CONTRACTUAL AND TECHNICAL RESTRICTIONS OF PATENT LIMITATIONS

INTELLECTUAL PROPERTY CONSEQUENCES FOR THE RIGHT TO FOOD[*]

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Technical restrictions

Gene splicing techniques have enabled the creation of many types of sexually reproducing plants with commercially attractive characteristics: increased nutritional value, resistance to drought and pests, herbicide resistance, medicinal properties, and many other valuable attributes.[1] To some, these transgenic plant varieties have been controversial. But even more controversial has been the application of recombinant DNA technology to restrict the use of such beneficial plant varieties.[2] These genetic use restriction technologies, or GURTs, curtail the saving of seed from year to year by rendering the progeny of proprietary seed sterile. Although the deployment of this technology has for the moment been restrained by adverse publicity, continued research and continued commercial interest in its application suggest that it is a question of when, not whether, the technology will be deployed.

GURTs are a controversial technological answer to the economic challenge impeding development of new plant varieties: that plants naturally reproduce themselves.[3] As a consequence, new varieties are relatively expensive to create, but are trivially inexpensive to propagate once they are in existence –

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1. *See* Keith Aoki, *Weeds, Seeds & Deeds: Recent Skirmishes in the Seed Wars*, 11 CARDOZO J. INT'L & COMP. L. 247, 268-76 (2003).

2. *See, e.g.*, Martha L. Crouch, Edmonds Institute, *How the Terminator Terminates: An Explanation for the Non-Scientist of a Remarkable Patent for Killing Second Generation Seeds of Crop Plants* (1998), *at* http://www.edmonds-institute.org/crouch.html (last visited Dec. 1, 2004).

3. William W. Fisher, *The Impact of Terminator Gene Technologies on Developing Countries: A Legal Analysis*, *in* BIOTECHNOLOGY, AGRICULTURE, AND THE DEVELOPING WORLD: THE DISTRIBUTIONAL

and, indeed, may propagate unintentionally. This "public goods" problem of distribution at a marginal cost close to zero is common in other areas of innovation, even where the subject matter does not reproduce itself.[4] Legal prohibitions have been the typical solution to this problem.[5] In the United States, trade secrecy and utility patents have been used to secure exclusive rights in transgenic plant varieties, as has a specific form of intellectual property granting plant breeders' rights. The Plant Variety Protection Act (PVPA),[6] the U.S. implementation of the international UPOV plant breeder's rights treaty, is specifically directed at encouraging development of new varieties of sexually reproducing plants by granting the developer broad control over the growth, use, importation, and sale of a new plant. But PVPA also includes some important exceptions to a seed developer's control, such as provisions allowing farmers to save seed from a proprietary crop,[7] or permitting agricultural research involving the plant.[8]

Plant variety owners might prefer that their control over the variety not be subject to such exceptions. Alternative forms of intellectual property, such as patent rights and trade secrecy may also be exhausted or surrendered with the sale of seed covered by such rights. Consequently, as a condition of access to their seeds, owners routinely require that farmers contractually waive their rights to save seed or engage in other legally permissible uses.[9] Often the terms of this contract are printed on or attached to the bag of seed; by using the seed, the contractual "fine print" purports that the farmer has agreed to the terms. However, it is difficult to police the use of seed and to enforce the terms of such "seed-wrap" licenses. To do so, seed developers must send agents out into farmers' fields to sample crops, looking for unlicensed users of proprietary seed.

IMPLICATIONS OF TECHNOLOGICAL CHANGE 137, 139 (Timothy Swanson ed., 2002).

4. *See generally* William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325 (1989).

5. *See generally* Peter J. Goss, *Guiding the Hand That Feeds: Toward Socially Optimal Appropriability in Agricultural Biotechnology Innovation*, 84 CAL. L. REV. 1395 (1996) (reviewing legal protection for plant innovation).

6. Plant Variety Protection Act, 7 U.S.C. §§ 2321-2583 (2000).

7. *See* 7 U.S.C. § 2543.

8. *See id.* § 2544.

9. *See* Mark D. Janis & Jay P. Kesan, *Intellectual Property Protection for Plant Innovation: Unresolved*

When such uses are found, costly legal procedures may be necessary to halt the use, force acceptance of a license, or recover unpaid royalties.

The breeder's problems of detection and enforcement might be lessened if seed could be designed to be "self-policing," that is, unsuitable for use without the developer's permission. GURTs allow for the creation of such "self-policing" seed. Genetic elements that produce a toxin late in seed development may be introduced into the plant variety.[10] The toxin kills the seeds after the plant has matured, producing a viable crop for the farmer, but forcing him to return to the seed producer for new seed each year. Even in the absence of a contractual obligation not to save seed, the technology makes saving seed impossible. Thus, the genetically altered seed in essence carries within its own makeup a prohibition on unlicensed use.

Indeed, the prohibitions embedded in such genetic code may be quite sophisticated. In one embodiment of the technology, it is possible to introduce into the seed a genetic "switch" that will repress, or turn off, the toxin production when the seed is exposed to a particular chemical.[11] This, in effect, supplies a chemical "password" to activate germination, which can be used to control the terms of seed usage from year to year. Yearly application of the control chemical, obtained from the seed owner for payment, would allow the owner to activate or deactivate seeds in return for prescribed payment. One can easily envision other types of switches, sensitive to temperature, precipitation, soil alkalinity, or other environmental factors, that could be used to limit use of the seed to certain geographical regions or seasonal applications. Indeed, plants could be engineered for various desirable properties - pest resistance, drought resistance, superior yield, and so on - and particular attributes activated or deactivated depending on the price paid by the purchaser.

Issues after J.E.M. v. Pioneer, 20 NATURE BIOTECHNOLOGY 1161, 1163-64 (2002).

10. *See* Crouch, *supra* note 2.
11. *See id.*

Legal restrictions

The description of seed licensing offered above bears an uncanny resemblance to the history of content licensing in digital media. Copyright law affords the owners of digital content some recourse against many unauthorized uses of their material,[12] but copyright is subject to a host of consumer uses that require no authorization from the copyright holder. Owners of digital content, much like seed owners, have long wished to escape the consumer privileges afforded by copyright law.[13] They have done so through the fiction of the mass-market or "shrink-wrap" license, which purports to restrict a purchaser's use of the accompanying product. But judicial treatment of these licenses has been mixed, and it is still extremely difficult for copyright holders to police such agreements. Consequently, copyright owners have begun deploying sophisticated software "lock-out" systems that prevent access to digitized content except on the terms dictated by the owner.[14]

The implications of this development are striking. Once constraints on behavior are built into the technical standards governing a technology, the technical standards effectively become a new method for governing use of that technology – in essence, the technical standards become a type of law. [15] Such technical rule sets may supplement or even supplant the legal rule sets designed to govern the same behavior.[16] The development of technological use controls, whether in software or transgenic corn, may substitute private technological rules for the public statutory rules declared by the legislature. Where control over the design of information rights is shifted into the hands of private parties, those parties may or may not honor the public policies that animate public access

12. *See* Charles R. McManis, *The Privatization (or "Shrink-Wrapping") of American Copyright Law*, 87 CAL. L. REV. 173, 175 (1999).

13. *See* Mark A. Lemley, *Intellectual Property and Shrinkwrap Licenses*, 68 S. CAL. L. REV. 1239, 1266 (1995).

14. *See* Dan L. Burk, *Anticircumvention Misuse*, 50 UCLA L. REV. 1095, 1132 (2003) [hereinafter *Anticircumvention*]; Dan L. Burk & Julie E. Cohen, *Fair Use Infrastructure for Rights Management Systems*, 15 HARV. J.L. & TECH. 41, 83 (2001); *see generally* Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-Out" Programs*, 68 S. CAL. L. REV. 1091 (1995).

15. *See* LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE 86 (1999); Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rule Through Technology*, 76 TEX. L. REV. 553, 554 (1998).

16. *See* LESSIG, *supra* note 15, at 213-30; Reidenberg, *supra* note 15, at 55.

doctrines such as the "farmer's exemption." Rights-holders can effectively write their own intellectual property statute in either software or DNA. Producers who employ lock-out technology may in essence become private legislatures, imposing rules of usage without regard to the broader public interest that informs democratic rule-making.

Indeed, the exclusivity conferred by technological restriction may be far more complete than that conferred by a legally enforceable license: legal safeguards are far "leakier" than technological safeguards. Where exclusivity over a plant variety is conferred by a contract, the purchaser may decide to breach the agreement, risk detection of the breach, and risk possible enforcement of the agreement. But technical protections are not so easily ignored; absent a high degree of technological sophistication, the purchaser will not have the option of ignoring an unwelcome, overreaching, or even illegal restraint on use of the plant variety.[17] Consequently, technological control over a patented plant variety could extend well beyond the life of a patent.

Note that this outcome could be contrived through a variety of strategies. Deployment of the GURT itself might confer an extended quasi-monopoly over use of the genetic invention so long as the technical protection is not easily circumvented and the entry of competing plant varieties into the market is impaired. More likely, the GURT might be coupled with contractual terms that extend the term of exclusivity beyond that of a patent. For example, the GURT-protected variety might be accompanied by a license that, rather than being directed to genetic improvement that is the subject of the expired patent, is directed to the GURT itself – GURTs may themselves be patentable, and a license for use of a GURT-protected variety might effectively capture the value of a genetic modification protected by the GURT. The accompanying license might also be styled as permission to access the GURT-protected variety: GURTs can be designed to be deactivated by a particular chemical "password," and an

17. *See generally* Crouch, *supra* note 2.

accompanying license might purport to trade GURT deactivation for agreement not to save seed, reverse engineer the seed, and so on.

Legal limitations

If technical constraints mimic private law, it may be that those constraints mimicking illegitimate contractual terms should be considered prohibited, preempted, or void. This point has perhaps been argued most forcefully by Julie Cohen, who suggests that the coercive power of the state should be extended in support of technological constraints no farther than it may be to enforce statutory or contractual constraints.[18] Stated differently, it makes little sense to allow rights holders to achieve via technological constraints outcomes that are disfavored or prohibited when implemented as contract.

For example, the jurisprudence of utility patent licensing for plants could closely parallel the employment of GURTs and GURTs-enabled licenses for plants, either because the technological protection confers exclusivity analogous to patent protection, or because the GURT itself is patented, and tampering with it may trigger patent liability. Patent rights are extensive, but they are not unlimited, and their exercise may be constrained by the doctrines of exhaustion, misuse, or by antitrust considerations. These doctrines might similarly be recruited to constrain analogous GURTs deployment.

However recent cases considering the breadth of patent protection over plant varieties offer little in the way of constraint upon patent licenses that might constrain GURTs related licenses. For example, there appears to be little constraint on the obliteration of PVPA exemptions via patent law. In the United States, the permissibility of overlapping patent and PVPA protection has been addressed by the United States Supreme Court in the much-ballyhooed decision *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International,*[19] where the defendant, accused of saving seed in violation of a patent-based "seedwrap" license,

18. *See* Julie E. Cohen, *Some Reflections on Copyright Management Systems and Laws Designed to Protect Them*, 12 BERKELEY TECH. L.J. 161, 172-79 (1997).

19. 534 U.S. 124 (2001).

challenged the propriety of utility patent protection for plants. The applicability of utility patents to plant varieties was upheld by the Court.

Much of the holding in *J.E.M.* rested upon the questionable conclusion that the patent and PVPA statutes are in some fashion compatible, so that no inference might be drawn that Congress did not intend the two statutes to overlap. But in fact this conclusion of compatibility is demonstrably erroneous given that patent protection is entirely incompatible with the research and farmer's exemptions in the PVPA. The overlay of patent law onto PVPA subject matter negates these exemptions in the same fashion that patent protection overrides the reverse engineering exemption for software. Whatever public benefit or constituent balance Congress intended for the exemptions is thus lost, much as it would be with the overlay of GURTs upon plant varieties.

U.S law regarding the limitations on patent "seedwrap" licensing have been similarly permissive, as in the leading case *Monsanto Co. v. McFarling* (*McFarling I*)[20], another lawsuit dealing with seed saved in violation of a "seedwrap license."[21] In challenging the Monsanto "seedwrap" agreement, McFarling argued that Monsanto's rights in the seeds and their progeny were exhausted upon sale of the seed. In a subsequent appeal from summary judgment, McFarling also claimed that the terms of the license constituted a patent misuse, tying a license for the first generation seeds to a license for the second generation seeds.[22]

Under the doctrine of patent exhaustion, the patent owner's rights to a particular embodiment of the claimed invention are exhausted after transfer, although he may still hold the right to prevent making, use, sale, offering for sale, or importation of the claimed invention. [23] Because the exclusive rights of the patent owner include the right to exclude *all* uses, the sale of a patented item is typically assumed to entail a license for the normal and customary "use" of the

20. 302 F.3d 1291 (Fed. Cir. 2002).
21. *See McFarling I*, 302 F.3d at 1294.
22. Monsanto Co. v. McFarling, 363 F.3d 1336, 1341 (Fed. Cir. 2004) [*McFarling II*].
23. *See* 35 U.S.C. § 271 (2000).

product – the purchaser would be highly unlikely to purchase a product which he was excluded from using in any manner whatsoever.

But the Federal Circuit held that patent exhaustion can be negated by explicit terms in the sale or license of the patented product, and that prohibiting the planting of second generation seeds within the patent could not constitute misuse without some showing of anticompetitive effects. The court rejected McFarling's claims regarding misuse as unproven, but this holding was primarily an evidentiary matter, without any serious analysis as to the dimensions of the relevant markets and Monsanto's market power in those markets. In an increasingly consolidated seed industry, the concomitant concentration of patents and market power in the hands of a very few firms deserves more serious scrutiny. Under such conditions, the technological "lock-out" effect of GURTs may be even greater than those of exclusive rights under patent law. I have suggested elsewhere that anticompetitive conduct and misuse constraints ought to apply in the context of digital rights management,[24] and they could equally well prove applicable in some situations of GURTs deployment.

Conclusion

Deployment of genetic use restriction technologies raises serious policy concerns over the substitution of private technological regimes for publicly enacted legal regimes. The key cases regarding the application of patent and patent licenses leave unanswered serious serious questions about the routine deployment of "seedwrap" licenses and about the intellectual property regimes applicable to transgenic plant varieties, let alone any new or more exotic set of issues. Extending the results of such cases to technological substitutes is highly problematic, leaving the legal propriety of GURTs deployment in substantial doubt for the foreseeable future.

24. *See* Burk, *supra* note 16.