

CAN YOU PATENT THAT? A REVIEW OF SUBJECT MATTER ELIGIBILITY IN CANADA AND THE UNITED STATES

*Emir Aly Crowne-Mohammed**

ABSTRACT

Exclusions to patentable subject matter are driven primarily by the courts. In this paper, I examine how the courts in Canada and the United States have arrived at their various exclusions to subject matter eligibility. I argue that judicial exclusions from subject matter eligibility ought to be approached narrowly and strictly. Broad categorical exclusions of patentable subject matter by the courts defeat the underlying purposes of the patent system by foreclosing entire avenues of progress *ab initio*. If the subject matter in question can be made to fit within definition of invention (even if slightly uncomfortably), then the courts should aim to ‘breathe life’ into the bare, and sometimes dated, words of patent statutes. Indeed, patent statutes are drafted with a view to the unforeseen; any judicial interpretation of the word “invention” must give deference to this vision.

* BA, LLB, LLM, LLM, PhD (cand.), Assistant Professor, Faculty of Law, University of Windsor, 401 Sunset Avenue, Windsor, Ontario, N9B 3P4, Canada, Tel: (519) 253-3000, Ext. 2984, Fax: (519) 973-7086. I would like to thank Ikechi Mgbeoji, Giuseppina (Pina) D'Agostino and Mark Perry, for providing feedback on earlier drafts of this work; as well as the invaluable and efficient research assistance provided by Michael Barbero (Law III), Esmaeil Mehrabi (Law III), Cristina Mihalceanu (Law III), Jessica Freedman (Law III), Christina Sgro (Law II) and Jenna Chandani (Law II). The unseen and thorough editorial efforts of the Temple International & Comparative Law Journal is also acknowledged. All errors remain my own, of course. The author would also like to acknowledge the collegial support of Thomas Folsom at Regent University, School of Law, and the Southeastern Association of Law School's (SEALS) Annual Conference/Meeting. This work has been made possible through the generous funding of the Foundation for Legal Research, the Law Foundation of Ontario and the University of Windsor's Academic Development Travel Fund.

I. INTRODUCTION

The central feature of patent law is the “invention.” As with most codified terms intended to have wide-ranging prospective applicability, it is usually left undefined or, if defined, is usually drafted broadly and permissively. Justice Sir Nicholas Pumfrey was correct to remark that “[a] moment’s thought will show that it is not possible to provide an exhaustive definition of ‘invention.’”¹

To be patentable, an invention must be novel, inventive, possess utility and consist of patentable subject matter. In recent years, courts, tribunals and patent offices have paid increasing attention to the fourth criterion – namely, the subject matter of the invention. For instance, the Canadian courts have held that higher life forms, methods for doing business, computer programs, and medical treatments are all excluded from the definition of an invention under Canada’s *Patent Act*.² This is despite the fact that Canada’s *Patent Act* defines an invention as “any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter”³ and excludes only “mere scientific principle[s] or abstract theorem[s]”⁴ from patentability. Even U.S. courts, which have become notorious in the past few decades for their liberal and inclusive approach towards patentable subject matter, have maintained that mathematical algorithms, laws of nature, natural phenomena, and abstract ideas *ought to remain* unpatentable.⁵ However, this approach has been called into question by the U.S. Supreme Court’s recent grant of certiorari to review an *en banc* circuit court decision that expanded the traditional limitations on patentable material.⁶

In this paper I argue that judicial exclusions from subject matter eligibility ought to be approached narrowly and strictly. Broad categorical exclusions of patentable subject matter by the courts defeat the underlying purposes of the patent system by foreclosing entire avenues of progress *ab initio*. If the subject matter in question can be made to fit within definition of invention (even if slightly uncomfortably), then the courts should aim to ‘breathe life’ into the bare, and sometimes dated, words of patent statutes. Indeed, patent statutes are drafted with a view to the unforeseen; any judicial interpretation of the word “invention” must give deference to this vision. Where the legislature seeks to provide few exceptions

1. Shopalotto.com Ltd., Patent Application No. GB0017772.5 ¶ 6 (Nov. 7, 2005).

2. Patent Act, R.S.C., ch. P 4 (1985).

3. *Id.* § 2.

4. *Id.* § 27(8).

5. See *Lab. Corp. of America Holdings v. Metabolite Laboratories, Inc.*, 548 U.S. 124, 400-01 (2006) (Breyer, J., dissenting) (endorsing both the exclusion of laws of nature, natural phenomena, and abstract ideas (citing *Diamond v. Diehr*, 450 U.S. 175, 185 (1981)) and mathematical algorithms and formulae (citing *Parker v. Flook*, 437 U.S. 584, 585 (1978))); *Gottschalk v. Benson*, 409 U.S. 63 (1972)). The dissent also appears to view mathematical algorithms and formulae as falling under the umbrella of a law of nature. *Id.* at 403-04.

6. Petition for Writ of Certiorari, *Bilski v. Doll*, No. 08- 964 (Jan. 28, 2009).

to patentability, courts and patent offices should be slow to craft their own exclusions.

This article traces how courts in Canada and the United States have dealt with unusual subject matter in the patent context over recent years – from abstract ideas and methods of medical treatment, to business methods, genes, and non-human mammals (including hypothetical half human/half monkey chimeras, one hopes).

First, I will address some preliminary philosophical matters. The justifications for the existence and emergence of intellectual property rights in general, and patent rights in particular, have traditionally been framed in terms of “labour desert theory” and/or “personality theory.”⁷ Labour desert theory is usually credited to the work of John Locke, and his *Second Treatise of Government* in which he wrote that “every man has a property in his own person; this nobody has any right to but himself. The labour of his body and the work of his hands we may say are properly his.”⁸ Thus, whoever mixes their labour with resources that are either “free” or held in common with others, are entitled to a “natural right” over the fruits of that labour.⁹ Personality theory has its roots in the writings of Hegel¹⁰ and Kant,¹¹ and stems from the view that ideas are an embodiment of their creator and their will. Therefore, the best way to protect and control one’s personhood is through property rights. In his seminal work on the philosophy of intellectual property, Justin Hughes wrote: “[p]roperly elaborated, the labor and personality theories together exhaust the set of morally acceptable justifications of intellectual property. In short, intellectual property is either labor or personality, *or* it is theft.”¹²

7. See generally Justin Hughes, *The Philosophy of Intellectual Property*, 287 GEO. L.J. 287 (1988); Tom G. Palmer, *Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects*, 13 HARV. J.L. & PUB. POL’Y 817 (1990).

8. JOHN LOCKE, *THE SECOND TREATISE OF GOVERNMENT*, § 27 (G.W. Gough ed., Blackwell 1976) (1946).

9. Hughes, *supra* note 8, at 300.

We can justify propertizing ideas under Locke’s approach with three propositions: first, that the production of ideas requires a person’s labor [sic]; second, that these ideas are appropriated from a “common” which is not significantly devalued by the idea’s removal; and third, that ideas can be made property without breaching the non-waste condition. Many people implicitly accept these propositions. The Lockean explanation of intellectual property has immediate, intuitive appeal: it seems as though people do work to produce ideas and that the value of these ideas – especially since there is no physical component – depends solely upon the individual’s mental “work.”

Id.; see also SEANA SHIFFRIN, *Lockean Arguments for Private Intellectual Property*, in *NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY* (Stephen Munzer ed., 2001); Edward C. Hettinger, *Justifying Intellectual Property*, 18 PHIL. & PUB. AFF. 31 (Winter 1989).

10. G.W.F. HEGEL, *ELEMENTS OF THE PHILOSOPHY OF RIGHT* (Allen W. Wood ed., H.B. Nisbet trans., Cambridge University Press 1991).

11. IMMANUEL KANT, *CRITIQUE OF PRACTICAL REASON AND OTHER WORKS ON THE THEORY OF ETHICS* (Thomas Kingsmill Abbott trans., Longmans, Green and Co. 1927) (1873).

12. Hughes, *supra* note 8, at 290.

Consequently, to Hughes, intellectual property rights must either be justified as a result of labour or personality, but not both. However, the Lockean labour desert theory appears largely inapplicable to the “first-to-file” method of determining eligibility for patent rights; and personality theory cannot fully account for patents on genes and life forms, *inter alia*. As trite as these criticisms may be, it is useful to note that many of these theories of “intellectual property” have been written or framed with copyright in mind. Patents are usually thrown in for good measure, which perhaps explains why theorists have turned to utilitarianism for the justification of technological inventions in particular.¹³

Peter Menell was perhaps correct when he stated that “[i]ntellectual property is rarely justified on one theory, although patents’ grounding in utilitarianism comes the closest.”¹⁴ However, despite the appeal of utilitarianism for patents, different layers and types of theory are needed to accommodate the varied and unique demands of the intellectual property game, because intellectual property is such a wide and varied field.

I aim to show that the primary literature reveals exclusions from subject matter eligibility ought to be approached narrowly and strictly,¹⁵ and at the least, not as widely drawn as much of the academic writings and jurisprudence suggest. This is especially true if one were to endorse the goals of the patent system, as promoting disclosure,¹⁶ innovation, investment, and the opportunity to design around.

II. CANADIAN EXCLUSIONS

Canada’s *Patent Act* describes an “invention” as “any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of

13. See Peter S. Menell, *Intellectual Property: General Theories*, ENCYCLOPEDIA L. & ECON. Vol. II 129 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000) (“Utilitarian theorists generally endorsed the creation of intellectual property rights as an appropriate means to foster innovation, subject to the caveat that such rights are limited in duration so as to balance the social welfare loss of monopoly exploitation.”).

14. *Id.* at 163.

15. I also accept that I may have implicitly adopted what Peter Drahos calls “proprietaryism,” which he describes as “a creed and an attitude which inclines its holders towards a property fundamentalism.” PETER DRAHOS, *A PHILOSOPHY OF INTELLECTUAL PROPERTY*, 201 (Dartmouth Publishing Co. 1996); see also E. Richard Gold, *The Reach of Patent Law and Institutional Competence*, 1 U. OTTAWA L. & TECH J. 263, 265 n.5 (2003-2004) (citing DRAHOS, at 202) (“Proprietaryism consists of three beliefs: ‘a belief in the moral priority of property rights over other rights and interests, a belief in the first connection thesis [the person with the first connection with a good ought to have a property right in it] and the existence of a negative commons.’”).

16. See Adam Mossoff, *Rethinking the Developments of Patents: An Intellectual History, 1550-1800*, 52 HASTINGS L.J. 1255 (2001) (discussing the common law Court’s growing insistence upon a “fair disclosure” for the award and enforcement of patent rights); Boulton v. Bull, (1795) 3 VES JUN 141, 2 H. B1. 463 (“The specification is the price which the patentee is to pay for the monopoly.”).

matter.”¹⁷ The *Patent Act* refines this definition further to state that “[n]o patent shall be granted for any mere scientific principle or abstract theorem.”¹⁸ Therefore, to be considered an “invention” under Canadian patent law, an invention must either be an art, process, machine, manufacture or composition of matter, or an improvement of the foregoing categories.

Judicial activism in this area, however, has meant that considerably more advances than mere scientific principles and abstract theorems have been excluded from the realm of patentable subject matter.¹⁹ Expansive terms like art, process, machine, manufacture or composition of matter, are “read down” to produce whatever restricted meaning the courts wish to give to Section 2 of the *Patent Act*,²⁰ Canadian. Courts have held that mathematical formulae and calculations, methods of medical treatment, professional skills, and higher life forms (plants, seeds and non-human animals) are not “inventions” despite how novel, non-obvious and useful they may be.²¹ Also, the Canadian Intellectual Property Office has issued practice notices stating that electromagnetic and acoustic signals, and fertilized eggs, totipotent stem cells organs and tissues are all unpatentable subject matter.²²

17. Patent Act, R.S.C., ch. P 4 (1985).

18. *Id.* § 27(8). Under the “old” Patent Act, which governs patents filed and granted before October 1, 1989, patents could not be issued for “an invention that has an illicit object in view, or for any mere scientific principle or abstract theorem.” § 27(3). The prohibition against inventions with an illicit object has since been removed from the current Patent Act. Interestingly, although no patent has been held invalid under the old Patent Act because it was illicit, the matter was addressed in *Pessers and Moody v. Haydon & Co.*, [1909] 26 R.P.C. 58 (Can.) (concerning a coin operated pinball machine), where the Court found the patent to be valid, since although the invention could have an illicit use (illegal gambling) the invention could equally have had a lawful use.

19. *Grissinger v. Victor Talking Machine Co. Of Canada*, [1929] Ex. C.R. 24 (Can.), *aff’d*, [1930] S.C.J. No. 51 (Can.) (holding that a principle cannot be the subject of a patent, and a claim to every mode or means of carrying a principle into effect amounts to a claim for the principle itself).

20. See *e.g.* *Harvard College v. Canada (Commissioner of Patents)*, [2002] 4 S.C.R. 45 (Can.) (the Harvard Mouse case); *Tennessee Eastman Co., v. Commissioner of Patents*, [1974] S.C.R. 111 (Can.); *Schlumberger Canada Ltd., v. Commissioner of Patents*, [1982] 1 F.C. 845 (C.A.).

21. See *Harvard College*, 4 S.C.R. 45 (holding that higher forms of life are unpatentable); *Tennessee Eastman Co., v. Commissioner of Patents*, [1974] S.C.R. 111 (Can.) (holding that methods of medical treatment are unpatentable); *Schlumberger Canada Ltd., v. Commissioner of Patents*, [1982] 1 F.C. 845 (C.A.) (holding that computer programs, if the discovery involved is a method of calculation, are unpatentable). All are discussed *infra*.

22. Canadian Intellectual Property Office, Office Practice Regarding Signals, (Aug. 14, 2007), <http://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr00293.html>; Canadian Intellectual Property Office, *Office Practice Regarding Fertilized Eggs, Stem Cells, Organs and Tissues*, (June 20, 2006), available at <http://www.cipo.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr00295.html>. [hereinafter Canadian Intellectual Property Offices]

A. *Scientific Principles and Abstract Theorems*

The drafters of the *Patent Act* prefaced the exclusion of scientific principles and abstract theorems by use of the word “mere.” The significance of these principles is that the discovery of a scientific principle, or the development of an abstract theorem, cannot be patented *per se*. Patent law protects the *application* of that discovery, because it protects the tangible result of applied scientific principles and abstract theorems.²³

This was emphasized many decades ago in *Grissinger v. Victor Talking Machine Co. of Canada*:

[I]t must be borne in mind that a principle cannot be the subject of a patent, and a claim to every mode or means of carrying this principle into effect would amount to a claim to a principle . . . A patent may be granted for a principle coupled with a mode of carrying out this principle into effect and it may be carried into effect under several patents operating in different ways and by different means and that is what we have in this case.²⁴

The distinction between discovery and invention, and the statutory exclusion of mere scientific principles or abstract theorems, has led to the exclusion of natural phenomena, laws of nature, and mathematical formulae and calculations (including software) from being considered patent-eligible subject matter.

The exclusion of natural phenomena from patent-eligible subject matter seems to accord with the other requirements for patentability – namely novelty,

23. It also appears that the inventor need not even know what scientific principle is at work. *See Bristol-Myers Co. v. Beecham Group Ltd.*, [1974] 1 All E.R. 333, 348-49 (1974) (L.J. Diplock):

The law of patents had its origin before the dawn of the modern sciences of physics and of chemistry. It was concerned with the practical results of manufacturing processes, not with the underlying scientific principles which explained the reason why those results were obtained; and in the case of products of manufacturing processes it was concerned with their utility not with what scientific analysis could reveal as to the composition of materials of which they were made. An invention is a patentable invention notwithstanding that the inventor, where the invention is a process, does not know on what scientific principle it works, or, where the invention is a product, is wholly ignorant of its chemical composition or molecular structure. And if this be true of the state of mind of the inventor it must equally be true of the state of mind of a person who uses the invention before it has been patented. One may use a product, as one may use prose, without knowing what it is.

Id.

24. [1929] Ex. C.R. 24, 25-26 (Can.), *aff'd*, [1930] S.C.R. 144 (Can.) (dealing with infringement of patented Gramophone equipment). *See also* *Diversified Products Corp. v. Tye-Sil Corp.* [1991], 35 C.P.R. (3d) 350 per Decary JA at 364-65 and Marceau JA at 370 (FCA); *Continental Soya Co. v. J.R. Short Milling Co.*, [1942] 2 C.P.R. 1, 4 (Can.) (“The difference between discovery and invention has been frequently emphasised [sic], and it has been laid down that a patent cannot be obtained for a discovery in the strict sense. If, however, the patented article or *process* has not actually been anticipated, so that the effect of the claims is not to prevent anything being done which has been done or proposed previously, the discovery which led to the patentee devising a *process* or apparatus may well supply the necessary elements of invention required to support a patent.”) (emphasis added).

non-obviousness and utility.²⁵ A natural phenomenon is, by its very definition, not novel. It always existed “naturally.” Despite my position that few advances should be excluded from patent eligibility, the restriction against patenting natural phenomena seems quite sensible and consistent with the way patents are prosecuted and granted. However, the growing practice of awarding patents for genes and related elements of the genetic code appears to be in direct conflict with this restriction.²⁶ Myriad Genetics, for instance, has been granted Canadian patents for the diagnosis of genes (BRCA1 and BRCA2) associated with hereditary breast and ovarian cancer.²⁷

Although this practice has not been reviewed by Canadian courts, it is likely that lower courts will follow the Canadian Supreme Court’s conservative approach towards advances in biotechnology, as exemplified by the majority’s reasoning in *Harvard College*, banishing claims over genes to the realm of ineligible subject matter. Interestingly, in *Re University of Washington Patent Application No. 616,544*, the Patent Appeal Board and Commissioner of Patents considered an appeal concerning a human erythropoietin gene,²⁸ and neither the Board nor the Examiner (whose decision was being appealed) considered that the gene itself fell beyond patent-eligible subject matter.²⁹ More recently, in *Re Yeda Research and*

25. *But see* Monsanto Canada Inc. v. Schmeiser, [2004] 1 S.C.R. 902, 2004 SCC 34, (Can.) T.2, P.254 (Arbour J., dissenting) (“Subject matters that are specifically precluded by statute from patent protection are natural phenomena, laws of nature, and scientific principles: s. 27(8).”) While Justice Arbour seems to view the exclusion of natural phenomena as deriving from statute, there does not exist any such express prohibition *per se*.

26. Konrad A. Sechley, *Gene Patents*, BIOTECH MAGAZINE 34 (May/June 2002) (“Of interest is that there has been no formal discussion of this matter [gene patenting] in Canada. The Canadian Patent Office has adopted a practice that is consistent with Europe and the U.S. in that a gene is patentable provided that it is novel, isolated, has been characterized, and has a utility.”).

27. Patent No. 2196790 (filed Aug. 11, 1995) (covering the “isolated nucleic acid which comprises a coding sequence for the BRCA1 polypeptide”); Patent No. 2196797 (filed Aug. 11, 1995) (covering an “isolated nucleic acid comprising nucleotides 120-5708 . . . having one or more of the following mutations or polymorphisms”); Patent No. 2239733 (filed Dec. 17, 1996) (covering an isolated nucleic acid selected from the group consisting of (a) a DNA comprising a cDNA coding for a BRCA2 polypeptide having the amino acid sequence set forth in SEQ ID NO:2 or a corresponding RNA; (b) a DNA which hybridizes to and is at least 95% complementary to a DNA coding for a BRCA2 polypeptide as in (a) above or a corresponding RNA; and (c) a DNA comprising a mutated DNA coding for a mutated form of the BRCA2 polypeptide as defined in (a) above associated with a predisposition to breast cancer, or a corresponding RNA”). There are also over thirty pending application for genes, and related methods of diagnosis. Canadian Patent Database, <http://patents.ic.gc.ca/cipo/cpd/en/introduction.html> (last accessed June 29, 2008). *See also* Bryn Williams-Jones, *History of a Gene Patent: Tracing the Development and Application of Commercial BRCA Testing*, 10 HEALTH L.J. 123 (2002).

28. Patent Application No. 616544 (filed June 22, 1987) (“A polypeptide exhibiting erythropoietic activity, said polypeptide being the expression product of a polynucleotide molecule comprising a human genomic DNA fragment which consists essentially of a nucleotide sequence corresponding to a 2.4 kb Apa I restriction fragment of a human erythropoietin gene or a sequence complementary thereto.”).

29. *Re Patent Application No. 616,544, (Re)* [1999] LNCPAT 3, 21 C.P.R. (4th) 356.

Development Co. Patent Application No. 2,017,025, the Patent Appeal Board and Commissioner of Patents had to consider an application relating to a protein isolated from human urine, vis-à-vis claims to the DNA molecules encoding the protein.³⁰ Neither the Board, nor the Panel, gave any consideration to the proteins as mere natural phenomena.³¹

Genetic material that exists naturally—either in a “healthy” state, or a mutated stated (as with tumors and cancers) —ought to fall beyond patent-eligible subject matter. Simply because it involves varying measures of effort, funding and luck, to discover such genetic materials still does not satisfy the novelty barrier. It is akin to rewarding innovation for mere “sweat of the brow.” By contrast, genetic material that has been altered through human ingenuity and intervention (so as to not occur naturally), ought to be considered the proper subject matter of an invention, since the novelty requirement would be satisfied.

One could argue that it is precisely because advances in genetics require such specialized training and funding that we ought to reward those “discoveries” with patents over genetic material itself. However, deep sea diving and space exploration³² require considerable training and funding, yet no one would seriously argue that natural phenomena like unknown marine life, or extra-terrestrial soil samples ought to be the subject matter of a patent. Certain innovations in genetics, like the discovery of genetic material itself, would be better protected through trade secrets, or licensing provisions, because patents over such genetic material appear to run afoul of basic patent doctrine.

Similarly, the restriction against patents covering laws of nature appears to be a sensible one. Laws of nature, by their definition, always existed and the mere discovery of such laws does not entitle one to a monopoly over them. As with natural phenomena, the novelty criterion will never be satisfied. In *Pioneer Hi*

30. Re Patent Application No 2,017,025, [2007] LNCPAT 2.

31. *Id.*

32. The United States is the only country which expressly claims dominion over inventions made in outer space. *See* 35 U.S.C.S. § 105(a)-(b) (2000):

(a) Any invention made, used, or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title, except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or with respect to any space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space.

(b) Any invention made, used or sold in outer space on a space object or component thereof that is carried on the registry of a foreign state in accordance with the Convention on Registration of Objects Launched into Outer Space, shall be considered to be made, used or sold within the United States for the purposes of this title if specifically so agreed in an international agreement between the United States and the state of registry.

Id.; see also *Intellectual Property and Space Activities, Issue paper prepared by the International Bureau of WIPO* (Apr. 2004), available at http://www.wipo.int/export/sites/www/patent-law/en/developments/pdf/ip_space.pdf.

Bred Ltd. v. Canada (Commissioner of Patents), then Justice Lamer commented that:

The intervention made by Hi-Bred [the cross-breeding of soybeans to create a new variety] does not in any way appear to alter the soybeans reproductive process, which occurs in accordance with the laws of nature. Earlier decisions have never allowed such a method to be the basis for a patent. The courts have regarded creations following the laws of nature as being mere discoveries the existence of which man has simply uncovered without thereby being able to claim he has invented them. Hi-Bred is asking this Court to reverse a position long defended in the case law.³³

Justice Binnie, dissenting in *Harvard College v. Canada (Commissioner of Patents)*,³⁴ also commented that the “laws of nature” are an essential part of many inventions, and merely because a patent utilizes them, is “scarcely a fatal objection.”³⁵ Where the invention has been described so broadly as to effectively claim a monopoly over all possible results and hence monopolize the underlying laws of nature, the restriction is said to be rooted.³⁶

Although the demarcation between mere scientific principles or unapplied laws of nature, and that of their application, appears to be a simple premise doctrinally, computer programs (and the mathematical algorithms that underlie them) have blurred this distinction.

B. Mathematical Algorithms, Calculations and Mental Steps

The only case in which a Canadian Court has considered the patentability of mathematical formula is *Schlumberger Canada Limited (Appellant) v. Commissioner of Patents (Respondent)*,³⁷ which concerned the patentability of certain software used to measure boreholes. Judge Pratte, writing for a unanimous Court, held that:

33. [1989] 1 S.C.R. 1623 at para. 18 (Can.).

34. [2002] 4 S.C.R. 45 (Can.) (the *Harvard Mouse* case), 2002 SCC 76 (Can.).

35. *Id.* at para. 87.

36. For further discussion on this topic, see French’s Complex Ore Reduction Co. of Canada v. Electrolytic Zinc Process Co., [1930] S.C.R. 462 (Can.) (discussing methods for the extraction of zinc); *id.* at 474 (quoting Neilson v. Hartford, [1841] 1 Web. Pat. Cas. 328) (“In the first place, it is necessary to ascertain what the patentee has claimed as his invention; and, in the next place, if he has claimed the principle and all the modes of applying it, his claim will be indistinguishable from a claim to the principle itself and will be too large.”). See also *Canada v. Smith Incubator Co.*, [1936] Ex.C.R. 105 (discussing patents over incubation, and principles of air circulation); *Otta v. Canada (Comm’r of Patents)* [1979] 51 C.P.R. 2d. 134, 138 (Can.) (discussing how inventions which appear to violate laws of nature are also considered unpatentable, since they lack utility and a “person skilled in the art would not be able to make, construct, compound or use the alleged invention from the description found in the applicant’s specification” because laws of nature cannot, by definition, be voluntarily circumvented, or violated by humankind).

37. [1981] 1 F.C. 845 (Fed Ct.), [1981] 63 C.P.R. (2d) 261 (dismissing application for leave to appeal to Supreme Court of Canada).

What is new here is the discovery of the various calculations to be made and of the mathematical formulae to be used in making these calculations. If those calculations were not to be effected by computers, but by men, the subject-matter of the application would clearly be mathematical formulae and a series of purely mental operations; as such, in my view, it would not be patentable . . . What the appellant claims as an invention here is merely the discovery that by making certain calculations according to certain formulae, useful information could be extracted from certain measurements. This is not, in my view, an invention within the meaning of section 2.³⁸

Since the patent in *Schlumberger* was directed solely at the use of computer programs to effect certain mathematical calculations, the Court reasoned that such mathematical formulae were no more than mere scientific principles, or abstract theorems.³⁹ On either limb of the statutory exclusions, Schlumberger's patent application would fail for want of patentable subject matter.

However, this does not amount to a judicial exclusion over computer programs as a whole, it merely amounts to an exclusion of computer programs used to implement a discovery.⁴⁰ It is often overlooked in the literature that the Court in *Schlumberger* expressly noted that:

[T]he Patent Act contains no provision specifying or even implying a limitation of the meaning of the word 'invention' in section 2 of the Act excluding inventions involving computers, there does not exist any reason for saying that the discovery claimed by the appellant, assuming it to be new and to have required inventive ingenuity, is not a patentable invention within the meaning of section 2 of the Act.⁴¹

Since *Schlumberger*, numerous Patent Appeal Board decisions have endorsed the patentability of computer programs which are directed towards a useful result and integrated with otherwise patentable subject matter.⁴² Of particular interest are

38. *Id.* at 847.

39. *Id.*

40. *See Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1987] 1 C.F. 173, 201 (Can.) (Reed, J.) (commenting that a "computer program in my view is not the same as a mathematical formula."). Correctly, in my view, she identifies the division between a computer program that is directed towards some useful result, product, machine or apparatus, as opposed to the mere use of a computer to effect mathematical calculations. *See also Mackintosh Computers Ltd. v. Apple Computer, Inc.*, [1990] 2 R.C.S. 209, 213, 215 (Can.) (Cory, J.) (overturning the Federal Court's reversal of Justice Reed's decision, remarked that her reasons were "exemplary," and that there was little he could, or wished to, add).

41. *Schlumberger Canada Ltd. v. Commissioner of Patents*, [1982] 1 F.C. 845, 846. *See also Re Northern Light Technology Group Inc. Patent Application No. 2,307,153*, [2006] LNCPAT 2 (upholding an application for a computerized system to track light fixtures and determine whether they were in need of repair or maintenance).

42. *See Re Belzberg Patent Application No. 2,119,921*, [2007] LNCPAT 1; *Re Application No. 291,377 For Patent Of Gerber Garment Technology, Inc.* (Now Patent No. 1,179,422), 1984 LNCPAT 5; *Re Application Of Honeywell Information System Inc.* (Now Patent No. 1,216,072), [1986] LNCPAT 2; *Re Application For Patent For Measurex Corp.* (Now Patent No. 1,170,750), [1983] LNCPAT 2; *Re Bendix Corporation Application* (Now Patent No. 1,176,734), [1984] LNCPAT 9.

the Patent Appeal Board decisions concerning patent applications filed by Motorola.⁴³ Motorola's applications dealt with apparatus for determining square or reciprocal roots and exponentials. Both applications, which at their core involved algorithms for solving various mathematical problems, were permitted on the basis that the invention was articulated to contain a "specific piece of computer hardware."⁴⁴ Hence, the invention went beyond "a mere scientific principle or abstract theorem."⁴⁵

"Mental steps," like mathematical formulae or calculations, are also excluded from patentability.⁴⁶ "Mental steps" may either refer to a series of "mere" steps which *could* be performed by a person, a machine, or some other electrical or chemical means, such as placing books on a shelf; or it can refer to the use of one's mental faculties in some interpretative or judgmental way, such as drafting a poem in a particular manner. The latter category of "mental steps" that is said to be unpatentable because it lacks the requisite predictability and repeatability as to enable the skilled practitioner to 'work' the invention.⁴⁷

C. Professional Skills, and Methods of Medical Treatment

1. Professional Skills

Professional skills are said to be outside the concept of invention and hence unpatentable. The sole judicial authority for this proposition is *Lawson v.*

43. Re Motorola Inc. Patent Application No. 2,047,731, [1998] LNCPAT 1; Re Motorola Inc. Patent Application No. 2,085,228, [1998] LNCPAT 2 (together, "Motorola's applications").

44. '731 Patent at 5; '228 Patent at 4.

45. *Id.* The Canadian Intellectual Property Office's Manual of Patent Office Practice also endorses the view that computer programs are patentable subject matter: "Software that has been integrated with statutory subject matter may be patentable . . . [but a] claim to a method consisting only of making certain calculations according to certain formulae is, even if it results in useful information, excluded from patentability under subsection 27(8) of the *Patent Act* [i.e. as in *Schlumberger*]." CANADIAN INTELLECTUAL PROPERTY OFFICE, MANUAL OF PATENT OFFICE PRACTICE sec.16.03.02 (2005), available at <http://www.cipo.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr00999.html>.

46. The Federal Court of Canada in *Schlumberger Canada Ltd. v. Commissioner of Patents* remarked that if the mathematical calculations were performed by "men" rather than computers, the calculations would amount to nothing more than a "series of purely mental operations" and not patentable. [1982] 1 F.C. 845, 847 (Fed. Ct.).

47. Re Application Of Itek Corp. (Patent No. 1,121,640), [1981] LNCPAT 9 para. 7. Stating that:

A mental step in the sense in which the term is employed in patent language is a step in a process, the performance of which is ascertained or controlled by the dictates of the human mind, which step may be performed manually or by mechanical, electrical or chemical means. A mental step which is judgmental or interpretive (purely mental) is definitive of a process the result of which depends on the intelligence and reasoning of the human mind. It seems settled that it is only this latter type of mental step which renders a process unpatentable. The mere fact that a human operator must provide a control function in a claimed process does not *per se* render it unpatentable.

Id.

Commissioner of Patents,⁴⁸ which involved an application to patent the manner in which land was sub-divided. Justice Cattanach reasoned that:

It is obvious . . . that professional skills are not the subject-matter of a patent. If a surgeon were to devise a method of performing a certain type of operation he cannot obtain an exclusive property or privilege therein. Neither can a barrister who has devised a particular method of cross-examination or advocacy obtain a monopoly thereof so as to require imitators or followers of his methods to obtain a licence from him.

It seems to me that a method of describing and laying out parcels of land in a plan of subdivision of a greater tract of land in [sic] the skill of a solicitor and conveyancer and that of a planning consultant and surveyor. It is an art which belongs to the professional field and is not a manual art or skill.⁴⁹

Justice Cattanach ruled that professional skills lay outside the ambit of “art” or “manufacture” under Section 2(d) of the *Patent Act*, and hence was not directed toward statutory subject-matter.⁵⁰ The underlying policy concern in *Lawson* is the prevention of a monopoly on intangible skills.⁵¹ The Patent Appeals Board has also been wary of veiled attempts at patenting professional skills through automated or computerized means. In *Patent Application No. 564,175*, the Patent Appeals Board upheld the Examiner’s conclusion that the patent application for a computerized financial management system was unpatentable, stating that “[s]ince the application is directed to a discovery which does not fall within the definition of invention and the use of a computer to implement that discovery does not change its nature, the Board concludes that the applicant’s system does not fall within the ambit of Section 2 of the *Patent Act*.”⁵²

Given the framework of *Lawson*, it is intuitively appealing to say that a particular method of sub-dividing land in the shape of a champagne glass⁵³ is beyond the realm of invention. However, the justification is less appealing. First, to paint a method of sub-dividing land broadly as a “professional skill” and then to analogize it to the skills of a surgeon is quite tenuous.⁵⁴ The so-called “professional skill” here in *Lawson* is precisely the type of inventiveness that the *Patent Act* was intended to promote, provided the other criteria of novelty and utility are present. The patent application was directed as a practical and useful way of sub-dividing land.⁵⁵ It was not directed at monopolizing the field of conveyances as a whole.

48. [1970] 62 C.P.R. 101 (Can.). See also *Re Dixon Application No.259,203*, [1978] LNCPAT 8 para. 2 (denying patentability to “a novel technique to improve the voices of individuals by means of a series of vocal exercises”).

49. *Lawson*, 62 C.P.R. at 111.

50. *Id.* at 116.

51. See *id.*

52. *Re System for the Operation of a Financial Account Patent Application No. 564,175*, [1999] LNCPAT 5.

53. 62 C.P.R. at 105.

54. *Id.* at 111.

55. See *id.* at 104-05 (describing the application’s method of land subdivision).

On this basis, it is not clear whether professional skills as a whole are excluded from the concept of invention. It would seem that a new, non-obvious, and useful means for employing certain professional skills ought to be patentable. The remarks of Justice Cattanach,⁵⁶ when taken beyond the field of conveyances, do not necessarily imply an exclusion of professional skills as a whole, and must be regarded as *dicta*. The Supreme Court⁵⁷ has stated that “art” includes a process that:

- (i) is not a disembodied idea but has a method of practical application;
- (ii) is a new and innovative method of applying skill or knowledge; and
- (iii) has a result or effect that is commercially useful.⁵⁸

An extension of this definition of art means that the practical application of a new, innovative, and commercially useful professional skill could be patentable.

2. Business Methods

The patentability exclusion on professional skills should not extend to “business methods.” Even the Canadian Intellectual Property Office’s Manual of Patent Office Practice acknowledges that nothing in the jurisprudence or the *Patent Act* expressly excludes business methods from patentability.⁵⁹ Justice Arbour, in her dissent in *Monsanto*, incorrectly identified “business systems and methods and professional skills and methods”⁶⁰ as excluded from the concept of invention, relying on the American decision in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*⁶¹ as the authority for this proposition.

Nonetheless, for a time, the Patent Appeals Board appeared increasingly willing to permit the patenting of business methods insofar as they are implemented within a machine. In *Belzberg Patent Application No. 2,119,921*,⁶²

56. *See id.* at 111.

57. *Tennessee Eastman Co. v. Comm’r of Patents*, [1974] S.C.R. 111 (Can.) (discussing Section 2(d) of the Patent Act).

58. This itemization was taken from *Progressive Games Inc. v. Comm’r of Patents*, [1999] 4 C.P.R. (4th) 517.

59. CANADIAN INTELLECTUAL PROPERTY OFFICE, MANUAL OF PATENT OFFICE PRACTICE sec. 12.04.04 (2005), available at <http://www.cipo.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr00723.html>:

The expression ‘business methods’ refers to a broad category of subject matter which often relates to financial, marketing and other commercial activities. These methods are not automatically excluded from patentability, since there is no authority in the *Patent Act* or *Rules* or in the jurisprudence to sanction or preclude patentability based on their inclusion in this category. Patentability is established from criteria provided by the *Patent Act* and *Rules* and from Jurisprudence as for other inventions. Business methods are frequently implemented using computers.

Id.

60. *Monsanto Canada Inc. v. Schmeiser*, [2004] 1 S.C.R. 902, 947 (Can.) (Arbour, J., dissenting in part).

61. 149 F.3d 1368, 1374-75 (Fed. Cir. 1998) (upholding patentability of algorithms insofar as they are directed towards some useful, tangible result).

62. [2007] LNCPAT 1 at 11.

the Board reversed an Examiner's refusal to patent a "Computerized Stock Exchange Trading System," holding that the subject matter was within the definition of invention and not obvious. Although, given the reasoning set forth in *Patent Application No. 564,175*⁶³ (discussed above, regarding a computerized financial management system), it is unclear why the computerized stock exchange system was not viewed as a mere aggregation⁶⁴ of several professional skills implemented by means of a computer.

I had once viewed this increasing willingness to permit the patenting of business methods as the Patent Appeals Board's implicit acceptance of the economic and competitive need to protect such innovations in accordance with American jurisprudence (discussed *infra*) and the restricted reading that *Lawson* ought to receive. However, the recent decision in *Patent Application No. 2,246,933 (Re)* (discussed below),⁶⁵ and the decision by the U.S. Court of Appeals for the Federal Circuit in *In re Bilksi*⁶⁶ (discussed *infra*), may signal a change in the trend. The newly constituted⁶⁷ Patent Appeals Board appears reluctant to permit the patenting of business methods.

*Patent Application No. 2,246,933*⁶⁸ was an application by Amazon.com that sought to patent a system for placing orders on-line using one click (commonly referred to as Amazon.com's one-click patent application). Customers were identified using cookies stored locally on their computers. These identifiers were then used to obtain the customer's pre-recorded information from Amazon.com's

63. [1999] LNCPAT 5 at 5 (applicant's computer system performs calculations based on mathematical formulae developed by the unpatentable professional skills of financial experts).

64. *Domtar Ltd. v. MacMillan Bloedel Packaging Ltd.*, [1978] 41 C.P.R. (2d) 182 (Can.) is often cited as support for the proposition that mere juxtaposition, or combination, of parts without any inventive unity is not patentable subject-matter. Yet, the Court of Appeal never affirmed the Trial Division's *ratio* (found at [1977] 33 C.P.R. (2d) 182, paras. 28-35) in this regard. The Court of Appeal expressly stated:

The learned trial Judge based his decision on three independent grounds. First, he found that the alleged invention was not new and had been anticipated by an American patent granted to one McElwee in 1953; secondly, he held that the alleged invention was not a patentable combination since it was not, according to him, a real combination but a mere juxtaposition or aggregation; thirdly, he found that, in any event, the alleged invention lacked subject-matter since neither its conception nor its realization had required any inventiveness.

I need not express any opinion on the first two grounds of the learned trial Judge's decision since I have reached the conclusion that his third ground is clearly well founded.

Domtar Ltd., 41 C.P.R. at 184.

65. *Kaphan Patent Application No. 2,246,933, (Re)*, [2009] LNCPAT 2.

66. 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008).

67. The decision in *Kaphan Patent Application* was delayed several years due to the retirement of two members of the Patent Appeal Board who formed part of the initial hearings on November 16, 2005. *Kaphan Patent Application No. 2,246,933 (Re)* [2009] para. 3. A new Board convened in 2008, and Applicant accepted the opportunity to have another hearing on September 18, 2008. *Id.* at paras. 4-5.

68. '933 Patent at para. 7.

database.⁶⁹ The Patent Appeal Board upheld the Examiner's rejection of the application as being directed towards unpatentable subject matter.⁷⁰ The Board held that Amazon.com's one-click patent application was neither a machine, manufacture, or composition of matter since it was not a physical object.⁷¹ It focused its analysis on whether the application satisfied the other two categories of invention: "art" or "process." The Board boldly noted that a "common characteristic of the five categories of invention⁷² is that they are physical in nature."⁷³ There is nothing in the *Patent Act* to indicate that physicality is a "theme" that underlies the concept of invention. The Supreme Court of Canada decision in *Shell Oil Co. v. Commissioner of Patents* actually encouraged an expansive interpretation of the word "art" to encompass both the "means" and the "end," and although the Board cited this decision in their reasoning,⁷⁴ they apparently failed to appreciate this expansiveness.

The Board also cited Justice Arbour's dissent in *Monsanto* as authority for the proposition that business methods are excluded subject matter in Canada, despite implicitly acknowledging that she was incorrect to cite the American decision in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*⁷⁵ as the underlying authority for this. The Board's reasoning was as masterful as it was misleading when it stated: "Notwithstanding the reference to *State Street Bank* above, the Board accepts the statement in dissent by the Supreme Court of Canada

69. *Id.*

70. *Id.* at para.194. The Examiner had also rejected the application as being obvious. The Patent Board did not agree with this conclusion based on the prior art cited. *Id.* at paras. 108-09.

71. *Id.* at paras.173-76.

72. As set out in Section 2 of the Patent Act, "invention" means "any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter." R.S.C., ch. P 4 (1985).

73. '933 Patent at para. 31.

74. *Id.* at para. 132 (quoting *Shell Oil Co. v. Comm'r of Patents*, [1982] 2 S.C.R. 536, 554 (Can.):

The court [in *Tennessee Eastman*], however, affirmed that 'art' was a word of very wide connotation and was not to be confined to new processes or products or manufacturing techniques but extended as well to new and innovative methods of applying skill or knowledge provided they produced effects or results commercially useful to the public An effort to articulate this broader concept of the term 'art' was made by Justice Cattanach in *Lawson*. In that case a patent was being sought on a new method of describing the boundaries of a plot of land. The application was rejected, again not because the subject-matter of the application was not an 'art' within the meaning of the definition in the Act but because, like the new use for the adhesive in *Tennessee Eastman*, it related to professional skills rather than to trade, industry or commerce[.]

Id. Justice Cattanach reasoned: "This supports the interpretation of 'art' as encompassing a wide variety of 'means' insofar as they produced commercially useful results. Physicality is not a requirement. The Supreme Court of Canada was careful with its words." '933 Patent at para. 132 (quoting *Shell Oil Co. v. Comm'r of Patents*, [1982] 2 S.C.R. 536, 554 (Can.).

75. 149 F.3d 1368, 1374-75 (Fed. Cir. 1998) (upholding patentability of algorithms insofar as they are directed towards some useful, tangible result).

that business methods are excluded subject matter.”⁷⁶ How could the Board deny the reference to *State Street* yet accept the statement that business methods are excluded subject matter? Justice Arbour’s exclusion of business methods is incorrect, as it is *entirely* premised on her importation of American jurisprudence into Canadian law, and the decision in *State Street* actually endorsed the patentability of business methods (discussed *infra*).

Unsatisfied with its equivocal adoption of Justice Arbour’s incorrect list of excluded subject matter, the Board then adopted other spurious references in support of its premise that business methods are unpatentable. The Board cited a 1901 English decision, *In the Matter of Cooper’s Application for a Patent*,⁷⁷ which excluded a “mere scheme or plan,” as well as a commentary of Harold G. Fox who repeats the exclusion of a “mere” scheme.⁷⁸ Nowhere did the Board acknowledge that a “mere” scheme or plan is entirely different than a scheme or plan that produces a practical result. A “mere” scheme or plan is nothing more than a series of mental steps, whereas the practical application of that scheme or plan may be patentable subject matter.⁷⁹

The Board also applied the discussion of “art” from the U.S. Court of Appeals for the Federal Circuit decision in *In re Bilski* (discussed *infra*).⁸⁰ It paraphrased Justice Dyk, who wrote a concurring opinion for the majority in *In re Bilski* and said “that in order to construe the term ‘art’ in the U.S. statute, it was necessary to consider what the drafters of the early patent statutes understood the term to mean.”⁸¹ The Board then argued that the U.S. Patent Act of 1793 was modelled after the Statute of Monopolies and the practice of the English Practice Office.⁸² And since the Canadian statute was modeled after the U.S. Patent Act, early English and American decisions should influence how the Canadian Act is interpreted.⁸³

First, if we relied on what the original drafters “intended” over two hundred years ago, then it is likely that every modern advance would have been outside of their conception. Second, the Board’s tenuous connection of early U.S. Patent Law and early English Patent Law, to modern interpretations of Canadian Patent Law is doubtful. Thirty years ago, Justice Pigeon, writing for a unanimous Court in

76. ’933 Patent at paras. 141, 142. *See also* Monsanto Canada Inc. v. Schmeiser, [2004] 1 S.C.R. 902, 947 (Can.) (Arbour, J., dissenting in part) (internal citations omitted) (“Other subject matter has been excluded by judicial interpretation of . . . definitions of ‘invention’ and ‘process.’ For example, the following have been excluded: computer programs[,] if the discovery involved is a method of calculation; methods of medical treatment; higher life forms; business systems and methods and professional skills and methods [in *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368 (1998).]”).

77. ’933 Patent at para. 143 (citing [1901] 19 R.P.C. 53).

78. *Id.* (citing Harold G. Fox, DIGEST OF CANADIAN PATENT LAW at 11).

79. *See generally id.*

80. *In re Bilski*, 545 F.3d 943, 960 (Fed. Cir. 2008).

81. ’933 Patent at para.145 (paraphrasing *In re Bilski*, 545 F.3d at 966-67 (Dyk, J., concurring)).

82. ’933 Patent at para. 145.

83. *Id.* para. 147.

Tennessee Eastman Co. v. Commissioner of Patents (discussed *infra*) held that British Patent Cases are not entitled to the precedential weight that some authors believe they should be given.⁸⁴

Furthermore, the current version of the U.S. Patent Act does not even include “art” within the enumerated categories of invention.⁸⁵ Even though the U.S. Supreme Court has held that a process “is an art,”⁸⁶ it still ignores the fact that, under Canada’s Patent Act, “art” and “process” are two distinct categories of invention. One term does not subsume the other, nor are the terms interchangeable with each other.⁸⁷ The Board’s use of American jurisprudence to define “art” or “process” under Canadian law is inappropriate.

Even if we ignore all of these problems with the Board’s reasoning and dissect the test used by the Board (the “*ratio*” itself), it too does not withstand scrutiny. The Board held that:

[W]here the claimed invention, in form or in substance, is neither a physical object (a machine, manufacture or composition of matter) nor an act or series of acts performed by some physical agent upon some physical object to produce in that object some change of either character or condition (art or process), it is not patentable.⁸⁸

Even if we adopt the Board’s language, there is no reason that Amazon.com’s one click patent application⁸⁹ cannot be viewed as a physical act (i.e., the inputting of customer data by a server) to some physical object (i.e., the physical display of a customer’s order on a computer screen) that results in a change of its condition whereby the blank form is made “useful” by the automated input of customer’s data. The mere fact that these activities are accomplished through a series of computers should not diminish the system’s patentability. Computers, servers and networks are all still “physical.” The information that they provide is displayed on a

84. [1973] 8 C.P.R. (2d) (Can.) at 208 (citing Fox, *Canadian Law and Practice Relating to Letters Patent* (4th ed.) at 19); see also *Hoffman-La Roche & Co. Ltd. v. Comm’r Pat.*, [1955] S.C.R. 414 (holding British patent practice cannot be followed due to distinguishable statutory provisions); *Comm’r of Patents v. Winthrop Chemical Co., Inc.*, [1948] 2 S.C.R. 46 (finding that since the Canadian Act is not modeled after the British Act, assumptions based on the British Act are irrelevant).

85. U.S. Patent Act, 35 U.S.C. § 101 (2000) (“Inventions patentable: Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title[.]”).

86. *Diamond v. Diehr*, 450 U.S. 175, 183 (1981) (quoting *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1877)) (explaining that even though Congress did not replace “art” with “process” until 1952, “a process has historically enjoyed patent protection because it was considered a form of “art” as that term was used in the 1793 Act.”).

87. If “process” and “art” were interchangeable, then the definition of “invention” under Canada’s Patent Act would be redundant. Patent Act, R.S.C., ch. P 4 (1985) (“[I]nvention means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter.”).

88. Kaphan Patent Application No. 2,246,933, (Re) [2009] LNC PAT ¶139.

89. *Id.* ¶6.

screen and is therefore as physical as a reflection in a mirror, however, this approach to physicality is flawed because it is not rooted anywhere in Canadian jurisprudence.

3. Methods of Medical Treatment

Methods of medical treatment are also excluded from patentable subject matter. In *Tennessee Eastman Co. v. Commissioner of Patents*, the Supreme Court upheld the Exchequer Court's denial of a patent application for the surgical bonding of tissues.⁹⁰ Justice Kerr, writing for the Exchequer Court,⁹¹ noted that this surgical method was neither a manual nor a productive art, nor was it "related to commerce" or "essentially economic."⁹² Instead, the method fell within the "professional field of surgery and medical treatment" and was not patentable under Section 2(d) of the Patent Act.⁹³

Although this decision was based on Section 41 of the old *Patent Act* (now repealed), the *ratio* has been affirmatively endorsed by the Canadian Supreme Court in *Apotex Inc. v. Wellcome Foundation Ltd.*⁹⁴ Moreover, subsequent jurisprudence has interpreted the *ratio* in *Tennessee Eastman* as excluding patents over medical treatment in the "strict sense"⁹⁵ and has permitted claims over diagnostic products⁹⁶ or devices.⁹⁷

90. [1974] S.C.R. 111 (Can.).

91. The former Exchequer Court of Canada, now the Federal Court of Canada, originally had limited jurisdiction, in that it only heard revenue cases against the federal government of Canada. Its jurisdiction gradually expanded, however, and until it became the Federal Court of Canada in 1971, the Exchequer Court had jurisdiction over all claims against the federal government. Canadian Federal Court Website, http://cas-ncr-nter03.cas-satj.gc.ca/portal/page/portal/fc_cf_en/History (last visited Oct. 12, 2009).

92. [1970] 62 C.P.R. (2d) 117 (Ex. C.R.), at 114-15.

93. *Id.*

94. [2002] 4 S.C.R. 153, 2002 SCC 77 (Can.), para.49.

95. *Application for Patent of Goldenberg* (Now Patent No. 1,244,344) (1988), 22 C.P.R. (3d) 159 <http://brevets-patents.ic.gc.ca/opic-cipo/comdec/eng/decision/1119/summary.html?query=%28Goldenberg%29++&start=1&num=10>

96. *See Re Application of McIntyre* (Can. Pat. App. Bd. & Pat. Commr., 1992), <http://brevets-patents.ic.gc.ca/opic-cipo/comdec/eng/decision/1172/summary.html?query=%28McIntyre%29++&start=1&num=10> (permitting claims over a diagnostic heart-monitoring device); *Re Application of Goldenberg* (permitting claims over a diagnostic method of detecting tumors). *But see Re Application of Imperial Chem. Indus. Ltd.*, 1982 LNC PAT 6 (holding that a tooth-cleaning and dental-whitening solvent was essentially non-economic). The combination of tooth-whitening's aesthetic nature and the Patent Appeals Boards' narrow reading of *Tennessee Eastman* leaves no consistent reason for holding that tooth-whitening solutions are directed toward the treatment of the human body. Furthermore, tooth-whitening may have been non-economic in 1982, but it is a sizeable industry today.

97. *See Visx Inc. v. Nidek Co.*, 3 C.P.R. (4th) 417, 418 (upholding the patents of several medical advances because they were either apparatuses or machines and did not infringe upon the professional skills of a surgeon).

4. Playing Games

The decision in *Progressive Games, Inc. v. Canada (Commissioner of Patents)*⁹⁸ is often cited in support of the proposition that methods of playing games are excluded from patentable subject matter.⁹⁹ *Progressive Games* involved the patentability of an improved method for playing poker, with odds that always favored the “house.”¹⁰⁰ The Trial Division denied patentability to the poker game because the improved method for playing poker did not substantially modify poker, create a new game, or invent “a method of using [an] old card game in a new way.”¹⁰¹ The Court of Appeals’ judgment reinforced this, stating:

These changes merely amounted to a change in the way an existing and well-known game is played. These changes do not substantially modify the poker game as it is generally known. The Appellant’s suggested game uses the standard deck of playing cards and the conventional rules of poker with a slight variation. We do not believe this amounts to a new and innovative method of applying skill or knowledge[.]¹⁰²

In delivering his judgment for the court, Justice Sexton noted (in *obiter*) that substantial changes to the game of poker still may not have changed the Court’s decision.¹⁰³ However, this does not amount to a jurisprudential exclusion of “game playing” from patentable subject matter; nor should it. Inventions that satisfy the other criteria of novelty, non-obviousness, and utility ought to qualify as patentable inventions. Restricting patentability on any other basis leads to uncertainty and improper line drawing. For example, many business methods and computer-implemented inventions can be construed as ways of playing loosely-defined “games.”

5. Higher Life Forms (or, “Don’t Let The Bastaraches Determine Patentable Subject Matter”)¹⁰⁴

Unlike the Canadian courts’ treatment of game playing, their treatment of higher life forms is a prime instance of unpalatable line drawing. Canadian jurisprudence has carved a singular line between lower life forms and higher life forms. Non-naturally occurring lower life forms like yeasts, molds, fungi, bacteria,

98. *Progressive Games, Inc. v. Canada (Commissioner of Patents)*, 4 C.P.R. (4th) 517.

99. See Hughes, Roger T., ed. *Hughes and Woodley Patents*, 2nd ed. looseleaf (Markham, Ont.: LexisNexis Butterworths, 2005) at p. 128.

100. 4 C.P.R. 517. para. 10.

101. *Id.* at paras. 23-26.

102. *Progressive Games Inc., Canada (Commissioner of Patents)* [2000] F.C.J. No. 1829 para. 1.

103. *Id.*

104. This is a twist on Allan C. Hutchinson’s work on the relationship between legal scholarship and the courts. Allan C. Hutchinson, *The Role of Judges in Legal Theory and the Role of Legal Theorists in Judging (or ‘Don’t Let the Bastaraches Grind You Down’)*, 39 ALTA. L. REV. 657 (Aug. 2001). Like Hutchinson, I “hold no brief against Justice Bastarache as either judge or person.” *Id.* at 657. However, I do take issue with his views on the patentability of higher life forms.

unicellular algae, cell lines and viruses, protozoa, and other micro-organisms are considered patentable since they can be produced “*en masse*” with uniform characteristics.¹⁰⁵ On the other hand, higher life forms like plants, seeds, humans and non-human animals are considered unpatentable.¹⁰⁶

*Harvard College*¹⁰⁷ was the first decision to deal squarely with the issue of higher life form patentability.¹⁰⁸ Harvard College applied for a patent relating to (a) the insertion of an activated oncogene sequence into a non-human mammal (greatly enhancing the probability that such mammals would develop neoplasms, particularly malignant tumors, and various cancers; and (b) the actual non-human mammal itself (the so-called “oncomouse”).¹⁰⁹ The Supreme Court held, *per se*, that the oncomouse circumscribed unpatentable subject matter, with Justice Bastarache writing for a narrow majority (Justices L’Heureux-Dubé, Gonthier, Iacobucci, and LeBel concurring) and Justice Binnie proffering a strong dissent for the rest of the Court.¹¹⁰

As the crux of the matter rested with the proper construction of Section 2 of the *Patent Act*, Justice Binnie maintained that the oncomouse ought to qualify as either a “composition of matter” or “manufacture”:

‘Composition of matter’ (composition de matières) is an open-ended expression. Statutory subject matter must be framed broadly because by definition the *Patent Act* must contemplate the unforeseeable. The definition is not expressly confined to inanimate matter, and the appellant Commissioner agrees that composition of organic and certain living matter can be patented. In the case of the oncomouse, the modified genetic material is a physical substance and therefore ‘matter.’ The fertilized mouse egg is a form of biological ‘matter.’ The combination of these two forms of matter by the process described in the disclosure is . . . a ‘composition of matter.’¹¹¹

105. *Re Application of Abitibi Co.*, [1982] 62 C.P.R. (2d) 81, <http://brevets-patents.ic.gc.ca/opic-cipo/comdec/eng/decision/962/summary.html?query=%28Abitibi+%3Cin%3E+cnote+%3COR%3E+Abitibi+%3Cin%3E+entext+%3COR%3E+Abitibi+%3Cin%3E+frtext%29&start=1&num=10>. See also *Monsanto Canada Inc. v. Schmeister*, [2004] 1 S.C.R. 902, 2004 SCC 34 (Can.), para. 97 (establishing infringement for the use of patented genes and cells); *Harvard College*, [2002] 4 S.C.R. 45, at para. 123 (acknowledging that lower life forms are patentable); *Re Application for Patent of Connaught Labs.*, [1982] 82 C.P.R. (2d) 32, 35 (approving an application to patent non-naturally occurring bovine cell lines).

106. *Harvard College*, [2002] 4 S.C.R. 45, para. 205.

107. *Id.*

108. In *Pioneer Hi-Bred Ltd. v. Canada (Comm’r of Patents)*, [1989] 1 S.C.R. 1623, 1629 (Can.), at 1629, the Court was asked to rule on the patentability of a new genetically-engineered soybean variety. However, because the parties had not provided sufficient information about the soybean, the Court declined to rule on the circumstances under which genetically-engineered products could be patentable. *Id.* at 1633-34.

109. *Harvard College*, [2002] 4 S.C.R. 45, para. 123.

110. *Id.* While the oncomouse itself was rejected, the insertion of an activated oncogene was patentable. *Id.* para. 125.

111. *Id.* paras. 43-44.

Justice Binnie urged that the line drawing between lower and higher life forms remained an exercise in “murine metaphysics” by both the Commissioner and the majority.¹¹² He did not find that the text of the Patent Act supported any of the proposed dividing lines.¹¹³ Instead, the lines were “policy driven” and should properly be enacted by Parliament, not the courts.¹¹⁴

Justice Bastarache, writing for the majority, also discussed the true construction of section 2 of the *Patent Act*. In first seeking to define “manufacture,” he wrote that “the word *would commonly be understood* to denote a non-living mechanistic product or process. . . . While a mouse may be analogized to a ‘manufacture’ when it is produced in an industrial setting, *the word in its vernacular sense* does not include a higher life form.”¹¹⁵ The majority’s constant appeals to ambivalent terminology suggest that it struggled to find wholly rational explanations for its line drawing. It has become quite common “in the vernacular” (in Justice Bastarache’s words) to speak of manufacturing biological weapons of mass destruction.¹¹⁶ This, like the insertion of an oncogene into an embryonic mouse, denotes a non-living mechanistic process for producing a living thing.

Justice Bastarache then noted that Canadian courts ought to construe the phrase “composition of matter” more narrowly than other courts had.¹¹⁷ In particular, if the Canadian courts construed the phrase as broadly as the American courts had,¹¹⁸ then they would render other words in the Canadian Patent Act, such as “machine” and “manufacture” redundant.¹¹⁹

The phrase ‘composition of matter’ (*composition de matières*) is somewhat broader than the term ‘manufacture’ (*fabrication*). It is a well-known principle of statutory interpretation that the meaning of questionable words or phrases in a statute may be ascertained by reference to the meaning of the words or phrases associated with them. Also, a collective term that completes an enumeration is often restricted to the same genus as those words, even though the collective term may ordinarily have a much broader meaning. The words ‘machine’ and ‘manufacture’ do not imply a conscious, sentient living creature. This provides *prima facie* support for the conclusion that the phrase ‘composition of matter’ is best read as not including such life forms. This argument is bolstered by the fact that there are a number of factors

112. *Id.* para. 45. When referring to “murine metaphysics,” Justice Binnie emphasized that judges are meant to resolve questions as a matter of *law*, and not an abstract, scientific inquiry.

113. *Id.* para. 53.

114. Harvard College, [2002] 4 S.C.R. 45, para. 78 (Can.) (Binnie, J., dissenting). Justice Binnie soundly dismissed policy arguments against the patentability of the oncomouse, including objections over religion, the laws of nature, the *ordre public* and morality, and unjust enrichment. *Id.* paras. 78, 87, 93-94.

115. *Id.* at para. 159 (majority opinion) (emphasis added).

116. *Id.*

117. *Id.* at para. 160.

118. See *Chakrabarty*, *infra* notes 188-98, 210, 265.

119. *Harvard College*, 4 S.C.R. 45, para. 160.

that make it difficult to regard higher life forms as ‘composition[s] of matter.’¹²⁰

Justice Bastarache’s statement that “machine” and “manufacture” do not imply a conscious, sentient living creature remains subjective. Would an artificial intelligence “machine” that remained new and useful fail Justice Bastarache’s equivocal threshold?

In a similar vein Justice Bastarache claims that “the capacity to display emotion and complexity of reaction, and to direct behavior in a manner that is not predictable as stimulus and response, is unique to animal forms of life.”¹²¹ This supposition is ill-founded. Skilled practitioners in the biological and chemical arts relate emotions to cellular and molecular mechanisms,¹²² thus explaining the efficacy of pharmaceuticals.¹²³ Furthermore, simple algorithms may be articulated to respond in a largely unpredictable manner.¹²⁴

In the alternative, Justice Bastarache notes that “[h]ad Parliament intended every conceivable subject matter to be patentable, it would not have chosen to adopt an exhaustive definition that limits invention to any ‘art, process, machine, manufacture or composition of matter.’”¹²⁵ However, one can narrow the definition of “invention” further by limiting the synonyms and related definitions that apply to its individual elements. Although judicial discourse, or argumentative discourse generally, is inevitably self-serving to one’s thesis, the majority’s rationale in this instance appealed more to inclinations, emotion, and subjectivity than to law.

Although one cannot help but sympathize with the majority as it deals with the revolutionary changes presented by biotechnology, it has artificially and unconvincingly drawn the line between “higher” (unpatentable) and “lower” (patentable) life forms. The majority drew this line in part because of the ease of certain analogies: it claimed that “it is easier to conceptualize a lower life form as a ‘composition of matter’ or ‘manufacture’ than it is to conceptualize a higher life form in these terms”¹²⁶ and that “it is far easier to analogize a micro-organism to a chemical compound or other inanimate object than it is to analogize a plant or an

120. *Id.* at para. 161.

121. *Id.* at para. 204.

122. Joseph E. LeDoux, *The Neurobiology of Emotion*, in MIND AND BRAIN: DIALOGUES IN COGNITIVE NEUROSCIENCE 301, 301 (Joseph E. LeDoux & William Hirst, eds., Cambridge U. Press 1986).

123. *Id.* at 310.

124. See Michael O. Rabin, *Probabilistic Algorithm for Testing Primality*, 12 J. OF NUMBER THEORY 128, 128 (1980) (describing a probabilistic algorithm that can test arbitrary large numbers for primality with a “provably small probability of error”); Michael O. Rabin, *Decidability of Second-Order Theories and Automata on Infinite Trees*, 141 TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY 1, 1 (1969) (utilizing second-order mathematical theories to solve decidability problems); M. O. Rabin and D. Scott, *Finite Automata and Their Decision Problems*, 3 IBM J RES DEV 114, 114 (1959) (finding some decision problems solvable and others unsolvable by algorithms). See generally MICHAEL MITZENMACHER & ELI UPFAL, PROBABILITY AND COMPUTING: RANDOMIZED ALGORITHMS AND PROBABILISTIC ANALYSIS (Cambridge U. Press 2005).”

125. *Harvard College*, 4 S.C.R. 45, para. 120.

126. *Id.* at para. 201.

animal to an inanimate object.”¹²⁷ However, mere ease of analogy is hardly a convincing rationale, especially since many practitioners skilled in the life sciences spend their careers viewing plants and animals as “compositions of matter.”¹²⁸ Therefore, on the strict points of law, Justice Binnie’s articulations are doctrinally sounder.

The Canadian Supreme Court was soon asked to reconsider the patent issues associated with biotechnological inventions in *Monsanto Canada Inc. v. Schmeiser*.¹²⁹ This time, in an infringement context. Monsanto alleged that Schmeiser infringed its patent by using Ready Roundup Canola without a license.¹³⁰ However, while Monsanto held patents on the canola’s cells and genes, it did not hold a patent on the canola itself.¹³¹

In a split decision, Chief Justice MacLachlin and Justice Fish held Monsanto’s patent valid and infringed,¹³² whereas Justice Arbour held the patent valid but not infringed.¹³³ Whether Schmeiser had infringed Monsanto’s patent depended on whether he had “used” the canola genes and cells.¹³⁴ The crux of the “use” inquiry was whether he had “deprived the inventor in whole or in part, directly or indirectly, of full enjoyment of the monopoly conferred by law[.]”¹³⁵ The court found these situations “relevant to the appellant’s submission that growing plants did not amount to ‘using’ their patented genes and cells.”¹³⁶ Therefore, “[p]atent infringement actions often proceed[ed] in a manufacturing context.”¹³⁷

127. *Id.* at para. 203.

128. See THEODORE. SCHWANN, MICROSCOPICAL RESEARCHES INTO THE ACCORDANCE IN THE STRUCTURE AND GROWTH OF ANIMALS AND PLANTS 161 (Harry Smith, trans., Kraus Reprint Co. 1969) (1839) (examining plant and animal cells and hypothesizing a “theory of the cells”); ROBERT HOOKE, MICROGRAPHIA, OR SOME PHYSIOLOGICAL DESCRIPTIONS OF MINUTE BODIES MADE BY MAGNIFYING GLASSES WITH OBSERVATIONS AND INQUIRIES THEREUPON (Dover 1961) (1665). Cell theory is one of the foundations of modern biology. *Id.*

129. *Monsanto Canada Inc. v. Schmeiser*, [2004] 1 S.C.R. 902. Farmers who wish to grow “Roundup Ready Canola” enter into an agreement with Monsanto which requires that the farmer “use the seed for planting a single crop” and sell the crop to an authorized purchaser. Moreover, “licensed farmers may not sell or give the seed to any third party, or save the seed for replanting or inventory.” *Id.* at para. 11. Although such restrictions may speak to elements of anti-competitiveness (pursuant to the Competition Act) and Canada’s obligations under TRIPS (particularly relating to the control of anti-competitive practices in contractual licenses), these arguments were not addressed at trial and lie beyond the ambit of this paper.

130. *Id.* at para. 6.

131. *Id.* at para. 17.

132. *Id.* at 903.

133. *Id.* at para. 139 (5-4 decision) (Arour, J., dissenting).

134. *Id.* at para. 28.

135. *Monsanto*, 1 S.C.R. 902, para. 35 (citing *Free World Trust v. Électro Santé Inc.*, [2002] 2 S.C.R. 1024, 2000 SCC 66 (Can.), para. 43 (emphasis omitted)).

136. *Id.*

137. *Id.* para. 41.

However, to analogize biotechnology to manufacturing grossly oversimplifies the organic nature of the former art. Justice Arbour noted that “the case law does not support my colleagues’ interpretation of use. Much of the jurisprudence on ‘use’ and various analogies are unhelpful because of the unique properties of biological materials, especially higher life forms that can self-replicate and spread.”¹³⁸

The majority stretched their tenuous analogy further by contending that “cells are somewhat analogous to Lego blocks: if an infringing use were alleged in building a structure with patented Lego blocks, it would be no bar to a finding of infringement that only the blocks were patented and not the entire structure.”¹³⁹ With great respect, this must surely be incorrect. Perhaps a more accurate analogy would be self-replicating Lego blocks, or self-replicating Lego blocks which themselves could reproduce, differentiate and grow into (arguably) “something more” than a series of Lego blocks.

Justice Arbour noted that there remains “no genuinely useful analogy between growing a plant in which every cell, and every cell of all its progeny, are remotely traceable to the genetically modified cell and contain the chimeric gene; and putting a zipper in a garment, or tires on a car or constructing with Lego blocks.”¹⁴⁰ Furthermore, the *ratio* of *Harvard College* weakens the analogy of cells to Legos.¹⁴¹ The Court held that a higher life form is not patentable because it is not a “manufacture” or “composition of matter”¹⁴² and that “it is far easier to analogize a micro-organism to a chemical compound or other inanimate object than it is to analogize a plant or an animal to an inanimate object.”¹⁴³

The majority emphasizes that patent monopolies are negative rights which “prevent others from depriving the inventor, *even in part and even indirectly*, of the monopoly that the law intends to be theirs.”¹⁴⁴ In the biotechnology context in particular, this unarticulated position, which may have served quite handily for other subject matter, would nonetheless extend patent monopolies (indirectly) to plants, animals, fetuses, and so forth. Consequently, the majority improperly extrapolates patent protection to the entire plant, contrary to the *ratio* in *Harvard*

138. *Id.* para. 154 (Arbour, J., dissenting).

139. *Id.* para. 42.

140. *Id.* para.156 (“The analogies are particularly weak when it is considered that the plant can subsequently grow, reproduce, and spread with no further human intervention.”).

141. *Harvard College*, 4 S.C.R. 45.

142. *Id.* at paras. 159-60.

143. *Id.* at para. 203.

144. *Monsanto*, 1 S.C.R. 903 para. 43 (emphasis added)(quoting *Free World Trust v. Électro Santé Inc.*, [2002] 2 S.C.R. 1024, 2000 SCC 66 (Can.) (“The guiding principle is that patent law ought to provide the inventor with ‘protection for that which he has actually in good faith invented.’”). *See also id.* at paras. 46, 49 (“The common thread is that the defendants employed the invention to their advantage, depriving the inventor of the full enjoyment of the monopoly . . . [T]he governing principle is whether the defendant, by his actions, activities or conduct, appropriate the patented invention, thus depriving the inventor, in whole or part, directly or indirectly, of the full enjoyment of the monopoly the patent grants.”).

College.¹⁴⁵ Yet from the outset, the majority noted that its decision was not inconsistent with its reasoning in *Harvard College*, where it found that plants and seeds were unpatentable “higher life forms.”¹⁴⁶

In paragraphs seventy-six through seventy-nine, the majority sought to dispel the minority’s objection that since “Monsanto’s claims are for genes and cells rather than for plants, it follows that infringement by use will only occur where a defendant uses the genes or cells in their isolated, laboratory form.”¹⁴⁷ The majority held that this “position flies in the face of century-old patent law, which holds that where a defendant’s commercial or business activity involves a thing of which a patented part is a significant or important component, infringement is established.”¹⁴⁸

With the clear precedent of *Harvard College*, it remains evident that the law of patent does not confer monopolistic protection to higher life forms, including plants. Therefore, if the patent were purposively construed through the eyes of the notional skilled worker¹⁴⁹ in art, it should reasonably be construed as extending protection to genes and cells only. A broader construction would upset the precedent set by the Supreme Court in *Harvard College*, which, Justice Arbour rightly argues, would also have been known to said skilled practitioner in the art.¹⁵⁰ It is difficult to expect the notional skilled worker in the art to devoid her mind of the jurisprudence which underlies the patent specification before her. She must understand the law and juridical or statutory developments which underlie the validity, scope and/or construction of the patent specification before her notionally skilled eyes.

Against the precedent set in *Harvard College*, which the majority stated is not overruled by this decision, Justice Arbour notes that “a person skilled in the art, upon filing of Monsanto’s patent, could not reasonably have expected that the exclusive rights for gene, cell, vector, and method claims extended exclusive rights over unpatentable plants and their offspring.”¹⁵¹ Any construction of Monsanto’s patent beyond Justice Arbour’s scholarship¹⁵² cannot easily be reconciled with the metaphysical divide between “higher” and “lower” life forms that the majority in *Harvard College* carved out.

145. 4 S.C.R. 45.

146. *Monsanto*, 1 S.C.R. 913, para. 21.

147. *Id.* at paras. 76, 78 (“It is no defense to say that the thing actually used was not patented, but only one of its components . . . otherwise the inventor would be deprived of the full enjoyment of the monopoly *that the law of patent confers on him or her.*”) (emphasis added).

148. *Id.* at para. 78.

149. A notation skilled worker is defined as “[a] person possessing ordinary skill and knowledge of the particular art to which the invention relates and a mind willing to understand a specification that is addressed to him.” *Id.* at 944, para. 126 (citing *Free World Trust v. Electro Santé Inc.*, [2002] 2 S.C.R. 1024, 2000 SCC 66 (Can.)).

150. *Id.* at paras. 126-28.

151. *Id.* at para. 128.

152. *Id.*

The Supreme Court's decision in *Monsanto* appears to be a retreat from *Harvard College*.¹⁵³ Plants and seeds¹⁵⁴ are indirectly given the benefit of patent protection through any patents covering the underlying genes and cells. Gervais and Judge note that while *Monsanto* does not reverse *Harvard College* with respect to subject matter eligibility,¹⁵⁵ it does stand for the proposition that patentable inventions embedded within life forms (modified genes, cells and so forth) can be infringed by "use" of the life form itself.¹⁵⁶ For the purposes of infringement (which Gervais and Judge would argue is distinct from subject matter eligibility), "it will prove to be a distinction without a difference."¹⁵⁷

Infringement and subject-matter eligibility, though clearly different concepts, are causally related. One cannot infringe something that is not an "invention." It is akin to denying patents over brains, but permitting patents over each and every neuron and glia that constitutes the brain. Even for subject-matter eligibility purposes this is surely a distinction without a difference or sound doctrinal basis. Furthermore, no one has provided a satisfying rationale for holding that micro-organisms are patentable, because they can be produced *en masse* with uniform characteristics, yet seeds, being a higher life form are not patentable. Seeds by their nature have uniform characteristics and are produced *en masse*. Despite their visibility to the naked eye, seeds share many attributes common to micro-organisms and ought to be considered patentable.

Following the decisions in *Harvard Mouse* and *Monsanto*, the Canadian Intellectual Property Office issued a practice notice declaring fertilized eggs, totipotent stem cells,¹⁵⁸ organs and tissues were unpatentable subject matter.¹⁵⁹ The notice was without jurisprudential or statutory basis in Canada, and can therefore be said to be administrative in nature and will affect the way patent examiners review patent applications.

The notice is reproduced below because it contains several elements (and purported justifications for the exclusions), which need to be examined:

The Patent Office takes the position that animals at any stage of development, from fertilized eggs on, are higher life forms and are thus not patentable subject matter under section 2 of the Patent Act.

153. On the one hand, the majority in *Monsanto* commented that under the current *Patent Act* "an invention in the domain of agriculture is as deserving of protection as an invention in the domain of mechanical science. Where Parliament has not seen fit to distinguish between inventions concerning plants and other inventions, neither should the courts." *Id.* para. 94. On the other hand, the majority in *Harvard College* questioned Parliament's intent. *Harvard College*, 4 S.C.R. 45, para. 153.

154. Both plants and seeds are considered "higher" life forms, and unpatentable subject matter in Canada per the *ratio* in *Harvard College*, 4 S.C.R. 48.

155. DANIEL GERVAIS & ELIZABETH F. JUDGE, *INTELLECTUAL PROPERTY: THE LAW IN CANADA* 383 (Carswell 2005).

156. *Id.*

157. *Id.*

158. Canadian Intellectual Property Office, *supra* note 23 (stating that a "totipotent stem cell can give rise to all the cell types that make up the body plus all of the cell types that make up the extraembryonic tissues such as the placenta.")

159. *Id.*

Totipotent stem cells, which have the same potential as fertilized eggs to develop into an entire animal, are considered to be equivalents of fertilized eggs and are thus higher life forms and are not patentable subject matter.

Embryonic, multipotent and pluripotent stem cells, which do not have the potential to develop into an entire animal, are patentable subject matter.

Further, the Office takes the position that organs and tissues are not compositions of matter for the purposes of the definition of invention under section 2 of the Patent Act and are therefore not patentable subject matter. Organs and tissues are created by complex processes, elements of which require no human intervention, and do not consist of ingredients or substances that have been combined or mixed together by a person.

Artificial organ-like or tissue-like structures, generated substantially through the hand-of-man by combining various cellular components and/or inert components, may be considered, on a case-by-case basis, to be compositions of matter and therefore patentable subject matter.¹⁶⁰

Aside from the lack of public consultation,¹⁶¹ the practice notice ignores clear *dicta* in *Harvard Mouse* and *Monsanto* which held that fertilized eggs were patentable subject matter. In *Harvard Mouse*, Justice Bastarache (for the majority) held that a fertilized egg was a composition of matter,¹⁶² as did Justice Binnie (for the dissent).¹⁶³ Despite these *obiter* musings, the majority in *Monsanto* also

160. *Id.*

161. See Hagen G., "Potency, Patenting and Preformation: The Patentability of Totipotent Cells in Canada", (2008) 5:2 *SCRIPTed* 515 at fn. 10 (available at <http://www.law.ed.ac.uk/ahrc/script-ed/vol5-3/hagen.asp>). Hagen actually filed an access to information request with the Canadian Intellectual Property Office ("CIPO") to gain access to CIPO's internal documents relating to the issuance, and justification for, the practice notice. Many of Hagen's recent insights inevitably mirror my own regarding the practice notice, but some of his observations are unique (given his access to these internal CIPO documents) – like the bizarre (and skirting) reliance of jurisprudence from the U.S., Europe, the United Kingdom, Australia and Japan by CIPO in fashioning its practice notice (*ibid.* at 517, 527, 530, 531 and 539).

162. In *Harvard College*, 4 S.C.R. 45, para. 162, he writes:

First, the *Oxford English Dictionary*, *supra*, vol. III, at p. 625, defines the word "composition" as "[a] substance or preparation formed by combination or mixture of various ingredients", the *Grand Robert de la langue française*, *supra*, vol. 2, at p. 367, defines "*composition*" as [translation] "[a]ction or manner of forming a whole, a set by assembling several parts, several elements". Within the context of the definition of "invention", it does not seem unreasonable to assume that it must be the inventor who has combined or mixed the various ingredients. Owing to the fact that the technology by which a mouse predisposed to cancer is produced involves injecting the oncogene into a fertilized egg, the genetically altered egg would appear to be cognizable as "[a] substance or preparation formed by combination or mixture of various ingredients" or as [translation] "[a]ction or manner of forming a whole . . . by assembling several parts".

(emphasis added).

163. Similarly, regarding the fertilized egg being a "composition of matter", he writes in *Harvard College*, 4 S.C.R. 45, para. 43:

emphasized that “all members of the Court in *Harvard Mouse* noted . . . that a fertilized, genetically altered oncomouse egg would be patentable subject matter, regardless of its ultimate anticipated development into a mouse. . . .”¹⁶⁴ Therefore, the exclusion of fertilized eggs from patentable subject matter cannot be said to derive from Canadian law, since the Supreme Court has twice confirmed (albeit in *obiter*) that fertilized eggs are indeed patentable “compositions of matter”. And, the further equivocation of this exclusion to totipotent cells merely because, like fertilized eggs, they have the “potential” to develop into life forms is equally tenuous. Totipotent cells are also found in many so-called “lower life forms,” and this exclusion seems to erode the patentability of a lower life form’s totipotent cells as well.¹⁶⁵

The remainder of the practice notice speaks to the patentability of organs and tissues. One can infer that the initial exclusion of organs and tissues is for those anatomical parts per se. In other words, the practice notice is directed at naturally occurring organs and tissues – “elements of which require no human intervention, and do not consist of ingredients or substances that have been combined or mixed together by a person . . .”¹⁶⁶ If this is indeed the intent of this part of the notice, then it is a sensible (albeit superfluous) exclusion. Naturally occurring phenomena – without something “more” – are not new. They cannot be patentable subject matter, for want of novelty.

The practice notice ends by permitting, on a case by case basis, “artificial ‘organ-like’ or ‘tissue-like’ structures, generated substantially through the hand-of-man by combining various cellular components and/or inert components,”¹⁶⁷ since they are “compositions of matter.” This is despite the earlier exclusion of fertilized eggs, which two Supreme Court decisions have held to be compositions of matter, even if only in *obiter*.

This practice notice—issued without public consultation (perhaps for good reason)—is far from satisfying. The Canadian Intellectual Property did not (and

“Composition of matter” (*composition de matières*) is an open-ended expression. Statutory subject matter must be framed broadly because by definition the *Patent Act* must contemplate the unforeseeable. The definition is not expressly confined to inanimate matter, and the appellant Commissioner agrees that composition of organic and certain living matter can be patented. In the case of the oncomouse, the modified genetic material is a physical substance and therefore “matter”. The fertilized mouse egg is a form of biological “matter.”

164. *Harvard College*, 4 S.C.R. 45, para. 23.

165. See, e.g., Rafal Ciosk, Michael DePalma, and James R. Priess, “Translational Regulators Maintain Totipotency in the *Caenorhabditis elegans* Germline”, (10 February 2006) *Science* 311 (5762), 851 (on the importance of lower life-form totipotency in research). For a more detailed discussion on the patentability of totipotent stem cells see, Gregory R. Hagen & Sébastien A. Gittens, “*Patenting Part-Human Chimeras, Transgenics and Stem Cells for Transplantation in the United States, Canada, and Europe*”, 14 Rich. J. L. & Tech. 11 (2008).

166. Canadian Intellectual Property Office, *supra* note 23 (emphasis and underling added).

167. Canadian Intellectual Property Office, *supra* note 23. One can quibble as to what “substantially” really means, since any biotechnological intervention undertaken in today’s research climate would amount to a “substantial” intervention (especially where the actual structure or properties of the organ or tissue are changed).

could not) ground their exclusions on any statutory or judicial basis. This trend continues in the next section, dealing with the exclusion of signals from patentable subject matter. An exclusion that seemingly arose from concerns other than adherence to statute or precedent.

6. Signals

On August 14, 2007 the Canadian Intellectual Property Office issued a practice notice stating that electromagnetic and acoustic signals were forms of energy, and hence not within the definition of invention in Section 2 of the *Patent Act*.¹⁶⁸ The notice was without jurisprudential¹⁶⁹ or statutory basis in Canada. It is therefore administrative in nature and will affect the way Patent Examiner's review patent applications.

The principal objection¹⁷⁰ to the Canadian Intellectual Property Office's position is that non-naturally occurring signals can be considered "manufacturers" or "compositions of matter" per Section 2 of the *Patent Act*. Justice Bastarache noted in the *Harvard College* majority opinion that "manufacture" could mean "a non-living mechanistic product or process" and "may be attributed a very broad meaning."¹⁷¹ A signal claim would fit squarely within this conception, as non-naturally occurring electromagnetic and acoustic signals *must* be created by some machinery or mechanistic process. In *Tennessee Eastman*, Justice Kerr accepted that even something as ephemeral as the transmission of electricity ought to be protected as a "vendible product."¹⁷²

168. Canadian Intellectual Property Office:

More particularly, an electromagnetic or acoustic signal is interpreted to be neither an "art" nor a "process" because it is not an act or series of acts or method of operation by which a result or effect is produced by physical or chemical action. Neither is an electromagnetic or acoustic signal a "machine," as it is not the mechanical embodiment of any function or mode of operation designed to accomplish a particular effect, or a "composition of matter," as it is not a chemical compound, composition, or substance. An electromagnetic or acoustic signal is taken not to be itself a material product and therefore not a "manufacture."

Id.

169. Simply due to its timing, it does appear to be an implicit import of the decision in *In re Nuijten* (500 F.3d 1346 (Fed. Cir. 2007), *reh'g en banc denied*, 515 F.3d 1361(2008), *petition for cert. filed*) into Canadian law. See discussion *infra* text accompanying notes 243-69.

170. Some elements of this sub-section have been derived from an unpublished report prepared by the Information Technology Committee of the Intellectual Property Institute of Canada. SUBMISSION ON THE PATENTABILITY OF "SIGNAL CLAIMS" TO THE CANADIAN INTELLECTUAL PROPERTY OFFICE (June 24, 2008) [hereinafter *Report*]. The author is a member of the Information Technology Committee, and a co-author of the *Report*; unless otherwise indicated, all material in this sub-section is original, or represents the author's contributions to that *Report*.

171. [2002] 4 S.C.R. 45, para.159.

172. *Tennessee Eastman Co. v. Comm'r of Patents*, [1974] S.C.R. 111 (Can.). Justice Evershed found that:

[I]t would not be right, nor in accordance with [Justice Morton's] intention, to give to the term "vendible product" a narrow or rigid construction by placing undue emphasis

Likewise, electromagnetic and acoustic signals can also be viewed as a “composition of matter,” though it is acknowledged that the term is not boundless, and must have limits that are reasonable and supported by a modern, purposive reading of the *Patent Act*.¹⁷³ The purposive approach to statutory interpretation has been repeatedly endorsed by the Supreme Court of Canada over the past two decades, and has arguably become the “preferred approach” to interpreting legislation.¹⁷⁴

In our Report to the Intellectual Property Institute of Canada, my physicist co-authors argued that “modern contemporary physics has also failed to provide a clear definition of ‘matter,’ with ongoing debate about the role and nature of elementary particles and the true distinction between ‘energy’ and ‘matter.’”¹⁷⁵ Therefore, the underlying purpose of the *Patent Act* is to promote innovation and to provide protection for things *that by their very definition have not yet been conceived*, this uncertainty should be resolved in favor of allowing patentability.¹⁷⁶

Given the uncertainties as to the meaning of “composition of matter,” it is possible that in at least some instances, electromagnetic and acoustic signals may be “compositions of matter.”¹⁷⁷ Applying a purposive approach, the Information

on the material requirements of what may otherwise fairly be regarded as the outcome of a process of manufacture and he did not think that a patent for the method should be barred on the ground that the electric oscillations are not vendible products and, on that account, not the subject of any manner of manufacture.

Id. (citing *Re Rantzen's Application* (1946), 64 R.P.C. 63 (method of transmitting electricity).

173. *Harvard College*, 4 S.C.R. 48, para. 160.

174. *Bell ExpressVu Limited Partnership v. Rex*, [2002] 2 S.C.R. 559, 580, 2002 SCC 42, para. 26 (Can.). See also *Stubart Investments Ltd. v. The Queen*, [1984] 1 S.C.R. 536, 578 (Can.) (citing ELMER A. DRIEDGER, CONSTRUCTION OF STATUTES (Butterworths 1983) (1974), to establish correct approach for statutory interpretation); *Québec (Communauté urbaine) v. Corp. Notre-Dame de Bon-Secours*, [1994] 3 S.C.R. 3, 17 (Can.) (“Driedger fittingly summarizes the basic principles . . . [t]he first consideration should therefore be to determine the purpose of the legislation, whether as a whole or as expressed in a particular provision.”); *Rizzo & Rizzo Shoes Ltd. (Re)*, [1998] 1 S.C.R. 27, para. 21 (Can.) (“Elmer Driedger in . . . best encapsulates the approach upon which I prefer to rely.”); *R. v. Gladue*, [1999] 1 S.C.R. 688, para. 25 (Can.) (“[T]he proper construction of a statutory provision flows from reading the words . . . the purpose of the statute, and the intention of parliament.”); *R. v. Araujo* [2000] 2 S.C.R. 992, 2000 SCC 65, para. 26 (Can.) (quoting *CanadianOxy Chemicals Ltd. v. Canada (Attorney General)*, [1999] 1 S.C.R. 743, para. 14 (Can.)) (“[W]ords of an Act are to be read in their entire context and in their grammatical and ordinary sense harmoniously with the scheme of the Act, the object of the Act, and the intention of Parliament.”); *R. v. Sharpe* [2001] 1 S.C.R. 45, 74 2001 SCC 2, para. 33 (Can.) (“Much has been written about the interpretation of legislation . . . [h]owever, E.A. Driedger in *Construction of Statutes* best captures the approach upon which I prefer to rely.” (citation omitted)); *Chieu v. Canada (Minister of Citizenship and Immigration)*, [2002] 1 S.C.R. 84, 102, 2002 SCC 3, para. 27 (Can.) (“This Court has stated on numerous occasions that the preferred approach to statutory interpretation is that set out by E.A. Driedger in *Construction of Statutes*”).

175. *Report, supra* note 171.

176. *Harvard College*, 4 S.C.R. 45, para. 158.

177. *Report, supra* note 171, § 2.2. *Contra* Canadian Intellectual Property Office (CIPO), Patent Notice: Office Practice Signals (June 14, 2007), <http://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr00293.html>.

Technology Committee found that the Canadian Intellectual Property Office should refrain from stating in absolute terms that signal claims may never be “compositions of matter.”¹⁷⁸ New, non-obvious, and useful signals ought to receive the benefit of a patent monopoly without arbitrarily and narrowly “reading down” the categories of “invention” enumerated in Section 2 of the *Patent Act*.¹⁷⁹

The Canadian jurisprudence on patentable subject matter is unsatisfying, because every exclusion of patentable subject matter in Canada hinges on a single judicial decision. As the previous cases demonstrate, the patentability of algorithms, conveyancing skills, casino games and even higher life forms all stem from a single decision, or series of appeals.¹⁸⁰ From these decisions even ‘grander’ exclusions are extrapolated such as the *Schlumberger* decision, which excludes not only algorithms and mathematical formulae from patentability, but computer programs as well.¹⁸¹ The *Progressive Games* decision, which dealt with a non-novel way of playing poker, is said to stand for the proposition that all ‘games’ (writ large) are excluded from patentability, based on Justice Sexton’s obiter comment that “we do not want to be taken as deciding that more substantial changes in the existing game would have changed the result.”¹⁸² The *Lawson* decision, which was concerned solely with the patentability of conveyancing skills is cited as the authority to exclude all professional skills – medical, legal and even business skills – from patentability.¹⁸³

Combined with the undisciplined approach to patentable subject matter that the Patent Appeals Board and Canadian Intellectual Property Office has taken recently with respect to business methods, signals, fertilized eggs, totipotent stem cells, organs and tissues the overall judicial and administrative state of affairs in Canada is disconcerting. The American situation outlined in the following section demonstrates a more principled approach to patentability, except for arguably aberrant decisions in *Nuijten* and *Bilski*.¹⁸⁴

178. *Report*, *supra* note 171, § 2.2.

179. *Id.*; *see also* *Schlumberger Canada Ltd. v. Commissioner of Patents*, [1982] 56 C.P.R. (2d) 204-05 (Can.).

As the Patent Act contains no provision specifying or even implying a limitation of the meaning of the word “invention” in [S]ection 2 of the Act so as to exclude inventions involving computers, there does not exist any reason for saying that the discovery claimed by the appellant, assuming it to be new and to have required inventive ingenuity, is not a patentable invention within the meaning of [S]ection 2 of the Act.

Id.

180. The decision in *Monsanto* was an infringement action, and therefore cannot be said to be a case concerning the patentability of life forms. *See supra* text accompanying notes 61, 129-55.

181. *See supra* note 42.

182. [2000] F.C.J. No. 1829 at para. 1. *See supra* text accompanying notes 99-104.

183. *See supra* text accompanying notes 49-53.

184. *See infra* discussion accompanying notes 204 and 271.

III. AMERICAN EXCLUSIONS

Section 101 of the *Patent Act* states that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”¹⁸⁵ The categories of patentable subject matter are almost identical to the Canadian *Patent Act*, except that the Canadian *Patent Act* explicitly includes the term “art” as well other specified patentable subject matter.¹⁸⁶ Despite the breadth of the Canadian *Patent Act*, the American courts have taken a more permissive approach to subject matter eligibility, excluding only laws of nature, physical phenomena, abstract ideas, signals and business methods (at the time of press).

A. *Laws of Nature, Physical Phenomena and Abstract Ideas*

In 1972, Ananda Chakrabarty, a microbiologist, filed a patent application for bacteria capable of eating and breaking down many components of crude oil, a discovery which could prove useful in cleaning up oil spills.¹⁸⁷ The Examiner and Patent Office’s Board of Appeals both rejected the application on the basis that the Patent Act was not intended to cover living things, even if they were created in a laboratory.¹⁸⁸ The Court of Customs and Patent Appeals reversed this decision and held that the mere fact that micro-organisms are alive is “without legal significance” as far as patent law is concerned.¹⁸⁹ The Commissioner of Patents and Trademarks then sought *certiorari* before the Supreme Court.¹⁹⁰

The Supreme Court held in *Diamond, Commissioner of Patents and Trademarks v. Chakrabarty* that micro-organisms could be either a “manufacture” or a “composition of matter” within the meaning of 101.¹⁹¹ Unlike the Canadian decision in *Harvard Mouse*, the majority did not embark upon a detailed analysis of what constitutes a “manufacture” or “composition of matter.”¹⁹² It rooted its *ratio* instead on the broad construction that Congress intended the terms to encompass.¹⁹³ The majority reinforced an underlying theme of this work:

Congress has performed its constitutional role in defining patentable subject matter . . . we perform ours in construing the language Congress has employed. In so doing, our obligation is to take statutes as we find

185. 35 U.S.C. § 101 (2006).

186. Patent Act, R.S., ch. P 4, § 2 (1985) (Can.) (invention means “any new and useful art, process, machine, manufacture, or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter”). The U.S. Patent Act is intended to promote the “Progress of Science and the useful Arts,” so arguably, the U.S. statute implicitly covers “art.” U.S. Const. art. I, §8, cl. 8.

187. *Diamond v. Chakrabarty*, 100 S. Ct. 2204, 2205-06 (1980).

188. *Id.* at 2206.

189. *Id.* (citing *In re Bergy*, 563 F.2d 1031, 1038 (C.C.P.A. 1979)).

190. *Id.* at 2206.

191. *Id.* at 2204.

192. *Id.*

193. *Chakrabarty*, 100 S. Ct. at 2211.

them, guided, if ambiguity appears, by the legislative history and statutory purpose. Here, we perceive no ambiguity. The subject-matter provisions of the patent law have been cast in broad terms to fulfill the constitutional and statutory goal of promoting ‘the Progress of Science and the useful Arts’ with all that means for the social and economic benefits envisioned by Jefferson. Broad general language is not necessarily ambiguous when congressional objectives require broad terms.¹⁹⁴

The decision in *Chakrabarty* is listed under this subsection, since *Chakrabarty* represents the high-water mark for patent jurisprudence in the United States, eroding (or leading to the erosion of) many of the exclusions to patent-eligible subject matter.

In extolling the breadth of the *Patent Act*, the majority in *Chakrabarty* famously endorsed the proposition that “Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’”¹⁹⁵ Nevertheless, the court maintained that laws of nature, physical phenomena, and abstract ideas are ineligible subject matter.¹⁹⁶ In particular, the Court endorsed its earlier judgments in *Parker v. Flook* and *Gottschalk v. Benson*.¹⁹⁷ In *Flook*, which concerned a patent application that updated the alarm limits on a catalytic converter, a majority of the Supreme Court held that an algorithm was not patentable subject matter *per se*, as it amounted to a monopoly over the mathematical expression of a fundamental truth.¹⁹⁸ Similarly in *Benson*, the court held that a method of converting numerical information from one format to another was merely a series of mental steps and/or mathematical calculations.¹⁹⁹ In *Diamond v. Diehr*, a case decided one year after *Chakrabarty*, which involved a method of monitoring the temperature within a rubber press, the Supreme Court again confirmed the exclusion of mathematical formulae.²⁰⁰ However, the *Diamond* Court emphasized that the bar does not apply

194. *Id.*

195. *Id.* at 2208 (quoting S. REP. NO. 1979 at 5 (1952); H.R. REP. NO. 1923 at 6 (1952)).

196. *Id.*

197. *Id.* at 2208 (citing *Parker v. Flook*, 98 S. Ct. 2522 (1978); *Gottschalk v. Benson*, 93 S. Ct. 253 (1972)).

198. *Parker*, 98 S. Ct. At 2526. *But cf. id.* (quoting *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 59 S. Ct. 427, 431 (1939)) (“[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be[.]” *Id.* (quoting *Funk Bros. Seed Co. v. Kalo Co.*, 440, 441 (1948)) (“He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.”).

199. *Benson*, 93 S. Ct. at 257:

It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting BCD numerals to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.

200. *Diamond v. Diehr*, 101 S. Ct. 1048 (1981).

where the mathematical formula is applied or directed to a useful result as to not preempt use of the formula itself.²⁰¹ In *State Street Bank & Trust v. Signature Financial Group*, an infringement action over a patent for a computerized data-processing system that managed and administered investments,²⁰² the U.S. Court of Appeals for the Federal Circuit also commented that the exclusion of mathematical algorithms is a judicially-created exception to patentability and should be narrowly confined to instances where no “useful, concrete and tangible result” is evident.²⁰³ The Court in *State Street* rightly pointed out that *any* step-by-step process, whether electronic, chemical, or mechanical, could be viewed as an “algorithm” in the broadest formulation of the term.²⁰⁴ However, the recent decision in *In re Bilski* appears to retreat from the position of the Court of Appeals for the Federal Circuit.²⁰⁵ I will return to *In re Bilski* later in the paper because it is an *en banc* decision that retreats from *State Street* without expressly overruling it, and because the United States Supreme Court granted Bilski’s Petition for a Writ of Certiorari²⁰⁶ on June 1st, 2009²⁰⁷ to resolve the following two questions:

Whether the Federal Circuit erred by holding that a “process” must be tied to a particular machine or apparatus, or transform a particular article into a different state or thing (“machine-or-transformation” test), to be eligible for patenting under 35 U.S.C. § 101, despite this Court’s precedent declining to limit the broad statutory grant of patent eligibility for “any” new and useful process beyond excluding patents for “laws of nature, physical phenomena, and abstract ideas.

Whether the Federal Circuit’s “machine-or-transformation” test for patent eligibility, which effectively forecloses meaningful patent

201. *Id.* at 1057 (1981). *See also* AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 1358-59 (Fed. Cir. 1999), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008)

The notion of ‘physical transformation’ can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, “when [a claimed invention] is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101. The ‘e.g.’ signal denotes an example, not an exclusive requirement.”

Id.

202. *State St. Bank & Trust v. Signature Fin. Group*, 149 F.3d 1368, 1370 (Fed. Cir. 1998) *abrogated by In re Bilski*, 545 F.3d 945 (Fed. Cir. 2008).

203. *In re Bilski*, 545 F.3d at 943.

204. *Id.* (citing AT&T Corp., 172 F.3d at 1357-58) (accepting that “more than an abstract idea was claimed [when] the claimed invention as a whole was directed toward a forming a specific machine that produced the useful, concrete, and tangible result of a smoothing waveform display.”)

205. *In re Bilski*, 545 F.3d at 943.

206. Petition for a Writ of Certiorari, *In re Bilski*, No. 08-964 (U.S. Jan 28, 2009); *see infra* part III.d.

207. 556 U.S., Order List, 08-964 (June 1, 2009), <http://www.supremecourtus.gov/orders/courtorders/060109zor.pdf>.

protection to many business methods, contradicts the clear Congressional intent that patents protect “method[s] of doing or conducting business.”²⁰⁸

Returning to *Chakrabarty*, the majority gave the example that “a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter.”²⁰⁹ As I mentioned earlier, the current climate of genetic patents appears to run afoul of this sensible doctrinal anchor holding that natural phenomena and related discoveries, irrespective of how much effort, luck, or funding was involved, lack the requisite novelty to be considered patentable.

Although the Supreme Court recently had the opportunity to clarify the exclusions relating to laws of nature and natural phenomena in *Laboratory Corporation of America Holdings v. Metabolite Laboratories Inc. et al.*,²¹⁰ it dismissed the writ as being improvidently granted. Justice Breyer (joined by Justices Stevens and Souter) did nonetheless offer a strong dissent, stating that the Court should answer whether the claim at issue (i.e., Claim 13) is invalid in light of the “law of nature” principle.²¹¹ This independent claim was particularly of concern since it claimed a monopoly over “correlating” homocysteine levels against deficiencies of cobalamin or folate. Since this was an infringement action, the petitioner (LabCorp.) asked the court to consider whether Metabolite could hold a monopoly over a “basic scientific relationship.”²¹² Justice Breyer emphasized that the correlation between homocysteine and vitamin deficiency is a “natural phenomenon.”²¹³ Noting that the Solicitor General argues, “The natural relationship between elevated homocysteine and deficiencies in the B vitamins is an unpatentable ‘principle in natural philosophy or physical science.’”²¹⁴ Further, the respondents concede that, “[t]he correlation between total homocysteine and deficiencies in cobalamin and folate that the Inventors discovered could be considered, standing alone, a ‘natural phenomenon’ in the literal sense: It is an observable aspect of biochemistry in at least some human populations.”²¹⁵ Justice Breyer parsed Claim 13 into two basic components: (a) obtain certain test results, and (b) think about them.²¹⁶

Breyer’s dissent was therefore of the view that homocysteine levels and deficiencies of cobalamin or folate are effectively controlled by “laws of nature” and are natural phenomena. The interpretation or correlation of the results in the

208. Petition for Writ of Certiorari *supra* note 197, at 2.

209. *Diamond v. Chakrabarty*, 100 S. Ct. 2204, 2208 (1980).

210. *Lab. Corp. of America v. Metabolite Lab. Inc. et al.*, 126 S. Ct. 2921 (2006).

211. *Id.* at 2925. (Claim 13: “A method for detecting a deficiency of cobalamin or folate in warm-blooded animals comprising the steps of: assaying a body fluid for an elevated level of total homocysteine; and correlating an elevated level of total homocysteine in said body fluid with a deficiency of cobalmin or folate.” U.S. Patent No. 4,940,658 (filed Nov. 20, 1986)).

212. *Id.* at 2922.

213. *Id.* at 2927.

214. *Id.* (citing Brief for U.S. as Amicus Curiae at 19, *Lab. Corp. of America*, 126 S.Ct. 2921).

215. *Id.* (citing Brief for Respondents at 31, *Lab. Corp. of America*, 126 S. Ct. 2921).

216. *Lab. Corp. of America*, 126 S. Ct. at 2927.

mind of a physician amounts to a mental step or abstract idea about such natural phenomena. The entire process is directed towards ineligible subject matter, irrespective of whether it produces a “useful, concrete, and tangible result.”²¹⁷ Justice Breyer emphasized that “useful, concrete and tangible result” criterion was never endorsed by any Supreme Court decision, even though the *ratio* in *Flook* appears to hold otherwise: “He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes.”²¹⁸ If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.²¹⁹ Without the benefit of a providently granted writ of *certiorari*, it is difficult to conclusively comment on Justice Breyer’s remarks. However, it does appear as though the claim is broad enough to cover routine instances of ‘correlation’ which invariably require some abstract reasoning or mental step.²²⁰

Although I have consistently argued that exclusions to patent-eligible subject matter ought to be narrowly defined, the subject matter of Claim 13 does appear to be nothing more than a fanciful combination of an abstract mental step combined with a scientific principle or natural phenomena. The *ratio* in *Benson*, three decades prior, summed it up neatly: “Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.”²²¹

Finally, although I have characterized the decision in *Chakrabarty* as the high water mark for patent jurisprudence in the United States, the Ninth Circuit decision in *Park-In Theatres Inc. v. Rogers et al.*²²² bears some mention as a classic example of how narrowly exclusions to subject matter eligibility ought to be drawn by the courts. Park-In Theatres patented a drive-in theatre, and the Court was asked to review whether, in the context of an infringement action, a drive-in theatre could amount to a patentable invention. A majority of the Court in *Park-In* held that a drive-in theatre could be classified as either a manufacture or a machine.²²³ The Court was of the view that insofar as the theatre had to be constructed, it was clearly within the ambit of a “manufacture.”²²⁴ The majority endorsed the view that the pyramids were no less manufactures simply because of their size.²²⁵ The patent

217. *Id.* (citing *State St. Bank & Trust v. Signature Fin. Group*, 149 F.3d 1368, 1370 (Fed. Cir. 1998) *abrogated by In re Bilski*, 545 F.3d 945 (Fed. Cir. 2008)).

218. *Id.*

219. *Parker v. Flook*, 98 S. Ct. 2522, 2526 (1978).

220. The sheer breadth of the claim ought to render it invalid for insufficiency, as the claim effectively covers all practical applications of the naturally occurring relationship. Furthermore, there are no dependent claims that limit the manner in which elevated level of homocysteine are correlated against a deficiency of cobalamin or folate. However, there is a dependent claim (Claim 15) that limits the manner in which the assaying is done, namely chromatography.

221. *Gottschalk v. Benson*, 93 S. Ct. 253, 255 (1972).

222. *Park-In Theaters Inc. v. Rogers*, 130 F.2d 745 (9th Cir. 1942).

223. *Id.* at 747.

224. *Id.*

225. *Id.* (citing *Riter-Conley Mfg. Co. v. Aiken*, 203 F. 699, 702 (3d Cir. 1913)).

in question covered a means of tilting and arranging cars within the theatre such that everyone's line of sight (while stationary or moving) would be unobstructed.²²⁶ *Park-In* represents a prime example of how courts ought to approach subject matter eligibility—from a responsive and inclusive framework that endorses the broad goals of any patent system, not from a narrow frame of reference that is preoccupied with masculine mechanical contrivances.

B. *Humans and Chimeras*

Due to recent amending legislation, there is a direct statutory exclusion of “patents on claims directed to or encompassing a human organism”²²⁷ in the United States. I would argue that the exclusion against patents on human organisms can be best understood in terms other than subject matter eligibility. I would argue that any human organism that is artificially produced would lack utility since it would violate the Thirteenth Amendment prohibition against “involuntary servitude.” Interestingly, it appears as though Congress does not believe that the phrase “directed to or encompassing” is broad enough to cover human genetic material, as evidenced by Senator Xavier Becerra’s introduction of the *Genomic Research and Accessibility Act*²²⁸ in 1997 to deal with precisely this problem. The *Genomic Research and Accessibility Act* is just two sections: the first section is the short title of the Act, and the second section deals with the “prohibition on patent [sic] of human genetic material.”²²⁹ The second section reads: “Notwithstanding any other provision of law, no patent may be obtained for a nucleotide sequence, or its functions or correlations, or the naturally occurring products it specifies.”²³⁰

If passed, the *Genomic Research and Accessibility Act* will not be retroactive in nature, and will only apply to the grant of future patents. The remarks of Congressman Xavier Becerra in the House of Representatives on February 9, 2007, are particularly telling, and echo many of my own reservations about the practice of gene patents:

Proponents of gene patenting have said they are not patenting genes but instead are patenting ‘isolated and purified’ genetic sequences. This is mere wordplay. In practice, these patents are patents on products of nature. For example, a patent on the supposedly isolated and purified breast cancer sequence prohibits a woman’s doctor from looking for the breast cancer gene in her blood without paying \$3,000 to the patent holder. It prohibits the same woman from donating her breast cancer gene to other researchers because the holder of the patent has the exclusive right to prevent anyone else from doing research on any

226. *Id.* at 746.

227. Consolidated Appropriations Act, Pub. L. No. 108-199, § 634, 118 Stat. 3, 101 (2004) (“the Weldon Amendment”).

228. H.R. 977, 110th Cong. (1st Sess. 2007).

229. *Id.*

230. *Id.* § 2.

individual's breast cancer gene. Such restrictions make clear that in effect, patents on isolated and purified sequences are patents on the actual genes found in nature.

We have overstepped our bounds. We have made a regulatory mistake. We have allowed the patenting of a product of nature.²³¹

Returning to the statutory exclusion set forth in the Weldon Amendment, it is also less clear whether patents not encompassing human organisms are covered by the exclusion.²³² That is, chimeric animals—possessing some human genetic materials and potentially human characteristics along with other non-human genetic materials—do not make them “human organisms” as such. In 1997, Stuart Newman and Jeremy Rifkin's patent application tested these bounds.²³³

The Newman-Rifkin application claims a mammalian embryo developed from a mixture of cells in which at least one of those cells is derived from a human embryo or embryonic stem cell line.²³⁴ All of the claims were directed towards said chimeric embryo, or cell lines isolated from said chimeric embryo, or the chimeric animal derived from said embryo.²³⁵ Neither the claims nor the preferred embodiment of the invention specified precisely how many cells (either numerically, or a percentage) were needed, insofar as at least one of the embryonic cells was human. Hence, the application *could* cover human – non-human chimeric embryos (and resulting chimeric animals) composed of, for example, one per cent pig cells and ninety-nine per cent human cells, or ninety-nine per cent pig cells and one per cent human cells, or any proportion in between.

The claimed invention was intended to enhance studies in developmental biology,²³⁶ cardiovascular physiology,²³⁷ development toxicology assays,²³⁸ hearts for transplantation,²³⁹ bone marrow for transplantation, and other organs and tissues in general.²⁴⁰ Aside from the immediate emotive reaction as to what a fully developed pig-human or baboon-human might look like, the patent application itself is sound doctrinally. There are no subject matter restrictions (yet) against human - non-human chimeras.

231. 153 Cong. Rec. E315, E316 (2007) (statement of Rep. Xavier Becerra) (statement before the U.S. House of Representatives in support of the Genome Research and Accessibility Act).

232. *Id.* § 634.

233. U.S. Patent No. 08/993,564 (filed Dec. 18, 1997).

234. *Id.*

235. *Id.*

236. *Id.* at 7 (Baboon/human or chimpanzee/human chimeras were involved in these studies).

237. *Id.* at 9 (Chimpanzee/human chimeras were involved in these studies).

238. *Id.* at 8 (Baboon/human or chimpanzee/human chimeras were involved in these studies).

239. '564 Patent, *supra* note 224, at 10 (Chimpanzee/human or pig/human chimeras were involved in these studies).

240. *Id.*

Despite this, the Patent Examiner rejected all of the application's fifty-five claims as being directed towards ineligible subject matter.²⁴¹ All of the Examiner's rejections equated the chimeric animal with a human.²⁴² That is, the Examiner spoke about the "human being" that was the subject of the patent, and not about the chimeric animal.²⁴³

As such, the Examiner was of the view that any patented human beings would be denied their reproductive freedom, a constitutionally guaranteed right, since the patent holder could restrict the "making" of other patented human beings or embryos.²⁴⁴ Another objection protested that patents over human beings would amount to involuntary servitude.²⁴⁵ Even though this objection is arguably stronger and perhaps more straightforward than the reproductive freedom analysis, it was curiously confined to a footnote in the Examiner's report.²⁴⁶

The Examiner also entered into a fanciful and strained analysis of the implications of viewing a human being as a "product" under patent law.²⁴⁷ She reasoned that a U.S. resident who had surgery abroad, where the surgical procedure was patented, and then re-entered the United States, would be importing a product made in violation of section 271(9) of the Patents Act. The patient would thus be liable under U.S. law for patent infringement.²⁴⁸

Even from non-patent perspectives, including public-policy concerns, the Examiner has improperly equated a human being with a human-non-human chimera. The Newman-Rifkin application was not directed at human beings; it was directed at human-mammalian chimeras.²⁴⁹ The Examiner's rejection does not deal with the substantive embodiment of the invention. In view of the expansive and permissive approach to subject matter eligibility taken by the courts in *Chakrabarty*, *State Street* and others, it is difficult to see how human-mammalian embryos or cell lines could be denied patentability. Human-mammalian chimeric animals themselves are quite another issue.

Given the manner in which humanity anthropomorphizes *everything* – religion, extraterrestrial life forms, robotics – the dividing line between a patentable chimeric animal and a non patentable one, might be either a creature that "looks" human and/or is *capable* of rudimentary "communication." Intangible things like emotion, self-awareness and intellectual capacity might also be further

241. U.S. Dept. of Commerce, Patent and Trademark Office, Office Action Summary Communicating Rejection of Application No. 08/993,564 (1999) [hereinafter *Office Action Summary*].

242. *Id.*

243. *Id.*

244. *Id.*

245. *Id.*

246. *Id.*

247. *Office Action Summary*, *supra* note 232.

248. *Id.*

249. *Id.*

dividing lines, but external factors like appearance and speech might be preferred since they are more concrete and lend themselves less to philosophical debate.

However, once the chimeric animal comes into existence it would be too late to deny patentability because it walks on its hind legs, has the face of a pig and mimics human speech. This is a very real concern. One cannot situate the dividing line on future conditions like outward appearance or speech. The mere fact that chimpanzees and humans are said to share ninety-five percent of the same genetic makeup²⁵⁰ (not 98.5 percent as previously thought²⁵¹), could mean that a one percent human and ninety-nine percent chimpanzee chimera may look, talk and socialize just like a “human.”

How do we treat, protect or afford rights to such an “invention” It would be too late for academic speculation. I propose that any claims to human – mammalian chimeric animals themselves be disallowed, for the very simple reason that such animals lack “utility.” The imprecise art of what a human – mammalian chimera might actually “be” demonstrates the lack of utility that this policy would rest upon (just as it is common to reject inventions directed at time travel, despite the possibility that an inventor may actually have discovered a means of achieving it). On the other hand (so to speak), human – mammalian cell lines, organs (grown in isolation) or embryos that do not reach maturation ought to be allowed since, philosophical and religious speculation aside, any element of “humanity” is largely absent from these inventions.

C. *Signals*

Despite the expansive treatment of subject matter eligibility under *Chakrabarty*, the U.S. Court of Appeals for the Federal Circuit has recently carved out a singular exception to patentable subject matter – propagated signals. In *In re Petrus A.C.M. Nuijten*,²⁵² a majority of the Court of Appeals for the Federal Circuit held that a signal *per se* was not statutory subject matter.²⁵³ The claim at issue in *Nuijten* dealt with a technique for reducing the distortion introduced by watermarks into signals.²⁵⁴ The technique disclosed in *Nuijten* reduces the distortion by compensating for distortions in audio and video signals.²⁵⁵ The claim provides, “A signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.”²⁵⁶ Hence, the issue before the Court was the patentability of the signal

250. Roy J. Britten, *Divergence Between Samples of Chimpanzees and Human DNA Sequences is 5%, Counting Indels*, 99 PROC. NAT'L ACAD. SCI. U.S. 13633, 13633 (2002), available at www.pnas.org/content/99/21/13633.full.pdf+html.

251. *Id.*

252. *In re Petrus A.C.M. Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007).

253. *Id.* at 1357.

254. *Id.* at 1348.

255. *Id.* at 1348-49.

256. *Id.* at 1351.

itself, not the apparatus for storing, receiving, transmitting or processing such signals.²⁵⁷ The majority held that such signals were not directed to any of the “four statutory categories” of process, machine, manufacture, or composition of matter.²⁵⁸

Signals are not processes, according to the majority, since they do not consist of a series of acts.²⁵⁹ The signals *per se* just “are.” The Court held that signals are not machines because they are not “made of ‘parts’ or ‘devices’ in any mechanical sense.”²⁶⁰ The majority relied on the dated definitions of “machine” from *Burr v. Duryee*²⁶¹ and *Corning v. Burden*²⁶² to support this proposition.²⁶³ The majority further held that signals were not compositions of matter. The majority adopted the definition of “composition of matter” from *Diamond v. Chakrabarty* as “all compositions of two or more substances and all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids.”²⁶⁴

Finally, despite the fact that these propagated signals were artificially created through human ingenuity, the majority also disqualified signals as “manufactures.”²⁶⁵ The majority relied upon the fact that, in the United States, “the Supreme Court has defined ‘composition of matter’ to mean ‘all compositions of two or more substances and all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids.’”²⁶⁶ The majority stated in *Nuijten* that “[t]he Supreme Court has defined ‘manufacture’ (in its verb form) as ‘the production of *articles* for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.’”²⁶⁷ The court also noted that “[t]he same dictionary the Supreme Court relied on for its definition of ‘manufacture’ in turn defines ‘article’ as a particular substance or commodity: as, an *article* of merchandise; an *article* of clothing; salt is a necessary *article*.”²⁶⁸ The

257. *Id.*

258. *In re Petrus A.C.M. Nuijten*, 500 F.3d at 1357.

259. *Id.* at 1355.

260. *Id.* (stating that a process claim cannot be aimed, as here, at a thing itself).

261. *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570 (1863) (stating that a machine includes every mechanical device or combination or parts or certain devices and combination of devices).

262. *Corning v. Burden*, 56 U.S. 252, 267 (1853) (finding that a machine includes every mechanical device or combination of powers and devices that performs or produces an effect).

263. *In re Petrus A.C.M. Nuijten*, 500 F.3d 1346, 1355. (Fed. Cir. 2007).

264. *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (quoting *Shell Development Co. v. Watson*, 149 F. Supp. 279, 280 (D.C. 1957)).

265. *In re Petrus A.C.M. Nuijten*, 500 F.3d at 1355.

266. *Id.* at 1357 (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980)).

267. *Id.* at 1356 (quoting *Chakrabarty* 447 U.S. at 308) (emphasis added).

268. *Id.* (citing 1 CENTURY DICTIONARY 326 (William Dwight Whitney ed. 1895)). This definition is another dated reference to a one hundred and thirteen year old dictionary. It is doubtful that the same Court would endorse century old definitions for marriage, slavery or homosexuality, so the incorporation of such forced definitions into *avant-garde* areas of patent law is particularly troubling.

majority failed to fully acknowledge that the Court in *Chakrabarty* intended all four of the categories of patent-eligible subject matter to receive expansive readings. By the same token, it could easily be said that “manufacturing” would not ordinarily refer to the mass production of yeast, bacteria, or oncomice, yet this is precisely the breadth that the Supreme Court sought to achieve in *Chakrabarty*.²⁶⁹ The fruits of biotechnological research are now commonly referred to as products, manufacturers and articles.

In his dissent, Justice Linn also focussed on the weakness of the majority’s analysis concerning “manufactures.”²⁷⁰ Justice Linn properly construed the precedent in *Chakrabarty* and chided the majority for failing to give the statutory categories of patentable subject matter (manufactures in particular) sufficient breadth and modernity.²⁷¹ He emphasized that the language the court was called to interpret had largely remained unchanged since the 1793 *Patent Act*, directing the court to consider the definition “contemporary with the statutory language.”²⁷² Justice Linn also criticized the majority for its failure to follow the Supreme Court’s guidance from *Chakrabarty* as to the interpretation of the language, because “Congress plainly contemplated that patent laws would be given wide scope.”²⁷³

Nuijten petitioned the Court of Appeals for the Federal Circuit for a rehearing.²⁷⁴ Both the panel rehearing and *en banc* rehearing were subsequently denied by a nine-to-three majority.²⁷⁵ Consistent with his previous dissent, Justice Linn also dissented against the denial of the petition for rehearing *en banc*.²⁷⁶ Justice Linn continued his emphasis on the framework provided by the Court in *Chakrabarty*.²⁷⁷ His remarks are undoubtedly correct: “[The *Nuijten* decision] conflicts with Supreme Court precedent . . . [P]atentable subject matter includes ‘anything under the sun that is made by man’ except for certain enumerated exceptions: ‘The laws of nature, physical phenomena, and abstract ideas have been held not patentable.’”²⁷⁸ Should the matter go to the Supreme Court for *certiorari* review, it would likely be reversed. Artificially-created signals are clearly “manufactures” and hence directed towards statutory subject matter consistent with *Chakrabarty*. This is an inconsistent decision that has even influenced how signal claims are treated in Canada. In a very loose sense, this is the extraterritoriality of U.S. patent law.

269. *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (finding that “manufacture” and “composition of matter” are expansive terms that give patent laws wide scope).

270. *In re Petrus A.C.M. Nuijten*, 500 F.3d at 1359-60 (Linn, J., dissenting in part).

271. *Id.*

272. *Id.* at 1361.

273. *Id.* at 1362 (citing *Diamond v. Chakrabarty*, 447 U.S. at 308).

274. *In re Petrus A.C.M. Nuijten*, 500 F.3d 1346, *reh’g denied*, 515 F.3d 1361, 1360-64 (Fed. Cir. 2008).

275. *Id.* at 1361.

276. *Id.* (Linn, J., dissenting).

277. *Id.* at 1361-62.

278. *Id.* (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

D. *Re Bilski (Ct. of App. for the Fed. Cir.)*

On October 30, 2008, the U.S. Court of Appeals for the Federal Circuit issued an *en banc* decision in *In re Bilski* denying an application for a method for hedging risks in commodities trading as being directed towards ineligible subject matter.²⁷⁹ This decision might be viewed as a retreat from *State Street* and recognition that business methods are no longer patentable matter, but I argue otherwise. *In re Bilski* must be viewed in the context of the actual claims before the Court. *State Street* was never overruled, even though the Court could have clearly done so. In light of the pending appeal, it is quite likely that the United States Supreme Court will “remind” the lower courts of the expansive approach to patentability that it endorsed in *Chakrabarty*.

Claim 1 of Bilski’s application (Serial No. 08/833,892) reads:

A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:

- (a) initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumer;
- (b) identifying market participants for said commodity having a counter-risk position to said consumers; and
- (c) initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.²⁸⁰

The remaining claims were dependent claims. If Claim 1 was directed towards ineligible subject matter, then the remaining claims also fall. Without examining the other hallmarks of patentability (novelty, inventiveness, and utility), the Examiner rejected the application since it was not limited to any specific apparatus and merely manipulated an abstract idea and/or solved a mathematical problem.²⁸¹ The subsequent appeal to the Patent and Trademarks Office’s Board of Patent Appeals and Interferences upheld the refusal but held that a specific piece of apparatus was not a hallmark of patent eligibility (as two chemicals may produce a patentable invention, even though no specific apparatus is claimed).²⁸² The Board endorsed the view that patent-eligible subject matter must transform physical matter from one state to another.²⁸³ In the board’s view, Bilski’s application did nothing more than manipulate financial risks and legal liabilities and merely recite an abstract idea that did not produce a practical result.²⁸⁴

279. *In re Bilski*, 545 F.3d 943, 966 (Fed. Cir. 2008), *cert. granted sub nom. Bilski v. Doll*, 129 S. Ct. 2735 (U.S. June 1, 2009) (No. 08-964).

280. *Id.* at 949.

281. *Id.* at 950.

282. *Id.*

283. *Id.*

284. *In re Bilski*, 545 F.3d at 966.

The most important element of the decision in *In re Bilski* was the adoption of the machine-or-transformation test for determining patent-eligible subject matter and the express rejection of other tests.²⁸⁵ Under the machine-or-transformation test, a process claim satisfies section 101 if it is tied to a machine or apparatus, or if it transforms an article into a new state or thing.²⁸⁶

The Circuit Court previously required a “useful, concrete, and tangible result” as the standard for patentability in *State St. Bank & Trust Co. v. Signature Financial Group, Inc.*²⁸⁷ and *In re Alappat*.²⁸⁸ The majority in *Bilski* rejected the idea that a “useful, concrete, and tangible result” determines patent eligibility under Section 101 and instead re-affirmed the Supreme Court’s machine-or-transformation test as the proper test to apply.²⁸⁹ The court also rejected a “technological arts test, stating that the contours of such a test would be unclear because “the meanings of the terms ‘technological arts’ and ‘technology’ are both ambiguous and ever-changing. And no such test has ever been explicitly adopted . . . Therefore, we decline to do so and continue to rely on the machine-or-transformation test as articulated by the Supreme Court.”²⁹⁰

In responding to this decision, I adopt my earlier views from the rejection of Amazon.com’s one-click patent application in Canada that likewise implicitly adopted the machine-or-transformation test because it incorporated a “physicality” theme into patent law restrictions.²⁹¹

Business methods easily satisfy the machine-or-transformation test insofar as we free ourselves from the mental baggage that the internet (or software) is a non-physical apparatus that exists somewhere in the ether. Therefore, a business-method claim, if properly drafted, will always be tied to some piece of hardware or apparatus software, servers, computers *or* be directed at transforming an “article” into a new state or thing. If the business method is truly novel and inventive, it will always transform some artifact in the business world into a more useful thing. Again, assuming we accept the premise that patent eligibility ought to be tied to a single test, the machine-or-transformation test,²⁹² I emphasize the need to

285. *Id.* at 966.

286. *Id.* at 954.

287. *State St. Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373 (Fed.Cir.1998) (reversing decision to deny patent by holding that a computerized accounting system that manages mutual fund investments is a patentable invention because it produces a useful, concrete and tangible result).

288. *In re Alappat*, 33 F.3d 1526, 1544 (Fed.Cir.1994) (reversing a decision to deny a patent because data transformed by a machine through a series of mathematical calculations that produced a smooth waveform created a useful, concrete and tangible result).

289. *In re Bilski*, 545 F.3d 943 at 959-60 (stating that “while looking for ‘a useful, concrete and tangible result’ may in many instances provide useful indications of whether a claim is drawn to a fundamental principle or a practical application of such a principle, that inquiry is insufficient to determine whether a claim is patent-eligible under [Section] 101”).

290. *Id.* at 960.

291. *See supra* text accompanying notes 69-72.

292. In the dissent, Justice Radar put it well:

[T]his opinion propagates unanswerable questions: What form or amount of ‘transformation’ suffices? When is a ‘representative’ of a physical object sufficiently

unshackle our minds from traditional conceptions of “apparatus” or “articles.” After all, an online display is no less an article than the ink molecules on my paper, or my image in a mirror.

I argue that the decision in *In re Bilski* must be confined to the actual claim(s) at issue. Bilski’s patent application is nothing more than a series of mental steps. It is not tied to *anything*. If the patent were granted it would amount to a monopoly over the implementation of “a method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price,”²⁹³ whether implemented by software, person, or some software-manual hybrid. *As drafted*, the claims would monopolize the entire industry. This is no different than Samuel Morse’s claim to monopolize electromagnetism *per se*.²⁹⁴ Justice Radar stated in the dissent, “[t]his court labors for page after page . . . to say what could have been said in a single sentence: ‘Because Bilski claims merely an abstract idea, this court affirms the Board’s rejection.’”²⁹⁵ Additionally, he noted that “[i]f the only problem of this vast judicial tome were its circuitous path, I would not dissent, but this venture also disrupts settled and wise principles of law.”²⁹⁶

The jurisprudential authority of *In re Bilski* should be “read down” and understood in the context of the widely drawn claims set out in the application. It is not a rejection of business-method patents for the simple reason that the *en banc* Court did not expressly overrule *State Street*. In fact, Chief Justice Michel noted,

linked to that object to satisfy the transformation test? (e.g., Does only vital sign data taken directly from a patient qualify, or can population data derived in part from statistics and extrapolation be used?) What link to a machine is sufficient to invoke the ‘or machine’ prong? Are the ‘specific’ machines of Benson required, or can a general purpose computer qualify? What constitutes ‘extra-solution activity?’ If a process may meet eligibility muster as a ‘machine,’ why does the Act ‘require’ a machine link for a ‘process’ to show eligibility? Does the rule against redundancy itself suggest an inadequacy in this complex spider web of tests supposedly ‘required’ by the language of Section 101?

In re Bilski, 545 F.3d at 1014 (Radar, J., dissenting).

293. *Id.* at 949.

294. *See id.* at 954 (making an analogy between Bilski’s claim and Samuel Morse’s attempt to use a patent to pre-empt all uses of electromagnetism to print characters at a distance).

295. *Id.* at 1011-13 (Radar, J., dissenting).

296. *Id.* Justice Rader’s entire dissent is an elegant template for the Supreme Court to craft its opinion:

The abstractness and natural law preclusions not only make sense, they explain the purpose of the expansive language of section 101. Natural laws and phenomena can never qualify for patent protection because they cannot be invented at all. After all, God or Allah or Jahveh or Vishnu or the Great Spirit provided these laws and phenomena as humanity’s common heritage. Furthermore, abstract ideas can never qualify for patent protection because the Act intends, as section 101 explains, to provide “useful” technology. An abstract idea must be applied to (transformed into) a practical use before it qualifies for protection. The fine print of Supreme Court opinions conveys nothing more than these basic principles. Yet this court expands (transforms?) some Supreme Court language into rules that defy the Supreme Court’s own rule.

Id.

“[w]e further reject calls for categorical exclusions beyond those for fundamental principles already identified by the Supreme Court. We rejected just such an exclusion in *State Street*, noting that the . . . business method claims are ‘subject to the same legal requirements for patentability as applied to any other process or method.’”²⁹⁷

I reiterate my belief that the United States Supreme Court will likely “remind” the lower courts of the expansive approach to patentability that it endorsed in *Chakrabarty* and *Diehr* and expressly overrule the decision in *Bilski* insofar as it excludes business methods from subject matter eligibility. This would also indirectly erode the authority of *Nuijten*. In the end, *Bilski*’s application should be rejected as merely reciting a series of mental steps, with Justice Radar’s sharp dissent²⁹⁸ serving as the basis for much of the Supreme Court’s *ratio*.

IV. CONCLUSION

Exclusions to patentable subject matter are driven primarily by the courts. They all appear to be derived from antiquated, masculine notions of “property”. All exclusions to patentable subject matter (at least, those that are judicially created) stem from pre-conceived notions, or concerns, about ascribing a property right to some “thing.” Signals and business methods are the clearest examples of this. These advances lie beyond our traditional conceptions of property. Therefore, a patent right seems inappropriate. Advances in bio-technology also represent a deep rooted concern (perhaps guilt?) about propertizing “life” itself. The idea that

297. *Id.* at 960.

298. Without belabouring the point too much, other gems from Justice Radar’s correctly identified that patent laws are intended to protect unforeseen advances *in the context of their novelty, inventiveness and utility*:

Much of the court’s difficulty lies in its reliance on dicta taken out of context from numerous Supreme Court opinions dealing with the technology of the past. In other words, as innovators seek the path to the next techno-revolution, this court ties our patent system to dicta from an industrial age decades removed from the bleeding edge. . . .

Thus, the Patent Act from its inception focused patentability on the specific characteristics of the claimed invention—its novelty and utility—not on its particular subject matter category. . . .

One final point, reading section 101 as it is written will not permit a flurry of frivolous and useless inventions. Even beyond the exclusion for abstractness, the final clause of section 101—‘subject to the conditions and requirements of this title’ — ensures that a claimed invention must still satisfy the ‘conditions and requirements’ set forth in the remainder title 35. These statutory conditions and requirements better serve the function of screening out unpatentable inventions than some vague ‘transformation’ or ‘proper machine link’ test.

In simple terms, the statute does not mention ‘transformations’ or any of the other Industrial Age descriptions of subject matter categories that this court endows with inordinate importance today. The Act has not empowered the courts to impose limitations on patent eligible subject matter beyond the broad and ordinary meaning of the terms process, machine, manufacture, and composition of matter. It has instead preserved the promise of patent protection for still unknown fields of invention.

In re Bilski, 545 F.3d at 1011-15 (Radar, J., dissenting).

one can “own” another being is considered abhorrent. Hence, the concern of the Supreme Court of Canada in *Harvard College – the Harvard Mouse* case - about propertizing (i.e. patenting) a “higher” life form; whereas in *Monsanto*, that very court appeared willing to indirectly grant property rights to a plant. Because, after all, “owning” a plant lies at the heart of agriculture and can be traced to the unquestioned ancient rights of a farmer to protect his or her crops from theft. The fact that pharmaceuticals are considered patent eligible subject matter, with little conceptual difficulty, whereas methods of medical treatment are viewed differently also demonstrates this quite handily. Propertizing pharmaceuticals “looks like” traditional property – be it a pill, liquid or other substance – whereas a method of medical treatment lies beyond traditional conceptions of what property “ought” to be.

Proponents of increasing the exclusions to patentable subject matter will argue that jurisprudential intervention is often needed to deal with evolving technologies that the patent statutes and the legislatures are simply too slow to address. I take the approach that interpretation of patent statutes should follow that of a “living tree,” a Canadian doctrine of constitutional interpretation, which “takes a progressive approach to ensure that Confederation can be adapted to new social realities.”²⁹⁹ Patent statutes, while updated from time to time, are rooted in times of much simpler mechanical contrivances. The courts should view contemporary questions on patentable subject matter as a “living tree” which must, “by way of progressive interpretation, accommodate[] and address[] the realities of modern life.”³⁰⁰

Some will argue that my metaphor, and analogy to Canadian constitutional law, does not support my contention that exclusions to patentability ought to be narrowly confined, because a living tree is only “capable of growth and expansion within its natural limits.”³⁰¹ I respond that, by its very definition and objectives, patent law is intended to protect advances that are unforeseen and even uncertain. The patent “tree” has been planted by the legislature, and should be nurtured by the courts to ensure that it has as few limits to its growth as possible. Broad categorical exclusions of patentable subject matter by the courts defeat the underlying purposes of the patent system by foreclosing entire avenues of progress *ab initio*. Indeed, once we have judicially foreclosed an entire category of invention based on subject matter eligibility there is no resurrection of those inventions. For the purposes of patent law, those inventions do not exist.

299. Reference re Employment Insurance Act (Can.), ss. 22 and 23, [2005] S.C.R. 669, 667, 2005 SCC 56 (Can.) (noting that the Canadian Supreme Court has adopted the “living tree” metaphor on many occasions in order to interpret the Canadian Constitution in a progressive way); see also PETER HOGG, CONSTITUTIONAL LAW OF CANADA, (Thomson/Carswell 2007) (1977).

300. Reference re Same-Sex Marriage, [2004] 3 S.C.R. 698, 700 2004 SCC 79 (Can.) (stating that the “living tree” idea is one of the most fundamental concepts of Canadian Constitutional interpretation).

301. *Edwards v. Canada (Attorney General)*, [1930] A.C. 124, 136 (P.C.) (stating for the first time that the Constitution of Canada should be viewed as a “living tree”).

Patent statutes are drafted with a view to the unforeseen; any judicial interpretation of the word “invention” must give deference to this vision. Where the legislature seeks to provide few exceptions to patentability, courts and patent offices should be slow to craft their own exclusions. If the subject matter in question can be made to fit within definition of invention (even if slightly uncomfortably), then the courts should aim to ‘breathe life’ into the bare, and sometimes dated, words of the patent statute.