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Patents and Traditional Knowledge of the Uses of Plants: Is a Communal Patent Regime Part of the Solution to the Scourge of Bio Piracy?

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INTRODUCTION

Since Filippo Brunelleschi successfully "blackmailed" Florence into granting him a patent on the vessel "Badalone,"[1] the patent system has conquered the globe, reaching beyond Italian city-states to become an integral part of most legal systems.[2] Brunelleschi's dramatic confrontation with the state, reflecting the perennial conflict between individual rights and the interests of society, is echoed in the philosophical and socio-legal heritage of the patent system generally.[3] Given the European cultural milieu in which the patent system originated, the institutionalization of the patent law system in non-western societies has been both controversial and problematic.

In the area of biological diversity, general cultural and philosophical questions arising from the globalization of the patent system have been compounded by particular questions regarding the genetic diversity of plants and the role of patents in protecting traditional knowledge relating to plant use. These trends have given rise to charges of misappropriation or theft of traditional knowledge of the

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1. Contrary to the usual practice of open and unconditional disclosure of inventions, Brunelleschi refused to disclose his invention of the craft unless Florence granted him a patent. Florence yielded to his demand and issued him a patent on June 19, 1421. To his embarrassment, the Badalone sank dramatically on its first trip on Lake Arno. As a result of this failure, Florence stopped issuing patents for a long time. However, this action did not affect the technical prowess of the city, nor did it diminish Brunelleschi's future creativity. *See generally* BRUCE WILLIS BUGBEE, THE EARLY AMERICAN LAW OF INTELLECTUAL PROPERTY: THE HISTORICAL FOUNDATIONS OF THE UNITED STATES PATENT AND COPYRIGHT SYSTEMS (1961).

2. The early European patent system was probably an offshoot of the Florentine and Venetian idea of patents. According to Maximilian Frumkin, "Italian influence shows like a thread in all incipient patent systems." MAXIMILIAN FRUMKIN, EARLY HISTORY OF PATENTS FOR INVENTION 52 (1947).

3. *See* ULF ANDERFELT, INTERNATIONAL PATENT-LEGISLATION AND DEVELOPING COUNTRIES (1971).

uses of plants (TKUP), as well as fears that patents on plant genetic diversity will only encourage the erosion and extinction of TKUP.[4] In addition, commentators have questioned how the commercial interests of the patent system may be used to ensure equitable and sustainable access to bio cultural knowledge without harming the traditional lifestyles that sustain this knowledge and biodiversity.

This paper proposes a framework for treating plant-related patents that reflects the contemporary revolution in the conceptualization of basic patent rights. Its central thesis is that, in view of changes to the constitutive elements of the patent system, local communities can legitimately exploit the malleability of the patent system to protect bio cultural knowledge. This approach may also guarantee local and traditional communities a fair bargain in the commercialization of this knowledge. In sum, the paper argues for the creation of a communal patent scheme under local legislative control.

The analysis in this article may appear radical or desperate. However, the combined effects of an expanding patent system—misappropriation of indigenous knowledge, the creation of cultural and genetic monocultures, reduction of biological diversity for short-term profit—are no less radical and desperate.[5] The

4. This analysis uses the concept of TKUP because it is more inclusive than the commonly used terms or concepts of "indigenous knowledge" or "ethno-botany." First, it is virtually impossible to extricate knowledge of a plant's utility or properties from the plant itself. In the absence of knowledge of a plant's utility, the plant in question, at least in a utilitarian sense, becomes a weed. Hence, it is the knowledge of the utility of the plant resource in question that confers economic value on the plant and makes the plant and the related knowledge a potential or actual subject of patents or other forms of economic unitization. Second, as the *World Intellectual Property Organization (WIPO) Report on Fact-finding Missions on Intellectual Property and Traditional Knowledge* clearly acknowledges, "indigenous knowledge is . . . part of the traditional knowledge category, but traditional knowledge is not necessarily indigenous. That is to say, indigenous knowledge is traditional knowledge, but not all traditional knowledge is indigenous." *Intellectual Property Needs and Expectations of Traditional Knowledge Holders: WIPO Report on Fact-finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, at 23 (2001) [hereinafter *WIPO Report*]. Third, the notion of ethno-botany perpetuates the mistaken impression that such knowledge is antiquated and inferior to western science, or, as some writers assert, that non-western plant resource-related knowledge is culture-bound or ethnic in nature. Plant resource-based knowledge, whether in the western or non-western paradigm, has universal validity and efficacy. Therefore, references to traditional knowledge of the uses of plants in this paper should be read to include the plant resource, parts, or derivatives thereof, and the knowledge of their various uses. For information concerning indigenous peoples, see generally Int'l Labour Org.: Convention Concerning Indigenous and Tribal Peoples in Independent Countries, June 27, 1989, 28 I.L.M. 1382 [hereinafter ILO Convention]; U.N. ESCOR, Comm'n on Human Rights, *Preliminary Report on the Study of the Problem of Discrimination Against Indigenous Populations*, U.N. Doc. E/CN.4/Sub.2/L.566 (1972) [hereinafter *Report on the Study of the Problem of Discrimination Against Indigenous Populations*]; *United Nations Declaration of the Rights of Indigenous Peoples*, ch. 2, ¶ 34, U.N. Doc. E/CN.4/1995/2, 34 I.L.M. 541 (1995) [hereinafter *Declaration of the Rights of Indigenous Peoples*]; Rüdiger Wolfrum, *The Protection of Indigenous Peoples in International Law*, 59 HEIDELBERG J. INT'L L. 369 (1999).

5. Recently, the U.S. government's National Institutes of Health (NIH) applied for a patent on 2,851 genes and DNA (deoxyribonucleic acid) fragments associated with the human brain. The application spanned over 1,000 pages

expansive contemporary patent system may be perceived as a modern legal framework and catalyst for the industrialization and privatization of biological diversity and bio cultural knowledge. Therefore, only a far-reaching and radical counter-response would force a global reexamination of patent law and its impact on sustainable use of bio cultural resources and the equitable sharing of the benefits thereof.

This article will examine the fundamentals of patent law—including novelty, utility, specification, and ownership (particularly in the context of non-Western societies, where individualism often yields to communitarianism)—in analyzing the operation of the international patent system. It positions the international patent system as a tool of political economy manipulated in order to effectuate the dominant interests of states and stakeholders.

Part I introduces the Convention on Biological Diversity (CBD) and its relationship to patent law. Part II focuses on the debate over the patentability of bio cultural knowledge. Part III begins by critiquing the current patent system, and concludes by suggesting how Community Intellectual Property Rights (CIPR) may be effectively instituted and operated. It argues that the ideal approach to resolving the conflict between the global patent system and the exploitation of indigenous peoples is one that works from within the international patent system, using its language and concepts to achieve the objectives of the CBD.

The interpretation of the international patent system as a tool of political economy suggests that it can be used to achieve the aims of article 8(j) of the CBD. Article 8(j) of the CBD requires state parties to:

> respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the

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and according to the U.S. Patent and Trademark Office, which has twice rejected the application, it would have taken its examiners until the year 2035 to review the application. This is not an isolated phenomenon: Incyte, an American company, has also applied for patents on 40,000 human genes and DNA fragments. "Sweeping" patents have been granted on all genetically engineered cotton and soybean. There are similar pending applications on rice, maize, groundnut, and beans. *See* THE CRUCIBLE GROUP, PEOPLE, PLANTS, AND PATENTS: THE IMPACT OF INTELLECTUAL PROPERTY ON BIODIVERSITY, CONSERVATION, TRADE, AND RURAL SOCIETY 10 (1994)[hereinafter CRUCIBLE GROUP].

> equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices. . . .[6]

With effective policy, legislative and administrative frameworks in place, states that supply genetic diversity and bio cultural knowledge will be able to institute measures that protect their own lifestyles and avoid the predation of the international patent system.

Four overarching principles inform the proposals discussed in this paper. First, the intellectual credit and economic reward for indigenous knowledge and conservation of biological diversity must be kept where they rightfully belong. Second, those asserting that indigenous knowledge and methods of biodiversity conservation do not deserve respect and potential economic benefit should bear the burden of so proving. Third, biological diversity and those cultural and traditional lifestyles that contribute to biological diversity must be preserved. Fourth, the development of access and benefit sharing (ABS) instruments must be further explored.

I. THE RELATIONSHIP BETWEEN THE CONVENTION ON BIOLOGICAL DIVERSITY AND PATENT LAW

During its history, the patent system has withstood attacks,[7] scholarly criticism,[8] and, oftentimes, popular reprobation.[9] As the patent system expands

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6. *See generally* United Nations Conference on Environment and Development: Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 818 (1992) [hereinafter CBD].

7. *See generally* Fritz Machlup & Edith Penrose, *The Patent Controversy in the Nineteenth Century,* 10 J. ECON. HIST. 1 (1950).

8. *See generally* FRITZ MACHLUP, SENATE COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM 1 (Comm. Print 1958); CHRISTOPHER T. TAYLOR & AUBREY SILBERSTON, THE ECONOMIC IMPACT OF THE PATENT SYSTEM: A STUDY OF THE BRITISH EXPERIENCE (1973); O.J. FIRESTONE, ECONOMIC IMPLICATIONS OF PATENTS (1971).

9. The patent system

> 'inflames cupidity,' excites fraud, stimulates men to run after schemes that may enable them to levy a tax on the public, begets disputes and quarrels betwixt inventors, provokes useless lawsuits, bestows rewards on the wrong persons, makes men ruin themselves for the sake of getting the privileges of a patent.

Amendment of the Patent Laws, ECONOMIST, July 26, 1851, at 811. As the Coordinating Body for the Indigenous Peoples' Organizations of the Amazon Basin (COICA) Statement of 1994 declares, "[p]revailing intellectual property systems reflect a conception and practice that is colonialist . . . racist . . .[and] usurpatory. . . . Patents and other intellectual property rights to forms of life are unacceptable to indigenous peoples. Prevailing IPR [intellectual property rights] systems must be prevented from robbing us, through monopoly rights, of resources and knowledge." THE COICA STATEMENT, ¶ 1, §§ 8, 10, http://users.ox.ac.uk/~wgtrr/coica.htm (Sept. 30, 1994).

beyond its original boundaries,[10] it is becoming increasingly difficult to have a polite or dispassionate discussion about the purported global necessity for and benefits of the patent system.

International law and institutions have reflected the controversy and confusion over the emerging global patent law regime.[11] Thus, law and institutions created and/or controlled by states with powerful and influential commercial and industrial interests (such as the World Trade Organization-administered agreement on Trade-Related Aspects of Intellectual Property Rights) maintain the view[12] that the patent system is an instrument useful for sustaining biological diversity and indigenous peoples,[13] and for protecting genetic diversity.

On the other hand, international law and institutions created and/or sustained by the United Nations, including the United Nations Environment Programme-moderated CBD, have been far less sanguine about the purported beneficial impact of an expanded patent system on bio culture and indigenous peoples. Article 16(5) of the CBD, for instance, recognizes merely that ". . . patents . . . *may* have an influence in the implementation of this Convention."[14] As has been noted, "The use of the term 'may' implies that the negotiators could not agree on whether intellectual property rights (IPRs) have a positive effect, a negative

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10. *See* CRUCIBLE GROUP, *supra* note 5, at 6-7.

11. *See generally* CBD, *supra* note 6; Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization [hereinafter WTO Agreement], Annex 1C, LEGAL INSTRUMENTS—RESULTS OF THE URUGUAY ROUND vol. 31, 33 I.L.M. 81, 93-94 (1994) [hereinafter TRIPS Agreement]. A comparison of the provisions of the UNEP's CBD and the TRIPS Agreement, administered by the WTO, shows the geopolitical divide and confusion. As a crucial aspect of the neoliberal project, TRIPS leans in favor of an expanded regime of patents. Note that unlike that of the United Nations or its agencies, the ability of social movements to influence the agenda of the WTO is constrained by the organization's constitutional law and structure. As a forum for inter-governmental negotiations, it is not formally open to social movement activists and does not operate on the principle of one state-one vote, thus leaving room for powerful states to pressure weak but numerous states into uncomfortable positions. *See* Marc Williams & Lucy Ford, *The WTO, Social Movements and Global Environmental Management, in* ENVIRONMENTAL MOVEMENTS: LOCAL, NATIONAL, AND GLOBAL 269 (Christopher Rootes ed., 1999).

12. *See generally* Michael Gadbaw & Leigh Kenny, *India, in* INTELLECTUAL PROPERTY RIGHTS: GLOBAL CONSENSUS, GLOBAL CONFLICT? (R. Michael Gadbaw & Timothy J. Richards, eds., 1998); Robert M. Sherwood, *Human Creativity for Economic Development: Patents Propel Technology,* 33 AKRON L. REV. 351 (2000).

13. International law defines indigenous peoples as

> peoples in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all of their social, economic, cultural and political institutions.

ILO Convention, *supra* note 4, at 1385. *See generally Report on the Study of the Problem of Discrimination Against Indigenous Populations*, *supra* note 4; *Declaration of the Rights of Indigenous Peoples*, *supra* note 4; Wolfrum, *supra* note 4.

14. CBD, *supra* note 6, art. 16(5), at 829 (emphasis added).

effect, or a negligible effect on technology transfer or on the achievement of the Convention's objectives generally."[15] "The placement of paragraph five in article 16 implies that if IPRs have an impact on the Convention's objectives, this is most likely to occur in the context of technology transfer, rather than in the context of conservation and sustainable use."[16] The inferences drawn from the text of article 16 itself and the peculiar placement of IPRs in the CBD regime largely stems from the fact that "[t]he only direct references in the CBD to IPRs are in article 16 on *Access to and Transfer of Technology*."[17] Further, given the crucial role of patents in the evolution of the biotechnology industry,[18] it is very curious that the CBD gave short shrift to the issue of IPRs. Furthermore, a careful reading of article 16 clearly shows that the drafters of the Convention deliberately subordinated the interests of conservation and sustainable use of biodiversity to the often competing interests of industry.

Interestingly, article 8(j) of the CBD shows that regardless of whether intellectual property mechanisms have a positive impact on biological diversity, the overriding purpose when applying the patent system to bio culture should be the attainment of a regime that would "respect, preserve and maintain knowledge . . . of indigenous and local communities."[19] Thus, it is fair to say that the agnosticism of article 16(5) of the CBD may reflect the convention's polite but decisive stance in favor of the need to respect, preserve and maintain those diverse cultures and indigenous peoples in their roles as conservators of biological diversity.

The debate and tension about whether the patent system is Euro-centric, racist, predatory, and exploitative is reflected in the relevant literature.[20]

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15. *See The Impact of Intellectual Property Rights Systems on the Conservation and Sustainable Use of Biological Diversity and on the Equitable Sharing of Benefits from its Use*, Nov. 4-15, 1996, CBD, UNEP/CBD/COP/3/22 (Sept. 26, 1996), *at* 3, http://www.biodiv.org/doc/meetings/cop/cop-03/official/cop-03-22-en.pdf (Sept. 22, 1996) [hereinafter *Impact of Intellectual Property Rights Systems*].

16. *Id.*

17. GRAHAM DUTFIELD, INTELLECTUAL PROPERTY RIGHTS, TRADE AND BIODIVERSITY 34 (2000).

18. For a recent analysis of this issue, particularly the relaxation of the rules of patentability in order to promote the interests of the biotechnology industry, see generally John Golden, *Biotechnology, Technology Policy, and Patentability: Natural Products and Invention in the American System*, 50 EMORY L.J. 101 (2001).

19. CBD, *supra* note 6, art. 8(j), at 826.

20. *See* Shayana Kadidal, Note, *Plants, Poverty, and Pharmaceutical Patents*, 103 YALE L.J. 223 (1993) [hereinafter *Plants, Poverty, and Pharmaceutical Patents*]. *See generally* Shayana Kadidal, *Subject-Matter Imperialism? Biodiversity, Foreign Prior Art and the Neem Patent Controversy*, 37 IDEA 371 (1997) [hereinafter *Subject-Matter Imperialism?*]; Naomi Roht-Arriaza, *Of Seeds and Shamans: The Appropriateness of the Scientific and Technical Knowledge of Indigenous and Local Communities*, 17 MICH. J. INT'L L. 919, 940 (1996); Michael Gollin, *Using Intellectual Property to Improve Environmental Protection*, 4 HARV. J.L. & TECH. 193, 193-94, 226 (1991); Michele Powers, *The United Nations Framework Convention on Biological Diversity: Will Biodiversity*

Nevertheless, scholars including Vandana Shiva maintain that the expansion of the patent system to deal with issues relating to indigenous knowledge and bio cultural communities would lead to the erosion of biological diversity, the legitimation of genetic and cultural mono-culturalism, and, of course, bio piracy.[21] The practical question, then, is what role—if any—the patent system should play in realizing the objectives of article 8(j) of the CBD. The conundrum here is that while the patent system is despised by indigenous peoples and most of the other conservators of genetic diversity and biocultural knowledge, its ascendancy in contemporary times is unquestionable.

II. THE DEBATE OVER THE PATENTABILITY OF BIOCULTURAL KNOWLEDGE

A. Proposals for Addressing the Problem of Bio Piracy

Responding to unprecedented genetic erosion and outraged by the nature of some recent patent grants, proponents of one school of thought, dominated largely by indigenous peoples and their advocates, have called for reform of the patent system. The scope of reform proposed varies widely, ranging from abolition of the patent system to a limitation on the role of patents implicating the knowledge and practices of indigenous peoples or genetic diversity in general.[22] Denunciations of the patent system echo the futile arguments of the anti-patent movement that occurred in late nineteenth-century Europe.[23]

Preservation be Enhanced through Its Provisions Concerning Biotechnology Intellectual Property Rights?, 12 WIS. INT'L L.J., Fall 1993, at 103, 110; Mark Ritchie, *Intellectual Property Rights and Biodiversity: The Industrialization of Natural Resources and Traditional Knowledge*, 11 ST. JOHN'S J. LEGAL COMMENT. 431, 431, 437 (1996).

21. *See generally* VANDANA SHIVA, MONOCULTURES OF THE MIND: PERSPECTIVES ON BIODIVERSITY AND BIOTECHNOLOGY (1993); VANDANA SHIVA, STAYING ALIVE: WOMEN, ECOLOGY, AND DEVELOPMENT (1989); VANDANA SHIVA, THE VIOLENCE OF THE GREEN REVOLUTION: THIRD WORLD AGRICULTURE, ECOLOGY AND POLITICS (1991).

22. The literature in this area is extensive. *See, e.g.*, The Mataatua Declaration on Cultural and Intellectual Property Rights of Indigenous Peoples, http://users.ox.ac.uk/~wgtrr/mataatua.htm (June 12-18, 1993) [hereinafter Mataatua Declaration]; Graham Dutfield, *Is Novelty Still Required for Patents in the United States? The Case of Turmeric*, http://users.ox.ac.uk/~wgtrr/turmeric4.htm (last visited Oct. 17, 2001); *U.S. Patent Office Admits Error, Cancels Patent on Sacred "Ayahuasca" Plant*, http://www.biotech-info.net/ayahuasca.html (Nov. 4, 1999) [hereinafter *U.S. Patent Office Admits Error*]; E-mail from Werner Reisberger to Gentech (Aug. 17, 1997), *Urgent Action Appeal Patenting*, http://www.gene.ch/gentech/1997/Jul-Aug/msg005553html [hereinafter *Urgent Action Appeal Patenting*]; Rural Advancement Found. Int'l , *No Cure for Patents: Biotech Patents Distort and Discourage Innovation and Increase Costs for Dubious Drugs*, http://www.rafi.org/web/allnews-display.shtml?Pfl=geno-list-en.param (July 2, 1997).

23. *See* Machlup & Penrose, *supra* note 7, at 1-29.

Another school of thought, largely centrist, champions—using newfangled catchphrases—the adoption of "new legal paradigms"[24] or "effective *sui generis* systems"[25] that "recognize property rights in traditional biocultural contribution"[26] and that protect "indigenous peoples and traditional knowledge."[27] Proponents of this school argue that within the context of article 8 (j) of the CBD, and keeping in mind the overall intention of the Convention, any such proposals should incorporate and reflect at least four primary concerns: (1) the relationship between the proposed intellectual property rights regime and the maintenance of traditional knowledge and practices of indigenous and local communities; (2) the role of the proposed intellectual property rights regime as an indirect incentive in favor of conservation and sustainable use; (3) the role of the proposed intellectual property rights regime in benefit-sharing through development of technologies using genetic resources; and (4) the role of the proposed intellectual property rights regime in governing the transfer of or access to technology and scientific know-how.[28]

Suggestions have been made for the establishment of a registry of traditional uses,[29] which would form the basis of contracts for exploitation of indigenous knowledge and genetic diversity between the affected bio prospectors and the indigenous communities in question.[30] The proposed registry would document

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24. David Stephenson, Jr., *A Legal Paradigm for Protecting Traditional Knowledge*, *in* INTELLECTUAL PROPERTY RIGHTS FOR INDIGENOUS PEOPLES: A SOURCE BOOK 181, 181-82 (Tom Greaves ed., 1994).

25. TRIPS Agreement, *supra* note 11, art. 27.

26. *See* Craig D. Jacoby & Charles Weiss, *Recognizing Property Rights in Traditional Biocultural Contribution*, 16 STAN. ENVTL. L.J. 74 (1997).

27. *See generally The Relationship Between Intellectual Property Rights and the Relevant Provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) and the Convention on Biological Diversity*, June 28-30, 1999, Convention on Biological Diversity, UNEP/CBD/ISOC/5 (May 11, 1999), *at* http://www.biodiv.org/doc/meetings/isoc/isoc-01/official/isoc-01-05-en.pdf [hereinafter *Relationship Between Intellectual Property Rights*]. There is a jurisprudential question as to whether Article 8(j) of the CBD constitutes a nonnegotiable positivistic norm or whether it is merely a "soft law" legal obligation. Whatever the position, the critical issue is that the protection of indigenous practices as a function of sustaining biological diversity is now part of international law. On the debate on the normative character of soft law, see generally R.R. Baxter, *International Law in "Her Infinite Variety,"* 29 INT'L & COMP. L.Q. 549 (1980); Christine M. Chinkin, *The Challenge of Soft Law: Development and Change in International Law*, 38 INT'L & COMP. L.Q. 850 (1989); Bruno Simma, *A Hard Look at Soft Law*, *in* AM. SOC'Y OF INT'L L., PROCEEDINGS OF THE 82ND ANNUAL MEETING 377-81 (1988).

28. *Impact of Intellectual Property Rights Systems*, *supra* note 15, at 2-3, http://www.biodiv.org/doc/meetings/cop/cop-03/official/cop-03-22-en.pdf.

29. *See* WILLIAM LESSER, SUSTAINABLE USE OF GENETIC RESOURCES UNDER THE CONVENTION ON BIOLOGICAL DIVERSITY: EXPLORING ACCESS AND BENEFIT SHARING ISSUES 128-29 (1997); *see also* Jacoby & Weiss, *supra* note 26, at 102.

30. *See generally Andean Pact: Common System on Access to Genetic Resources*, June 1992, *at* http://users.ox.ac.uk/~wgtrr/andpact.htm [hereinafter *Andean Pact*].

the knowledge and propagation of sustainable harvests and conservation as well as economic uses of biological resources that are found within these communities. Additionally, the registry would include previously published scientific reports of genetic materials with use references.[31] Nevertheless, there are serious problems with these suggestions.

B. The Problems with Some of the Proposed Solutions to Bio Piracy

The problem with the first solution—the reform of the patent system—is that, given the configuration of global economic, technological and political power, it is not practically feasible. Contrasting the immense profitability in the global commercial exploitation of indigenous knowledge and biological diversity that is enabled by the international patent system, on the one hand, with the acute weaknesses of those communities that are the source of this knowledge and diversity, on the other, it would appear easier for those commercial interests to self-destruct than for them to allow for the abolition or even weakening of the patent system.

Appropriation of indigenous knowledge by commercial interests, backed by powerful states, as in the notorious cases of the Neem tree,[32] Turmeric,[33] Ayahuasca,[34] and Quinoa[35] patents, is simply too profitable to be surrendered in response to the indignation of indigenous peoples and other providers of bio cultural knowledge. Since business is motivated by profit, moral outcries against misappropriation achieve only marginal results. Although there may be occasional retreats, for any "Ayahuasca patent" that is successfully opposed and subsequently canceled, there are probably thousands of successful misappropriations of indigenous knowledge. In the absence of a convincing global morality, strong and innovative national policies are imperative.[36]

There are several philosophical and practical problems with the proposal to develop a registry of traditional uses[37] describing genetic materials so that they

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31. These community-based catalogues already exist in India. *See* LYLE GLOWKA, A GUIDE TO DESIGNING LEGAL FRAMEWORKS TO DETERMINE ACCESS TO GENETIC RESOURCES 40 (1998).

32. Emily Marden, *The Neem Tree Plant: International Conflict over the Commodification of Life*, 22 B.C. INT'L & COMP. L. REV. 279, 280 (1999).

33. *See* Dutfield, *supra* note 22.

34. *See U.S. Patent Office Admits Error*, *supra* note 22.

35. *See* Rural Advancement Found. Int'l, *Quinoa Patent Dropped: Andean Farmers Defeat U.S. University*, http://www.rafi.org/genotypes/980522html (May 22, 1998).

36. *See* CRUCIBLE GROUP, *supra* note 5, at 1.

37. *See* LESSER, *supra* note 29, at 102.

can be identified unambiguously for contractual exploitation. First, although the publication of indigenous knowledge in a registry of uses would probably thwart attempts at bio piracy through dubious foreign patents, mere publication does not go far enough. It is doubtful whether any profit-conscious bio prospector, working within a highly permissive patent system, would pay for knowledge or genetic material that could be obtained surreptitiously, by payment of a token sum, or for free. Moreover, once the basic information is obtained, biotechnology and the contemporary patent system leave ample scope for cosmetic changes that would permit patents to be obtained on that information or genetic material.

Second, the registry of uses approach perpetuates the unfair economic paradigm that conceptualizes indigenous peoples as mere producers of raw materials and importers of finished products. This skewed regime has been implicated in the phenomenal loss of biological diversity, as wretched peoples devastate their forests to cultivate mono-cultural "cash crops" that will enable them to pay for fancy finished goods.[38]

Third, the registry of uses approach also implicitly denies the intellectual effort expended by indigenous peoples in the cultivation, improvement and conservation of genetic diversity. Within the framework of contemporary international intellectual property law, both hard and soft, the claims of TKUP providers transcend rights to lost profit, implicating human rights as well.[39] They include a fundamentally legitimate claim for recognition of indigenous peoples as an intelligent, rational and creative part of humanity.[40] Accordingly, proposals that reduce the claims of indigenous peoples and non-western local communities to begging for funds ought to be rejected as inconsistent with international law.

Fourth, it is generally recognized that intellectual property systems provide more comprehensive protection and control than contracts ostensibly based on

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38. *See generally* Catherine O'Neill & Cass R. Sunstein, *Economics and the Environment: Trading Debt and Technology for Nature*, 17 COLUM. J. ENVTL. L. 93 (1992) (discussing debt-for-nature swaps between developing nations and their industrialized counterparts); Matthew B. Royer, *Halting Neotropical Deforestation: Do the Forest Principles Have What It Takes?*, 6 DUKE ENVTL. L. & POL'Y F. 105 (1996) (discussing the problem of tropical deforestation and the solutions offered by the Forest Principles).

39. For a recent examination of this issue, see generally Rosemary Coombe, *Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity*, 6 IND. J. GLOBAL LEGAL STUD. 59 (1998). *See also* James Anaya, *Environmentalism, Human Rights and Indigenous Peoples: A Tale of Converging and Diverging Interests*, 7 BUFF. ENVTL. L.J. 1 (2000).

40. *See* CBD, *supra* note 6, arts. 8, 15, 16, at 825-36, 828-29; *see also* The Declaration of Belém, http://users.ox.ac.uk/~wgtrr/belem.htm (last update May 30, 1996) [hereinafter Declaration of Belém].

the registry of uses.[41] Fifth, the contract model, based upon the registry of uses approach, neglects the immense inequality of bargaining power between most commercial outfits and poor, local, bio cultural communities. Sixth, the contract model raises problems of privity of contract. Seventh, the registry of uses approach raises the specter of paternalistic bureaucracy overseeing the resulting licensing arrangements.[42] Therefore, it seems better to incorporate the "contract model" as part of a holistic intellectual property scheme, as suggested below.

III. OPTIONS FOR MODIFYING THE PATENT SYSTEM

A. Overview

Given the internal contradictions[43] and interstices of the patent law system, there is ample room for creative "fencing off" of unwanted appropriation and commodification of life forms. This is especially true now that the patent system has so significantly altered its basic concepts that its essential postulates, and the cultural milieu that gave birth to it, may no longer be invoked in preventing indigenous peoples from applying it, at least defensively. For example, the paradigm of the patent system as a normative relationship between the individual inventor and the state, as demonstrated in the classical "Signor Brunnelleschi v. Florence" confrontation, is now an anachronism. Similarly, the routine granting of patents on descriptions of genomes and "natural" products has blurred the distinctions between inventive step and improvement, discoveries and inventions.[44] Ironically, arguments ostensibly based on the non-violability of the criteria for patentability have been vigorously employed to dissuade traditional communities and local providers of TKUP from obtaining patents on TKUP. However, the concept of Community Intellectual Rights[45] has found legislative support in Brazil and a few other countries.[46] Accordingly, indigenous peoples,

41. "[I]t is only through some form of intellectual property rights that local and indigenous communities will be able to exercise the necessary degree of control in order to allow for prop[er] internalization of the value of their knowledge, innovation and practices." *Relationship Between Intellectual Property Rights*, *supra* note 27, at 2.

42. *See Plants, Poverty, and Pharmaceutical Patents*, *supra* note 20, at 236.

43. JOHN JEWKES, THE SOURCES OF INVENTION 25-53 (1969).

44. *See generally* Paul T. Clark, *Animal Invention Protection* 16 AIPLA Q.J. 442 (1988-89) (examining the issues related to granting patents for both "classically bred" and "transgenic" animals). *See also* Golden, *supra* note 18, at 122-26.

45. For a further explanation of Community Intellectual Rights, see DUTFIELD, *supra* note 17, at 118-20.

46. For an exhaustive analysis of the concept of communal patents, see Ikechi Mgbeoji, *Patents and Plants: Rethinking the Role of International Law in Relation to the Appropriation of Traditional Knowledge of the Uses of Plants* (Oct. 2001) (Doctoral Dissertation submitted to Dalhousie Law School, Halifax, Canada).

with the active cooperation of their respective states, may create regimes of communal patents in which inventions related to TKUP may be protected with patents or modifications thereof granted to collectives or other identifiable groups of local innovators and inventors.[47]

B. Patents and the Concept of Patentability

Although the patent system is intrinsically international, it is peculiarly nationalistic;[48] often, aggressively so. The phenomenon of aggressive patent nationalism has been so pervasive that it is occasionally difficult, if not impossible, to define concretely the conditions for granting patents.[49] In other words, there are no absolute or uniform standards or criteria worldwide for the patentability of inventions. Even though textbooks and learned disquisitions on the criteria for patentability generally point out such standards as (a) novelty, (b) inventive step, (c) industrial applicability, *et cetera* as conditions precedent to the grant of patents, the reality is that there is little consensus across national systems on the appropriate content of a patent regime.

Neither the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), nor any other relevant international legal instrument, nor an international adjudicative panel or court has articulated a binding, authoritative or definitive interpretation of the key elements of a global patent system. The most recent international instrument that deals with patents, the WTO/TRIPS Agreement, is often seen as "a flexible document open to many interpretations."[50] In short, on a strict analysis, there is no "international law" on, or system of,

47. *See generally* GRAHAM DUTFIELD, CAN THE TRIPS AGREEMENT PROTECT BIOLOGICAL AND CULTURAL DIVERSITY? (1997).

48. Studies by various scholars and institutions have proved beyond a shadow of doubt that states, especially in the "developed North," Latin America, and Asia, usually prefer to have patent laws which serve their respective national agendas, particularly in terms of social, cultural, and economic priorities, and sovereignty. *See generally* INTELLECTUAL PROPERTY RIGHTS: GLOBAL CONSENSUS, GLOBAL CONFLICT?, *supra* note 12; JACK KLOPPENBURG, FIRST THE SEED: THE POLITICAL ECONOMY OF PLANT BIOTECHNOLOGY 1492-2000(1988). This phenomenon is deeply rooted in history. The early French and English patent systems were essentially regimes of privileges without any genuine pretensions to using originality or inventiveness as criteria for the grant of patents. Since the times of Edward the Third in England, letters patent were granted to foreign craftsmen to settle in England and transmit their skills to the native English apprentices. The prevailing motive in the various states of western Europe was to acquire a pre-eminent position in the sciences and technology, especially in textiles, mining, metallurgy, and ordnance.

49. For a concise but enlightening analysis of the evolution of the modern patent system, particularly from the British perspective, see BRAD SHERMAN & LIONEL BENTLY, THE MAKING OF MODERN INTELLECTUAL PROPERTY: THE BRITISH EXPERIENCE, 1760-1911 (1999).

50. CRUCIBLE GROUP, *supra* note 5, at 4.

patents. None of the key elements of patentability, especially the concepts of "novelty" and "invention," has any globally accepted definition.

In addition, a close scrutiny of the prescribed conditions for patentability shows that the interpretation of these concepts by various courts at the domestic level has been largely subjective. As John Golden and other scholars have noted, the expansion of the patent system has been largely a function of judicial activism.[51] The result is that judges of varying judicial temperament and philosophies have played key roles in the changes to patent regimes. As a notable British commentator observed, "readers of the Reports of Patent cases might well reach the conclusion that the state of the law in this field depends on how key words and concepts at any crucial moment strike the judge hearing a cause or fit the line of reasoning."[52] The inference, then, is that indigenous peoples and affected states may profit from this interpretative gap and protect their "informal knowledge" from misappropriation by promoting interpretations suitable to their aspirations. In this regard, a close scrutiny of the judicial explication of some of the key concepts of the patent system may be instructive.

1. Novelty

An invention is marked by three principal elements: novelty, inventive step and (particularly important in the United States) utility.[53] In theory, knowledge that is already in the public domain cannot be patented. The interesting issue here is that neither "knowledge" nor "publication" has a clear and global juridical meaning.[54] In other words, a well-known herbal remedy in, for example, Bolivia, may under certain circumstances pass for a novel invention in the United States. In resolving the conundrum of what constitutes publication for the purpose of granting patents, it is revealing that most national courts and law (especially in the western world) posit a bifurcated vision of what constitutes publication. That is to say, many national laws maintain the medieval distinction between inventions that have been "published" within the boundaries of the relevant state and

51. *See, e.g.*, Golden, *supra* note 18, at 122-26.

52. Richard Gardiner, *Language and the Law of Patents,* 47 CURRENT LEGAL PROBLEMS 255, 256 (1994).

53. For a description of these elements in the British patent system, see e.g., Alan W. White & J.C. Warden, *The British Approach to "Obviousness," in* ANNUAL OF INDUSTRIAL PROPERTY LAW 447 (John Warden ed., 1977).

54. For a critique of the law on printed publication as relating to patentability, see Gerald Rose, *Do You Have a "Printed Publication?" If Not, Do You Have Evidence of Prior "Knowledge or Use?",* 61 J. PAT. & TRADEMARK OFF. SOC'Y 643 (1979); Steven Rothschild & Thomas White, *Printed Publication: What Is It Now?,* 70 J.PAT. & TRADEMARK OFF. SOC'Y 42 (1988).

inventions or innovations that may be common knowledge elsewhere but have not yet been "published" in the state in question. Thus, it is prior use within the state in question and/or "printed publication" outside the realm of the state in question that suffices to bar patent grants. Indeed, the crucial element here is not necessarily the absence of a global standard of novelty but the narrow delimitation of "publication" to printed matter, thus excluding knowledge published by word of mouth. In effect, inventions and innovations orally described and/or in common use elsewhere but which have not been "printed" or "published"—in the Eurocentric conception of "printed publication"—fall within the purview of matters which may be granted patent protection. The existence of orally transmitted knowledge of the uses of a plant in, for example, Nigeria or India would not necessarily bar the relevant authorities in, for instance, the United States from issuing patents in America to an "invention" derived from such a plant.[55] This unhelpful and primitive distinction is probably traceable to the ancient case of the *Clothworkers of Ipswich*, where the court reasoned that:

> [I]f a man hath *brought in a new invention and a new trade within the kingdom*, in peril of his life, and consumption of his estate or stock, &c. or if a man hath made new discovery of any thing, in such cases the King . . . in recompense of his costs and travail, may grant by charter unto him, that he only shall use such a trade or trafique for a certain time, because at first the people of the kingdom are ignorant, and have not the knowledge or skill to use it. . . .[56]

In effect, there are parallel regimes on "publication" for the purposes of determining novelty. As the United States Supreme Court held in *Gayler* v. *Wilder*,

> [I]f the foreign invention had been printed or patented, it was already given to the world and open to the people of this country as well as of others, upon reasonable inquiry. They would therefore derive no advantages from the invention here. It would confer no benefit upon the community, and the inventor

55. *See* A. Samuel Oddi, *Beyond Obviousness: Invention Protection in the Twenty-first Century*, 38 AM. U. L. REV. 1097, 1120-27 (1989).

56. The Clothworkers of Ipswich Case, 78 Eng. Rep. 147, 148 (K.B. 1615) (emphasis added).

> therefore is not considered to be entitled to the reward. *But if the foreign discovery is not patented, nor described in any printed publication , it might be known and used in remote places for ages, and the people of this country be unable to profit by it. The means of obtaining knowledge would not be within their reach; and as far as their interest is concerned, it would be the same thing as if the improvement had never been discovered.*[57]

Section 102 of Code 35 of the United States provides that:

> a person shall be entitled to a patent unless
>
> (a) the invention was known or used by others in this country, patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent, or
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more that one year prior to the date of the application for patent in the United States, or. . . .[58]

For indigenous peoples and other societies who neither pursue patents nor "publish/print"[59] their ideas or inventions in "formal outlets of knowledge," one consequence of this regime is the unabated appropriation of indigenous foreign knowledge and disruption of traditional lifestyles.

However, it may be argued, under U.S. law, that 35 U.S.C. § 102(f) offers some protection. That paragraph provides: "A person shall be entitled to a patent unless he did not himself invent the subject matter sought to be patented." In other words, if somebody does not invent something himself, but instead learns

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57. Gayler v. Wilder, 51 U.S. 477, 497 (1850) (emphasis added); *see also Subject-Matter Imperialism?*, *supra* note 20.

58. 35 U.S.C. § 102 (a)-(b) (1994 & Supp. V 1999).

59. In fact, the courts in the United States have, on some occasions, gone to rather incredible lengths in construing this term. *See, e.g.*, Carter Prods. Inc. v. Colgate-Palmolive Co., 130 F. Supp.557, 565-66 (D.Md. 1955) (holding that a typewritten patent document from Argentina was not "printed" matter and therefore could not debar a patent application and grant in the United States).

of it from somebody else, he cannot receive a valid patent. Nevertheless, if someone independently (i.e., without learning about it from someone else) invents something, then he is entitled to a patent, even though it is known in foreign countries—provided it has not been published anywhere. In theory, this argument seems strong; but a careful examination of the patent policies of most powerful states clearly shows that section 102(f) and similar laws are easily circumvented by the liberality of modern patent regimes. As John Golden and other have pointed out, it has become apparent that "whether as a result of a pro-patent judiciary or as a consequence of the natural extension of prior legal doctrine, by the early 1990s patent law had resolved many fundamental issues in favor of biotechnology's patentability."[60] The short point here is that modern patent regime leans gently on the biotechnology and pharmaceutical industries and hard, in comparison, on the mechanical and heavy industries. This may also be borne out by the ease with which cosmetic changes in "inventions" relating to TKUP are routinely patented, rendering section 102(f) irrelevant.

Arguably, it is the economic interests of developed states that create and sustain this dubious but powerful distinction between printed or oral conceptions of publication for the purposes of determining novelty. Critics of the prevailing regime have thus argued that a patent holder must be the original inventor in relation to every part of the world. The anachronistic distinction between public use within the boundaries of a state—which is a bar to patentability—and public use elsewhere in relation to unprinted or unpatented publication—which is not necessarily a bar to patentability—is no longer defensible in a global village.[61] In sum, the prevailing international patent system lacks a legitimate and definitive claim to universal objectivity[62] in determining what "new" (as per article 27(3) of the CBD) means.[63]

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60. Golden, *supra* note 18, at 126; *see also* Michael Davis, *The Patenting of Products of Nature*, 21 RUTGERS COMPUTER & TECH. L.J. 293, 347 (1995) (discussing the liberal biotechnology patent policy of U.S. courts and arguing for a "narrow scope of protection on patent claims for products of nature").

61. *See generally* R.V. Anuradha, *In Search of Knowledge and Resources: Who Sows? Who Reaps?*, 6 REV. EUR. CMTY. & INT'L ENVTL. L. 263 (1997); Donald Chisum, *Foreign Activity: Its Effect on Patentability Under United States Patent Law*, 11 INT'L REV. INDUS. PROP. & COPYRIGHT L. 26 (1980).

62. *See* Technograph Printed Circuits Ltd. V. Mills & Rockley (Electronics) Ltd. [1969] R.P. C. 395; *see also* J. Dundas White, *The New "Investigation" for Patents*, 19 LAW Q. REV. 307 (1903).

63. For instance, Barbasco-Clibadium Sylvestre 4 is a well-known plant cultivated by Amazonian indigenous peoples for hundreds of years. Its properties have been known to the Amazonian natives for centuries. A barbasco compound, with no modification, let alone inventive steps, has been patented by Conrad Gorinsky. The compound is being marketed to pharmaceutical giants Zeneca and Glaxo. Patents such as this are legion. *See Urgent Action Appeal Patenting*, *supra* note 22.

Since indigenous knowledge "floats and flies" around the communities involved, it is often posited that such knowledge and practices are in the public domain and cannot be patented. This argument is fallacious and takes no account of similarities with laboratory operations in industrialized countries. The villages or local communities of the indigenous and local peoples engaged in innovations of biological diversity may be likened to a huge laboratory complex in a developed nation.[64] Information on innovations, valuable discoveries and applicable technology are generally discussed and passed around informally by people in both systems. As the Crucible Group[65] affirmed, "Farmers' fields and forests are laboratories. Farmers and healers are researchers. Every season is an experiment."[66] Similarly, in modern laboratories, information on innovations and valuable discoveries usually spend years or even decades in gestation or on the shelves before patents are sought for them.

Of course, no one has seriously suggested that because of the "common knowledge" of an invention among researchers in a laboratory the scientist should lose a right to a patent on such invention. By similar reasoning, in the absence of a previous patent on the invention or formal publication of such inventions, there is no legal reason barring indigenous peoples from obtaining a patent on such inventions and innovations, even if those innovations have been with them for a long time. By parity of reasoning, a particular plant or herbal remedy may be known to a group of farmers or herbalists without being known to other farmers or herbalists elsewhere.

Curiously, in the political economy of patents, it seems that indigenous peoples themselves have leaned too far towards a *strict and narrow* regime on publication, thereby devaluing their own innovations and leaving them open to appropriation.[67] With patent laws falling essentially within the domestic jurisdiction of individual nations, the TRIPS Agreement merely attempts to set a minimum standard. It failed to define or establish a global standard of novelty, inventive step, industrial applicability, enablement, and utility. These crucial

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64. *See* MACHLUP, *supra* note 8, at 78.

65. The Crucible Group is an association of scholars, academics, professionals, stakeholders, and others from both the private and public sectors across the globe with expertise and interest in the formulation of policies on conservation of, access to, and sharing of the benefits of biodiversity. CRUCIBLE GROUP, *supra* note 5, at vii-ix.

66. *Id.* at xviii.

67. This position may be inferred from the vocal and persistent argument by representatives of indigenous peoples that the modern patent system is inflexible and ill-suited for TKUP. *See, e.g.*, Bellagio Declaration (Aug. 24, 2001), http://www.cpc.unc.edu/nutrition_transition/declarations/Editedfinaldeclaration9-01.pdf; Declaration of Belém, *supra* note 40.

elements remain susceptible to domestic politics and interests. It is hardly deniable that states are at liberty to construe "publication" in a manner that is consistent with their aspirations and that serves the spirit and intention of the CBD.

2. Inventive Steps, Innovations, and Discoveries

Another requirement of patentability is the existence of an inventive step in the subject matter claimed. Given the general appellation of indigenous knowledge as "traditional knowledge," there is a pervading notion that it is, as such, incapable of being patented. This argument is misconceived. Indigenous knowledge is not frozen in time; rather, it is intrinsically "innovative." Enormous intellectual effort spanning centuries, if not millennia, continue to be improved upon and applied in modern times in the identification, nurturing, conserving and screening of crop and animal varieties.[68] By its very nature, "inventive step" is judged in the context of what is known by experts in the relevant field. If the invention is already obvious to the indigenous people, is it possible that the invention would nevertheless fail the non-obviousness requirement? But perhaps, indigenous knowledge could be considered innovative if it is known only to those within a certain cult or secret society.

Those with traditional knowledge often show "scientists" the "specific part of the plant containing the desired substance . . . the best means of preparing the substance for use, the optimal season to look for the substance, and the symptoms the substance will alleviate."[69] If indigenous knowledge is only a discovery, then given contemporary patenting of genes and other frontier activities in the biotechnology and pharmaceutical industries, one might argue that the distinction between discoveries and inventions has been eliminated, and therefore that there is no reason why indigenous peoples should not have the same rights to patents on purified natural substances as their western industrial counterparts.[70]

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68. On this basis, some states have adopted natural resource laws protecting particular crop varieties. The State of Queensland in Australia, for instance, "passed a law giving it intellectual property rights in genetic information embodied in the plants and animals found within Queensland." Jacoby & Weiss, *supra* note 26, at 99 n.110.

69. *Id.* at 85.

70. *See generally* CHARLES J. HAMSON, PATENT RIGHTS FOR SCIENTIFIC DISCOVERIES (1930); Lawson M. McKenzie, *Scientific Property*, 118 SCIENCE 767 (1953). Certainly, the contemporary patent system with serious inroads into patenting of genetic diversity, scientific facts, and principles cannot really lay any serious claims to any purported distinction between principles, discoveries, and inventions.

Moreover, the ultimate test of inventiveness is a judgment as to value—what German jurists have termed "Werturteil." Between the poles of the so-called "workshop improvement" and "invention" lies a measure of discretion by the patent office. As Justice Tomlin lamented in the *Samuel Parkes* case,

> [n]obody, however, has told me, and I do not suppose anybody ever will tell me, what is the precise characteristic or quality the presence of which distinguishes invention from a workshop improvement. Day is day, and night is night, but who shall tell where the day ends or night begins . . . it is, I think, practically impossible to say there is not that scintilla of invention necessary to support the patent.[71]

In other words, the test of inventiveness is subjective, since there is always a continuum between inventions and improvements[72] and a determination of which gradation in the continuum rises to the level of "inventive step" is a function of how that gradation impresses the examiner or the bench.[73] In the contemporary regime on patents, this value judgment, often reflecting the rising influence and power of certain industries at particular stages of a state's industrial progress or the development of its economic interests, has led to the current availability of patents on life forms, particularly plants and fragments of genes. A fortiori, innovative knowledge and improved genetic varieties may be patented, as they are legitimate inventions rather than discoveries.[74] Any argument to the contrary is disposed of by article 8(j) of the CBD and other international hard law that repeatedly acknowledges the "innovative" character of indigenous knowledge.

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71. Harold E. Potts, *The Definition of Invention in Patent Law*, 7 MOD. L. REV. 113, 114 (1944) (citing Samuel Parkes & Co. Ltd. v. Crocker Bros. Ltd., (1929) 46 R.P.C. 241, 248).

72. *Id.* at 114.

73. For an analysis of the problems posed by this phenomenon, see *id.*

74.

> [A] discoverer is one thing and an inventor is another. The discoverer is one who discloses something which exists in nature, for instance, coal fields, or a property of matter, or a natural principle: such discovery never was and never ought to be the subject of a patent . . . [however] much effort may have gone into the discovery of a principle...no one could be said to have invented these.

THOMAS WEBSTER, ON PROPERTY IN DESIGNS AND INVENTIONS IN THE ARTS AND MANUFACTURES 5-6 (London, Chapman & Hall 1853). Harsher excoriation of the notion of unpatentability of "principle" may be found in the scathing remarks of a commentator who lamented that it was a "witchcraft used by lawyers . . . in mingling three different meanings together and by the aid of certain professional solemnities, producing a mystical word, capable of harlequinizing an idea into many various forms." SHERMAN & BENTLY, *supra* note 49, at 45 n.5.

3. Industrial Applicability and Utility

The requirement that an invention must be capable of industrial application means simply that the invention must be capable of repetition; that is, it should not be a fluke.[75] The requirement of enablement under U.S. law is largely an expansion of the crucial requirement of specification in reasonable detail and writing of the invention in question. This requirement of a written description of the invention has often been described as the heart of the patent system.[76] Specification determines the scope of the patent grant and indeed informs the public of what exactly the patent holder has revealed to the public in exchange for the limited monopoly of commercial exploitation of the patented invention. As to utility, indigenous knowledge is literally the victim of its own success.[77] No less than three quarters of the plant-derived drugs now in use were discovered through research involving information from indigenous groups.[78] According to one commentator, "sales of prescriptions for plant-derived drugs in the United States alone reached an estimated $15.5 billion in 1990."[79]

4. Ownership: Parties to a Patent Grant

The communal/collective nature of the development and improvement of traditional biocultural knowledge has been cited in several fora as one reason why indigenous peoples may not patent their intellectual contributions to bio cultural diversity. In contrast, the individualism in western societies has been held up as the model of compatibility with the patent law system.[80] These are superficially valid observations, as traditional bio cultural knowledge is rarely the product of the "inventive genius" of an individual. However, appearances are deceptive.

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75. *See* Paul T. Clark, *Animal Invention Protection*, 16 AIPLA Q.J. 442, 445-50 (1988-89) (discussing the German "Red Dove" and Merat cases); *see also In re* Merat & Cochez, 519 F.2d 1390, 186 U.S.P.Q. (BNA) 471 (C.C.P.A. 1969).

76. *See generally* GEORGE F. TAKACH, PATENTS: A CANADIAN COMPENDIUM OF LAW AND PRACTICE (1993).

77. *See* Rural Advancement Found. Int'l, *supra* note 22. Without the information supplied by indigenous cultures and peoples to bioprospectors, finding medicinal cures from biocultural knowledge would be like finding the proverbial needle in a haystack. *See generally* Valentina Tejera, *Tripping over Property Rights: Is it Possible to Reconcile the Convention on Biological Diversity with Article 27 of the TRIPS Agreement*? 33 NEW ENG. L. REV. 967 (1999).

78. Curtis M. Horton, *Protecting Biodiversity and Cultural Diversity Under Intellectual Property Law: Toward a New International System*, 10 J. ENVTL. L. & LITIG. 1, 6-7 (1995).

79. *Id.* at 7.

80. Marci Hamilton, *The TRIPS Agreement: Imperialistic, Outdated, and Overprotective*, 29 VAND. J. TRANSNAT'L L. 613, 617 (1996).

Such arguments are anachronistic and display serious oversight and ignorance of the nature of contemporary processes of invention.

Simply put, the romantic tale of the patent system as a shield for the heroic, individual, impoverished "basement inventor" has been replaced by the contemporary reality of communities of scientists working away in huge laboratory complexes. Indeed, were Brunelleschi, Newton, and Edison alive today, they would probably be a few out of several thousand scientists working away in multinational or publicly-owned laboratories and bouncing ideas off one another. The inventive process and consequently, the relevant laws thereon, have changed significantly in order to accommodate the needs of an industrial age wherein employees of private corporations or public institutions constitute the largest bloc of applicants for patents. The juridical testament to this transformation may be found in the various principles of law governing ownership of inventions made by employees in the course of their employment.

Ironically, this "transformation" is in several respects identical to the inventive process in local bio cultural communities, where, consciously or otherwise, innovations take place among groups of farmers or breeders. Yet it has not been suggested that the inability to source to an individual scientist the particular "flash of genius" leading to an invention or innovation in a modern industrial complex should bar the relevant corporation from obtaining a patent on such an invention.

Most bio cultural communities function as, and are usually recognized as, legal persons for numerous purposes, including land ownership and succession to titles. The category of legal persons is never closed, but depends on the legal culture of a particular society and its aspirations and needs. Traditional peoples may and should define for themselves who has such rights of membership. Therefore, bio cultural communities cannot by their communality[81] be legally barred from pursuing patent applications. Indeed, all members of the community, and their heirs and successors,[82] may be parties to and beneficiaries of such communal patent grants.

81. *See generally* Ronald R. Garet, *Communality and Existence: The Rights of Groups*, 56 S. CAL. L. REV. 1001, 1001 (1983) (defining "communality" as a moral good that is the intrinsic value of groups compared to the intrinsic value of individuals and society).

82. *See* Lise Osterborg, *Patent Term à la Carte?*, 17 I.I.C. 60 (1986).

5. Specification

In principle, most patent laws require the applicant(s) to provide a full written description of the invention and how to carry it out. This may include any appropriate plans and drawings.[83] The specification must disclose the relevant invention in a manner sufficiently clear and complete for the invention to be put into effect by a person skilled in the art or field of knowledge to which the invention relates.[84] Thus, the value of a patent is entirely dependent on the manner in which the specification and claims are drawn. The scope of a patent grant is as narrow or as wide as the specification. Patent applications largely stand or fall on the basis of the specification; hence the notion that specifications constitute the heart of a patent grant. Indigenous knowledge is usually intimately connected with biological diversity. The very nature of life forms makes it practically impossible fully to describe necessary details to enable the invention to be successfully repeated.[85] It is for this reason that some jurisdictions have sought to address the issue by requiring deposits of organisms. Be that as it may, this option hardly achieves the *raison d'être* of specification, which is easy public access to the information about the invention for which patent protection has been extended. While copies of drawings or photographs thereof can be easily obtained by interested researchers and other stakeholders, a biological specimen deposited with the patent examiner may not be easily copied or accessed by the public.

Hence, a patent would in principle be incompatible with indigenous knowledge: a model developed for steam engines, electric, bulbs and the like may not serve the requirements of plants. Thousands of patents are being granted on life forms and fragments of life forms. There is no reason why local communities should not join the party—not to further the expansion of the patent system, but to exploit that system in "fencing out" future misappropriation.[86] On the other hand, there is a need to raise the standards of patentability in matters relating to life forms and TKUP. Innovations and inventions which constitute mere cosmetic rearrangement of molecules should not be granted patent

83. The requirement of specification is an English idea originating in 1711. However, it did not become customary until 1734. *See* D. Seaborne Davies, *The Early History of the Patent Specification* 50 L. Q. REV. 86, 87-95 (1934).

84. Pioneer Hi-Bred Ltd. v. Commissioner of Patents (1989) 25 C.P.R. (3d) 257, 260.

85. *See* Geertrui Van Overwalle, *Patent Protection for Plants: A Comparison of American and European Approaches*, 39 IDEA 143, 156-59 (1999).

86. *See generally* Mataatua Declaration, *supra* note 22; Declaration of Belém, *supra* note 40.

protection. The test of utility should be brought to bear on such inventions. Not only should the "pith and marrow" of the invention be reflected in the specification, but other important aspects including landraces,[87] intangible components,[88] derivatives,[89] and synthesized products[90] should be skillfully incorporated into the specification. Regarding the duration of the proposed communal patent, the TRIPS minimum of twenty years should be extended. Given that some of the bio diversity in question is considered sacred and that the rights are communal, the duration of the communal patent should reflect such values.

In cases where the ethical sensibilities of the indigenous peoples prevent the "commodification" of the plant, animal or idea in question, the patent need not be exploited and may be renewed in such a manner as to take care of such concerns. While this scheme may promote the practice of "sitting" on patents, that is a small price to pay. This renewal scheme would basically serve as a shield against unwanted appropriation and exploitation. However, in the event that the community became interested in working the patent or otherwise reaping its economic benefits, it could then negotiate on agreeable terms.

CONCLUSION

The race for patents on biodiversity and bio cultural knowledge is a contemporary "gold rush," with devastating consequences for the ecosystem and local bio cultural communities. The alignment of global forces does not allow for

87. This refers to actively cultivated crop varieties that have been developed in traditional agricultural systems through both natural and human selection. *See Plants, Poverty, and Pharmacuetical Patents, supra* note 20, at 229 n.37.

88. "'Intangible component' means any knowledge, innovation or individual or collective practice of actual or potential value associated with the genetic resource, its derivatives or the biological resource containing them, whether or not it is protected by intellectual property systems." *Andean Pact, supra* note 30, tit. I, art. I.

89. "Derivative" refers to a "molecule or combination or mixture of natural molecules, including raw extracts of living or dead organisms of biological origin, derived from the metabolism of living organisms." *Id.* at tit.1, art 1. Pharmaceutical companies have already evaded this hurdle by making cases of a purported semi-synthetic invention of the natural substance. This is possible because under most European and U.S. laws, "natural products" may be patented if they were previously unknown in their purified form. In addition to high purity, the substance must demonstrate unexpected properties. These hurdles are easily circumvented by slightly changing the chemical structure of the chemical so that it essentially duplicates the beneficial effects of the original. *See In re* Merz, 97 F.2d 599, 601 (C.C.P.A. 1938); Parke-Davis & Co. v. H.K.Mulford & Co., 1989 F. 95, 103 (C.C.S.D.N.Y. 1911).

90. This means substances obtained by means of an artificial process, using genetic information or other biological molecules. This includes semi-processed extracts and substances obtained through treatment of a derivative using an artificial process known as hemisynthesis.

a decrease in the scope of the patent system. Nor are justified outrage and indignation against the excesses of the patent system likely to yield more than marginal moral victories. The more effective approach may be to undermine the ethos of the contemporary patent systems by operating from within the international patent system itself.

This objective is achievable if the patent system is applied creatively to address the needs of peoples genuinely committed to the sustenance and conservation of biological diversity for the benefit of the entire world.[91] Communal patents give scope for blocking the issuance of future patents on biological diversity and also afford weak local communities a stronger basis for the negotiation of terms for access and benefit sharing. Providers of bio cultural knowledge deserve to have the right to determine when, where, and how their bio cultural knowledge is used.[92]

A five-pronged strategy may be used to achieve this goal. First, a registry of uses should be created, detailing indigenous knowledge practices, innovations, and bio cultural knowledge. Second, this registry should provide the basis for the issuance of community patents under CIPR legislation. Community patents may be issued without examinations. Competing claims may be resolved by local and inexpensive arbitration. Third, a public officer with the status of a public defender of Community patents should be created with competence to track down, on a global scale, cases of appropriation of indigenous knowledge and to make necessary international representations. Fourth, the Public Defender of Community Patents should establish a Gene Tracking Database for rare genes occurring within the boundaries of the biological diversity in the local communities. Fifth, the concept of environmental self-determination should be revisited. As Richard Falk has rightly pointed out, indigenous peoples often constitute "'captive nations' caught within the confines of . . . juristic entities often established and maintained by coercion, not consent. . . ."[93] Multicultural states should seriously consider maintaining a plurality of regimes on ownership and protection of bio cultural knowledge. The time to act is now.

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91. *See generally* Ritchie, *supra* note 20.

92. *Consultation on Indigenous Peoples' Knowledge and Intellectual Property and Intellectual Property Rights,* U.N. Development Program, Final Statement, Apr. 1995, at pmbl., http://www.undp.org.fj/library/indigenous%5Fpeople.htm.

93. Richard Falk, *The Rights of Peoples (in Particular Indigenous Peoples), in* THE RIGHTS OF PEOPLES 17,23 (James Crawford ed., 1988).