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1996

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#### Recommended Citation

Richard A. Epstein, "Property Rights in cDNA Sequences: A New Resident for the Public Domain," 3 University of Chicago Law School Roundtable 575 (1996).

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# Property Rights in cDNA Sequences: A New Resident for the Public Domain

RICHARD A. EPSTEIN<sup>†</sup>

Professor Rebecca Eisenberg has provided us with an exhaustive and useful account of the recent dispute over patent protection for large-scale complementary DNA ("cDNA") sequencing.<sup>1</sup> Stripped to its essentials, the dispute arose as follows. Scientists at the National Institute of Neurological Diseases and Stroke developed the initial techniques for the discovery of cDNA sequences and the ability to isolate certain "expressed sequence tags" ("ESTs") within the cDNA sequences. These gene tags permit investigators to identify the larger active DNA strands of which they are a part and provide information that might be used to develop drugs and other end products that, if successful, could command a handsome return in the marketplace.

No one doubts, I think, that any novel processes used to isolate these gene tags are entitled to receive patent protection. But researchers also sought patent protection for the non-"junk DNA" tags themselves, even though their exact functions were not clearly established. In the end, these patent applications were rejected.<sup>2</sup> Our post mortem, therefore, must consider the implications of this incident for future applications.

While I make no strong claim to expertise on patent law, I yield to no one in my enthusiasm for the institution of private property. Notwithstanding the latter and perhaps because of the former, I am puzzled as to why Professor Eisenberg hesitates to condemn these claims. I can hardly conceive of a weaker case for patent protection than this one. To outline the reasoning behind this conclusion, I shall divide my response into two parts. Part I gives a quick overview of the rules governing the acquisition of property rights both in things and inventions. Part II applies the principles behind property rights to the cDNA dispute.

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1. See Rebecca S. Eisenberg, *Intellectual Property at the Public Private Divide: The Case of Large-Scale cDNA Sequencing*, 3 U Chi L Sch Roundtable 557 (1996).

2. See *id.* at 563; James Boyle, *Shamans, Software and Spleens* 9 (Harvard 1996).

## I. Property and Patents

The common law rules governing private property made no provision for patents, but were keyed to the protection of a *specific thing* that was found by the defendant and was otherwise unowned. The rules applied both to land and to movables, such as driftwood on the beach. The law allowed for the capture of the unowned fox on a barren beach in *Pierson v Post*.<sup>3</sup> But in all cases the payoff was limited. The first possessor took the ownership of the particular tangible thing—*period*. The classical writers on property delighted in the rule because they believed that everything deserves, or at least needs, an owner.<sup>4</sup> By assigning that right to the first possessor, the law makes it clear who can farm the land, carve the wood, or skin the fox—no small advantages. But for animals, the rule that firmed up property rights in the individual animal allowed the species to be hunted to extinction. Therefore, other collective limits had to be devised and were.<sup>5</sup> The first possession rule had its limits as well as its uses.

Moreover, the first possession rule functions fitfully with respect to property rights in ideas. For example, it protects the owner of the first telephone, which is fine, but does not give the inventor the exclusive right to produce telephones, which is not so fine. The first possession rule ignores the fact that the payoff from research and development comes not in the ownership of the specific thing, but in the use of the key ideas and plans to produce a line of similar products. The common law rules of first possession allow anyone to assemble the needed materials and to make telephones identical to those produced by the original inventor. Free riding on the inventor's research and development costs, the subsequent producer of telephones will likely sell telephones at a lower price. Facing that threat, the original inventor may well withdraw from the field if he knows that his first customer could become his victorious low-cost competitor. To prevent this result, patent law protects the inventor against the use of his invention by others. No longer are property rights embedded solely in the tangible objects to which the common law rules assign owners. Instead, the property rights conferred by patent law extend to classes of things, present and future, that fall within the scope of the patent. Unfortunately, it is much more difficult to define the scope of a patent than the boundaries of a parcel of land, the confines of a piece of wood, or the body of a fox. So just how broad should a patent be?

In dealing with the acquisition of physical objects, the social considerations that lurk behind the definition of property rights are not called into high relief.

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3. 3 Cai R 175 (NY 1805).

4. "Its true basis [of the priority for the first possessor] seems to be, not an instinctive bias towards the institution of Property, but a presumption, arising out of the long continuance of that institution, that *everything ought to have an owner*." Henry S. Maine, *Ancient Law* 257-58 (Murray 12th ed 1888).

5. For the now classic exposition on the origin of trapping territories, see Harold Demsetz, *Toward a Theory of Property Rights*, 57 Am Econ Rev 347, 352, 353 (1967).

It is sensible enough to assign to one person exclusive and perpetual rights when a specific piece of land, a specific chattel, or a specific wild animal is at stake. The old maxim that "only he who sows shall reap" recognizes the obvious truth that a crop can be harvested only once. So, the right to harvest has to be assigned to the party who planted the crop, if planting is to take place at all. Similarly, a given animal can be captured and used but once. As a result, the incentives for its capture and use are best situated, so long as overhunting is combated in some other fashion, if that right belongs to the party who reduced the animal to possession in the first place.

With patents, on the other hand, the calculation is far trickier. Just because it is imperative to give the inventor of the telephone protection that goes beyond the specific telephone he makes, it hardly follows that his patent protection should be infinite either in scope or duration for all telephones however and whenever designed. Some protection of exclusive rights after invention, at the back end of the process, seems necessary to create incentives for spurring inventions and discoveries at the front end. In this context, however, exclusivity comes at a far higher price because others who could use this idea profitably for nothing are now required to defer their use to the holder of the patent monopoly. The basic social choice is strictly functional and instrumental. We must decide whether the incentives for the creation of these inventions and discoveries are large enough to justify the restrictions on output that follow when rights over invention or discovery are vested exclusively in the inventor and discoverer.

While there is widespread agreement in the literature about the imperative necessity of making this tradeoff, there is far less agreement as to how to make it. Theorists on the patent law form a mysterious and inveterate set of fine-tuners, who argue constantly about the size of the trade-offs in particular contexts. They attempt to achieve a balance where the extent of protection is sufficient to spur the first round of invention without unduly dulling the second.

The problem is further complicated because there are no legal rules that require individuals to patent their inventions once they are made. As the word "patent" itself suggests, the patent is patent (with a long "a"), as opposed to latent. The particulars of the invention must be disclosed in full in order to receive legal protection. Yet individuals who have developed certain processes to produce standard goods often do not want to publish the details of their inventions because others could build the suitable apparatus themselves and sell their standardized output at low prices without ever disclosing that their activity infringes the patent of another. To forestall this result, some inventors prefer to keep their inventions secret. These trade secrets are then disclosed only to those individuals who agree by contract to use the invention solely for limited purposes and not to disclose its key features to others. Therefore, one cost of supplying insufficient patent protection is to encourage an excessive migration into trade secrets, which are of indefinite duration, so long as the secret can be kept.

## II. The cDNA Dispute

I am in no position to hazard a responsible guess as to the optimal scope and length of patent protection in some hypothetical generic case. But I do have a strong reaction about the prospect of patent protection for cDNA sequences. Try as I might, I cannot comprehend how these applications could have been regarded as giving rise to a respectable case for patent protection. Rather, this controversy seems to present an oasis of simplicity surrounded by a sea of doubt. Professor Eisenberg presents us with a taut narrative that treats the correct resolution of the dispute as a close matter, but she never quite gives us her bottom line. Not being an expert in the area, I am not so bashful. It is hard to conceive of a weaker case for patent protection than these cDNA tags. The scope of the claimed protection is enormous. It is quite literally as though the hunter who bagged the first fox gets an exclusive right to capture every member of the species. However, the logic of extending cDNA tags such expansive protection is just not there. For example, as Eisenberg reports, Merck & Co., Inc., which is no stranger to the patent wars, has provided an extensive fund to Washington University in St. Louis in order to help pay for the production of cDNA tags that will be immediately placed in the public domain. Other private institutions, including universities, also appear to be willing to chip in to help cover the costs of these enterprises.<sup>6</sup> This collective enterprise may well be fraught with some risk, for if the patent applications of the private firms, Human Genome Sciences and Incyte Pharmaceuticals, are ever granted, then this public database would infringe the patent. Both the parties who have assembled the database and those who have used it could be liable. The ensuing legal snarls promise handsome annuities to patent lawyers and their squads of expert witnesses and could only slow down the research process that depends on access to this database.

So why tolerate the patent? Within the logic of the patent tradition, the only possible explanation for this untoward development is that exclusion is part of the regrettable cost of new discoveries. In this context, however, no society should make so lopsided a bargain or be presumed to have made one by allowing for generalized patent protection. The cDNA sequences are not some hidden secret. Right now many research groups and firms are out to discover them. So long as at least one group is prepared to place its discoveries in the public domain, and to do so at a rapid rate, then why use the patent laws to secure innovation? It is not as though the private companies are fashioning some new bacteria or virus with commercial application, as was the situation in *Diamond v Chakrabarty*.<sup>7</sup> In that case, patent protection was accorded, rightly in my view, for the creation of a new organism not found in nature.<sup>8</sup> In the present imbroglio, we have all the inconveniences of exclusion

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6. See Eisenberg, 3 U Chi L Sch Roundtable at 569-70 (cited in note 1).

7. 447 US 303 (1980).

8. Id at 313 ("Congress thus recognized that the relevant distinction was not between living and inanimate things, but between products of nature, whether living or not, and

at the back end, without any of the compensating social advantages of innovation at the front end. Instead of allowing the uncertainty to place a pall over innovation, the sensible course of action is to categorically reject any and all applications for patent protection.

Then, the line between the public and private domain will continue to shift, but only in desirable ways. Individual firms can still treat the cDNA sequences they discover as trade secrets. They can sell their wares to private buyers, subject to suitable covenants against public disclosure. In undertaking these sales or licenses, they can make the appropriate business judgments about whether the use of their cDNA sequences should be given on an exclusive or nonexclusive basis. They can decide on whether to take their compensation in a lump sum, by royalty, or both. Also, they can select whatever information sharing arrangements they desire. No one in the public sector need decide which of these business arrangements are desirable and which are not, for the firms are quite able to do this by themselves. The public list of cDNA sequences, supported by Merck and others, will still remain available to the world and will compete with trade secret arrangements. Whether these private firms can survive is hard to say, but the rapid collection, compilation and organization of the data might well continue to justify the hefty sums collected today.

In some sense, none of this matters at all. If private firms cannot add value to the library of cDNA sequences, then their efforts should cease or be redirected toward using the publicly available cDNA sequences to make patentable products. Professor Eisenberg is right to observe that it is odd, to say the least, for the NIH, as a public agency, to argue for patentability, while Merck, a private firm, pays cash on the barrelhead to keep cDNA sequences in the public domain.<sup>9</sup> But irony is not our major concern. The key inquiry concerns the soundness of our basic institutional arrangements in light of the moves that private parties have made and are likely to make again in the future. I can see no reason to award any form of patent protection to the firms that first discover some critical cDNA sequences. If we grant patents for the discovery of cDNA tags, we might as well say that Madame Curie should be entitled to a patent for radium since she first isolated it from pitchblende. Quite simply, the cDNA sequences belong in the public domain.

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human-made inventions.”).

9. Eisenberg, 3 U Chi L Sch Roundtable at 561 (cited in note 1).

