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SUBJECT-MATTER IMPERIALISM? BIODIVERSITY, FOREIGN PRIOR ART AND THE NEEM PATENT CONTROVERSY

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Under section 102 of the United States Patent Act prior knowledge, use or invention in this country can be used as evidence to invalidate a U.S. patent for a lack of novelty. However, almost all similar foreign activity can not be used against a U.S. patent. A U.S. patent issued to an American company on a method for improving neem oil extract is an example of this distinction in section 102. Neem oil has been used in India for ages. But under the patent laws of the United States, what is obvious in India might not qualify as obvious for purposes of obtaining an United States patent.

This article recommends that the foreign-activity prior art distinctions in section 102 should be eliminated. First, this article discusses the neem patent controversy. Then, the application of knowledge, use and invention in this country as prior art is explained. Next, the exclusion from prior art of foreign knowledge, use or invention is analyzed. Then the inadequacy of foreign patents and printed publications as prior art in biodiversity inventions is discussed. Finally, the article presents several criticisms of the foreign-activity distinctions under section 102.

I. The Neem Patent Controversy

Its biological name is Azadirachta indica, n1 but the neem tree is known in Sanskrit as "sarva-roga nivarini" or "curer of all ailments," n2

[*372] and more recently in English as the wonder tree. n3 Prolific even by the standard of the most famous biodiversity sources, the neem tree and its seed-oil give forth chemicals with an almost ridiculous n4 variety of pesticidal, n5 agricultural, n6 medicinal, n7 contraceptive, n8 cosmetic n9 and dental n10

[*373] applications. Neem has been used in India n11 for ages and studied there for many years, n12 but despite this no patents have ever issued in India on products or processes related to neem, n13 for the simple reason that agricultural and pharmaceutical inventions are specifically excluded from patentability under the laws of most developing nations, India included. n14

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GATT will soon change this. The TRIPS (Trade Related Aspects of Intellectual Property Rights) provisions of GATT prohibit discrimination as to patentable subject matter. n15 However, the change may come too late for Indian companies. The exclusion from patentability under India's patent laws did not stop an American company, W.R. Grace, from recently patenting a method of improving neem oil extract here in the United States. n16 The patent claims a rather simple-sounding innovation (as is typical of most patents): n17 namely, extracting the neem oil, a natural pesticide in itself, from crushed seeds into a solvent which is "aprotic" n18 (as opposed to water, the traditional solvent used). This

[*375] innovation extends the shelf-life of the rapidly-decaying active ingredient of neem oil, azadirachtin, n19 from a few days to up to two years. n20

The controversy surrounds the fact that the improvement is so simple that many in India and elsewhere claim that it is at best obvious, n21 and at worst not new at all. n22 Similar neem preservation techniques, they say, have been known in India for many years. This fact led Vandana Shiva, one of many activists opposing Grace's patent in the U.S. Patent and Trademark Office (PTO) n23 and in the European Patent Office (EPO), n24 to claim that its "novelty exists mainly in the context of the ignorance of the West," n25 and George Fernandes, a prominent Indian MP, to sneer "[p]atenting neem is like patenting cow dung." n26 But under the

[*376] patent laws of the United States, what may be obvious in India n27 may not be obvious for purposes of obtaining a United States patent. Under section 102 of the U.S. Patent Act, only very specific and limited types of prior foreign activity can be used to invalidate a U.S. patent. Thus, while almost all domestic prior knowledge, use or invention is considered against a later United States patent, almost all similar foreign activity is not. Therein lies the technical problem n28 behind the inflammatory hypothesis of this article's title.

The impact of a U.S. patent such as W.R. Grace's does not just have territorial implications, n29 especially lying as it does in the context of world trade. Only 3 percent of the Indian neem seed harvest is purchased by Grace now, n30 but Grace's share eventually could be much greater,

[*377] driving up seed prices everywhere. n31 Yet Grace's patent may deny indigenous Indian companies access to the U.S. market, which may be the largest and most lucrative one n32 given the environmental cache of neem n33

[*378] as an "all natural" n34 and "biodegradable" n35 pesticide. Ultimately, Grace's control over the largest market for the final neem product may allow it to create a monopsony in the cash-crop market for the raw material n36 - all while bidding seed prices out of the reach of neem's less sophisticated consumers.

Perhaps more significantly, the whole debate lends insecurity to the progress of intellectual property protection and national treatment thereunder in India, a large price to pay for lacunae in our patent law's recognition of foreign activity. This article suggests that, whatever arguments were behind the introduction of these mixed standards, they are not now advancing the goals of our domestic patent system and are indeed advancing the cause of the opponents of the international patent system.

II. 35 U.S.C. 102: An Academic Cottage Industry

102. Conditions for Patentability; Novelty and Loss of Right to Patent

A person shall be entitled to a patent unless -

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for 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 than one year prior to the date of the application for patent in the United States, or

. . . .

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. n37

Section 102 of the U.S. Patent Act does not state a general definition of "prior art" n38 such as "all information available to people in the United States who are skilled in the specific subject matter." n39 Instead, section 102 provides a rather arcane, rule-bound n40 method for determining

[*380] which materials will automatically defeat (anticipate) a patent application describing an identical invention or, more subjectively, render "obvious" an application that claims only a small advance over this prior art. n41 Prior foreign activity anticipates a U.S. patent only when the foreign activity is fixed in a tangible, accessible form such as by a description in a printed publication, or in a document related to either the applicant's own foreign patent (after allowing a one year grace period), or some other person's foreign patent. However, prior foreign knowledge, use and invention are all excluded from the prior art related to a U.S. patent application. n42 Criticizing the foreign activity distinction requires that this article first analyze how prior domestic knowledge, use and invention can invalidate a patent.

A. Domestic Knowledge

Under section 102 of the U.S. Patent Act, knowledge of an invention or use of it by anyone other than the applicant anticipates her application as long as the knowledge or use is in this country. According to U.S. courts, this section of the Patent Act has never quite said all that it means. n43 "Knowledge" does not mean that someone else understood generally in their head how to make or use the invention. Instead, prior

[*381] knowledge of the invention requires some form of "reduction to practice," n44 and availability to the public. "Private or secret knowledge will not anticipate" a later applicant's invention. n45 Older cases required that to be "known," an invention must also be actually reduced to practice. However, this reading makes section 102 redundant by combining "knowledge" and "use." n46 This reading of section 102 was rejected in a decision allowing for mere constructive reduction to practice n47 (i.e. with a written n48 enabling disclosure, or with an inoperative model that would have worked had the maker been up to the level of average skill in the art n49).

B. Domestic Use

For prior use to anticipate a patent application, a prior user must have a physical embodiment of the invention, n50 use the embodiment as

[*382] the applicant intends, n51 and not conceal the use. n52 The concealment requirement is often expressed as a "publicity Requirement"

[*383] similar to that for prior knowledge described above: the use, like the knowledge, must be "accessible to the public." n53 However, as Chisum points out, this frequently-recited phrase "cannot be taken at face value." n54 Gayler v. Wilder, n55 the Supreme Court case so frequently cited as the origin of the requirement, n56 actually stressed that the prior user's failure "to bring [his device] into public use" would not negate anticipation. n57 One might also question whether it is possible to form a coherent, logical interpretation of the statutory language of section 102(a) given such a publicity requirement. Depending on one's loyalties in the constructive-versus-actual reduction to practice debate, n58 such a blanket "publicity requirement" over all of 102(a) either makes section 102(a) redundant, failing "to distinguish prior use from prior knowledge" n59 (where one believes that both use and knowledge require actual reduction), or makes the parallelism with the knowledge publicity requirement false (where one believes knowledge has a weaker, constructive standard for reduction to practice, which could justify a greater publicity requirement on evidentiary grounds). n60

Chisum concludes that "at most" this requirement of public access to the use seeks the "absence of affirmative steps to conceal." n61 Usually this means deliberate attempts to hide the use from public sight, instructions to employees to keep the invention secret, and so forth. n62 Even given active measures by the prior user to ensure secrecy, some courts have held that the prior use anticipates anyway. n63 Chisum argues that such a "concealment exception" should be limited to a deliberate and totally successful decision to practice the invention secretly. n64 In any event, any of these concealment standards allow 102(b) to be distinguished, for there the rationale for actual public access to the "public use" is to "alert the inventor with priority . . . of the need to file an application" n65 before the end of the one-year grace period.

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C. Domestic Invention

Prior "invention" by others is relatively straightforward. n66 Even secret prior invention can invalidate a later patent applicant as long as the secrecy was not due to active n67 suppression, concealment, or abandonment, in their technical senses. n68 Note that a prior use which fails the "publicity requirement" will ordinarily still be an anticipating prior invention. n69

In summary, under section 102 a patent application is anticipated when there is evidence of prior knowledge sufficient to teach the invention (constructive reduction to practice), or there is prior use or invention not specially hidden from the public. From this analysis it seems safe to conclude that casual, private knowledge, use or invention of W.R. Grace's neem stabilization techniques by Indian corporations or "scientific agriculturalists" would void Grace's patent, but for the historical oddity of section 102's blanket exclusion of such foreign activity from consideration as prior art.

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III. Towards A Parochial Prior Art: The History Of The Foreign Activity Exclusions

The 1790 and 1793 Patent Acts forbade patents on any inventions "before known or used." n70 No geographic qualification was included. n71 We may speculate that the reasons for this global scope for anticipating prior art had to do with resentment over the earliest English crown-granted monopolies and their association with the subsequent grants for importation of inventions found overseas, since the provision remained unchanged in the 1793 Act which added the restriction that only U.S. citizens could apply for U.S. patents. n72 This xenophobic requirement was abandoned in the next major modification of the patent laws, the Patent Act of 1836, n73 which added the requirement that prior knowledge, use or invention by others be "in this country," n74 with the qualification that the applicant "believe himself to be the first inventor," and not merely an importer. n75

This exclusion from prior art of foreign knowledge, use, or invention by others survives to this day, n76 despite the fact that the rationale

[*386] behind it was not voiced "in the report accompanying the 1836 Act or in the subsequent codifications," n77 leaving us to speculate today in hindsight. The change may have been in response to a contemporaneous Supreme Court decision "invalidat[ing] a patent because of use of the invention in England and France with the inventor's consent prior to his filing an application in the United States." n78 At a time when transatlantic crossings were measured in weeks, n79 the "supposed evidentiary problems in proving foreign uses were undoubtedly influential." n80 Also, fostering disclosure of inventions (which might otherwise be held secret) to the American public was, at the time, thought to be the greatest justification for the existence of the patent system. n81 Chisum notes the incongruity of this principle in practice in the 1836 Act: "the exclusion of unpublished foreign uses was based on a convenient presumption of inaccessibility just as the inclusion of published foreign sources was based on a convenient presumption of accessibility." n82

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IV. Biodiversity And Anecdotal Prior Art

Foreign patents, along with foreign printed publications, were considered anticipating under the 1836 Act and are so today. n83 But this provides scant help for a litigant attempting to defeat a patent like the one on neem described in section I of this article. Biodiversity often leaves little in the way of a patent record because it tends to occur in countries where its products, or improvements thereon, are unpatentable. Biodiversity usually flourishes in tropical regions n84 and most of the nations in the tropics are underdeveloped. n85 However, patent statutes in

[*388] underdeveloped nations typically have not allowed health or agricultural patents. n86 To do so would effectively raise prices to farmers or pharmaceutical consumers and thus has generally been considered too politically risky, n87 and though historically such provisions are not related to the functionally-similar Japanese and German postwar patent statutes embodying a chemical industry protectionism, n88 in hindsight that would appear to be a reasonable interpretation of India with its thriving pharmaceutical industry. n89 Moreover, biodiversity products tend to be health or agriculture related, since being biologically-derived, they typically are biologically- active. n90 Pharmaceuticals, pesticides and agricultural breeding are mainstay fields of biodiversity-driven innovation and all are unpatentable in India.

In the absence of a system of patent coverage for biodiversity improvements, one might imagine that secrecy would be used to protect any innovations. While it is of course impossible to prove, this is certainly consistent with the paucity of printed matter discussing biodiversity-related invention. In the United States trade secrecy has always been seen as the sole alternative to patenting for businesses investing in innovation. However, trade secrets risk a subsequent independent inventor patenting the same invention, in which case the

[*389] first innovator could be precluded from use. n91 Since this cannot happen in India, secrecy may be an even better strategy there. For these reasons alone, we might expect Indian corporate science to turn out far less of a paper trail than its American equivalent. n92

Another contributing factor is that biodiversity and agricultural inventions, and much innovation not confined to a laboratory, generally tend to be communicated, recorded and passed down by word of mouth. Certainly traditional plant breeders have done so for centuries; similar oral transmission is likely to prevail amongst farmers working within an extensive agricultural system, where what competition there is, is over arable land, not technology. It has been suggested that such a cooperative n93 and incremental inventive culture does not make a snug fit with the utility patent system and its paradigm of large inventive leaps by individual inventors. Instead it is more appropriate to a system allowing for petty patents, which are suited to such lesser inventive leaps. n94

[*390] Furthermore, economic conditions in the third world disfavor "printed" communication; widely disseminated written communications are often in ephemeral form, sometimes even failing to qualify as "printed" under section 102, as in the well-known case of a typewritten Argentine patent held not to constitute prior art. n95

Section 102 thus reduces much documentation to the status of anecdotal prior art, useful only as evidence of some category of "authentic" prior art which it does recognize. Oral testimony of prior knowledge, use or invention already had such anecdotal status. n96 In the remaining non-patent

[*391] anticipatory foreign prior art under section 102, there is a severe evidentiary prejudice in favor of written sources. However, it should be noted that in the statute's words such prior art should be "described in a printed publication." These words date all the way back to the 1836 Act, n97 but subsequent case law has demonstrated that they do not found a lapidary standard. n98 In the days when the only alternative to printing was a quill pen, n99 anything printed was capable of being "multiplied indefinitely," n100 and of clearly constituting prior art on a general standard: relevant information a potential inventor should be able to search out and find. As the ability to reproduce writing became more and more commonplace, the statute remained unchanged through the 1952 Act, and the courts were forced to reconsider the words "printed" and "publication" as halves of a two-tiered standard.

"Printed," clearly the more meaningless of the two terms, was greatly broadened to include any mode of copying one would ordinarily use to make enough copies to distribute widely ("publish"). n101 Although single copies of a typewritten thesis indexed in a college library have been held "printed" and "published," n102 the modern standard would probably reject typescripts generally. n103 "Publication" under the older two-tiered standard had to incorporate a greater variety of documents: corporate communications, manufacturer's sales literature, classified documents, etc. n104 Not surprisingly, this has forced a more coherent standard. As long as there is "accessibility to at least the pertinent part of the

[*392] public," n105 namely "persons interested and ordinarily skilled" n106 in the field of art, a work is sufficiently disseminated to qualify as published.

This aspect of the two-tiered test has evolved into the more modern "unitary" test for "printed publication," n107 which relies on accessibility and dissemination to determine whether a document has entered the prior art. The difficult question of what is "printed" is not gone completely, however. To be accessible, the reference in question must meet a test analogous to the copyright standard "fixed in a tangible medium of expression," n108 but with cases making reference to "recording" in "material" form. n109 This appears to place oral and other evanescent sources clearly outside the prior art, confined as now to being evidence of knowledge, use and invention. Along such lines, Gerald Rose suggests an even more unitary test: n110 the items detailed in section 102 are not "prior art" but mere "evidence of prior art." Rose states "Much confused thinking could be avoided by realizing that rejections are based on statutory provisions, not on references, and that the references merely supply the evidence of lack of novelty, obviousness . . . or whatever may be the ground of rejection." n111 But novelty and obviousness are still judged

[*393] in terms of evidence of domestic knowledge, use, or invention - the only such evidence that is admissible in light of what becomes the iron-clad evidentiary rule of section 102. This explains why typewritten and openly accessible patent applications in foreign countries, n112 and even issued German Gebrauchsmustern, n113 are not considered "printed publications" - a situation which Rose finds a mystery, n114 but his own test, modified to incorporate 102's foreign activity exclusions, would reach the same result making it starkly clear that the real "statutory bar" of section 102 is not to patents on anticipated inventions but rather to the consideration of foreign activity.

Outside of finding printed articles on the topic in "accessible" scientific journals, it appears that the only way to introduce Indian prior knowledge, use or invention into a dispute styled on the neem opposition petition would be if a party in India had printed and widely disseminated a description of the invention. This is the sort of act economists claim never happens, n115 resulting in a bleak situation for activists opposing such patents without the support of the scientific literature. n116 Beyond this, other evidence of prior foreign knowledge, use or invention carries almost no evidentiary weight in the United States. n117

It should also be noted that another possible evidentiary strategy for introducing foreign prior art against a domestic patent turns on the 1836 Act's distinction between discovery and importation. If it can be proven that the applicant for a U.S. patent merely imported an invention discovered overseas, he cannot obtain a patent; the rationale being that only independent invention should be rewarded. Perhaps the drafters were motivated by the thought that protection should be reserved to

[*394] reward the spark of creative genius, n118 or perhaps by importation's association with the monopolistic early history of English crown patents. n119 The requirement of originality now survives in various sections of the modern statute. n120 Certainly one could envision introduction of foreign use and knowledge as part of an attempt to prove the applicant discovered n121 the invention overseas and merely imported it.

[*395] But obviously a very specific course of conduct is imputed to the applicant, one proposing the blatant, literal theft that would be a challenge to prove and that in truth may not underlie most biodiversity disputes. n122

V. Some Non-Novel Criticisms Of Foreign-Activity Distinctions

The President's Commission on the Patent System's 1966 Report to the U.S. Congress recommended that section 102's geographical distinction be abolished, n123 so that

> Foreign knowledge, use and sale would be included as prior art. Present arbitrary geographical distinctions would be eliminated. The same high standard of proof now required for showing domestic public knowledge, use or sale would also be applied to such foreign prior art.

The anomaly of excluding, from prior art, public knowledge, use or sale in a border town of Mexico or Canada, and including the same kind of disclosure in Alaska or Hawaii, would be eliminated.

This change would prevent the granting of valid U.S. patents on inventions which would be unpatentable abroad, because of long use or sale there. It would be another step towards conformity with European patent laws and would promote acceptance of a common definition of universal prior art. Additionally, it would promote the establishment of international scientific data banks, thus eliminating one of the barriers to the useful exchange of search results among patent offices of various countries. n124

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Chisum agrees, stating that all the current foreign activity restrictions are unreasonable. Removing them would speed convergence with other nation's domestic patent laws, an important goal in light of subsequent international harmonization agreements (e.g. the Patent Cooperation Treaty and GATT's TRIPS provisions), n125 and encourage international comity in matters relating to the patent system (e.g. provisions for collection of evidence), goals that are already aspired to in the universal definitions of prior art given in the Strasbourg Convention on patent harmonization and the European Patent Convention. n126

Chisum believes ending the prior art distinctions in particular would promote efficiency by "encourag[ing] broad and thorough searches of all secondary sources prior to engaging in primary innovative work, which is generally more costly." n127 In light of recent biodiversity disputes and the political outcry they have produced, we can add that eliminating

[*397] the border distinctions would encourage acceptance of strong patent systems by underdeveloped nations as a whole n128 and not just by their private-sector inventors, who may only care about their ability to get a patent in the United States; the sovereign's attitude is more relevant to the key issue of overseas enforcement.

We can dismiss outright the nineteenth-century fears, cited frequently in the years since, that such a broad definition of prior art will mean that many foreign inventions will never reach the U.S., n129 now the world's largest consumer market. In a worldwide free trade system, open ports assure that products will benefit U.S. consumers even without "introduction" of the manufacturing processes. In fact, today the majority of United States patents are issued to foreign inventors; accused American infringers of these United States patents, unable to cite to many types of foreign prior activity, ironically have less prior art to defend themselves with.

Finally, and perhaps most importantly, access to foreign prior art is now much easier than it was at the time of the 1836 Act, given increased international communication, transportation, trade, and judicial comity. As Chisum points out, recent cases dealing with multinational collective research point out the "artificiality" of other border-drawing distinctions in patent law. n130 And regarding the supposed evidentiary problems raised by legal cognizance of foreign activity, the Federal Rules of Civil Procedure, n131 as well as the PTO's own regulations, n132 allow for the taking of foreign testimony. Additionally, the 1993 Amendments to the Federal Rules have added an open-ended provision to the text which

[*398] obviously anticipates further facilitating treaties for transnational evidence gathering. n133

Most of this theoretical reasoning seems to have been tacitly acknowledged in recent legislation modifying one of the more notorious examples of differential treatment of foreign and domestic activity in U.S. patent law, the total ban on using foreign activity to prove inventive priority previously embodied in 1946 Act's section 104. This section traces its history to the short-lived rule of Electric Storage Battery v. Shimadzu. n134 At the time of the case, one could establish a date of invention for priority purposes based on foreign activity. However, one could not then, nor now, use foreign activity to defeat a claim of novelty, under the same prior-art sections now in 35 U.S.C.

102, described above.

Shimadzu had reduced his invention to practice in Japan in 1919, Electric Storage Battery independently invented it in the U.S. in 1921, and Shimadzu filed his first patent application in 1922. n135 The court held that Shimadzu could establish invention as of 1919 by reference to his reduction to practice in Japan, thus Electric Storage's subsequent independent invention would not be anticipating prior art. Of course, if Electric Storage had applied for a patent first, they would have had priority and would have received the U.S. patent instead of Shimadzu; this would have been an absurd result n136 in a putatively "first-to-invent" country such as the United States then was. n137

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Congress responded by enacting what is now 35 U.S.C.

104, n138 which created a total ban on establishing "a date of invention by reference to knowledge or use thereof, or other activity with respect thereto, in a foreign country." n139 Subsequent modifications were made in response to the 1970 Patent Cooperation Treaty (PCT). n140 Under Patent Act sections 119 and 365, one can establish priority by reference to foreign filing in a PCT country. The rule of section 104 has now been similarly modified to take account of NAFTA n141 and GATT n142 membership. The new section 104(a)-(b) recognizes any filing in a NAFTA or WTO country for priority purposes. n143 Evidence of unpublished foreign

[*400] knowledge or use may be introduced under 104 to challenge priority n144 - in stark contrast to the inability to introduce such evidence to defeat novelty under 102. While conditions are attached to the acceptance of such evidence, n145 the very fact that it is considered on any terms contradicts many of the policy rationales against recognition of foreign activity under section 102. However, if one assumes that all such legislation has its origins in necessity, n146 it should be noted that the section 104 change is perhaps more necessary under our TRIPS obligations; the new section 104 firmly establishes "national treatment" for the purposes of allowing foreigners to obtain U.S. patents n147 - always the most politically-sensitive aspect of international patent cooperation - whereas changing section 102 to recognize foreign anticipatory activity would simply prevent inventors (on U.S. soil) from obtaining U.S.

[*401] patents, an issue whose facial implications for world trade n148 are harder to see. Nonetheless they exist. And the real danger here to American interests is that they will be recognized in an irrational way.

VI. Conclusion: Colonizing The Unpatentable In The Third World?

At present, it is safe to speak of neem paranoia in India. n149 The current dispute is not without antecedents, n150 given the recent insurrection

[*402] directed against the American agricultural patentholder Cargill, n151 and even the recent Enron affair. n152 Traditionally, Indians have approached trade issues with an obsessive focus on decapitalization, whether actual or more theoretical, n153 perhaps out of a fixation on the not-so-ancient mercantilism of the colonial powers. n154 The related notion of underdevelopment, describing a post-colonial nation's inability to begin the process of large-scale capital accumulation due to a vicious cycle of population growth, huge subsistence consumption and low worker productivity, has always informed Indian government policy. This is exemplified today with the country's recent focus on directly creating an influx of capital by liberalizing foreign direct investment rules, while neglecting the domestic market liberalization that would encourage spontaneous capital accumulation and inflow. Effective intellectual property protection certainly falls into the latter category, and would help India increase the productivity of its numerically huge, highly-educated and grossly underemployed middle classes.

Eliminating the foreign-activity prior art distinctions could thus potentially enhance markets for American copyrighted goods, for American overseas investment, and help eliminate patent infringement havens currently producing patented goods for export to other third-world markets. While a certain degree of reverence for provisions that

[*403] have escaped revision since 1836 may be in order, there is no time like the present to change them. For this decade, with its halting progress towards either a universal free trade system or one consisting of multiple geographic zones, also has marked a watershed in the fight to create a world intellectual property system that consists of more than the mere convergence of national laws and national treatment standards. And despite much technical progress towards that goal, we still lie at the beginning of the debate in the underdeveloped world about whether to accept it. n155

n1 Paul Hoversten, Legal Battle Takes Root Over 'Miracle Tree', USA Today, Oct. 18, 1995 at 8A.

n2 Michael D. Lemonick et al., Seeds of Conflict: Critics Say a U.S. Company's Patent on a Pesticide from an Indian Tree is "Genetic Colonialism", Time, Sept. 25, 1995, at 50; Sir Monier Monier- Williams, A Sanskrit-English Dictionary 1211, 888, 559 (1970) (1899). Neem is also known as "arishtha," "proof against [disease]," in Sanskrit, id. at 88, and, for those desiring cross-cultural confirmation, as "mwarubaini," "forty cures," in Kiswahili. Tom Pawlick, People as Pests, 1(2) Agroforestry Today 2-5 (1989).

n3 Lindsay Bond Totten, Neem It; Natural Insecticide Making Waves, News, Star-Tribune, Apr. 3, 1995, at 10 (describing reaction to neem and its products in the gardening literature as approaching "tabloid horticulture" hype).

n4 While some of these claims, particularly the medical ones, may turn out to be false, the 1952 discovery of the pioneering psychoactive drug reserpine in the winding, snakelike root of Rawulfia serpentina is an instructive counterexample to the skeptical: This root, which had been in use in folkloric medicine in the foothills of the Himalayas, was prescribed for . . . ills ranging from snakebite through insomnia to insanity. Such diverse claims for natural product mixtures frequently turn out to be groundless when examined by the procedures of modern pharmacology. However, a sufficient number of these have provided leads for new drugs; therefore they cannot be lightly dismissed . . . . It is of note that the two drugs [reserpine and chlorpromazine] ushered in the new era of psychopharmacology. Daniel Lednicer & Lester A. Mitscher, The Organic Chemistry of Drug Synthesis 319 (1977). For a summary of the general effects of Neem and its economic potential, see National Research Council & Research Foundation for Science, Technology and Natural Resource Policy (India), Neem: A Tree for Solving Global Problems (National Academy Press 1992) [hereinafter Neem].

n5 Neem's pesticidal activity is broad yet selective, which has accounted for its amazing popularity with horticulturists: it is effective as a repellent or growth or reproductive inhibitor against almost 200 species from aphids to locusts, Totten, supra note ; Neem, supra note , at 39-50, but is harmless to beneficial predatory insects (such as spiders or ladybugs), bees (which provide essential cross-pollenization for many crops) and birds. Jeff Zimmer, Neem Tree Grows on West, Herald-Sun (Durham, N.C.), Nov. 5, 1995, at G1; Telephone Interview with Chuck Suits, W.R. Grace Spokesperson (Nov. 28, 1995) [hereinafter Suits Interview]; and see generally Neem, supra note 4, at 58-59.

n6 Agricultural uses, in addition to the pesticidal properties, are as an antifungal and antimildew agent. U.S. Patent Storm Warning in India, Marketletter (May 29, 1995)

(antifungal being marketed by W.R. Grace); Neem, supra note , at 53-54 (effective against fungal production of aflatoxin, one of the most deadly carcinogens known); Margaret C. Crooks, Inspection Time, Asbury Park Press, Sept. 21, 1995, at E7 (effective against mildew in gardens).

n7 Among the diseases against which neem products are claimed to have an effect are leprosy, diabetes, ulcers, constipation, Hoversten, supra note , chicken pox, Richard Saltus, U.S. Firm Is Accused of "Usurping" Patent, Boston Globe, Sept. 13, 1995, at 6, and viral diseases generally, Neem, supra note , at 61-62 (anecdotal human effects), 57, 98 (antiviral effect in plants), pains, fevers and infections generally, Zimmer, supra note . Many of these effects are being investigated at Duke University Medical Center under the auspices of an NIH grant. Id. For existing references in the scientific literature see Neem, supra note , at 60-70.

n8 Neem oil is a potent spermicide, and its local availability indicates promise as a low-cost contraceptive in India and the Third World. See Neem, supra note , at 67-69, 104-106 (listing citations).

n9 Uses have been claimed for acne, Zimmer, supra note ; eczema, John F. Burns, Tradition in India vs. A Patent in the U.S., N.Y. Times, Sept. 15, 1995, at D4; nail polish, facial creme, skin care, Hoversten, supra note ; see generally Neem, supra note , at 73-74.

n10 Perhaps most famously, neem twigs are used as a sort of natural toothbrush in India. Burns, supra note 9. Lately it has been incorporated into toothpaste concoctions in India and Germany. Neem, supra note , at 62-63.

n11 It should be noted that the tree does grow in over 30 countries, being native to lowland tropical climates generally. Hoversten, supra note . There is talk of its being transplanted to Florida, Totten, supra note , where it grows in isolated stands now, although California and Arizona are more ideal since the otherwise hardy tree is very vulnerable to high winds (e.g., hurricanes). Neem, supra note , at 25, 30. Neem plantations have apparently been created in other tropical nations, Indonesia among them. *Suits Interview*, *supra* note .

n12 Neem has been under study by Indian scientists since the 1920s. Neem, supra note , at 32.

n13 Hema Shukla, Indians Challenge U.S. Pesticide Patent, UPI-International (Sept. 14, 1995). Of course, patents could issue only on derivative inventions: universally, a product of nature (such as unrefined neem oil) is considered unpatentable in itself. See, e.g., the laws of the two main models, *35 U.S.C. 101* (invention must be "new"); German Patent Law of Dec. 16, 1980, Art. 2, in 2d John P. Sinnott, World Patent Law and Practice (1991).

n14 The Patents Act, 1970 (India) Ch. II: "Inventions not patentable . . . " include all products capable of use as food, medicine or other drugs, or any products of chemical processes, although the processes leading to such products may be patented, 5(a)(b), but this would not include the process for stabilizing neem at issue here since 3(h) and 3(i) bar patents on methods of agriculture and "any process for the medicinal, surgical, curative, prophylactic, or other treatment of human beings or any process for a similar treatment of animals or plants to render them free of disease or to increase their economic

value or that of their products," respectively, the latter provision covering the neem stabilization patent, described infra, on two fronts. With respect to pharmaceutical patents, see also 53(1)(a), limiting term of (manufacturing) process patents in the medical field to an almost meaninglessly-short 5 to 7 years. The full text of the Indian Patent law may be found in 2e Sinnott, supra note . Many other underdeveloped nations also exclude from patentability all medical and agricultural products and processes, for a combination of economic and normative reasons; see, e.g., Note, Exclusions from Patent Protection, Memorandum of the International Bureau of WIPO, 27 Indus. Prop. 192, 192-93 (1988).

n15 TRIPS Agreement, GATT Doc. MTN/FA IIA1C (1994), *33 I.L.M. 81, 93 (1994)*, H.R. Doc. No. 316 1621, 103d Cong., 2d Sess. (1994), art. 27.1. While there remains some very open-ended loophole provisions (grounds for exclusion: "necessary to protect ordre public or morality, including to protect human, plant or animal life or health, or to avoid serious prejudice to the environment"; also excludable: "diagnostic, therapeutic and surgical methods" Id., art. 27.2-3), most nations will probably provide for a wide range of protection in the sensitive fields of pharmaceuticals and agribusiness, given the financial (and thus trade) clout of the transnational companies in whose interest such provisions lie. "Soon" is perhaps an overstatement, given the generous transition periods provided for in the TRIPS agreement. All signatories will have one year to implement the necessary changes to their national legal systems, with an extension of four years for developing nations (or nations making a transition from a command economy), and an additional five years for developing nations providing patent protection to previously unpatentable subject matter. Thus India may have a total of ten years to extend patent protection to pharmaceuticals, agrochemicals, and related processes. Id., art. 65.1-4.

n16 Charles G. Carter et al., Storage-stable Azadirachtin Formulation, U.S. Pat. No. 5,124,349 (June 23, 1992).

n17 Its defenders analogize the neem improvement patent to the stream of recent patents granted on methods for coating aspirin - a rather ancient invention in itself, by pharmaceutical standards. Hoversten, supra note .

n18 "In the chemical vernacular, aprotic is generally accepted to mean the absence of chemical moieties containing protons attached to oxygen, nitrogen or sulfur. In other words, waters and alcohols are protic solvents and ethers, ketones, etc. are aprotic." Letter from Dr. George W. Kabalka, Robert H. Cole Professor of Chemistry, University of Tennessee-Knoxville, to Theodore Waugh, Foundation on Economic Trends (Nov. 2, 1995) (on file with author).

n19 Azadirachtin belongs to the complex chemical class known as triterpene liminoids. Neem produces a great variety of limonoids, described (with chemical structures included) in Neem, supra note , at 31-36. Similarly, the chrysanthemum was the original source of a variety of pyrethrins, many of which are now common as commercial neurotoxic pesticides. Id. at 91.

n20 *Suits Interview, supra* note .

n21 "Any chemist worth his salt could have come up with it." Jeremy Rifkin, quoted in Biodiversity: Groups Sue to Invalidate Pesticide Patent, Greenwire, Sept. 13, 1995. See also Kabalka, supra note (given structural knowledge of azadirachtin, it "would be

expected to be sensitive to protic solvents"); Letter from K. N. Sukhatme, Research Director, Herringer Bright Chemicals Pvt. Ltd., to U.S. Patent and Trademark Office 1 (Sept. 9, 1995) ("obvious" in light of work done by chemists in India) (on file with author).

n22 Open Letter from Dr. Madeline Adamczeski, Oct. 11, 1995 ("no novel chemistry"); Open Letter from Peter H. Hull, Oct. 4, 1995 (prior knowledge of subject matter in Australia) (both on file with author).

n23 Organizations leading the resistance in the U.S. include the noted biotechnology gadfly/Luddite Jeremy Rifkin and his Foundation on Economic Trends, and RAFI (Rural Advancement Foundation-International), along with 225 other organizations from 45 countries. Burns, supra note 9. These groups have filed a petition for reexamination under Patent Act 301-307, *35 U.S.C. 301*-307 (1994), with the Patent and Trademark Office. Request for Reexamination of Patent No. 5,124,349, requested by Foundation on Economic Trends, c/o Jeremy Rifkin, Reexamination No. 90/004,050 (Off. Gaz. Pat. Office Jan. 16, 1996) Ex. Gp.:1205, filed in the United States Patent and Trademark Office, Dec. 8, 1995 (on file with the author) [hereinafter Reexamination Petition].

n24 This effort is spearheaded Linda Bullard of the MEP (Members European Parliament) and Magda Aelvoet of the Green Party. U.S. Patent Storm Warning in India, supra note .

n25 Shukla, supra note .

n26 Tim McGirk, India Turns Its Back on Western Ways, The Independent, Sept. 29, 1995, at 16. Fernandes is best known for being the primary instigator behind the expulsion of Coca-Cola from India in 1977 for, among other things, failure to divulge the "secret formula." Id.

n27 Grace claims that they will not be seeking a patent in India, presumably even post-TRIPS implementation, largely because the court system there is "too slow." Grace Issues Statement about Patent for Neem Pesticide, Universal News Services (Sept. 15, 1995) ("Grace holds no neem pesticide patent in India and does not intend to seek a patent there."); Saltus, supra note (quoting Martin Sherwin, Grace V.P., re. motivation). In any event it is doubtful that India will institute so-called "pipeline" protection, which would extend patent status to products already under patent elsewhere when their subject matter first becomes patentable within India. (Such Indian patents would last only for the remaining part of their original country terms.) Pipeline protection is explicitly not required under TRIPS for applications preceding the entry-into-force, although it is required for applications during the transition period. TRIPS Agreement, supra note , art. 70.1, 70.8; but see Suresh Koshy, Note, The Effect of TRIPs on Indian Patent Law: A Pharmaceutical Industry Perspective, *1 B.U. J. Sci. & Tech. L. 4*, pt. V(D) (1995) (urging Indian adoption of pipeline protection for pharmaceuticals). Without pipeline protection, Grace's U.S. patent would presumably constitute prior art for a parallel Indian application - even if it was not found per se obvious in light of prior use or knowledge within India.

n28 Those biodiversity activists who state that the formal opposition petition is merely a cover for the much "larger issue" of compensation for the historical efforts of farmers and other humble folk in preserving and improving neem through the generations

(e.g. Michael Gollin, apparently, in an National Public Radio interview, Joe Palca, Debate Continues over Ownership of Biological Resources, NPR Morning Edition, Sept. 14, 1995; and Theodore Waugh ("There has to be some recognition of community-created intellectual property"), Group Challenges W.R. Grace Pesticide Patent, Reuter Business Report, Sept. 13, 1995) usually also think neem stabilization techniques should have been patentable long ago, but that the rights should have belonged to a (historically-broad) group inventor rather than an individual inventor.

n29 As claimed by Grace (Saltus, supra note), and in Lemonick et al. (supra note) ("Grace's U.S. patent has no effect in India").

n30 Grace Issues Statement about Patent for Neem Pesticide, supra note . Grace spokesperson Chuck Suits elaborates, "India has not done much with neem . . . only 16 percent of the neem seed that falls to the ground is harvested;" - note that, given the ubiquity of the tree, this is somewhat like claiming underutilization because the U.S. harvests under 1 percent of the acorns that fall to the ground - "out of that 3 percent is purchased by Grace." *Suits Interview, supra* note ; see also Neem, supra note , at 73.

n31 On fears in India about a rise in prices for harvested seed, see Mara Bovsun, FET Challenges U.S. Patent on India's Natural Pesticide, Biotechnology Newswatch, Sept. 18, 1995 (quoting Rifkin); Biodiversity: Groups Sue to Invalidate Pesticide Patent, supra note . An actual jump in prices has already been reported. Id. (reporting a doubling in prices since Grace opened its local production facility); Lemonick et al., supra note (notes jump but expresses doubt that rise has forced small farmers out of business).

n32 Obviously a key element of the dispute as framed in this paper is the fact that the product has an underdeveloped country origin, but primarily a developed country market (due to its expense; see infra note). This is not atypical of biodiversity products by any means, however. Another mainstay of that field is alkaloid compounds, typically from tropical flowering plants, which have provided many useful chemotherapy agents. Cancer treatments are largely a geriatric concern, of interest to the aging populations in developed countries but a secondary concern for the Third World, where pediatric health problems predominate and demand different forms of research, primarily into antibiotics. While much microbial biodiversity research is oriented towards producing new antibiotics, single-celled life forms, being hard to assign to a national homeland, have not quite been the main political battleground in the fight for compensation for biodiversity resources. See Carl Djerassi, Making Drugs (and soaking the poor?), 310 Science 517 (1984). Grace claimed that sales of Neem product accounted for only a "fraction" of its total sales of $ 5.1 billion. See Burns, supra note 9; Grace May Sell Unit, Sun-Sentinel, Sept. 14, 1995 (re. total sales). Grace recently sold this patent and all other assets of its botanical and microbial pesticide research divisions to the Thermo Ecotek Corporation. Daniel Lott, Mass. Environmental Firm Acquires Grace's Columbia Pesticide Division, Daily Record, May 15, 1996, at 3. Outside estimates place the revenues from Neemix, the agricultural product, at around $ 60 million annually from sales within the U.S. The product is sold mainly in the U.S. and the Middle East, and Grace had reserved patents in other key markets. Bovsun, supra note ; Ralph T. King Jr., Grace's Patent on a Pesticide Enrages Indians, Wall St. J., Sept. 13, 1995, at B1, B9.

n33 Neem is described as "quite expensive," Totten, supra note , and Grace's spokesperson states "cost-wise it's a high-end product," *Suits Interview, supra* note , which does seem to indicate that it may fall into the rather large category of "environmental luxury-goods," a term encompassing many measures (e.g. strict pollution regulation) which enhance environmental quality but are expensive enough to be preferred only by wealthy "consumers." (Cf. prior note for relevance.) Another aspect of neem's environmental appeal is the fact that it is not an "outright killer," but rather interferes subtly with various essential processes needed for insect growth, feeding and reproduction. Neem, supra note , at 4. Thus, no sudden accumulation of corpses will litter the gardens of the bourgeois horticulturist, distinguishing neem from pyrethrins, the breakthrough biodiversity pesticides of the last century. Id. at 91. Ironically it has been suggested that some of the (decidedly non-natural) solvents listed in Grace's patent may in themselves repel insects. Cf. Sukhatme, supra note , at 2 and Grace patent, *Carter et al., supra* note , at claim 16.

n34 Zimmer, supra note ("the nation's growing interest in natural products will bring neem to America," quoting Barry Cassileth). The presumed lower toxicity of neem pesticides is a major reason for their current popularity. How to Fight Plant Pests, Plain Dealer, Nov. 3, 1995 (quoting Warren Lytle). Note that all-natural does not necessarily imply nontoxic in the sense of having no effect on humans: Neem is also used as a human contraceptive, being a potent spermicide. See note , supra. There is however scant evidence of other effects on humans or other vertebrates. Zimmer, supra note , but see Neem, supra note , at 70, 22. Grace's most potent neem oil has been approved by the FDA. BNA Chem. Reg. Daily, Oct. 31, 1995. Its other neem products have been approved for use on ornamentals and vegetables for over two years (except in California and New York which have stricter standards). See Totten, supra note ; Neem, supra note , at 100-03 (broad Grace testing analysis).

n35 The traditional preparation of neem seeds squeezed in water typically decays (on the shelf as well as in sunlight exposure) within days, thus requiring repeated applications for most pest control purposes. Saltus, supra note ; Burns, supra note 9. This biodegradability was, of course, the impetus behind the invention here at issue.

n36 See, e.g., Saltus, supra note (quoting Vandana Shiva: Grace "sucking up the resource . . . because of their economic power"); contra Grace's statements in Saltus, supra note 7 (to the effect that Grace's competitors are currently producing, extracting and, the only significant point, selling neem oil products in India). However, most of Grace's product is apparently sold in the U.S. and the Middle East, see supra note .

n37 *35 U.S.C. 102*(a)-(b), (g) (1994).

n38 The meaning of the term "prior art" may perhaps be best explained to non-specialists by invoking its first use in the Patent Statute, at section 103: A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *35 U.S.C. 103* (1994). Thus "prior art" is "all of the available information in the field which may relate to the invention," Margreth Barrett,

Intellectual Property 18 (1991), i.e., everything in the "public domain" for a given field of expertise. Note that this includes everything described in section 102(a), (b), (e), which merely provides for a sort of "automatic" finding of obviousness (identity) when one can invoke such material against a patent or application for one. See *In re Bass, 474 F.2d 1276, 1290, 177 U.S.P.Q. (BNA) 178, 189 (C.C.P.A. 1973),* whose additional inclusion of 102(g) was subsequently overruled by statute, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 103, 98 Stat. 3384. See also infra note .

n39 For another suggested general, and universal, definition of prior art, see infra note .

n40 The insistence on a large set of putatively specific rules may be in response to the fact that patent examiners (who are fairly low-ranking in the hierarchy of bureaucratic responsibility, and grossly overworked, even in 1790) are, under the 1836 Act (re-establishing an examination system in the U.S.) primarily responsible for determining novelty. While they are also now responsible for determining obviousness, the latter is inherently more subjective; the statutory bars of 102 keep questions of fact at bay in cases of identity. Robert L. Harmon, Patents and the Federal Circuit 56-57 (3d ed. 1994). The 1836 Act provides that inventions must be "new and useful" but not non-obvious. Act of July 4, 1836, ch. 357, 1, 5 Stat. 117, 118, the same act allowing for the commissioner to judge whether the invention was "important," 7 at 120. Since much of the structure of the current patent act is descended from the organization of the 1836 Act, this may explain the generality of 103 versus the specificity of 102. Note that 7 of the 1836 Act, on examination procedures, adds language more specific than 15's similar description of prior art references ("described in any printed publication," 5 Stat. at 119; "described in some public work," 5 Stat. at 123, respectively), and that 15 relates to litigation and is drawn from the 1793 Act, which eliminated examination (Cf. Act of Feb. 21, 1793, ch. 11, 6, 1 Stat. 318, 322). In any event, the same references that defeat identical patents under 102 serve as the prior-art foundation for findings of obviousness under 103.

n41 Prior art under 103 includes all novelty-precluding references under 102. 2 Donald Chisum, Patents: A Treatise on the Law of Patentability, Validity and Infringement 5.03[3] (1995).

n42 See, e.g., *E.I. du Pont de Nemours & Co. v. Berkley & Co., 620 F.2d 1247, 1265, 205 U.S.P.Q. (BNA) 1, 15 (8th Cir. 1980)* (error to introduce foreign prior art as bearing on "state of the Art"; courts need to distinguish clearly prior use qua prior art versus being "merely one possible indicium of obviousness").

n43 Legislative history acknowledges this but does not respond: "The interpretation by the courts of [102(a)] as being more restricted than the actual language (for example, 'known' has been held to mean 'publicly known') is recognized but no change in the language is made at this time." Reviser's Notes, Patent Act of 1952. But see *42 U.S.C. 2185* (secret prior knowledge or use of classified atomic technology held to be anticipating, an express exception to the judicial rule that "known" really means "publicly known").

n44 "[P]rior knowledge, in order to defeat a patent, must be of a complete and operative device, as distinguished from knowledge of a conception." *In re Schlittler, 234 F.2d 882, 884, 110 U.S.P.Q. (BNA) 304, 306 (C.C.P.A. 1956).*

n45 1 Chisum, supra note , 3.05[3] (citing, inter alia, *In re Lund, 376 F.2d 982, 153 U.S.P.Q. (BNA) 625 (C.C.P.A. 1967)); In re Schlittler, 234 F.2d 882, 110 U.S.P.Q. (BNA) 304 (C.C.P.A. 1956).*

n46 1 Chisum, supra note , 3.05[3].

n47 *In re Borst, 345 F.2d 851, 145 U.S.P.Q. (BNA) 554 (C.C.P.A. 1965)* (adequate enabling disclosure is sufficient). Chisum claims that the ability to anticipate with mere constructive reduction to practice militates for a higher standard of publicity for prior knowledge than for prior use. 1 Chisum, supra note , 3.05[2][a] text accompanying n.3.

n48 *Judson v. Moore, 14 F. Cas. 17, 21 (C.C.S.D. Ohio 1859)* (No. 7,569) ("mere conversation" insufficient); *Corser v. Brattleboro Overall Co., 93 F. 807, 808 (C.C.D. Vt. 1899)* ("merely oral and casual suggestion" insufficient, especially when disclosure is fragmentary); *Bishop & Babcock Mfg. Co. v. Western Auto. Supply Co., 105 F.2d 886, 888, 42 U.S.P.Q. (BNA) 293, 295 (6th Cir. 1939)* (unpublished written disclosure has evidentiary value, given other evidence).

n49 *In re Kehl, 101 F.2d 193, 40 U.S.P.Q. (BNA) 357 (C.C.P.A. 1939)* (inoperative prior art device may anticipate if defect could have been cured with mere mechanical, i.e., non-inventive, skill).

n50 *Coffin v. Ogden, 85 U.S. (18 Wall.) 120 (1874)* (embryonic, inchoate, or unconsummated devices not anticipating); *United States v. Adams, 383 U.S. 39, 148 U.S.P.Q. (BNA) 479 (1966)* (inoperable or failed invention not anticipating). Unlike with prior knowledge, here constructive reduction is not acceptable. Cf. note , supra. Actual physical use can of course occur with processes as well as products. 1 Chisum, supra note , 3.05[2] at ? 3.

n51 Opinions have differentiated between using the invention in the same way as the later applicant, and expressly intending to do so. See *Verdegaal Bros., Inc. v. Union Oil Co., 814 F.2d 628, 632, 2 U.S.P.Q.2d (BNA) 1051, 1053 (Fed. Cir. 1987)* (even if a prior art inventor does not recognize a function of process, it can anticipate if function was inherent).

n52 *Full Mold Process, Inc. v. Central Iron Foundry Co., 489 F. Supp. 893, 900, 208 U.S.P.Q. (BNA) 650, 656 (E.D. Mich. 1980); Minnesota Mining & Mfg. Co. v. Research Medical, Inc., 679 F. Supp. 1037, 1048-50, 6 U.S.P.Q.2d (BNA) 1401, 1409-10 (D. Utah 1987); W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1549, 220 U.S.P.Q. (BNA) 303, 309 (Fed. Cir. 1983).*

n53 See, e.g., *Connecticut Valley Enters., Inc. v. United States, 348 F.2d 949, 950, 146 U.S.P.Q. (BNA) 404, 406 (Ct. Cl. 1965).*

n54 1 Chisum, supra note , 3.05[2][a]. Interestingly, this recital first occurred after the introduction of the "in this country" qualification and may have been an attempt to justify it in the absence of any legislative history on the subject. The phrase probably continues to play a similar role today given that it is repeated so often when clearly counterfactual.

n55 *51 U.S. (10 How.) 477 (1850).*

n56 See, e.g., *Searls v. Bouton, 12 F. 140, 142 (C.C.S.D.N.Y. 1882); Acme Flexible Clasp Co. v. Cary Mfg. Co., 96 F. 344, 347 (C.C.S.D.N.Y. 1899); Ajax Metal Co. v.*

Brady Brass Co., 155 F. 409, 415 (C.C.D.N.J. 1907); Anthracite Separator Co. v. Pollock, 175 F. 108, 111 (C.C.M.D. Pa. 1909); Ramsay v. Lynn, 187 F. 218, 222 (C.C.W.D. Pa. 1911); Cincinnati Milling Mach. Co. v. Oakley Mach. Tool Co., 268 F. 257, 261 (S.D. Ohio 1920); Illinois Tool Works, Inc. v. Continental Can Co., 273 F. Supp. 94, 109, 154 U.S.P.Q. (BNA) 401, 414 (N.D. Ill. 1967); State Indus., Inc. v. Rheem Mfg. Co., 223 U.S.P.Q. (BNA) 305, 316 (M.D. Tenn. 1984).

n57 *Gayler, 51 U.S. at 498.*

n58 Chisum lists both objections as simultaneously logically viable, 1 Chisum, supra note , 3.05[2][a], for unclear reasons, especially since Chisum seems to regard Borst as definitively establishing that the standard for "prior knowledge" findings is "full enabling disclosure," which seems to equate roughly to constructive reduction to practice, perhaps without the "written" requirement; in any event this would still be a different reduction standard that that for "use" and would thus distinguish the terms as used in 102(a). 1 Chisum, supra note , 3.05[3] at text accompanying nn.7-8; *In re Borst, 345 F.2d 851, 854-55, 145 U.S.P.Q. (BNA) 554, 556-57 (C.C.P.A. 1965).*

n59 1 Chisum, supra note , 3.05[2][a].

n60 See note , supra.

n61 1 Chisum, supra note , 3.05[2][a] text accompanying n.6.

n62 *Rosaire v. Baroid Sales Div., National Lead Co., 218 F.2d 72, 75, 104 U.S.P.Q. (BNA) 100, 102 (5th Cir. 1955).*

n63 *E.W. Bliss Co. v. Southern Can Co., 251 F. 903, 907-08 (D. Md. 1918),* aff'd, *265 F. 1018 (4th Cir. 1920).*

n64 1 Chisum, supra note , 3.05[2][a] at 3-77. In such cases the prior use will probably have trade secret status, the elements of which typically are: the user has valuable information being put to present use under substantial secrecy maintained with active measures. See Restatement of Torts 757 (1939). It is generally understood that the choice to pursue trade secret protection for one's advances carries with it some risk of a later inventor gaining patent rights in the invention, see *35 U.S.C. 102*(b),(g) (1994), a risk the non-disclosing first user does not merit protection from.

n65 1 Chisum, supra note , 3.05[2][a] at 3-79.

n66 See *Corona Cord Tire Co. v. Dovan Chem. Corp., 276 U.S. 358 (1928)* (unpublished documents evidence of prior knowledge, invention); *Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 231 U.S.P.Q. (BNA) 81 (Fed. Cir. 1986)* (inventions with priority also anticipate).

n67 By analogy to 102(a)'s publicity requirement, which is supposedly more arduous. See *Oak Indus. Inc. v. Zenith Elecs. Corp., 726 F. Supp. 1525, 14 U.S.P.Q.2d (BNA) 1417 (N.D. Ill. 1989).*

n68 *International Glass Co. v. United States, 408 F.2d 395, 402, 159 U.S.P.Q. (BNA) 434, 440 (Ct. Cl. 1968)* (secret invention anticipatory; same standard for priority or anticipation under 102(g)); *Oak Indus., 726 F. Supp. at 1533, 1537, 14 U.S.P.Q.2d (BNA) at 1422, 1426* ("no requirement under 102(g) that prior invention be known . . . 'to the

art'"; standard easier than under 102(a)). With respect to *International Glass, cf. Steierman v. Connelly, 197 U.S.P.Q. (BNA) 288* (Comm'r Pat. & Trademarks 1976) (abandonment defeats priority but not anticipation), questioned, *In re Suska, 589 F.2d 527, 530, 200 U.S.P.Q. (BNA) 497, 499 (C.C.P.A. 1979).* But cf. *State Indus., Inc. v. Mor-Flo Indus., Inc., 639 F. Supp. 937, 231 U.S.P.Q. (BNA) 242 (E.D. Tenn. 1986),* aff'd, *818 F.2d 875 (Fed. Cir. 1987)* (after reasonable time, prior invention not prior art if no steps taken to make it known to public); *L.D. Schreiber Cheese Co., v. Clearfield Cheese Co., 540 F. Supp. 1128, 214 U.S.P.Q. (BNA) 285 (W.D. Pa. 1982),* aff'd, *716 F.2d 891 (3d Cir. 1983)* (same standard of public knowledge under 102(a) and (g)). Briefly, in the technical sense, abandonment means conduct indicating intent to forgo right to a patent, concealment means hiding the invention from public view, and suppression means not making, using or vending the invention.

n69 1 Chisum, supra note , 3.05[2] text accompanying n.4 (noting publicity resulting in finding prior use avoids all technical considerations of abandonment, suppression, or concealment).

n70 Act of Apr. 10, 1790, ch. 7, 1, 1 Stat. 109, 110; Act of Feb. 21, 1793, ch. 11, 1, 1 Stat. 318, 319 ("known or used before"). This historical section is largely based on the discussion in Donald S. Chisum, Foreign Activity: Its Effect on Patentability Under United States Law, 11 Int'l Rev. Indus. Prop. & Copyright L. 26, 27- 28, 36 (1980).

n71 See *Dawson v. Follen, 7 F. Cas. 216 (C.C.D. Pa. 1808)* (patentee must be original inventor "in relation to every part of the world," with lack of knowledge of prior invention no defense to invalidity).

n72 Resident aliens were extended the patenting right in 1800. Act of Apr. 17, 1800, ch. 25, 1, 2 Stat. 37, 38.

n73 Act of July 4, 1836, ch. 357, 12, 5 Stat. 117, 121-22 [hereinafter 1836 Act].

n74 1836 Act, supra note , 7, 15, 5 Stat. at 119-20, 123.

n75 1836 Act, supra note , 15, 5 Stat. at 123. The emphasis on belief recognizes independent invention, although today the complexity of technology has perhaps moved us beyond the archaic requirement of good-faith, embodied in the requirement of oath-swearing, now at *35 U.S.C. 115,* which perhaps carried more weight in the early days of our country. See, e.g., *Ex parte Fry, 9 F. Cas. 972, 972 (C.C.D. D.C. 1859)* (testimony tending to establish foreign use and importation by others insufficient against applicant's oath that he is original discoverer). On the heavy weight accorded to oath-swearing generally in the early days of the republic, see A.R. Amar, The Bill of Rights and the Fourteenth Amendment, *101 Yale L.J. 1193, 1241 (1992)* (quoting John Bingham, Cong. Globe, 35th Cong., 1st Sess. 1034 (1866)).

n76 *35 U.S.C. 102*(a),(g) (1994). One commentator states, "To the chagrin of many observers today, the 1836 Act continues to provide the basic structure and principles of United States patent law." Paul Goldstein, Copyright, Patent, Trademark and Related State Doctrines 365 (rev. 3d ed. 1993). The importation provisions effectively survive in the originality requirements of *35 U.S.C. 101,* 102(f), 111, 115. See Chisum, supra note , at 36 n.55.

n77 Chisum, supra note , at 36. See Sen. John Ruggles, Senate Report Accompanying S. Bill No. 239, 24th Cong., 1st Sess. (Apr. 28, 1836), reproduced in 6 Chisum, supra note , at app. 12.

n78 Chisum, supra note , at 36, citing *Shaw v. Cooper, 32 U.S. (7 Pet.) 292 (1833),* without, however, making explicit the suggestion of a causal linkage.

n79 John A. Garraty, The American Nation 376 (7th ed. 1991).

n80 Chisum, supra note , at 36.

n81 Although the 1793 Act lacked a preamble to explain its aspirational values, and the constitutional provision authorizing it alludes only to the progress of science generally, the form of grant the statute allowed for is expressly not a property right, and there is no requirement that the authorities issue a patent when the examination standards are met, leading one to believe the main motivation behind the patent grant is disclosure to the public and not a reward for the inventor along a "natural rights" model. Cf. the more secure "Grants of Privilege" under the English Statute of Monopolies, Statutes at Large, 21 Jac. I, c.3 (1624). Bruce W. Bugbee, Genesis of American Patent and Copyright Law 144, 148 (1967); see generally 18(7) J. Pat. Off. Soc'y (1936) (centennial issue on 1836 Act).

n82 Chisum, supra note , at 36. Chisum cites the following dicta from Gayler v. Wilder: If 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 advantage from the invention here. It would confer no benefit upon the community, and the inventor 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. It is the inventor here that brings it to them, and places it in their possession. And as he does this by the effort of his own genius [i.e. no unjust reward], the law regards him as the first and original inventor, and protects his patent, although the improvement had in fact been invented before, and used by others. *51 U.S. 477, 497 (1851).*

n83 One author has stated that other "patents are the classical prior art, and probably the most frequently encountered obstacles to patentability, both in the PTO and in infringement litigation . . . ." Harmon, supra note , at 68.

n84 According to one authority, biodiversity predominates in tropical regions because they are generally so friendly to life (i.e., there is a stable climate providing sun and rain in abundance for plants, and thus food sources in abundance for insects and animals) that oddball species which may have been selected out of the gene pool in a more unforgiving, unstable environment are instead allowed to survive through "greater niche specialization," with the climactic stability leading to "the coevolution of highly interdependent species" which can only survive in their very specific environmental niches. Richard B. Norgaard, The Rise of The Global Exchange Economy and the Loss of Biological Diversity, in Biodiversity 206, 209 (E.O. Wilson ed., 1988) (citing R.M.

May, Stability and Complexity of Model Ecosystems (1973)); but see, for a variety of diversity hypotheses, Michael W. Palmer, Variation in Species Richness: Towards a Unification of Hypotheses, 29 Folia Geobotanica et Phytotaxonomica 511, 528- 30 (1994).

n85 The "Vavilov centers of genetic diversity" are "situated predominantly in what is now known as the Third World." These eight regions, first identified in the 1920s by Soviet botanist N.I. Vavilov, are defined as "centers of origin of most of the world's economically important crops." Although the midwestern United States, Mediterranean Europe, and the Euro-Siberian regions are listed among the twelve current sites of such diversity (Zhukovsky gene megacenters), the crops composing this diversity were mostly imported from elsewhere. Of Vavilov's eight original centers, only the Mediterranean falls within the developed world. Jack R. Kloppenburg, Jr., First the Seed: The Political Economy of Plant Biotechnology, 1492-2000, 46 (1988); Jack R. Kloppenburg, Jr. & Daniel L. Kleinman, Seeds of Controversy: National Property Versus National Heritage, in Seeds and Sovereignty, 173, 175-81 (Jack R. Kloppenburg, Jr., ed., 1988). Perhaps this underdevelopment is a product of historical reasons similar to those explaining why these countries are biodiversity-rich. Parallel factors would include: mountainous terrain inhibiting human commerce, but providing a niche (e.g., the Costa Rican rift valley) to protect odd species; stable, bounteous conditions not forcing instrumental rationalization of human societies, or natural- selecting out of quirky species, by contingent necessity, nor requiring political centralization to organize irrigation due to irregular rainfall (the so-called Wittfogel thesis).

n86 See Note, Exclusions from Patent Protection, supra note .

n87 Consumer protection rationales are most frequently put forward in defense of weak intellectual property protection schemes in underdeveloped nations, especially regarding pharmaceuticals, which are available and quite affordable in India. There have been academic arguments to the effect that such weak protection, at least for patents, may be on the whole beneficial to consumers in underdeveloped economies. See A. Samuel Oddi, The International Patent System and Third World Development: Reality or Myth?, *1987 Duke L.J. 831 (1987)* (instituting a patent system not necessarily beneficial to economic development in underdeveloped nations).

n88 The postwar German and Japanese patent statutes disallowed chemical structure patents in order to encourage the development (or rather "reconstruction") of the war-ravaged chemical industries in those countries. Shayana Kadidal, Digestion as Infringement, 78 J. Pat. & Trademark Off. Soc'y 241, 271 n.160 (1996).

n89 In opposition to the claim that the policies were primarily motivated by a desire to prevent the usurpation of local knowledge See King, supra note , at B1-B9. The policy predates this concern by a wide margin.

n90 See, e.g., Scott Cahill et al., Have Pharmaceutical Companies Missed the Boat on Biotechnology?, 27(1) Medical Marketing & Media 28 (1992) (Biotechnology creates as products "naturally occurring biological response modifiers (BRMs)" which tend "to generate . . . chemically complex and highly specific" drugs).

n91 Courts and commentators have been split on this issue - the rights of the trade-secret first user who does not seek a patent versus a later patentee - for quite some time, a situation perpetuated by the fact that a legal dispute really only can arise in cases of "non-informing public" uses - e.g., a secret process used to make a publicly sold end-product (which cannot be usefully reverse engineered). Some cases hold the first trade-secret user to be guilty of concealment, and others disagree. See Lisa M. Brownlee, Trade Secret Use of Patentable Inventions, Prior User Rights and Patent Law Harmonization: An Analysis and Proposal, 72 J. Pat. & Trademark Off. Soc'y 523, 533 n.51 (1990) (list of cases). Commentators are likewise split: e.g., Frank E. Robbins, The Rights of the First Inventor-Trade Secret User As Against Those of the Second Inventor-Patentee (Part I), 61 J. Pat. & Trademark Off. Soc'y 574 (1979) (against any in personam right of continued use for a prior [trade- secret] user); and compare Karl F. Jorda, The Rights of the First Inventor-Trade Secret User As Against Those of the Second Inventor-Patentee (Part II), 61 J. Pat. & Trademark Off. Soc'y 593 (1979) (for); with Chisum, see Brownlee, supra, at 524 n.3 (against; the author finds the arguments in favor of such in personam rights strained and the breadth of the proposed rights troubling).

n92 Another contributing factor to the disparity is the presence of a "critical intellectual mass" for scientific advances in the U.S., due to our stronger patent system, greater domestic capital, and a longstanding post-war policy of heavy government subsidy for academic science in the interests of winning the technological battle, motivated both militarily and ideologically, with the Soviet Union.

n93 Of course, in a legal environment which allows no patenting in the subject-matter area, openness may also be a viable alternative to patents or secrecy.

n94 Petty patents, or Gebrauchsmustern in German, are typical of patent systems originally modeled on that of the German Second Empire. See *Boldt v. Turner, 199 F. 139, 143 (7th Cir. 1912)* (description of the German Petty Patent Act of 1891). Due to the dispersal of the German Empire at Versailles, few underdeveloped post-colonial nations are adherents of a German-model patent system, which would provide for "petty patents" on incremental improvements to the state of the art, which otherwise fail to meet the (now-supplanted, pre-1976 in Germany) German-system standard of "inventive progress" over the state of the art required for a full utility patent. Michael A. Gollin, An Intellectual Property Rights Framework for Biodiversity Prospecting, in Biodiversity Prospecting 159, 172-73 (Walter V. Reid ed., 1993) (discussing petty patents and their potential applicability to biodiversity innovations); Wolfgang G. Fasse, Basic Patentability Requirements in the United States and Germany, *44 J. Pat. Off. Soc'y 27, 32-37 (1962),* Frithjof E. M ller & Harold C. Wegner, The 1976 German Patent Law, *59 J. Pat. Off. Soc'y 89, 116-17 (1977)* (discussing the German system inventive step, "non-obviousness" in the U.S., standards and changes thereto). Under *35 U.S.C. 102*(a),(b) it is likely that such a petty patent would be recognized as a foreign patent for anticipation purposes, since public disclosure, and not prior patentee's inventiveness, is at issue. See *In re Carlson, 983 F.2d 1032, 25 U.S.P.Q.2d (BNA) 1207 (1993);* 1 Chisum, supra note , 3.06[2].

n95 *Carter Prods. Inc. v. Colgate-Palmolive Co., 130 F. Supp. 557, 104 U.S.P.Q. (BNA) 314 (D. Md. 1955),* aff'd *230 F.2d 855, 108 U.S.P.Q. (BNA) 383 (4th Cir. 1956)* (typewritten Argentine patent document could not qualify as printed; using expert

testimony to determine foreign law, patent itself non-enabling). See also *In re Tenney, 254 F.2d 619, 624, 117 U.S.P.Q. (BNA) 348, 354 (C.C.P.A. 1958)* (listing citations). Note that even today, Indian appellate decisions are first issued typewritten, as only the Supreme Court has word processors.

n96 Examiners have in the past sworn out declarations testifying that the affiant had seen the invention practiced in this country. In litigation, oral testimony can be introduced as well, but courts have split on whether any weight is accorded to such testimony standing alone. See *Carella v. Starlight Archery & Pro Line Co., 804 F.2d 135, 231 U.S.P.Q. (BNA) 644 (Fed. Cir. 1986)* (evidence suspicious but possibly sufficient); *Thomson Spot Welder Co. v. Ford Motor Co., 268 F. 836 (D. Mich. 1920),* aff'd, *281 F. 680 (6th Cir. 1922),* aff'd, *265 U.S. 445 (1924);* Washburn & Moen Mfg. Co. v. Beat '*Em All Barbed-Wire Co., 33 F. 261 (C.C.N.D. Iowa 1888)* (same; must prove beyond reasonable doubt); *A.J. Indus., Inc. v. Dayton Steel Foundry Co., 394 F.2d 357, 157 U.S.P.Q. (BNA) 545 (6th Cir. 1968)* (not "fatal"); *Jack Winter Inc. v. Koratron Co., 375 F. Supp. 1, 181 U.S.P.Q. (BNA) 353 (N.D. Cal. 1974)* (not insufficient); but see *Smith v. Hall, 301 U.S. 216 (1937); Lockheed Aircraft Co. v. United States, 553 F.2d 69, 190 U.S.P.Q. (BNA) 134 (Ct. Cl. 1977)* (memory testimony insufficient); *Cold Metal Prods. Co. v. E.W. Bliss Co., 285 F.2d 244, 128 U.S.P.Q. (BNA) 59 (6th Cir. 1960)* (insufficient). See also *General Battery Corp. v. Gould, Inc., 545 F. Supp. 731, 215 U.S.P.Q. (BNA) 1007 (D.C. Del. 1982)* (factors: intervening time, corroborating evidence, whether testimony is recollection or hindsight reasoned belief).

n97 1836 Act, supra note , 7, 5 Stat. at 119.

n98 For excellent summations and analyses of the caselaw, 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), and Steven J. Rothschild & Thomas P. White, Printed Publication: What is it Now?, 70 J. Pat. & Trademark Off. Soc'y 42 (1988).

n99 The typewriter was patented in 1843 by inventor Charles Thurber of Worcester, Mass. James Trager, The People's Chronology (1992), reprinted in Microsoft Bookshelf 1994.

n100 *Keene v. Wheatly, 14 F. Cas. 180, 192 (C.C.E.D. Pa. 1861).*

n101 *In re Tenney, 254 F.2d 619, 624-25, 117 U.S.P.Q. (BNA) 348, 354 (C.C.P.A. 1958)* (citing *Gulliksen v. Halberg, 75 U.S.P.Q. (BNA) 252, 255 (BPAI 1937)).*

n102 *Gulliksen v. Halberg, 75 U.S.P.Q. (BNA) 252 (BPAI 1937),* and more recently, *Hamilton Labs., Inc. v. Massengill, 111 F.2d 584, 45 U.S.P.Q. (BNA) 594 (6th Cir. 1940); Ex parte Hershberger, 96 U.S.P.Q. (BNA) 54 (BPAI 1952)* (restriction on copying no bar); *In re Bayer 568 F.2d 1357, 196 U.S.P.Q. (BNA) 670 (C.C.P.A. 1978).*

n103 *In re Tenney, 254 F.2d at 627, 117 U.S.P.Q. (BNA) at 354* (rejection of typewritten references as printed publications).

n104 Rose, supra note , at 661-73.

n105 *In re Wyer, 655 F.2d 221, 226, 210 U.S.P.Q. (BNA) 790, 794 (C.C.P.A. 1981).*

n106 *I.C.E. Corp. v. Armco Steel Corp., 250 F. Supp. 738, 743, 148 U.S.P.Q. (BNA) 537, 540 (S.D.N.Y. 1966).* In the context of the present problem, perhaps one may ask the inappropriately broad question: To what extent is traditional oral ethnobotanical knowledge, so prized by successful professional biodiversity prospectors, part of the knowledge "accessible" to them? In a form "perceptible" to them? Which they are familiar with - irregardless of the fact it occurs in a foreign country?

n107 Rothschild & White, supra note , at 42.

n108 *Wyer, 655 F.2d at 226-27, 210 U.S.P.Q. (BNA) at 794-95* ("perceptible description of the invention in whatever form it may have been recorded . . . whether information is printed, handwritten . . . magnetic"); see also Rothschild & White, supra note , at 49-50, for copyright analogies. Rose thus dubs this in actuality a "dual test, of form and fact." Rose, supra note , at 675. Rose, supra note , at 655, anticipates a very contemporary question: What of the status of electronic communication in cyberspace (fixed in a medium of electronic ether)? Of files accessible via internet on distant computer systems? Or downloadable from an individual's home page? How well "indexed" is the internet? How likely is it to ever be organized in an "accessible" fashion? Will it become the easiest place to find topical or pre-publication papers?

n109 See *Wyer, 655 F.2d at 226, 210 U.S.P.Q. (BNA) at 794; Tyler Refrigeration Corp. v. Kysor Indus., 601 F. Supp. 590, 225 U.S.P.Q. (BNA) 492* (D. Del.), aff'd *777 F.2d 687, 227 U.S.P.Q. (BNA) 845 (Fed. Cir. 1985).*

n110 Rose, supra note , at 674-76.

n111 Id. at 675 (citing *In re Hilmer, 359 F.2d 859, 879, 149 U.S.P.Q. (BNA) 480, 496 (C.C.P.A. 1966)).*

n112 Rose, supra note , at 672-73, 673 n.118.

n113 These are German "petty patents." See note , supra; *Permutit Co. v. Wadham, 13 F.2d 454,* reh'g denied *15 F.2d 20 (6th Cir. 1926); Permutit Co. v. Graver Corp., 43 F.2d 898 (7th Cir. 1930); Ex parte Smith, 82 U.S.P.Q. (BNA) 83 (Pat. Bd. App. 1941)* (Gebrauchsmustern not printed publications).

n114 Rose, supra note , at 672 (presumably curious as to why they are not considered disseminated in an accessible way to the U.S. public).

n115 That is, it would be economically irrational unless they could sell such a publication as a sort of instructional guide, but it is hard to see how that could be profitable in a nation where paper is relatively costly, as are aprotic solvents.

n116 Note the scientific literature typically shows some forbearance from publishing the obvious.

n117 See *E.I. du Pont de Nemours & Co. v. Berkley & Co., 620 F.2d 1247, 1265, 205 U.S.P.Q. (BNA) 1, 15 (8th Cir. 1980)* (stating such evidence may be "one possible indicium" of obviousness). However, technically, such a finding must be made in light of the "prior art" which under 103 does not include that excluded under 102.

n118 *Cuno Eng'g Corp. v. Automatic Devices Corp., 314 U.S. 84, 91 (1941).*

n119 Mentioned by Sen. Ruggles in the Senate Report, supra note , at 6; Chisum, supra note , at App. 12-2.

n120 See supra note .

n121 But see Gayler v. Wilder, where the Court stated: So, too, as to the lost arts. It is well known that centuries ago discoveries were made in certain arts the fruits of which have come down to us, but the means by which the work was accomplished are at this day unknown. The knowledge has been lost for ages. Yet it would hardly be doubted, if any one now discovered an art thus lost, and it was a useful improvement, that, upon a fair construction of the act of Congress, he would be entitled to a patent. Yet he would not literally be the first and original inventor. But he would be the first to confer on the public the benefit of the invention. He would discover what is unknown, and communicate knowledge which the public had not the means of obtaining without his invention. *51 U.S. (10 How.) 477, 497 (1851).* Justice Daniel, dissenting, stated: The term lost art is applicable peculiarly to certain monuments of antiquity still remaining in the world, the process of whose accomplishment has been lost for centuries, has been irrectrievably swept from the earth, with every vestige of the archives or records of the nations with whom those arts existed, and the origin or even the identity of which process none can certainly establish. And if a means of producing the effect we see and have amongst us be discovered, and none can either by history or tradition refer to a similar or to the identical process, the inventor of that means may so far claim the merit of originality, though the work itself may have been produced possibly by the same means. *Id. at 507-08.* But, despite this rhetoric, extending this principle to discoverers of merely unpublished foreign inventions the Court concluded: we regard him [the current patentee] upon the same ground with the discoverer of a lost art, or an unpatented and unpublished foreign invention, and like him entitled to a patent. For there was no existing and living knowledge of this improvement, or of its former use, at the time he made the discovery. And whatever benefit any individual may derive from it in the safety of his papers, he owes entirely to the genius and exertions of [the patentee]. *Id. at 498* (emphasis added). The law on "lost arts" is currently mixed, 1 Chisum, supra note , 3.06[1][c], (citing the more recent case of *C. Van der Lely N.V. v. F. lli Maschio S.n.c., 222 U.S.P.Q. (BNA) 399, 425 (S.D. Ohio 1984)* (remote in time patents not anticipating)); but see *Frank B. Killian & Co. v. Allied Latex Corp., 188 F.2d 940, 944, 89 U.S.P.Q. 219, 223 (2d Cir. 1951),* where Judge Learned Hand stated "there is no room for 'lost arts' in the case of inventions, 'described in printed publications in this or any foreign country.'" Judge Hand added in a different case: "Perhaps this should not be so; perhaps there should be some equivalent of a 'lost art,' which would put even prior patents in Limbo, when they have really gone to the place of departed spirits. That is another question: it is not for courts." *Western States Mach. Co. v. S.S. Hepworth Co., 147 F.2d 345, 350 (2d Cir. 1945).*

n122 Pharmaceutical companies often seem at least to value continued access above avoiding compensation, and at best to want to help conserve biodiversity resources. See Shayana Kadidal, Plants, Poverty, and Pharmaceutical Patents, *103 Yale L.J. 223, 235 nn.10, 11 (1993).*

n123 The Commission recommended that "Prior art shall comprise any information, known to the public, or made available to the public by means of disclosure in tangible form or by use or by placing on sale, anywhere in the world, prior to the effective filing

date of the application." President's Commission on the Patent System, "To Promote the Progress of the . . . Useful Arts" in an Age of Exploding Technology 5 (1966) [hereinafter 1966 Report to Congress].

n124 Id. at 7. Chisum reports that this Report to Congress "failed to induce any legislative action," despite its strong advocacy of a universal conception of prior art and of eliminating our idiosyncratic first-to-invent priority system. Chisum, supra note , at 37 n.57.

n125 Chisum, supra note , at 37. See TRIPS Agreement, supra note , and Patent Cooperation Treaty, June 19, 1970, *28 U.S.T. 7645,* 1160 U.N.T.S. 231.

n126 In his treatise, Chisum comments: Both the Strasbourg convention on harmonization of national patent laws in Europe and the European Patent Convention adopt a universal definition of prior art as "everything made available to the public by means of a written or oral description, by use, or in any other way." The 1977 Patent Act in the United Kingdom adopts this definition, which constituted a radical change from the rather restricted definition which theretofore prevailed. See The British Patent System: A Report on the Committee to Examine the Patent System and the Patent Law 69-74 (1970) (the Banks Committee Report). 1 Chisum, supra note , at 3.05[5] n.11 See also European Patent Convention, Art. 54(2); Convention on the Unification of Certain Points of Substantive Law on Patents for Invention, done at Strasbourg, Nov. 27, 1963, Art. 4(2), available in 2A Sinnott, supra note , App. 3-105 (1996). The 1980 German Patent Law also adds identical language. Patent Law of Dec. 16, 1980, supra note , Art. 3(1). Unsurprisingly, the provisions for an "international search" of the prior art in the Regulations promulgated under the Patent Cooperation Treaty, supra note , one of the main benefits embodied therein, use a universal definition of prior art: "relevant prior art shall consist of everything which has been made available to the public anywhere in the world by means of written disclosure (including drawings and other illustrations) . . . ." Rule 33.1 (Regulations Under the PCT as Amended, Sept. 29, 1993, in 2A Sinnott, supra note , App. 3-257 (1996)).

n127 Chisum, supra note , at 35, contra Note, Prior Art in the Patent Law, *73 Harv. L. Rev. 369, 373-74 (1959)* (arguing standard for what inventors/prior art searchers are expected to encounter is too high). Intensive searching also would reduce the resort to patent applications, which are very costly in themselves, often to no eventual purpose.

n128 Chisum has stated that "Retention of foreign-domestic distinctions in any area of United States patent law raises suspicions of discrimination against foreign nationals, and hence weakens the general United States position supporting equal national treatment in all countries." Chisum, supra note , at 3.05[5].

n129 *Gayler v. Wilder, 51 U.S. 477, 497 (1850).* Compare Art. 15(2) of the Jan. 2, 1968 German Patent Law (barring treaty to the contrary, patents will be canceled if "invention is exclusively or mainly applied outside Germany"), with the Dec. 16, 1980 statute (cancellation provisions deleted) (both statutes available in 2e Sinnott, supra note).

n130 Chisum, supra note , at 3.05[5] n.13 (citing *Sealectro Corp. v. L.V.C. Indus., Inc., 271 F. Supp. 835, 153 U.S.P.Q. (BNA) 610 (E.D.N.Y. 1967)* (determining whether a

joint invention by an American and an Englishman occurred in this country for purposes of the Invention Secrecy Act, *35 U.S.C. 184*-85)).

n131 Fed. R. Civ. P. 28(b).

n132 See note , infra, and accompanying text.

n133 Hague Convention on the Taking of Evidence Abroad in Civil or Commercial Matters, done at The Hague, Mar. 18, 1970, entered into force Oct. 7, 1972, *23 U.S.T. 2555, 8 I.L.M. 37.*

n134 *307 U.S. 5, 41 U.S.P.Q. (BNA) 155 (1939).*

n135 *Id. at 15, 41 U.S.P.Q. (BNA) at 157.* See also *Shimadzu v. Electric Storage Battery Co., 17 F. Supp. 42, 44 (E.D. Pa. 1936)* (Shimadzu's reduction); *17 F. Supp. at 49* (six U.S. patents, nos. 1,584,149; 1,584,150; 1,584,151; 1,584,152; 1,584,479; and 1,896,020, applied for from 1922-24); and *Shimadzu, 307 U.S. at 17-18* (petitioner's perfection of independent invention).

n136 The court acknowledged this: There is force in the petitioner's argument that the distinction seems illogical. Thus, if a diligent domestic inventor applies, in good faith believing himself to be the first inventor, 4923 [allowing good-faith domestic inventor to overcome prior foreign use or knowledge not yet patented or published overseas] assures him a patent and gives it priority, despite prior foreign use, even though that use is evidenced by a patent applied for after the invention made in this country. The foreign applicant or patentee cannot carry the date of his invention back of the date of application in this country, as the holder of a later patent for an invention made here would be permitted to do in order to establish priority. On the other hand, a domestic inventor who is willing to dedicate his invention to the public may be held as an infringer by reason of the later patenting of an invention abroad which antedates the invention and use in this country; and so is put in a worse position vis a vis a foreign inventor who subsequently secures a patent, and succeeds in establishing an earlier date of invention, than he would occupy if he had promoted his own interest by procuring a patent. *Shimadzu, 307 U.S. at 13-14, 41 U.S.P.Q. (BNA) at 158-59.* However, the Court declared itself unable to "rewrite the statute." *Id. at 14, 41 U.S.P.Q. (BNA) at 159.*

n137 The United States still is a "first-to-invent" country, despite the passage of certain TRIPS modifications within the Uruguay Round Agreements Act, Dec. 8, 1994, P.L. 103-465, 108 Stat. 4809. The United States has yet to switch to the first-to-file system.

n138 Act of August 8, 1946, 9, 60 Stat. 943, creating *35 U.S.C. 104* (1946).

n139 *35 U.S.C. 104* (1996). As Chisum points out, the apparent blanketing of foreign publication under "other activity" in this code produces its own anomaly: where the first inventor is foreign and publishes overseas before a domestic second inventor, neither one can obtain a U.S. patent. See Chisum, supra note , at 30-31.

n140 Patent Cooperation Treaty, Jun. 19, 1970, *28 U.S.T. 7645,* 1160 U.N.T.S. 231.

n141 North American Free Trade Agreement Implementation Act, *19 U.S.C. 3300* et. seq. (1996).

n142 Uruguay Round Agreements Act, Dec. 8, 1994, P.L. 103-465, 108 Stat. 4809.

n143 The amended section reads as of Jan. 1, 1996: 104. Invention made abroad. (a) In general. (1) Proceedings. In proceedings in the Patent and Trademark Office, in the courts, and before any other competent authority, an applicant for a patent, or a patentee, may not establish a date of invention by reference to knowledge or use thereof, or other activity with respect thereto, in a foreign country other than a NAFTA or a WTO member country, except as provided in sections 119 and 365 of this title. (2) Rights. If an invention was made by a person, civil or military - (A) while domiciled in the United States, and serving in any other country in connection with operations by or on behalf of the United States, (B) while domiciled in a NAFTA country and serving in another country in connection with operations by or on behalf of that NAFTA country, or (C) while domiciled in a WTO member country and serving in another country in connection with operations by or on behalf of that WTO member country, that person shall be entitled to the same rights of priority in the United States with respect to such invention as if such invention had been made in the United States, that NAFTA country, or that WTO member country, as the case may be. (3) Use of information. To the extent that any information in a NAFTA country or a WTO member country concerning knowledge, use, or other activity relevant to proving or disproving a date of invention has not been made available for use in a proceeding in the Patent and Trademark Office, a court, or any other competent authority to the same extent as such information could be made available in the United States, the Commissioner, court, or such other authority shall draw appropriate inferences, or take other action permitted by statute, rule, or regulation, in favor of the party that requested the information in the proceeding. (b) Definitions. As used in this section - (1) the term "NAFTA country" has the meaning given that term in section 2(4) of the North American Free Trade Agreement Implementation Act; and (2) the term "WTO member country" has the meaning given that term in section 2(10) of the Uruguay Round Agreements Act. *35 U.S.C. 104* (1996).

n144 See *35 U.S.C. 104*(a)(1), reproduced supra note . In interferences, a foreign inventor is allowed to rely on the date of introduction into this country. 3 Chisum, supra note 41, 10.03[3][c]. The purpose of introducing evidence of foreign knowledge or use of an invention would be to support a foreigner's claim that their invention was introduced into this country prior to another's invention here. See *Breuer v. DeMarinis, 558 F.2d 22, 194 U.S.P.Q. (BNA) 308 (C.C.P.A. 1977),* and generally Chisum, supra note , at 32.

n145 See *35 U.S.C. 104*(a)(3), reproduced supra note . The language allowing the drawing of "appropriate inferences" is "an important provision" protecting "domestic inventors whose priority date is being challenged by a foreign rival who either refuses to hand over evidence or lacks sufficient evidence to prove [their] position." Questel IPTO Alert, Oct. 18, 1995 (quoting in part Lois E. Boland, PTO attorney advisor, Office of Legislative and International Affairs).

n146 Antonio Gramsci, Universal Language and Esperanto, in History, Philosophy and Culture in the Young Gramsci 29-33 (Paul Piccone & Pedro Cavalcanti eds., 1976) (1918).

n147 See TRIPS Agreement, supra note , Art. 27.1 (prohibiting discrimination based on place of invention).

n148 It might be suggested that section 102 should then be changed merely to grant reciprocal recognition - that only use or knowledge in a WTO country, for instance, would be recognized. Here it is only worth noting that reciprocity has not always been the condition of recognition of foreign activity or national treatment in the history of U.S. patent law. See Chisum, supra note , at 27-28 and 28 n.8 (extension, after 1836 Act, to foreigners of right to obtain a patent was never tied to reciprocity, and goes beyond treaty obligations under Art. 2 of the Paris Convention).

n149 One commentator has stated "well, it only shows, anybody who has the muscle power and the money power, he will snatch whatever he can." Burns, supra note 9 (quoting reaction of Dr. Vadya Satya Pal to the Grace patent). See also Fred Pierce, Pesticide Patent Angers Indian Farmers, New Scientist, Oct. 9, 1993, at 7. Vandana Shiva's foundation organized over 100,000 farmers as signatories to the reexamination petition in the U.S. PTO. See Reexamination Petition, supra note , at 1-2 n.1 and Appendix I. The Reexamination Petition itself states: The prospect of these [GATT] patent law changes and the resulting effect of W.R. Grace's neem tree claims have sparked an outcry among Indian farmers, scientists, and political activists. They object to the fact that the patent grants the company rights to information which is the accumulation of centuries worth of Indian knowledge and effort. Additionally, Indian citizens are very concerned that W.R. Grace's patent will deprive local farmers of their ability to produce and use neem-based pesticides by altering the price and availability of the neem seeds themselves. There is already evidence that W.R. Grace's patent has forced many Indians out of the market for this locally-developed technology. Id. at 10-11 (citing 23 Ecologist 224, 225 (1993) and Farmers Burn Dunkel Effigy at Lal Quila Rally, Telegraph, May 9, 1995) The petition continues: many Indians are ethically opposed to the patenting of biological resources. These feelings are especially strong in regards to the neem tree because the tree has played such an important role within Indian culture and religion . . . It is important to remember that several Indian manufacturers vehemently refused to participate in W.R. Grace's initial patenting efforts because of their strong opposition to patents on native agricultural products. Reexamination Petition, supra note 23, at 21 (citing 23 Ecologist at 224).

n150 Nor, apparently, descendants: recently, an Indian government entity filed a reexamination request with the PTO asking it to revoke a U.S. patent claiming the use of tumeric to promote blood vessel growth in wound healing, again on the grounds that such techniques are well-known in traditional Indian medicine. Suman K. Das & Hari Har P. Cohly, Use of Tumeric in Wound Healing, U.S. Patent No. 5,401,504 (Dec. 28, 1993) (named inventors are non-resident Indian citizens); Gregory Aharonian, Internet Patent News Service (Jul. 24, 1996).

n151 In 1993, rioters destroyed the Bangalore facilities of the American seed corporation Cargill in reaction to a seed pricing dispute exacerbated by intellectual property conflicts over protection of hybrid lines.

n152 The foreign investment markets were forced to endure several tense months in the Fall of 1995 as the newly-elected Hindu nationalist (BJP) government of the state of Maharashtra canceled the Texan Enron Corporation's Dabhol power plant project, a contract worth over $ 2.8 billion, threatening no compensation for an alleged $ 300 million in sunk costs because the terms of the deal were thought to have been negotiated

with bribes to the previous government. The BJP, again resurgent in India, has long voiced opposition to the influx of Western consumer goods into India, its newest slogan being "We need computer chips, not potato chips." The Enron crisis is apparently over for the time being, the Dabhol project's terms having been renegotiated.

n153 E.g. "brain drain," biodiversity or cultural "IP" as silent outflow of intellectual capital, etc.

n154 Note the mirror-image connection between the incentive to importation (via piracy) produced by India's exclusions from patentability and the mercantilist theory of the early crown patent grants in England.

n155 As Rifkin points out:

What many Americans have not realized is that the anger, frustration and resentment in the developing countries against what they regard as piracy of their heritage is every bit as intense as the outrage that has been drummed up by the United States over the violation of our intellectual property copyrights in the developing world.

quoted in Burns, supra note 9, at D4.