2000) *University of Illinois Law Review* 2000/4 at 1123.

²³ Merges and Reynolds, n. 18 above.

confines. This strictness, which is both a formal expression of American respect for their Constitution and an endorsement of it, has made other U.S. Courts and authorities very reluctant to think about non-traditional ways of protecting information, even when new kinds of information manifestly do not fit within existing arrangements.

The Constitution's influence is even reflected in the way the United States Patent and Trademark Office claims that the Patent laws exclude inventions derived from human embryos from patent protection. There are indeed many grounds, philosophical and otherwise, by which such a ban can be justified, but the Office uses none of them. Nor does it claim that the Congress has ever passed such a law, since it has not. Instead, the USPTO's official stance is based on its inference that Congress *could not* pass a law to this effect, as to do so would breach the Thirteenth Amendment, which bans slavery.²⁴

The Article 1.8/1790 mindset is consequently at the root of the difficulty which the U.S. authorities have with any move that seems to lead away from the patent/copyright paradigm which has explicit sanction in the Constitution. It explains why new kinds of information which deserve their own appropriate type of protection, have been forced into one or other component of this paradigm, however badly they may fit. Moreover, as will be discussed below, because of the dominance of American influence in intellectual property matters, restrictions which originate in the U.S. Constitution have also inhibited the development of intellectual property throughout the world.

4. EFFECTS OF THE CONSTITUTION'S INFLUENCE

The following are five areas in which the effects of this reverence for the combination of Article 1.8 and the intellectual property Acts of 1790 are highly visible:

- The change from invention through individual creative activity to invention as the result of investment in large-scale, purposive R&D;
- The parallel shift in literary, musical and similar creative activity from the freelance mode to work being done "for hire," most frequently as a collaboration and on a large scale;
- The "non-obviousness" criterion in patent law. This was introduced to try to cope with the antibiotic revolution, in which the individual creative element was eliminated from chemical R&D almost completely. This has led to great subsequent difficulties when the need to protect biotechnology arose;
- The digitization of information, including computer programs, associated with the drastically reduced cost of copying and the internet; and
- The increased influence on intellectual property laws of interests which can benefit from them.

Before going on to discuss these, it may be helpful to illustrate how Article 1.8 of the U.S. Constitution constrains legislators, judges and officials in practice. This can be

²⁴ Rifkin's application, 1997.

clearly seen in relation to trade marks and to protection of boat hull design as well as in the "Interferences" procedure of the Patent and Trademark Office.

4.1 Trade Marks

Rapid industrialization of the United States in the nineteenth century involved both the sale of goods at greater distances from where they were made, and much increased discretionary incomes. The combination of these led to very strong growth in the importance of trade marks as the basis of branded goods. These are probably the most valuable of all kinds of non-tangible property, and it is in respect of them that the Supreme Court can be seen giving effect to the restricting influence of Article 1.8 of the Constitution for the first time.

The first Federal Trademark Act was struck down by the Court in 1889, on the ground that it gave a monopoly (which is of course perfectly true) whereas the only monopolies sanctioned by the Constitution were those allowed to authors and inventors under this Article. A trade mark did not require the creativity which was prescribed for the grant of exclusive rights.²⁵ Consequently, the United States was without Federal trade mark protection until 1905, when an Act was introduced under the Commerce clause.

4.2 Boat hull design

Because Article 1.8 of the Constitution explicitly puts intellectual property under the control of Congress, individual States are prohibited from legislating for it, although they can do so for all other kinds of property. This is clearly shown by the fate of a law passed by the State of Florida to protect the designs of fibreglass yachts and the moulds from which these are made. In fact, what happened in this case is a perfect illustration of how difficult it is for U.S. intellectual property law to be adapted to protect new kinds of information.

Once boats could be made from plastic, a designer might expend enormous effort and expense to produce a race-winning hull, and hope to sell many hundreds of identical copies of these from the "plug" or mould of this. In such a hull, the designer has produced information of a quite new type. It is not an invention, nor can it be fully captured even in a combination of copyrightable drawings and a design patent. But it is all contained in the "plug", and a competitor needs only to buy a single hull from the originator, make his own "plug" from it, and start selling perfect copies, having made no investment, nor taken any risk, in respect of research and testing.

It was quite reasonably thought in Florida that this was not conducive to investment in boatbuilding and design, and the State passed a law prohibiting the copying of "plugs". But this was struck down by the Supreme Court, using the words "the federal patent laws must determine what is protected, but also what is free for all to use".²⁶ There could hardly be a clearer affirmation of how the U.S. Constitution restricts development of new kinds of intellectual property.

²⁵ The Trade Mark cases, 100 U.S. 82, 94 (1879).

²⁶ *Bonito Boats v. Thundercraft Boats*, 1989 at 141.

This is strengthened still further by the nature and history of the response to the Supreme Court decision, in the form of a Federal "Vessel Hull Design Protection Act" which became Chapter 13 of the Copyright Act in 1998. This is a curious hybrid, in that it sets out to provide design protection to a "useful article" which is then defined as being only a "vessel hull, including a plug or mold, which in normal use has an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information." It echoes some of the wording of the British 1988 functional design protection, *e.g.*, the design must not be "staple or commonplace."

The wording of this bill and its discussion in Congress are very revealing about the constitutional constraints on intellectual property reform and development. In the nineteenth century paradigm, patents protect "function" and copyright protects "expression". Since there could be no question of being able to protect a hull design by a patent, it was vital that the new protection should be firmly located in copyright, that is, in "expression". To achieve this, the law contains a provision that it cannot apply to any design which is "dictated solely by a utilitarian function of the article that embodies it".²⁷ To be sure, it has been claimed that "the perfecting of a type of object mechanically is evidenced by its beauty",²⁸ but this is hardly what is at stake here: like an aircraft's wing, in the very highest degree it is function and not aesthetics which determines the shape of a vessel's hull. Yet if the new type of information that comes with a new type of boat construction is to be protected at all in the United States, this is the kind of legal semantics required to try to keep within the Constitution, when what is really needed is a set of new tailor-made or "*sui generis*" arrangements. Experts even doubt that in the end the new Chapter 13 of the Copyright Act is constitutional.²⁹

4.3 Interference procedure

The need to keep within the limits of Article 1.8 of the Constitution also explains the role of the Interference system in U.S. Patent and Trademark Office procedure. The protection permitted to be given by law to authors and inventors is for "the creations of their minds". A patent cannot therefore be granted automatically to whoever is first to file an application for one, since this applicant may not have invented first, in which case protection for a creation of an individual's mind would be given to the wrong person. Consequently, when it is noted that two (or more) applications that might possibly be for the same inventive entity have been filed, what is known as an "Interference" is declared. All parties must then provide evidence as to their respective dates of "conception of the invention" and of their efforts to reduce it to practice. There are about 200 such interferences each year and the probability of an applicant for a patent becoming involved in this procedure is about three per thousand.

This feature of the U.S. patent law has been used until very recently, in breach of the country's obligations under the Paris Convention, to discriminate against foreign inventors. This was because evidence of date of invention outside the United States was not acceptable, so that an applicant for a U.S. patent from a foreign country who had

²⁷ Copyright Law of the United States, Section 1302.

²⁸ S. C. Gilfillan, *The Sources of Invention* (University Press, Chicago, 1935) at 8.

²⁹ Heald and Sherry, n. 22 above at 1187.

actually made the invention first and even filed first, could lose the Interference case (and consequently the patent protection) to a U.S. applicant who had both invented later and applied later. The records in the United States Patent and Trademark Office in Washington, D.C. contain many examples of this. Foreign firms to which patents were important were put to very great additional expense to avoid the danger of losing an Interference case. "Introduction into the United States" counts as equivalent to "invention" there, so these firms had to transfer copies of laboratory notebooks and other evidence of invention frequently to their subsidiaries or Agents in the United States, so as to obtain dates of record for "introduction of inventions".

Not surprisingly, this discrimination led to strong pressure by other countries on the U.S. to abandon its Interference system and change to the "first to file" arrangements of the rest of the world. However, this has always been met with the response that to do so would require a constitutional amendment, which could not be contemplated as practical politics. The furthest that the U.S. authorities considered they could go without violating the Constitution was to accept evidence of invention from abroad, which they eventually did.

5. INVENTION THROUGH INVESTMENT

Throughout the nineteenth century, the source of inventions increasingly became corporate investment in purposive research and development, and publishing increased vastly in scale from the 127 printers who were in business in America when the 1790 copyright act was passed. A gap inevitably opened up between the actual world and that of the Constitution, reflected in the employment of researchers to invent in workshops and laboratories which were not their own. The Constitution allows only laws to protect individual "authors" and "inventors". How then could a partnership or corporation invest in R&D if any resulting patents were to be granted to the individual researchers and not to their employers? Granting patents to firms could not be reconciled with the explicit mention of "authors" and "inventors" in the Constitution, so in the end a working solution to the problem had to be found *outside of the patent law*. In spite of the Common Law's traditional reluctance to endorse restrictive covenants in employment contracts, in *United States v. Burns* in 1871 the Supreme Court ruled that such contracts could validly include a clause providing for any patents which might be granted to an individual as a result of his employment to be assigned to his employer for a nominal fee, which to this day is usually \$1. Many years afterwards, it became possible for corporations to own copyrights directly, by an amendment to the Copyright Act covering "works produced for hire", but judicial doubt has been thrown on the constitutionality of this.³⁰

³⁰ In a dissenting judgment, Circuit Judge Friendly called attention to the fact that: "the Constitution, Art. I, @ 8, authorizes only the enactment of legislation securing 'authors' the exclusive right to their writings. It would thus be quite doubtful that Congress could grant employers the exclusive right to the writings of employees regardless of the circumstances . . ." (*Scherr v. Universal Match Corp.* 417 F.2d 497, 502 (2d Cir.) 1969; Nimmer on Copyright 1968 at 6.3).

5.1 Changing sources of invention

As inventions increasingly resulted from purposive investment, it became correspondingly more difficult to obtain protection for them from a patent system which had been established to enable individuals obtain rewards from their discoveries.³¹ In a landmark U.S. case in 1851, *Hotchkiss v. Greenwood*, the Supreme Court ruled that "something more than the work of a skilled mechanic" was required if what was accepted as being both useful and new was also to be patentable. It took nearly a century to reach a judicial description of what this "something more" actually was, but in 1941 the same Court used the expression "flash of creative genius" for it in the case of *Cuno Engineering Corp. v. Automatic Devices Corp.* Moreover, it claimed that this was the level of ingenuity which had all along been required for patentability.

Between the two cases the way in which inventions emerged had changed almost completely from being the result of individual ingenuity to being produced by purposive, large-scale investment in research and development. The change can even be noted in differences between the actors: In *Hotchkiss*, they are individuals; in the *Cuno Engineering* and two 1944 cases which taught similarly (*Mercoind Corp. v. Mid-Continent Investment Co.* and *Mercoind Corp. v. Minneapolis Regulator Co.*), they are corporations.

Inevitably, the incompatibility between the "flash of genius" criterion and the new method of invention showed up in Court decisions. In 1925–29, for example, one-third of the patents coming before Circuit Courts of Appeal were ruled invalid, but twenty years later, this proportion had almost doubled.³² Those concerned with patents, either as users or as practitioners, blamed this change on progressively greater judicial stringency, but it is far more likely that it simply reflected growth in inventions resulting from purposive investment. If a "flash of creative genius" is to be a requirement for patentability, it is much easier to discern it in the output of individuals than of firms. R&D laboratories are staffed by "skilled mechanics", and those who direct them cannot allow their employees to sit around waiting for "flashes of genius". It is hardly surprising, therefore, that the Courts progressively found more patents invalid for lack of these. What was described as an "ever-widening gulf between the decisions of the Patent Office in granting patents and decisions of the Courts which pass upon their validity" was even the subject of a concerned Message from the President of the United States in 1943.³³

In 1976, legislation provided for automatic assignment of an employee's copyright to her employer to be taken as given, without any need for formalities.

³¹ See David R. Noble, "The Corporation as Inventor: Patent Law Reform and Patent Monopoly." Chapter 6 of *America by Design* (Oxford University Press, 1980).

³² Mintz and O'Rourke, quoting Congress Hearings, in John F. Witherspoon, (ed.) *Nonobviousness—The Ultimate Condition of Patentability* (Bureau of National Affairs, Washington D.C., 1978) at 2:218.

³³ Transmitting the Report of the National Patent Planning Commission, June 18, 1943.

5.2 The antibiotics crisis

The mechanical and electrical industries can live with a patent system which is unsuited to the protection of inventions which result from investment in R&D, because they have other ways of obtaining the protection they need. These come through the power to exclude competitors that goes with massive investment in productive assets and in resources for marketing. In fact, empirical research has shown that for these industries, patents are "unambiguously the least central of the major appropriability mechanisms".³⁴ There is one industry, however, which simply cannot do without patents, and that is chemicals, especially pharmaceuticals. The formula discovered in the laboratory is the formula that is patented and the formula of what the physician prescribes and his patient uses. Once any useful formula is known, investment in resources to make the product is no great barrier to copying, and if the drug is effective, little persuasion is needed for its sale. Because chemical inventions can be communicated so easily to others, therefore, if patents did not protect them, free-riding would ensure that investment in research would not be justified. This is why the coming of antibiotics during and after World War 2, which was associated with a revolution in the way the pharmaceutical industry does its R&D, was such a crisis for the patent system.

The first antibiotic was Penicillin, but for several reasons this was not patented. The next one of great (indeed, almost equal) importance was Streptomycin, and this was patented, in 1947. Penicillin had undoubtedly been discovered through a "flash of creative genius", but the origin of Streptomycin could not have been more different. Stimulated by the success of penicillin, Merck commissioned Selman Waksman of Rutgers University, New Jersey, to search for antibiotic activity in his lifetime collection of soil fungi. The team-based and painstaking examination and testing of these from which Streptomycin emerged, copied techniques which the German chemical industry had pioneered, and through which they had discovered important drugs such as Salvarsan and Prontosil.³⁵ The work in the U.S. was the beginning of a deluge of inventions from pharmaceutical firms which were (and are) typically the output of similar large-scale, routine activity which is anything but inspired.³⁶

Whilst these two discoveries opened up an almost limitless prospect of profitable drugs, it was clear at the time that investment in antibiotics R&D could only be made on the scale which was desirable if effective patent protection would be available for its results. It was equally clear that the Courts would insist on looking for a "flash of genius" which research for antibiotics based on techniques of large-scale screening would be quite unable to supply. If, on the contemporary form of the U.S. Circuit Courts of Appeal, at least two of every three antibiotic patents were likely to be held invalid, there was really no option but to change the patent law fundamentally. This would require very careful drafting, because a law to recognise frankly that investment had replaced individuals as the source of what is to be protected, would not be in

³⁴ Cohen *et al.* (2000) n. 3 above.

³⁵ R. Hare, "New Light on the Discovery of Penicillin" (1982) 26 *Medical History* at 1.

³⁶ For a full account of how this came about, see William Kingston, "Antibiotics, Invention and Innovation" (2000) 29/6 *Research Policy* 679.

accordance with the terms laid down for Congress by the Constitution. Given this constraint, change could only come about in a way that forced the reality of invention from investment into the pretence of invention by individuals.

This was achieved in the Patent Act of 1952, the first major revision of the U.S. patent law since 1870, by killing off the "flash of genius" requirement.

5.3 New definition of invention

The first crucial provision of this Act was that "Patentability shall not be negated by the manner in which the invention was made". This made the result of mindless labour just as patentable as that of creative vision. The second was to replace the "flash of genius" criterion by making the condition of patentability "that the subject matter should not be obvious to a person having ordinary skill in the art to which it pertains". As interpreted by judges, this came to mean that in applying a known technique to a definable problem, an invention will only fail the test of non-obviousness if it was "obvious to try" what led to it, or if the trying was done "with a reasonable expectation of success", or if the "chances of success were considered worth a try".³⁷

The U.S. 1952 Act thus made it possible to obtain valid patents for inventions produced by purposive investment, which had been becoming progressively more difficult for more than a century. In the words of a judge who as a patent attorney had played an important part in the shaping of the Act, the result of both these changes is that "long toil stands on an equal footing with flashes [of genius]".³⁸ However, the disadvantages of this "running repair" to the patent system in 1952 (which was probably all that could have been done, given the constitutional restriction) were to emerge in a very serious way when the question of patents for computer programs, biotechnology and business methods arose later on, as will be discussed below.

5.4 Use of R&D portfolios

Since it was the pharmaceutical industry's requirements which had brought the issue of protecting the results of investment in R&D to a head, it is hardly surprising that the U.S. 1952 Act and its imitations in other countries do in fact give pharmaceutical inventions very effective protection. This industry dominates the use of patents in every country; several countries have given its patents extended terms to compensate for delays caused by the need for certification; and very few disputes in it reach the courts. What may be considered surprising, since this has all been made possible by the non-obviousness criterion, is that it has happened in spite of the reality that "[t]he invention of chemical structures which are *per se* unobvious is an exceedingly rare

occurrence".³⁹ Moreover, after reaching a plateau with screening techniques, the industry set off on a new trajectory of rapidly increasing R&D investment and sales from the 1970s on the basis of "rational drug design" which resulted in such famous drugs as Tagamet, Prozac and Zantac. Such an approach is even more incompatible with the concept of "invention" in Article 1.8 of the U.S. Constitution than the methodical screening of the kind which led to streptomycin.

It can be understood, however, by analogy with portfolio theory in finance. Rational investment in a portfolio of risky projects is possible because the risk which attaches to the portfolio as a whole is statistically lower than that of the more risky individual components. What enables the pharmaceutical industry to obtain patents is that the "screening" and "rational drug design" activities which are so characteristic of its research and development are in fact the operation of *portfolios* of research possibilities. So much is this the case that investments which can now surpass \$200 million per product on average can now be rationally made to find, develop, test and market a new drug.⁴⁰ At the level of the *individual* assignments in a research portfolio, however, a new combination can meet the non-obviousness criterion because there was no "reasonable expectation of success" in trying the particular known means which had been used in it.

Thus, the "non-obviousness" criterion biases the system strongly in favour of technologies in which a portfolio approach can be used in R&D, especially the pharmaceutical industry. It gives correspondingly poor protection to firms which cannot use such an approach, above all the smaller firms whose inventions most need patent protection. This bias is the direct result of failure to face up frankly to the reality that most useful inventions now result from investment. The penalty is paid by firms that cannot use a portfolio approach, to protect the pretence that the source of inventions is still individual creativity. This is particularly ironic, considering that this type of creativity is more likely to be found in the small firms which are denied the protection they need. Further, the degree of this bias is concealed in patent statistics, because so many patents in complex technologies are now obtained for quite different purposes to that for which patents were originally established.

5.5 Complex technologies

Roycroft and Kash contrast these with simple technologies (which are characterised by being capable of being fully understood by a single individual) and have demonstrated how rapidly their economic importance has been growing.⁴¹ The non-obviousness criterion enables firms in them to get large numbers of patents for incremental changes, because the patent Examiner is required to find some earlier published suggestion of the claimed invention, which is not easy to do for small advances in these specialised

³⁹ John Rowland, in John F. Witherspoon, (ed.) *Nonobviousness—The Ultimate Condition of Patentability* (1978) at 7:201. Washington, D.C. Bureau of National Affairs.

⁴⁰ H. Grabowski and J. Vernon, "A New Look at the Returns and Risks to Pharmaceutical R&D" (1990) 36/7 *Management Science* 804; H. Grabowski and J. Vernon "The Determinants of Pharmaceutical Research and Development Expenditures" (2000) 10/2 *Journal of Evolutionary Economics* 201.

⁴¹ R. Roycroft and D. Kash, *The Complexity Challenge: Technological Innovation for the Twenty-First Century* (1999).

³⁷ For discussion, see John Bochnovic, *The Inventive Step* (Weinheim, Basel, Verlag Chemie, 1982).

³⁸ Judge Rich, quoted in P. J. Federico, "Origins of Section 103." In John F. Witherspoon, (ed.) *Nonobviousness—The Ultimate Condition of Patentability* (1978) at 1:09. Washington, D.C. Bureau of National Affairs.

technologies.⁴² In the hands of a firm with powerful resources for litigation, however, patents for even technically worthless "inventions" have to be treated respectfully. They are consequently much more a bargaining currency to prevent "lock-out" from use of state-of-the-art components developed by competitors, than they are a stimulus to a firm's R&D.⁴³ Another important use of patents in complex technologies is to bargain with standards regulators, so as to have an industry standard incorporate as much as possible of a firm's technology.

Both these uses of patents diverge from their economic justification. Indeed, the large firms that are characteristic of complex technologies already have so much of other kinds of market power that they could easily innovate without any intellectual property at all. There is no other cause for these distortions to arrangements for protecting information than the non-obviousness criterion, which in turn is a piece of casuistry introduced to pretend that modern patents correspond to what was intended by the U.S. constitutional provision.

5.6 "Romantic authorship"

Under the same constitutional provision as patents, copyright under the 1790 Act was originally designed to protect "the creations of the minds" of *individual* authors. Much of what it is now used for, however, relates to the results of large-scale investment, as in the publishing, advertising, motion picture and television industries which developed during the twentieth century, on the basis of work done "for hire". But in a parallel way to what happened to the protection of inventions, copyright has been "stretched" to cover the results of investment as if these were the same as the results of spontaneous individual literary and artistic creativity.

The same casuistry is therefore evident in copyright as in patent law, and Boyle attributes many of the problems of contemporary intellectual property to the resulting:

"ahistorical and romanticised vision of authorial creation . . . The romantic vision of authorship offers an attractive idea of creative labor—transcending market norms, and entailing a world in which workers have a real connection to and control over the fruits of their labors. This is a vision that we might want to expand far beyond the limited realms of property in information. As currently constructed however, intellectual property law in particular and information issues in general seem to be in the thrall of an idea that is taken as truth when it should be questioned as dogma".⁴⁴

Such a "vision of authorial creation" is indeed what lay behind Article 1.8 of the U.S. Constitution, and, of course, it is shared by those who see anything stemming from this

⁴² United States Patent and Trademark Office Manual of Patent Examining Practice Section 2143.01.

⁴³ D. Kash and W. Kingston, "Patents in a World of Complex Technologies" (2001) 28/1 *Science and Public Policy* 11.

⁴⁴ James Boyle, *Shamans, Software and Spleens: Law and the Construction of the Information Society* (1996) at 175. (Harvard University Press, Cambridge).

Article as being "too sacred to be touched." But it is altogether inappropriate to apply the same "vision" to information which results primarily from investment, which is precisely what has been done.

This of course is not to argue that information resulting from investment, or from "toil" rather than "genius", should not also be protected—in fact, nothing is more needed now than a workable system of protecting *innovation*, which is the result of investment, with a realistic, commercial criterion of novelty.⁴⁵ But such protection should be appropriate to it, and not what was devised for "the creations of the minds" of *individuals*. Such new kinds of information protection or intellectual property might well have developed were it not for the strait-jacket woven out of the reverence of the American people for their Constitution and Article 1.8 as part of it. Instead, legislators, administrators and judges have been constrained to ground all protection within the "authorial" patent-copyright paradigm, so as not to step outside the limits of what is thought to be permitted by the fundamental law.

6. THE DIGITAL REVOLUTION

A new crisis emerged in relation to the protection of computer software. Software is text, but it differs from all other kinds of text in that it *behaves*.⁴⁶ Those who use it have no interest whatever in the text, only in its behaviour, *i.e.* the way it makes hardware perform. Unlike other kinds of text, for example music, two different software texts can result in substantially the same behaviour and performance. Consequently, copyright on its own gives poor protection to investment in software development. On the other hand, such development is almost invariably of an incremental kind, which fails to reach the level of non-obviousness needed for patent protection. Software is therefore a new kind of information which falls outside the scope of both of the elements in the traditional paradigm.

If it is to be appropriately protected, therefore, it requires its own special system. Not alone was the case for this made powerfully by an outstanding expert group, they also proposed in detail the kind of *sui generis* arrangements there should be for it.⁴⁷ Long before they did this, however, the issue had been pre-empted by the U.S. authorities, who extended the Copyright Act to include software in 1980. They did so in the face of a much more appropriate Model Law proposed by the World Intellectual Property Organization in 1978 and similar *sui generis* proposals which came close to adoption in France and Japan. U.S. pressures thwarted these, because the Article 1.8/1790 mindset prevented the authorities there from being able to take the advantages of such new arrangements seriously.

Incidental to this decision was the refusal of the U.S. Patent and Trademark Office to agree that early computer programs could be patentable, not on strict legal grounds,

⁴⁵ For a multi-author discussion of specific proposals for this kind of protection, see William Kingston (ed.) *Direct Protection of Innovation*, (Kluwer, Dordrecht, Boston, 1987).

⁴⁶ See Pamela Samuelson, Randall Davis, Mitchell D. Kapor, and J. H. Reichman, "A Manifesto Concerning the Protection of Computer Programs" (1994) 94 *Columbia Law Review* at 2316.

⁴⁷ *ibid.* 2405–2431.

but because they believed that they could not obtain and train enough staff to deal with the flood of applications for software patents which they anticipated they could face. The Court of Appeal disagreed, but the Office was supported by the Supreme Court, so software developers had to turn to copyright for such protection as it could give them. Over many years, this pattern of Office rejection—Court reversal—Supreme Court support of the Patent Office—continued, until eventually the Supreme Court reversed its earlier stance and software became eligible for patent protection.

Ever since, there has been strong disagreement as to the respective parts which copyright and patents should play in protecting computer programs. Aharonian has produced a website which details a mass of judicial decisions which apply copyright protection to non-literal elements of programs such as structure, sequence and organization. All of these, he claims, add up to "30 years of bad logic and bad law".⁴⁸

Karjala explains an aspect of this history in terms of what he calls a "restitutionary impulse" on the part of judges to extend protection beyond what the law allows, where they see evidently unfair misappropriation.⁴⁹ He argues that the best that can be done—"without revamping our entire scheme of intellectual property protection for functional works or for technological creativity"—is to protect literal program code and mechanical or electrical translations of it under copyright, with all other structural elements eligible for patent protection. Given the quite inappropriately long copyright term (roughly 75–100 years) however, it is clear that in terms of software innovation the failure to introduce *sui generis* protection (a "revamping" such as Karjala implies is needed but impossible to achieve) has been most harmful, for which an important cause can only have been the prevailing mindset. Within this damage must be listed the growth of Microsoft's market power to a level where the Federal Trade Commission could hardly fail to take action against it.

6.2 "Business Method" Patents

Traditionally, "methods of doing business" were not considered to be entitled to benefit from exclusive rights. However, a case decided by the Court of Appeal for the Federal Circuit, which has been charged with dealing with all Patent Appeals since the early 1980s, changed this in 1998. This was *State Street Bank and Trust v. Signature Financial Group* and in it the Court was harking back to the Supreme Court's dictum in *Diamond v. Chakrabarty* (the first biotechnology patent case) that "anything under the sun that is made by man" can be patented. In its decision, the Appeal Court ruled that "[s]ince the 1952 Patent Act, business methods have been, and should have been, subject to the same legal requirements for patentability as applied to any other process or method". This is reminiscent of how in the case of *Cuno Engineering Corp. v. Automatic Devices Corp.* in 1941, the Supreme Court claimed that a "flash of creative genius" had all along been the level of ingenuity which was required for patentability. Business method patents have thus been ruled by the Court of Appeal to be a logical working out of the implications of the non-obviousness criterion, so that the problems with them, too, can be traced to the Article 1.8/1790 mindset.

⁴⁸ Aharonian, n. 9 above.

⁴⁹ Dennis J. Karjala, "The Relative Roles of Patent and Copyright in the Protection of Computer Programs" (1998) 17 *John Marshall Journal of Competition and Information Law* at 502.

Chiappetta has named the subject matter of these patents "the competitive arts", but he is only one of many scholars who are dubious about the merit of extending exclusive rights in this direction:

"[Other] arguments combined with the concerns regarding objective verification and a strong bias in favor of non-interference with the normal operation of the market absent a convincing demonstration of the need to intervene make the overall case for competitive arts patenting appear extremely weak. Therefore, unless and until empirical evidence demonstrates otherwise, the working hypothesis must be against applying traditional patent law to the competitive arts".⁵⁰

The United States Patent and Trademark Office has been besieged with applicants for business method patents, and has issued quite a number of them. Some of these are already in litigation, of which perhaps the most widely known is the recently settled case of *Barnes and Noble v. Amazon*, about the latter's "one-click" method of buying on the internet. A Bill was introduced in Congress in April 2001 to deny patents "where patentability depends only upon the application of known computer technology to prior art", and if it becomes law it could seriously restrict this entire development.⁵¹

7. THE SPECIAL CASE OF BIOTECHNOLOGY

DNA is information, the "operating system" of a biological cell. But just as the Article 1.8/1790 mindset prevented software from being given its own appropriate protection and forced it instead into copyright, so biotechnology was forced into patents. In this case, patent protection raises particular fears lest whole areas of development in the life sciences may be monopolised by individual firms. This would also carry with it the danger of slower development through lack of stimulus from competition. An indication of the level of this concern is the unprecedented joint statement on March 14, 2000 by the U.S. President and the British Prime Minister, urging patentees in this field to licence their inventions generously.

Patent protection in its present form is inappropriate for genomics for three main reasons. Firstly, the careful consideration which should precede any decisions about what information is to be protected and how this is to be done is still far from completion. Should protection be available as early as possible (as the genomics firms want) or further downstream in the drug-discovery process (which would suit the pharmaceutical firms) or only when an actual product has been produced? Or, indeed, should biotechnology not be protected in any sense akin to that given by patents at all, as many—especially in Europe—think?

The second, and most important, reason is the way in which the non-obviousness criterion for granting patents works in respect of genes. When applied to engineering inventions, this criterion leaves scope for a good deal of "inventing around" a patent,

⁵⁰ Chiappetta, n. 8 above.

⁵¹ Bill No. H.R. 1332, introduced by Representatives Berman and Boucher.

and correspondingly preserves competition. This scope is largely absent in pharmaceutical inventions, which is why patent protection is so effective in this industry. When applied to DNA sequences, protein structures, disease pathways, pluripotent stem cells or SNPs (single base points within the genome at which individuals differ) there is simply no alternative. "Inventing around" is impossible, so that a patent delivers a real monopoly. When it is considered that this monopoly may be granted in exchange for a disclosure which is the result of the work of one of the machines now available for automatic sequencing of DNA, it is clear how far such a grant is from fulfilling the intention of Article 1.8 of the Constitution to provide for protection of the results of individuals' creativity. Ironically, this outcome is the result of the attempt in the U.S. 1952 patent Act to pretend that invention through investment is actually invention by individuals, as this Article requires.

Because commercialization of the results of genomic research may require the use of a number of fragments, the holder of a patent on a single one of these is in a classical "blocking" position. As Heller and Eisenberg have pointed out, the resulting costs of assembling enough licences for a commercial application can make the patent system an impediment rather than a stimulus to innovation.⁵² The third reason why patents are particularly unsuitable for biotechnology is that so much of the research is publicly funded, and it is impossible to be precise about the balance between the public and private contributions in any disclosure for which a patent is granted.

Evidence of the scale of the error of forcing the protection of biotechnology into the traditional patent system comes from both Congress and from the Patent and Trademark Office itself. From Congress, it is in an amendment to the Patent Act in 1996 which eliminates the *non-obviousness* requirement for patenting biotech processes under certain conditions.⁵³ This of course makes nonsense of all discussion of the conditions of patentability back to *Hotchkiss v. Greenwood* in 1851 and even beyond. It is yet further testimony of how impossible it is to reconcile modern needs with eighteenth-century prescriptions, since it cannot possibly be in line with Article 1.8 of the U.S. Constitution.

From the Patent and Trademark Office the evidence is in its recent publication of a Research Paper, "Patent Pools: a solution to the problem of access in biotechnology patents?"⁵⁴ This suggests that the authorities sense so much trouble building up in this area that they are seeking any possible way to avoid having to make changes which are clearly necessary in respect of biotechnology patenting. This paper has all the signs of effort to get an intellectual property problem solved outside its own law, just as was done by conscripting employment law to deal with the question of employed inventors. Having found patent pools illegal for some of the country's main industries, however, the Federal Trade Commission may be unwilling to come to the USPTO's rescue in this instance.

⁵² Heller and Eisenberg, n. 6 above at 700.

⁵³ 35 U.S.C., Section 103(b)(1).

⁵⁴ United States Patent and Trademark Office, White Paper (2000) *Patent Pools: A solution to the problem of access in biotechnology patents?* Available at: www.uspto.gov/web/offices/pac/dapp/opla/patpoolcover.html

8. WORLD-WIDE EFFECTS

The restrictions of the U.S. Constitution on development of new types of intellectual property have been extended to the whole world through U.S. example, leadership, and use of that country's economic power. It is of course in the interest of the United States that the rest of the world should adopt its system, and not try to develop arrangements outside the dual patent-copyright paradigm. Poor understanding of intellectual property by both politicians and civil servants elsewhere, has made achieving this an easy task for U.S. commercial diplomacy.

This foreign subservience to U.S. practice in intellectual property matters was anything but the case in the nineteenth century, when Germany was the source of new developments. For example, from 1872 Werner Siemens organised the German Patent Protection Association to put pressure on legislators in the interests of invention through investment. In fact, he wrote that German industrialists should insist on a patent law that "does not solely protect the interests of the inventor, but also takes account of the interests of industry".⁵⁵ This, of course, is just the same problem with which the United States attempted to deal in *United States v. Burns* and in its 1952 Patents Act, but without the disadvantage of having to do so within the limits of Article 1.8. Siemens achieved his goal in the Patent Act of 1877.

As well as Siemens's own electrical industry, German chemical firms were quick to understand the potential, not just of patents, but also of the 1883 Paris Convention. Their own 1877 Act only enabled them to obtain process patents for chemicals, but under the national treatment provision of this Convention they could also get product patents in many foreign countries. They used this power to dominate international chemical markets right up to the outbreak of World War I. This was done by surrounding every one of their key discoveries by a thicket of patents which provided highly effective barriers to entry by competitors.⁵⁶ German interests were determined and strong enough to finance three successive referenda in Switzerland until a decision to pass a patent Act there (which ended Swiss free-riding on German inventions) was reached. German pressure was also a factor in restoration by the Netherlands in 1912 of the patent system which it had abandoned in 1869. This German dominance was so comprehensive that it was only when all German patents in Britain and the United States were confiscated by Enemy Property Custodians during World War I, that serious pharmaceutical industries could begin to develop in those countries.

The prodigious government-backed efforts in the United States to produce penicillin in quantity during World War II (in scientific manpower terms, second only to what was devoted to developing the atomic bomb) gave U.S. firms an overwhelming advantage in developing antibiotics, and their interest in protecting their inventions internationally grew correspondingly. Other countries also experienced the same progressive incongruity as the United States between patent arrangements designed to protect the results of individual creativity, and inventions which came from purposive

⁵⁵ Alfred Heggen, *Erfindenschutz und Industrialisierung in Preussen, 1793-1877* (1975) at 115-118. Göttingen, Vandenhoeck und Ruprecht.

⁵⁶ See Jonathan Liebenau, *The Challenge of New Technology* (Gower Publishing, Aldershot 1988).

research and development. They solved the problem by following the example of the United States in its 1952 Act, making the non-obviousness criterion the basic element in their patent examination procedure. Significantly, Japan was the first to do this, in 1959, followed by Sweden in 1967, France in 1968, Germany in 1976 and Britain in 1977. Under the Convention of 1973 which established the European patent, this criterion, now called the "inventive step", was built into examination of applications from the start. Its disadvantages in the United States have already been mentioned; in the European context where validity is a matter for the national Courts of E.U. member-states, its basic incoherence could hardly find a better illustration than the *Epilady* case, where the Courts in Germany and Britain reached diametrically opposite conclusions about its meaning.⁵⁷

In the process of extending U.S. intellectual property arrangements to other countries, the World Intellectual Property Organization has been a compliant ally. It is inevitable that as the biggest provider of funds to WIPO, U.S. interests would be reflected in the international system which that organization exists to promote. Personnel trained in the U.S. intellectual property system are also bound to be in influential posts in WIPO. Resulting pressures for "harmonization" are particularly seductive for Europeans who have been struggling for thirty years without success to agree the conditions for a single patent for their Community. Documentary evidence on the way WIPO's influence has been exercised is scarce, but one case involving the Government of Brazil and another that of Canada, clearly show the Secretariat acting to preserve structures which reflect the Article 1.8/1790 mindset.⁵⁸

However, from the U.S. point of view, the Conventions administered by WIPO had a fatal disadvantage in lacking means of imposing sanctions on member-states which did not live up to their obligations. Consequently, in the Uruguay Round of the General Agreement on Trade and Tariffs the use of the economic and political power of the United States to impose its own system of intellectual property on the world became quite overt and unrestrained. Such policies are now directed by an Office called the U.S. Trade Representative. Without this Office, U.S. policy would affect other countries only to the extent that they decided to copy American concepts and laws. By and large, this was the position at the outset of the Uruguay Round negotiations for revision of the GATT treaties in 1984. During these negotiations, however, the U.S. Trade Representative undertook an aggressive campaign to make intellectual property on the American model into the world-wide system in the interests of U.S. industry, and this resulted in the TRIPS agreement as part of the establishment of the World Trade Organization at Marrakesh in 1996. This sidelines WIPO, and effectively means the imposition of the U.S. intellectual property system on the entire world, irrespective of its suitability. As Reichman put it:

"The momentum of the multilateral negotiations during the Uruguay Round carried the developed countries well beyond their initial goal, which was to limit the capacity of firms in developing countries to make and export free-riding copies of

⁵⁷ Discussed in David Cohen, "Article 69 and European Patent Integration" (1998) 92 *Northwestern Law Review*, 1083.

⁵⁸ Kingston 1987, n. 45 above at 21, 22.

high-tech goods produced at great cost in the developed countries. Instead, by . . . 1991, the developed countries' strategic goal was to impose a comprehensive set of intellectual property standards on the rest of the world".⁵⁹

Not surprisingly, as the implications of this sank in, there has been a massive world-wide reaction. This began with street protests against WTO meetings but has now progressed to the level of Governments, as evidenced by the establishment of a Committee to bring about reform of TRIPS by the U.K. Overseas Development Ministry. Any worthwhile reform will depend upon contesting the influence of the Article 1.8/1790 mindset, of which TRIPS is now the international expression.

9. CAPTURE OF LAW-MAKING BY ECONOMIC INTERESTS

To the extent that any laws of property fail to be formulated by the authorities in terms of the public good, they will be shaped instead by those who can benefit from them. The inertia which the Article 1.8/1790 mindset engenders has been responsible for massive failure to match intellectual property law to the needs of new kinds of information. As a result, this type of law is a particularly easy target for lobbyists, and pressures from special interests have grown correspondingly. Lobbyists do not share the Article 1.8/1790 mindset, so it can be no coincidence that in the United States, "[d]espite the limiting language of the Intellectual Property Clause, Congress has recently enacted, or is seriously contemplating enacting, more than a dozen laws that seem to ignore or purport to avoid it."⁶⁰ Once lobbying by powerful groups has been successful in initiating and shaping legislation, judges (who of course share the mindset) appear to be reluctant to "second-guess" the intention of Congress. As far as copyright is concerned, Litman claims that:

"legislation in the United States has for at least a century been crafted not by the Congress, and not by the executive branch, but by multilateral negotiations among private industry representatives, sometimes with the assistance of the legislative branch. Copyright bills that have been drafted by some other process—by members of Congress, Congressional staffers, or agencies in the executive branch—have failed to achieve enough support for enactment".⁶¹

The same is true of patents, as the way in which the non-obviousness criterion was introduced makes abundantly clear. Once the pharmaceutical industry grasped both the potential of antibiotics and that this potential could never be realised if judges were to be able to rule patents for the results of the new research methods invalid for lack of "a flash of genius", it moved very quickly to get the patent law changed. In 1948, only

⁵⁹ J. H. Reichman, "Securing compliance with the TRIPS agreement after *United States v. India*." (1998) 1 *New York University Journal of International Economic Law* at 586.

⁶⁰ Heald and Sherry, n. 22 above at 1120.

⁶¹ Quoted in Merges n. 75 below. See also Jessica Litman, "Copyright, Compromise, and Legislative History" (1987) 72 *Cornell Law Review* at 857.

a year after the Streptomycin patent issued, the New York Patent Bar Association drafted a Bill and was able to get it introduced in Congress, and this, supplemented by other Bills and pressures, brought about the results they wanted. As a judge who as a patent attorney had been the main drafter of the legislation wrote later:

"The [1952] Patent Act was written basically by patent lawyers . . . A good 95% of the members [of Congress] never knew that the legislation was under consideration, or that it had passed, let alone what it contained".⁶²

This Act of Congress was evidently given its form solely by those who would benefit by it, the large (especially pharmaceutical) firms and their patent attorneys. Progressively afterwards:

"The world's intellectual property system and the domestic competition laws with which it is allied have come under intense pressure from special interests seeking to obtain artificial lead time through one legal device or another . . . governments tend to respond by extending patent and copyright laws to protect subject matter for which these laws were not intended or by implementing hybrid legal regimes that grant exclusive property rights to new objects of protection that fall outside of the classical legal framework. These *ad hoc* efforts to accommodate nontraditional forms of innovation have spawned a proliferation of restraints on trade that strain the international intellectual property system to the breaking point and weaken the competitive ethos from within".⁶³

Merges considers that "the notion that strong interest groups have captured IP policy is too simplistic in many cases" and believes that the provision of information to legislators by lobbyists needs also to be taken into account. However, he does accept that "[T]here is a broad consensus that industry groups have unusually broad input into the drafting of IPR-related legislation".⁶⁴ Either way, the result has been "the seemingly unstoppable growth of copyrights, neighbouring rights, *sui generis* rights, trademarks and other rights of intellectual or industrial property".⁶⁵ According to Boyle:

"Over the last twenty years, there has been an enormous extension of intellectual property; a far-ranging enclosure movement over the public domain, paralleling the eighteenth century's enclosure of common lands. Intellectual property rights have been broadened to cover more subjects, deepened to cover them for a longer time, widened to cover them in more ways. Current law is actually nibbling at the two areas that supposedly could never be owned, facts and ideas respectively".⁶⁶

⁶² Rich, n. 38 above at 1:10, 1:11.

⁶³ Reichman, n. 16 above at 2444.

⁶⁴ R. Merges, "Intellectual Property Rights and the New Institutional Economics" (2000) 53 *Vanderbilt Law Review*, 1857.

⁶⁵ Hugenholtz, n. 11 above at 343.

⁶⁶ Boyle, n. 43 above at 6.

There is no shortage of evidence of growing "enclosure" of information which was formerly considered to be freely accessible to all. For example, the term of copyright was only 14 years in the first U.S. Act, but is now 70 years from an author's death or 120 years from creation in the case of a work made "for hire", and there is pressure for still further extension. At the present time, lobbying is most evident on the part of firms which have traditionally relied on this type of intellectual property. These have especially strong motivation because technical developments have virtually eliminated any protection they had from the actual cost of making copies. Copyright first became necessary when printing brought about the first such major reduction; the coming of Xerography (plain paper copying) was the next revolution in this field; and finally the Internet reduced the marginal cost of making and transmitting a copy of material in digital form almost to zero.

As well as lobbying for copyright term extension, publishing and media interests have been active in promoting the use of contract law and the law of trespass to protect their intangible investments.⁶⁷ Technology has also been enlisted to provide protection beyond what copyright and other laws provide. Material on the internet can be encrypted so that only those who buy the key can have access to it, and it is now a criminal offence in the United States to make available any means of circumventing the encryption.

The latest development in this direction proposes a combination of software in anything broadcast or sent over the Internet, with equipment in all receiving devices to prevent unauthorised copying. Although this contains some gestures towards the public domain, the strength of the influence of owners of intellectual property rights on the proposed legislation is evident from the provision that:

"at any time, the legislation would allow the representatives of the content, consumer electronic and information technology industries to implement any necessary modification of the agreed-upon technologies. They could simply do so on their own, and advise the Federal Communications Commission of their actions. At every stage of the process, the private sector, and not the government, has the opportunity and the incentive to grab the reins".⁶⁸

Publishers' lobbying was singularly successful in getting a Directive from the European Community which gives them the potential of perpetual protection for electronic databases.⁶⁹ Significantly, the change in the text of this which brought about "the project's conversion from a relatively weak liability regime to a strong exclusive property right, occurred during the closed proceedings of the European Council of Ministers".⁷⁰ Two bills on the same topic are currently before Congress in the United States, one of which, H.R. 354, seeks to copy the E.U. protection, and the other, H.R. 1858, is much less favourable to publishing interests, reflecting as it does, academic

⁶⁷ See John Adams, "Trespass in a Digital Environment" (2002) I.P.Q. 1.

⁶⁸ Consumer Broadband and Digital Television Promotion Act, introduced on March 21, 2002. (Congressional Record, Senate, March 27, 2002, S2271).

⁶⁹ E.U. Database Directive 1996 (1996 O.J. (L77 20)).

⁷⁰ J. H. Reichman and Pamela Samuelson, "Intellectual Property Rights in Data?" (1997) 50 *Vanderbilt Law Review* at 84.

opposition to these. Samuelson's account of publishers' attempts to influence a WIPO Diplomatic Conference is highly revealing of the strength and methods of this kind of pressure for intellectual property law changes.⁷¹

Boyle is a leading member of a group of academics who are trying to defend the public domain from encroachment by such changes, especially by the expansion of copyright and rights related to it.⁷² This group's argument is that to the extent that barriers to entry surround information, the public domain which is the quarry for the materials which creativity needs, is correspondingly restricted, to the detriment of innovation. These scholars do not think that enclosure of information will have the same good effect as enclosures of land in Britain in the eighteenth century which led to much more productive agriculture in the longer run because of R&D. Instead, they foresee a "tragedy of the anti-commons", which will dry up the resources which people need if they are to do creative work, with the trend towards:

"a world of private censors and a sterile, narrow public domain, a world of slow technical progress in which the divide between rich and poor countries is widened farther, where intellectual property rights become the vehicle for oligopolistic concentrations of corporate power . . ."⁷³

Concern over the steady proliferation of intellectual property rights, or, conversely, the declining public domain, is no longer limited to the United States. In opposing the harmful effects in relation to copyright which are ultimately traceable to the Article 1.8/1790 mindset, members of the Public Domain group are able to make use of another constitutional provision, the First Amendment, which guarantees free speech. For foreigners, this way of dealing with intellectual property problems is not available. To the extent, therefore, that they follow U.S. intellectual property provisions uncritically, they are also taking over the inflexibility of Article 1.8 of the U.S. Constitution, but they are not similarly able to make use of whatever countervailing force the First Amendment may provide for Americans.

However, Hugenholtz thinks that Article 10 of the European Convention of Human Rights (ECHR) could be useful in this regard. This warrants the "freedom to hold opinions and to receive and impart information and ideas". Assuming that every copyrighted work consists, at least in part, of "information and ideas", a potential conflict between copyright and freedom of expression is apparent. Consequently, in his view, Article 10 "may serve, perhaps, not as a dike, but as a lifebuoy for bona fide users drowning in a sea of intellectual property".⁷⁴

⁷¹ Pamela Samuelson, "The U.S. Digital Agenda at WIPO" (1997) 37/2 *Virginia Journal of International Law* 360-440.

⁷² See Duke University Conference on the Public Domain, Nov. 9-11, 2001 (Schedule at www.law.duke.edu/pd).

⁷³ Boyle, n. 44 above at 184.

⁷⁴ Hugenholtz, n. 11 above at 344.

10. A PARTIAL CURE FOR THE ARTICLE 1.8/1790 MINDSET?

Most of the developments discussed above reflect interaction of the Article 1.8/1790 mindset with the replacement of individual creativity by investment as the primary source of the subject matter of exclusive rights. The "non-obviousness" criterion of the 1952 patent Act was introduced as an attempt to force the intellectual property aspects of this change into line with the Constitution's prescription. It was not of course foreseen that with technologies becoming more complex, it would lead to a plethora of unmerited patents; through *Diamond v. Chakrabarty* to patents for biotechnology; and through *State Street Bank and Trust* to business method patents, with all the problems these have brought with them.

These developments cause Merges to conclude that the patent system is "in crisis", for which he, too blames Article 1.8 of the Constitution, although from a different standpoint. This Article, he writes, was "coined in a spirit of blind technological optimism" and consequently set "no plausible subject matter limits, express or implied". Neither Congress nor the Courts have shown any inclination to set limits in recent years, he points out, so continued growth in patenting can be forecast to undermine patent quality in the future. Unless a number of changes which he suggests are made, therefore, "the proud tradition of the U.S. patent system is sure to continue its slow decay".⁷⁵ The reason, of course, why the authorities have been unwilling to set the limits which Merges considers to be necessary, is the Article 1.8/1790 mindset. Barton, who has made a special study of the decline in patent quality to which Merges refers, despairs of improvement through legislation but hopes that judges could be educated to hand down better decisions.⁷⁶

There is another possibility, however, which holds out considerable promise of improvement, and this is to introduce a financial dimension to the time measure of grants of exclusive rights.⁷⁷ Once the subject matter of protection changed from the results of individual creativity to those of investment, the method of *measuring* the protection should have been changed also, since money made is the only proper measure of money risked. More precise measuring of grants in this way is now technically feasible, as has been recognised by a recent E.U. expert group in the following terms:

"Invention and radical innovation can never be other than a cost from the point of view of industry accounting procedures. In today's complex technologies, money is only made by those firms that can develop them into commercial products through subsequent incremental changes. There is now persuasive evidence that progress in any field of technology is made most rapidly when several firms are competing to capture a share of a new market, and to widen the scope of application of an invention, through making such incremental improvements along different and competitive 'trajectories'.

⁷⁵ R. Merges, "As Many As Six Impossible Patents Before Breakfast: Property Rights For Business Systems and Patent System Reform" (1999) 14/2 *Berkeley Technology Law Journal* at 579.

⁷⁶ Barton n. 2 above at 1934.

⁷⁷ See William Kingston, "Intellectual Property Needs Help from Accounting" (2002) E.I.P.R. 508.

The recognised comparative failure of European firms to commercialise inventive and R&D efforts is partly explained by this. No firm can exploit more than a single trajectory of incremental change properly. Proprietary rights can prevent firms which could exploit other trajectories from doing so, thus also depriving the originator of competitive pressure to move along the learning curve as fast as possible. Eventually, products from foreign firms which incorporate more incremental improvements, gain an advantage in the market.

A useful contribution towards solving this problem would be the compulsory licencing of intellectual property, consistent with Articles 7, 8(1), and 8(2) (though Article 31 should also be noted) of the Agreement on Trade related Aspects of Intellectual Property Rights (TRIPS), subject to the condition of maintaining, and if possible improving incentives to invent and innovate.

It has been proposed with support from empirical research that this could be achieved by changing from time to money as the measure of any grant of intellectual property.⁷⁸ The proper measure of any economic privilege, in fact, can only be money. No doubt at the time when intellectual property originated, any measure other than time was out of the question, since accounting techniques were undeveloped.

But to persist with such a poor measure as time today is simply to ignore all the achievements of accountancy since, which are now capable of providing the measurement required. Many of the problems of intellectual property rights, especially in new fields such as biotechnology and information processing, are actually caused by having to use time as the very crude measure of a patent, copyright or other grant.

The empirical research underlying this proposal shows how incentives to invent could be maintained or even enhanced by the use of capital payments for licences, instead of royalties. We think that if both objectives of this proposal could be achieved, there would be considerable benefits in terms of S&T policy. We therefore consider that although this is clearly a long-term project, it is worth investigating further.⁷⁹

This proposal might contribute to solving many of the problems of intellectual property identified earlier. For example, it could help to end the mismatch between patents and inventions which are brought about through investment; improve diffusion of innovations; deal fairly with private patenting of publicly-funded research results; make sense of copyright for information in digital form, including computer software; reduce the number of intellectual property disputes and the costs of resolving them; and remove most of the causes of international antagonism to TRIPS.

Moreover, since it would be desirable that it could be put into effect in the United States, it is important that there is no difficulty in reconciling the proposal with Article 1.8 of the Constitution. It is indeed the case that whereas most other countries have provision in their patent law for compulsory licencing for "non-working", the United

⁷⁸ William Kingston, "Compulsory Licensing with Capital Payments as an Alternative to Monopoly Grants for Intellectual Property" (1994) 23/5 *Research Policy* 661.

⁷⁹ Strategic Dimensions of Intellectual Property Rights in the Context of Science & Technology Policy: an ETAN Report (1999) Section 3.4. Brussels, Publications Office of the Commission of the European Communities, EUR 18914.

States does not, as well as which no patent owner can be deemed guilty of misuse "by reason of refusal to license any rights under the patent".⁸⁰ In spite of this, there are already provisions for compulsory licencing in some U.S. legislation, such as the Clean Air and Atomic Energy Acts of 1970, and it is a basic component of protection for sound recordings.⁸¹

Objectors might invoke the Constitution to support their position on the ground that since it allows Congress to legislate for "exclusive rights" for authors and inventors, the exclusivity of a copyright or patent owner is in some sense lost if it is "compulsory" to license others. However the authority on Copyright law contests this in the following terms:

"The copyright clause of the Constitution vests in Congress the authority to enact copyright legislation, but does not itself command that copyright legislation must be enacted. Congress is given discretion whether in fact to enact such legislation and if so, as to its scope. Inasmuch as Congress manifestly has the power either to grant complete exclusivity or no protection at all, it would seem that it may properly invoke protection somewhere between these two polar positions. Non-exclusivity under a compulsory license appears to constitute such a reasonable middle ground. It may, then, be concluded that the phrase 'the exclusive right' imports words of authority, but not of limitation".⁸²

The same argument would of course also apply to patents. On the general question as to what the exclusive rights Clause permits Congress to do in respect of compulsory licencing, Heald and Sherry conclude that:

"History provides little rationale for a requirement that all grants provide the strongest possible protection to authors and inventors. Indeed, both the history and structure of the Clause—with its language tending to curtail the size of potential grants—suggest that more limited grants are preferable. Putting ourselves in the shoes of the framers, and fully cognizant of the fear and distrust of monopolies that animated their drafting of the Clause, we simply do not perceive a concomitant worry about possible congressional attempts to limit monopolies in constructive ways".⁸³

As to the addition of a financial dimension to the time measurement of a patent grant, there should be no constitutional difficulty whatsoever. Article 1.8 prescribes that there should be "exclusive rights for limited times". Instead of the present exclusive right of "making, using and selling", the new exclusive right would be that of granting licences to others to "make, use and sell", and although there could be merit in changing the "limited times" prescribed in current legislation, there would be no need to do so. What there can be no doubt at all about is that the proposed change could be of considerable benefit "to the Progress of Science and useful Arts".

⁸⁰ 35 U.S.C. Section 271.

⁸¹ 17 U.S.C. Section 114(d)(2).

⁸² Nimmer on Copyright 1.07

⁸³ Heald and Sherry n. 22 above at 1195-6.