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Semicommons in Fluid Resources

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SEMICOMMONS IN FLUID RESOURCES

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INTRODUCTION

Intellectual property has an exclusion problem. Much of the current controversy over intellectual property appears to stem from the excessive exclusion that intellectual property law affords the holders of rights—rights that derogate from the public domain and prevent what would otherwise be use that does not directly harm anyone. To the economist, it is the nature of information as a resource that causes us our ambivalence about exclusion rights to information: if information can be consumed at zero marginal cost, exclusion is an unalloyed bad. The only rationale for intellectual property would be as an incentive to produce the information in the first place, but once it is produced, we implement exclusion only with regret and should not do so if there is a cheaper way to provide an incentive for the production of information. Given that exclusion looks like a colossal waste, many would hold that one or more of these alternatives—from prizes to social recognition—simply has to be better.[1]

And intellectual property is not the only area in which exclusion proves

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1. *See, e.g.*, MICHELE BOLDRIN & DAVID K. LEVINE, AGAINST INTELLECTUAL MONOPOLY (2008); *see also* JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008).

controversial. As with information, many would claim that property rights of any sort in water, and especially those involving prior appropriation as in the American West, are inherently wrong and violate human rights.[2] Similar ire is directed against proposals for property rights in the radio spectrum and on the Internet.[3]

From these perspectives, property itself would appear to be the problem. It is property that erects the metaphorical fences around information, spectrum, water, and other resources with public goods characteristics; it is, therefore, property that so many would like to do away with.

In this lecture, I would like to propose a somewhat different diagnosis. Property is indeed at the heart of these questions over rights in fluid resources. However, I will argue that the picture of property is incomplete. Once we understand how property meets its own challenges, we will be in a position to see how problems involving intellectual property, water, spectrum, and so on—what I will call "fluid resources"—can be, and sometimes are, solved rather than created by means of property institutions. In particular, I will show that fluid resources are very likely to call for hybrid property systems combining private and common elements—a semicommons—and require much more fine-tuning through rules governing property use than do more-familiar kinds of resources.

To begin with, the notion of exclusion is not uncontroversial in property. People disagree about how central exclusion is to the notion of property (if there is such a notion!), and how far it should be pushed.[4] Further, if we do

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2. *See, e.g.*, Karen Bakker, *The "Commons" Versus the "Commodity": Alter-globalization, Anti-privatization and the Human Right to Water in the Global South*, 39 ANTIPODE 430 (2007); Joseph W. Dellapenna, *The Importance of Getting Names Right: The Myth of Markets for Water*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 317 (2000).

3. *See, e.g.,* YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006); LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (2001); *see also* Jon M. Peha, *Approaches to Spectrum Sharing*, IEEE COMM. MAG. (Feb. 2005).

4. *See, e.g.*, J.W. HARRIS, PROPERTY AND JUSTICE 30–32 (1996); J.E. PENNER, THE IDEA OF PROPERTY IN LAW 68–74 (1997); Larissa Katz, *Exclusion and Exclusivity in Property Law*, 58 U. TORONTO L.J. 275 (2008); Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 731 (1998); *see also* Henry E. Smith, *The Thing About Exclusion*, 3 BRIGHAM-KANNER PROP. RTS. J. 95 (2014). Trespass is a sovereignty-based tort. *See* Arthur Ripstein, *Beyond the Harm Principle*, 34 PHIL. & PUB. AFF. 215 (2006). For use-based critiques of emphasizing exclusion, *see, e.g.,* Eric R. Claeys, *Exclusion and Exclusivity in Gridlock*, 53 ARIZ. L. REV. 9, 17–28 (2011) (reviewing MICHAEL HELLER, THE GRIDLOCK ECONOMY: HOW TOO MUCH OWNERSHIP WRECKS MARKETS, STOPS INNOVATION, AND COSTS LIVES (2008)); Adam Mossoff, *What Is Property? Putting the Pieces Back Together*, 45 ARIZ. L. REV. 371, 395–97 (2003). For critiques of the importance of exclusion, *see, e.g.*, HANOCH DAGAN, PROPERTY: VALUES AND INSTITUTIONS 37–55 (2011); Gregory S. Alexander, *The Social-Obligation Norm in American Property Law*, 94 CORNELL L. REV. 745 (2009).

implement exclusion strategies in "regular" property, they lead to many of the same problems identified in the controversies over intellectual property, water, and the other mentioned resources, but often to a lesser extent. Whether for fluid or regular resources, exclusion always comes at a cost in terms of delineation and enforcement effort—and in terms of forgone harmless use. Intellectual property and water law problems are indeed problems, but they are property problems.

And yet, the difficulties in intellectual property, water law, spectrum, and the like are in a sense special, and bear a family resemblance. I will argue here that all these resources are "fluid" resources, and that it is precisely the intersection of fluid resources with the institutions of property that inevitably leads to challenges in managing potentially conflicting use. Once we can account for the nature of that use and for the actual function of the property institutions, we will see that property law is not the villain of this piece, but a highly flexible set of tools that allows for a surprisingly wide range of institutional responses to conflict.

What is a fluid resource? I am going to argue that certain resources are not just hard to bound, but are even hard to separate into legal things. Their uses are hard to isolate, period. Just as a legal thing is similar to, but different from, a physical thing, so economic and legal "fluidity" is similar to but different from physical fluidity—physical fluidity will typically lead to legal fluidity. Physical fluids deform continuously under shearing stress, and they flow in characteristic ways; this makes it difficult to keep track of particular bits of a fluid (compared to solids), and the study of fluids is statistical and aggregate.[5] For our purposes, legally and economically fluid resources will be defined as those for which separation between groups of uses is difficult.[6] As we will see, one way to pick out a broad class of uses for protection is to define a legal thing and protect it using an exclusion strategy. By definition, this is difficult in the case of fluid resource because any separation into classes of uses is itself difficult. Not impossible, though. The question becomes which set of separations and other devices to employ—if any—to manage the complex set of potentially conflicting uses of these resources. The problem is similar to, but a more extreme version of, that obtaining in the case of more-familiar non-fluid resources.

For the fluid resources we care most about, their fluidity leads to a dilemma. Many fluid resources are valued by multiple users and for multiple types of

5. *See, e.g.*, BRUCE R. MUNSON ET AL., FUNDAMENTALS OF FLUID MECHANICS 3 (7th ed. 2013).

6. For an early take on this idea, *see generally* Henry E. Smith, *Governing Water: The Semicommons of Fluid Property Rights*, 50 ARIZ. L. REV. 445 (2008).

uses, sometimes on very different scales. At the same time, because of the fluid nature of the resource, the uses cannot easily be kept separate for purposes of tracking by the legal system. This has implications for how property will be delineated in such resources, if at all. The strategies for delineation range between two poles.[7] On one side are exclusion strategies, in which rough proxies of access are used to protect a range of uses. Trespass and the *ad coelum* rule are the prototypical methods of implementing such a strategy. At the other pole is governance, whose proxies focus in on smaller classes of uses for special treatment. Many institutions can zero in on particularly important uses; nuisance, servitudes, and land use regulation all do so, even though very different institutions supply them. In the case of fluid resources, we will see that the cost of exclusion and the benefits of singling out uses both push away from exclusion and toward governance, as a matter of degree.

Thus, these resources are often subjected to a regime of semicommons, in which different interacting uses are subject to different property regimes, some private and some common.[8] The problem is that when the uses interact and are not fully legally separated, actors can engage in strategic behavior—a user in one use may proceed with a view to gaining in another class of uses. The incentives in a hybrid system can be worse than in pure private property or pure commons; sometimes strategic behavior will allow shifting more than a proportionate cost to others and grabbing disproportionate benefits.[9] A historical example of a semicommons is the open-field system of medieval and early modern Europe, where peasants would own scattered long thin strips for purposes of grain-growing, which they would be obligated to throw open for common grazing after harvest and in fallow periods.[10] Circumstantial evidence suggests that the thin, scattered strips prevented strategic behavior—participants could not, during the common-use period favor, with extra manure land that would be theirs in the private-use period, and could not direct damaging trampling towards the strips of others.[11]

This essay will begin with the notion of fluid property and the special problems to which it gives rise. Part II will show how these problems are dealt with in water law. In Part III, a similar picture is painted for intellectual property. The parallel institutions in both areas are more extremely governance-oriented, as we would expect from the delineation cost account. I

7. Henry E. Smith, *Exclusion Versus Governance: Two Strategies for Delineating Property Rights*, 31 J. LEGAL STUD. S453, S467 (2002).

8. Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131 (2000).

9. *Id.*

10. *Id.*

11. *Id.*

conclude with some thoughts on the use of property talk in intellectual property.

I. FLUID PROPERTY

If exclusion is controversial in water and intellectual property, this very controversy is not unknown to property law either. In property theory itself there is a lively debate about the importance of, and desirability or undesirability of, exclusion. One might think, though, that the debate is different, in that intellectual property and, for some purposes, water are nonrival resources. This is true, but it should be kept in mind that one of the costs of exclusion in regular property is forgone use. Not every use that an excluded actor would make of a resource would conflict with that of an owner or possessor. And yet the right to exclude, combined with transaction costs, will preclude that kind of use, along with those that are truly harmful. Trespass does not include a harm requirement, unlike the law of nuisance and many other torts.

As noted in the introduction, exclusion has been a flashpoint in intellectual property as well as property. In other works, I suggest that a fixation on exclusion—for or against—is often a stand-in for ambivalence over the role of the *thing* in property. Thus, the right to exclude can be exaggerated as a *sine qua non* of property because it is doing the work of the thing as a starting point.[12] While it is true that notions of possession and exclusion strategies key off the thing more directly than do governance strategies, effacing the role of the thing makes the "right to exclude" look like a particularly important stick in the bundle or an essential feature, which runs into trouble when we get to property rights such as easements. By the same token, those who seek to deemphasize exclusion are often the ones who are most against property as a right in a thing, or who dismiss talk of things altogether.[13]

When it comes to intellectual property, it might appear that some of the debate over exclusive rights might likewise be really about the problematic status of things in intellectual property. And there is some truth to this, too. Nevertheless, the problem may loom larger than it needs to because of an impoverished notion of legal *thing*.

Whether something is a *thing* depends on whether it can be treated separately. This separation need not be absolute or complete. Separation is also not the same phenomenon as exclusion.[14] One can have a thing without

12. Smith, *The Thing About Exclusion, supra* note 4.

13. *See, e.g.,* Tom Grey, *The Disintegration of Property*, *in* NOMOS XXII: PROPERTY 69, 69–80 (J. Pennock & J. Chapman eds., 1980). For discussion, *see* Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 357–58, 365 (2001).

14. PENNER, *supra* note 4.

exclusion, but exclusion depends on the thing. Frederick Pollock defines a legal *thing* as "some possible matter of rights and duties conceived as a whole and apart from all others, just as, in the world of common experience, whatever can be separately perceived is a thing."[15] Picking up on this line of thought, James Penner sets forth, in addition to his thesis that exclusion is the formal basis of property (his exclusion thesis), an equally important separation thesis, which is a theory of the "thinghood" of objects of property:

> Only those "things" in the world which are contingently associated with any particular owner may be objects of property; as a function of the nature of this contingency, in theory nothing of normative consequence beyond the fact that the ownership has changed occurs when an object of property is alienated to another.[16]

The nature of the thing helps determine what kind of property we can have in it. There are actually two kinds of "thing" that are involved in property: actual things in the world and legal things. The latter depends on the former. As Pollock notes:

> [O]n the whole perhaps we have good ground for saying that the "thing" of legal contemplation, even when we have to do with a material object, is not precisely the object as we find it in common experience, but rather the entirety of its possible legal relations to persons. We say entirety, not sum, because the capacity of being conceived as a distinct whole is a necessary attribute of an individual thing. What the relations of a person to a thing can be must depend in fact on the nature of the thing as continuous or discontinuous, corporeal or incorporeal, and in law on the character and the extent of the powers of use and disposal which particular systems of law may recognize.[17]

Thus, the characteristics of physical things are easy for the law to track when defining legal things. An umbrella as a legal thing is not that interestingly different from a physical umbrella. When it comes to land, legal definition does more work, under the *ad coelum* rule.[18] Exclusion, through the law of trespass,

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15. Frederick Pollock, *What Is a Thing?*, 10 L.Q. REV. 318 (1894); *see also* FREDERICK POLLOCK, A FIRST BOOK OF JURISPRUDENCE 121 (1896) ("A thing is, in law, some possible matter of rights and duties conceived as a whole and apart from all others, just as, in the world of common experience, whatever can be separately perceived is a thing.").

16. PENNER, *supra* note 4, at 111.

17. Pollock, *supra* note 15, at 320–21.

18. *See generally* Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PA. L. REV. 2083 (2009).

keys off this definition of the legal thing.[19] Finally, when it comes to intangibles, legal definition does the most work.[20]

There are costs and benefits to legal thinghood. In terms of benefits, the question is how much our additional efforts at defining a legal thing promote the purposes of property. For tangible objects this includes managing literally conflicting uses. In the case of intangibles, uses do not conflict in this way. Instead, the purpose of defining intangibles is to have a method to get at something else—a set of activities, some of which may involve tangible resources.[21] Thus, in intellectual property, the information itself is nonrival, but the legal thing is a stand-in for the activities and resources surrounding the information, much of which comes under the heading of commercialization. Therefore, labor, lab space, and resources used in marketing are all rival. The returns from them are appropriable and more easily transferable because we can get at them through rights in legal things like inventions and expressions.

This brings us to the cost side of the ledger. While it is true that we tend to think of things as things when we want to define ownership in them,[22] not everything is equally easy to delineate as a thing. As already mentioned, there is an everyday ontology involving physical things that may well preexist our desire to establish ownership. So, in the case of personal property, the ability to regard something as a separate thing is often not much of a constraint on property. Cultural artifacts would be easy to treat as transferable commodities, but sometimes legislation prevents this. The problem with slavery is that it is wrong—people are not legal things or objects of rights—not that it is hard to delineate rights in people. Organs in place are not fully separable, but if one can own one leg of mutton,[23] we might be able to delineate property rights in organs in place. Nonetheless, this would be offensive from a moral and policy point of view.

The constraint on the cost side of delineating things, and by extension rights to them, looms large for fluid property. Fluid property is almost by definition property in things that are hard to separate. Hard and thus costly, but not impossible.

Separation into legal things is an example of modularity in law.[24]

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19. *See generally id.*

20. *See* Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381, 417–19 (2005); *see also* Emily Sherwin, *Two- and Three-Dimensional Property Rights*, 29 ARIZ. ST. L.J. 1075, 1080–92 (1997).

21. *See generally* Smith, *Institutions and Indirectness in Intellectual Property*, *supra* note 18.

22. Tony Honoré, *Ownership*, *in* MAKING LAW BIND 161, 179–81 (Oxford University Press 1987).

23. Pollock, *supra* note 15, at 318–19.

24. *See generally* Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691

Modularity is a matter of degree.[25] If clusters of interactions can be found in which elements interact within the component, but not across component boundaries, the system is fully decomposable and modularity can be complete.[26] More common is what Herbert Simon called near-decomposability.[27] A nearly decomposable system can be separated into modules such that that interaction is intense within the modules and relatively sparse between them.[28] The intense interactions can thus happen inside without causing hard-to-predict ripple effects throughout the system.[29]

In fluid resources, it is costly to achieve thingness in terms of both delineation and forgone benefit. In other words, modularization is necessarily incomplete because a system of interactions surrounding such resources is a less decomposable system. On the cost side, clusters of uses are harder to separate than they are in regular property. Physical fluidity, as is well known, makes a resource hard to bound. It is very hard to contain water, measure its flows (compared to measuring a solid object), and monitor use. If boundary crossing can be used in the case of land as a proxy for violation in trespass and in much of the law of nuisance, this is not possible in water law. And it is much more difficult in the case of intellectual property than for tangible property. Invention space is hard to describe, let alone to bound.[30]

At the same time, multiple uses of fluid resources are highly beneficial. In some ways this is the flip side of the cost. If two uses of the resource are valuable, then it is highly unlikely that they can be separated. So we will wind up with a rights structure or a collection of privileges that can be characterized as "multiple" use of a larger unbounded resource. Or we can delineate things, but, again, it will be valuable for multiple actors to have "access."

Once we allow for multiple access, strategic behavior becomes a danger. In terms of the strategies for delineating property rights, we must either give up on property rights altogether or move to some kind of governance regime. Where multiple use is valuable, but not very separable, various more fine-grained proxies will have to be used at the interface between legal modules (in intellectual property, things like inventions or expressions) in order to prevent

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(2012). On modularity, *see, e.g.,* CARLISS Y. BALDWIN & KIM B. CLARK, DESIGN RULES: THE POWER OF MODULARITY 58–59, 236–37, 257 (2000); HERBERT A. SIMON, THE SCIENCES OF THE ARTIFICIAL 209–10 (2d ed. 1981).

25. *See generally* Smith, *Property as the Law of Things, supra* note 24.

26. *See generally id.*

27. *Id.* at 1701.

28. *Id.*

29. *Id.*

30. *See generally* Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719 (2009); Peter S. Menell, *Governance of Intellectual Resources and Disintegration of Intellectual Property in the Digital Age*, 26 BERKELEY TECH. L.J. 1523 (2011).

damaging spillovers from activities. Again, this is not directly a matter of rival use. If intellectual property gets indirectly at commercialization activities, the question is how someone else's activity might interfere with appropriability and transferability. Relatively on/off violations of rights are just a crude first cut. In fluid resources, this first cut is likely to be particularly rough. Put differently, exclusion strategies, to the extent they can be used, will be especially indirect in the case of fluid resources. And around this first cut, especially because of its crudeness, we need to deal with strategic behavior.

All structures of property rights face what might be termed the Property Dilemma. Property's modularization and separation facilitate specialization. Someone whose use is protected behind an exclusion strategy based on legal things will be the residual claimant to that thing. As is true elsewhere, from organizations to computer programs, modularization promotes specialization. Owners can develop familiarity and even expertise in using their assets, secure in the ability to reap the reward. Contracting for this kind of separation would be prohibitively costly. Because this separation cannot be achieved by contract alone, it is a true contribution of property law.[31] Separation is an "essential role" of property law.[32]

Separation cannot be complete. The system of interactions with respect to resources is, after all, only nearly decomposable (if that). As a result, modularization and separation lead to the potential for strategic behavior (opportunism). First of all, owners will care excessively about their assets and not for those of others or those of the public. This is the familiar externality problem. But wherever proxies for protecting uses are inaccurate, we have to worry about those who would exploit this gap. On the owner side, there can be some spiteful behavior (spite fences) and what Dan Kelly calls strategic externalities: engaging in an offensive land use in order to be paid off.[33] A classic example was the Chicago livery stable scam, in which someone would quickly open a livery stable in a residential area solely in order to be paid to

31. *See* Brian Angelo Lee & Henry E. Smith, *The Nature of Coasean Property*, 59 INT'L REV. ECON. 145–155 (2012).

32. *See id.* at 152; *see also* Henry E. Smith, *Property as Platform: Coordinating Standards for Technological Innovation*, 9 J. COMPETITION L. & ECON. 1057, 1061 (2013). I take the term "essential role" from Hansmann and Kraakman, who argued that affirmative asset-partitioning could not be achieved by contract and so was the essential role of organizational law. Henry Hansmann & Reinier Kraakman, *The Essential Role of Organizational Law*, 110 YALE L.J. 387, 406–07 (2000). They noted that asset partitioning was a "property" institution. *Id.* We can add that asset partitioning is a special case of more general separation into modules. *See* Smith, *Property as the Law of Things, supra* note 24, at 1722.

33. *See generally* Daniel B. Kelly, *Strategic Spillovers*, 111 COLUM. L. REV. 1641, 1667–68 (2011).

shut down.[34] Another type is extreme holdout behavior, which might be described as abuse of right.[35] As we will see, exercises of rights against their purpose might lead to equitable withholding of remedies or even equitable intervention. And the potential for opportunism exists on the non-owner side, too. Even if a court gets damages right on average, a violator who can predict error can cherry-pick entitlements to violate.[36] This, too, could lead to extortion.

Strategic behavior leads to the use of governance strategies to delineate rights, and such governance strategies include equitable interventions. There are many possible governance strategies, and it is an important question in comparative institutional analysis, which is the least bad problem of strategic behavior. Most straightforwardly, rules of proper use limit the amount of an activity, such as grazing on a village common. Occasionally, clever boundary placement can serve a governance function. In the semicommons of the medieval open fields, carving the land into long thin strips in the private property period made strategic behavior costlier.[37] Additionally, and more conventionally, rules of property use can be created by participants or governments to contain strategic behavior.[38] Many of the examples dealt with by Elinor Ostrom involved large groups in control of a common pool of resources instituting governance regimes to solve the problems of conflict and overuse among themselves.[39] Governance strategies will refer to particular relatively narrow classes of use.[40] In real property, governance devices include servitudes, nuisance, and land use regulation.[41] Each is supplied by a very different set of institutional actors, but all focus in on particular classes of uses, to a far greater extent than do exclusion strategies.

For very systematic problems, new forms of separation and governance have been devised. One can separate out control from beneficial ownership (the trust or corporation) or from possessory ownership (common-interest communities). Far from being a challenge to notions of private property, as Adolf Berle and Gardiner Means thought,[42] the separation of ownership and

34. *Id.* at 1645.

35. *Id.* at 1710–12.

36. *See generally* Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719, 1774 (2004).

37. Smith, *Semicommon Property Rights, supra* note 8, at 132.

38. *See generally id.* at 138–44.

39. *See generally* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990); *see also* GARY D. LIBECAP, CONTRACTING FOR PROPERTY RIGHTS 29–34, 36–37 (1989).

40. Smith, *supra* note 7, at S455–56, S467–74.

41. *Id*. at S456.

42. *See generally* ADOLF A. BERLE & GARDINER C. MEANS, THE MODERN CORPORATION

control is property-like separation of a different, more refined sort. Like other forms of modularization, this allows specialization at some cost of strategic behavior, including the agency costs familiar from the commentary on corporate law.[43] Tom Merrill and I have termed this kind of property that allows for organizational-style separation "entity property."[44]

Finally, an important set of governance tools comes under the heading of equity. As I argue elsewhere, equity is a targeted "meta" law—law about law.[45] Certain problems are worth the extra cost of solving at a higher level that can override the results of regular law. In systems theory and cybernetics, this is referred to as "hierarchy."[46] Among the problems calling for this second-order intervention are what Lon Fuller called "polycentric tasks," including complex conflicting rights.[47] They also notably include opportunism,[48] or what used to be called constructive fraud.[49] As we will see, fluid property often involves complex interactions—due to lack of separation—and openings for opportunism. As expected, equity has played an important role in both areas.

II. MANAGING WATER

Water law has occupied an important and yet ambivalent place in property theory. Water law is sometimes viewed as a challenge to conventional notions of property, especially those notions based around exclusion.[50] Ironically, it is also used as support for such theories, at least when it comes to the emergence of prior appropriation in the western United States.[51]

AND PRIVATE PROPERTY (1932).

43. Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305, 355 (1976).

44. THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 646–47 (2d ed. 2012).

45. Henry E. Smith, *Equity as Second-Order Law: The Problem of Opportunism* (Harvard Pub. L., Working Paper No. 15-13, 2015).

46. *See, e.g.*, Francis Heylighen & Cliff Joslyn, *Cybernetics and Second-Order Cybernetics*, *in* ENCYCLOPEDIA OF PHYSICAL SCIENCE & TECHNOLOGY 165 (R.A. Myers ed., New York: Academic Press 3d ed. 2001). *See generally* A.Y. Aulin-Ahmavara, *The Law of Requisite Hierarchy*, 8 KYBERNETES 259–66 (1979).

47. Lon L. Fuller, *The Forms and Limits of Adjudication*, 92 HARV. L. REV. 353, 394–95 (1978).

48. OLIVER E. WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM 47 (1985). *See also* Henry E. Smith, *Why Fiduciary Law Is Equitable*, *in* PHILOSOPHICAL FOUNDATIONS OF FIDUCIARY LAW 261–84 (Andrew S. Gold & Paul B. Miller eds., Oxford University Press 2014).

49. JOSEPH STORY, COMMENTARIES ON EQUITY JURISPRUDENCE: AS ADMINISTERED IN ENGLAND AND AMERICA 327 (Hillard, Gray & Co. 1836).

50. Eric T. Freyfogle, *Context and Accommodation in Modern Property Law*, 41 STAN. L. REV. 1529, 1530 (1989).

51. Dean Lueck, *The Rule of First Possession and the Design of the Law*, 38 J.L. & ECON. 393, 429 (1995); *see also* CHARLES J. MEYERS & RICHARD A. POSNER, MARKET TRANSFERS OF WATER

Seeing property as the elaboration of separation and modularization in a system of complex interactions allows a different and more realistic account of water law.[52]

Water is a fluid resource. It is a literal fluid, and this is reflected in water law. Water is notoriously hard to delineate. In the formative period of water law, very rough measurement in terms of type and length of use was the best that could be done.[53] Typically, measurement happens upon transfer (if allowed), in order to protect those with the right to return flow.

Let's start with riparianism, which is the system obtaining in most of the United States and in England. Riparianism is based on reasonable use and thus can be analogized to nuisance.[54] It is, therefore, clearly a governance regime. And, if anything, riparianism is moving further in that direction, as it is being subjected to a regulatory overlay.

Yet there is more to riparianism than pure governance. First, riparian rights are not open-ended. They are appurtenant to adjacent land.[55] This gives them an exclusive character even beyond the closed community that has access.[56] By being appurtenant to land, they become part of the modular package of rights in land and thus rest on the foundation of exclusion in land law.[57] Under riparianism, water rights cannot be severed from riparian land, and doctrines to prevent excessive fragmentation are required to police the rough proxy of adjacency to the watercourse, which defines access in this exclusionary regime.[58] Further, water withdrawn from the watercourse can be used only on riparian land.[59] Even some of the use-governance has a rough modular character, as where so-called natural wants such as drinking, household uses, and cattle raising have per se priority over artificial wants such as irrigation (in a nonarid climate) and power generation.[60]

As with nuisance, riparianism involves evaluating conflicting rights and using rules of thumb to reconcile them. Often this is done in the course of deciding on an injunction. Equity courts played a major role.

RIGHTS: TOWARD AN IMPROVED MARKET IN WATER RESOURCES 290 (National Water Commission, Legal Study No. 4, NTIS No. NWC-L-71-009, July 1971) (proposing property rights to return flows).

52. Smith, *Governing Water*, *supra* note 6, at 447.

53. Nicole L. Johnson, *Property Without Possession*, 24 YALE J. ON REG. 205, 218–19 (2007).

54. Olivia S. Choe, *Appurtenancy Reconceptualized: Managing Water in an Era of Scarcity*, 113 YALE L.J. 1909, 1914 (2004).

55. *Id.* at 1916.

56. *Id.* at 1917, 1920.

57. *Id.* at 1917–18.

58. *See generally id.* at 1923–27.

59. *Id.* at 1923.

60. Evans v. Merriweather, 4 Ill. 492, 495 (1842).

Prior appropriation has received much attention from property theorists. Often it is taken as an example of the Demsetz Thesis, in which property rights emerge when resources increase in value and externalities become worse.[61] In arid climates, we thus get more "parcelized" water law, as exemplified in the famous case of *Coffin v. Left Hand Ditch Co*.[62] Carol Rose pointed out that the use of water in the East had more public-goods characteristics than in the West, and this helped shape water law in the two areas.[63] Evidence of parcelization comes from its system of priorities based on first diversion for a beneficial use, and (in some times and places) its transferability.

While it is true that prior appropriation does put in effort to define rights in water separately from land and in that sense is more exclusionary, upon closer look, prior appropriation is very much a governance regime, in keeping with the fluid character of the resource. First of all, rights are defined in terms of use, and even quantification is based on rough measurement of use. Prior appropriation does not give a right to all water diverted, but only so much as is consumed in the particular pattern of use at the time of diversion.

Because of high measurement costs, and the benefits of multiple use, water is difficult to separate and requires more emphasis on advanced forms of separation and governance to contain strategic behavior.[64] First of all, it is necessary to acknowledge that, in both use and transfer, there remain many important third-party effects.[65] Partly this is the result of the desirability of multiple use. Strikingly, return flows are appropriable by downstream users. This probably allows for more thorough use of the watercourse at any given time, but at the cost of making transfers more cumbersome.[66] In a further governance aspect of the system, transfers are subject to the no-injury rule, which means that in a transfer the new diversion point and the new use cannot place a greater impact on downstream junior appropriators than the old use

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61. Smith, *Semicommon Property Rights, supra* note 8, at 143–44; Jedidiah Brewer, Robert Glennon, Alan Ker & Gary Libecap, *Transferring Water in the American West: 1987–2005*, 40 U. MICH. J.L. REFORM 1021, 1024–25 (2007).

62. 6 Colo. 443, 446 (1882). The court stated:

> The climate is dry, and the soil, when moistened only by the usual rainfall, is arid and unproductive; except in a few favored sections, artificial irrigation for agriculture is an absolute necessity. Water in the various streams thus acquires a value unknown in moister climates. Instead of being a mere incident to the soil, it rises, when appropriated, to the dignity of a distinct usufructuary estate, or right of property.

63. Carol M. Rose, *Energy and Efficiency in the Realignment of Common-Law Water Rights*, 19 J. LEGAL STUD. 261, 262, 293–95 (1990).

64. *See generally* Smith, *Governing Water, supra* note 6; *see also* Freyfogle, *supra* note 48.

65. Ronald N. Johnson, Micha Gisser & Michael Werner, *The Definition of a Surface Water Right and Transferability*, 24 J.L. & ECON. 273 (1981).

66. George A. Gould, *Water Rights Transfers and Third-Party Effects*, 23 LAND & WATER L. REV. 1, 21 (1988); *see also* Johnson, Gisser & Werner, *supra* note 63, at 279–83.

did.[67] As with riparianism if not more so, prior appropriation is being overlaid with public regulation.

Unlike riparianism, organizational—or entity—property plays a large role in prior appropriation.[68] Additional internalization is achieved by institutions that can be characterized as entity property.[69] Mutuals and water districts allow for separation of a group or a watershed for separate legal treatment.[70] They promote modules of an extended sort. Within these overall modules, there is separation of function inside the entity, in terms of management and use.[71] Water entities, especially mutuals, make intra-entity transfers of water much smoother than corresponding external transfers.[72] Water districts mix entity property and public functions.[73]

Finally, equity has played a major role in prior appropriation law.[74] This is expressed in the full arsenal of equitable principles, such as maxims and defenses, when courts consider injunctions.[75] Courts also can draw on equitable apportionment doctrine to solve particular problems of conflicting rights in interstate contexts.[76] Apportionment is a classic example of the second-order solution to problems of complex, conflicting rights. And equity courts had historic equity jurisdiction over custom, which was a source of early prior-appropriation water law.[77]

In both riparian and prior-appropriation systems, private and public rights interlock so tightly that it makes sense to see them as different versions of semicommons.[78] The elaborate structures are a response to the access afforded by the mix of private and common property elements in the system of water law.

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67. Freyfogle, *supra* note 50, at 1539.

68. *See generally* Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671 (1993).

69. *Id.* at 718–20.

70. *Id.*

71. *Id.*

72. *Id.*

73. *See id.*; Smith, *Governing Water, supra* note 6, at 472.

74. Duane Rudolph, *Why Prior Appropriation Needs Equity,* 18 U. DENV. WATER L. REV. 348, 351–52 (2015).

75. *Id.* at 365–66.

76. *Id.* at 351–52.

77. *See generally* DAVID SCHORR, THE COLORADO DOCTRINE: WATER RIGHTS, CORPORATIONS, AND DISTRIBUTIVE JUSTICE ON THE AMERICAN FRONTIER (2012); MARK KANAZAWA, GOLDEN RULES: THE ORIGINS OF CALIFORNIA WATER LAW IN THE GOLD RUSH (2015).

78. Smith, *Governing Water, supra* note 6, at 449–50.

III. THE INTELLECTUAL PROPERTY SEMICOMMONS

Information is a fluid resource, as discussed earlier. As with water, separation and exclusion are costly, and multiple interlocking uses are desirable. Thus, from both ends, intellectual property cannot rely on even nearly accurate rules of access. The on/off proxies on offer do an even worse job than those in tangible property at getting at the class of uses we are interested in. This is particularly true because the proxies used in intellectual property are at some remove from the rival resources they are protecting—the resources that go into commercialization, in particular.[79] Thus, what we are left with are crude exclusion devices and heavier use of governance. In intellectual property, we find both.

To begin with, exclusion has its limits in intellectual property. This is well known in some of its aspects. Nevertheless, exclusion serves a similar function to that in regular property—but at some remove. Intellectual property and patent law, in particular, employ modular, indirect exclusion rights to help solve a complex coordination problem of attributing returns to rival inputs to development of nonrival information.[80] Because accurate exclusion proxies are unavailable, a combination of crude exclusion and extensive governance must be used (if anything will be).[81] A major difference between patent and copyright is that there is more reliance in the former on crude exclusion than there is in copyright.[82] Modularity is particularly important in patent law where commercialization looms large.[83] And thing-style delineation is probably even more difficult in copyright than in patent law.[84] As is familiar, an expression is inherently difficult to isolate. Copyright employs use more in terms of entitlement definition.[85]

In both patent and copyright, the semicommons is a major element, and much of the recent work on semicommons comes from the intellectual property area.[86] The doctrine of fair use in copyright creates a semicommons where

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79. *See generally* Smith, *Institutions and Indirectness in Intellectual Property, supra* note 18, at 2090–2113.

80. *See generally id.*; Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1751–53 (2007).

81. Smith, *Intellectual Property as Property, supra* note 80, at 1817–19.

82. *Id.* at 1800.

83. *See generally id.* at 1814–15.

84. *Id.* at 1799–1800.

85. *Id.* at 1799–1814.

86. *See* BRETT M. FRISCHMANN, INFRASTRUCTURE: THE VALUE OF SHARED RESOURCES 302–03 (2012); *see also* Robert A. Heverly, *The Information Semicommons*, 18 BERKELEY TECH. L.J. 1127, 1184 (2003); Peter K. Yu, *Intellectual Property and the Information Ecosystem*, 2005 MICH. ST. L. REV. 1, 11 (2005); Lydia Pallas Loren, *Building a Reliable Semicommons of Creative Works: Enforcement of Creative Commons Licenses and Limited Abandonment of Copyright*, 14 GEO. MASON

private and public rights interact over the same resource.[87] In patent law, norms of scientific research have, at least until recently, allowed for sharing with fellow academics and private exclusion with respect to commercial users.[88] Many of the collective-rights and standardizing organizations that grow up around intellectual property rights mix private and public rights in a semicommons.[89]

Indeed, when holders of intellectual property rights contract in a group, the result is often a complex mix of private and group entitlements. This goes for contracts for joint ventures and looser organizations governing collective rights, such as copyright organizations and patent pools. It is even true in a limited way in standard-setting organizations, where much attention has been given to the problems of potential strategic behavior in which participants will let their (perhaps hidden) private intellectual property interests affect their behavior with respect to deliberations on the choice of standards.[90] A variety of governance mechanisms, including equitable intervention, are used (and can be used further) to contain such strategic behavior.[91]

As in regular property, servitudes are also a major contracted-for source of governance for intellectual property. In intellectual property, licenses tend to be more robust than in regular property. They are the means by which owners of intellectual property can set up a governance structure around specific rights. Through doctrines like exhaustion in patent law and first sale in copyright law, the law sets limits on what can be accomplished through intellectual property licenses, and some limits make sense in keeping property rights from becoming too idiosyncratic and expansive. Intellectual property licenses present problems that go beyond those of regular property. Molly Van Houweling shows that these "new servitudes" present greater problems of notice and the potential to conflict downstream.[92] These problems are related to the fluid nature of the property. As an example of conflict, Van Houweling considers GPL Version 2 and the Wikipedia GNU Free Documentation License, each of which requires licensees who are incorporating the work to license their own work on the same terms.[93] The specific terms of openness can require different

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L. REV. 271, 296–97 (2007); Smith, *Institutions and Indirectness in Intellectual Property, supra* note 18; *see also* Jonathan M. Barnett, *The Illusion of the Commons*, 25 BERKELEY TECH. L.J. 1751, 1761 (2010).

87. *See generally* Heverly, *supra* note 86, at 1183–84.

88. Robert P. Merges, *Property Rights Theory and the Commons: The Case of Scientific Research*, 13 SOCIAL PHIL. & POL'Y 145, 157–59 (Summer 1996).

89. Smith, *Institutions and Indirectness in Intellectual Property, supra* note 18, at 2111.

90. Smith, *Property as Platform*, *supra* note 32, 1079–80.

91. *Id.* at 1059, 1078–88.

92. *See generally* Molly S. Van Houweling, *The New Servitudes*, 96 GEO. L.J. 885 (2008).

93. *Id.* at 941–42.

conflicting actions.[94] This is less of a problem in real property, in which easements are tied to non-overlapping areas. Likewise, "new servitudes" can exceed the entitlement baseline, as Microsoft's Vista EULA exceeded the copyright baseline.[95] By contrast, in real property, the thing-based bubble around land (and similarly for chattels) prevents this leakage from the modules.

Finally, equity has a role to play in countering strategic behavior in intellectual property law. As Gergen, Golden, and I have argued, when the United States Supreme Court adopted in *eBay v. MercExchange*[96]—under the banner of "traditional principles of equity," a novel four-part test for issuing injunctions, it replaced, ironically, a more traditional approach that was tailored well for dealing with opportunistic behavior.[97] Under the *eBay* test, the movant must show:

> (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.[98]

Unlike the truly traditional approach to injunctions, this test makes no reference to good faith, which is directly tied to opportunism. Although the test mentions "disproportionate hardship," traditionally that formula described a safety valve in situations where an injunction would normally issue, but where there was gross disparity of hardship on the defendant. The disproportionate or undue hardship defense was not a balancing test seeking equipoise.[99] When dealing with opportunism, there is a strong case for the traditional disproportionate-hardship defense in the patent realm.[100] Also, the traditional

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94. Eliminating this problem of potential conflict required elaborate and controversial relicensing by the Wikimedia Foundation. Niva Elkin-Koren, *Tailoring Copyright to Social Production*, 12 THEORETICAL INQUIRIES L. 309, 340–41 (2011).

95. *See generally* Van Houweling, *supra* note 92 at 941–42.

96. eBay, Inc. v. Mercexchange, LLC, 547 U.S. 388, 390 (2006). The Court has employed this test outside the patent context. Monsanto Co. v. Geertson Seed Farms, 561 U.S. 139, 156 (2010).

97. *See* Mark P. Gergen, John M. Golden & Henry E. Smith, *The Supreme Court's Accidental Revolution? The Test for Permanent Injunctions*, 112 COLUM. L. REV. 203, 243–45 (2012).

98. *eBay, Inc.,* 547 U.S. at 391.

99. Gergen, Golden & Smith, *supra* note 97, at 246; *see also* Douglas Laycock, *The Neglected Defense of Undue Hardship (and the Doctrinal Train Wreck in Boomer v. Atlantic Cement*), 4 J. TORT L. 3, 29–31 (2011).

100. *See* Herbert F. Schwartz, *Injunctive Relief in Patent Infringement Suits*, 112 U. PA. L. REV. 1025, 1045–46 (1964); *see also* Vincenzo Denicolò, Damien Geradin, Anne Layne-Farrar & A. Jorge Padilla, *Revisiting Injunctive Relief: Interpreting* eBay *in High-Tech Industries with Non-Practicing Patent Holders*, 4 J. COMPETITION L. & ECON. 571, 602–03 (2008); Smith, *Institutions and*

gross-disparity approach allowed courts to take into account the possibility of opportunism not just on the part of patent-owning trolls, but also on the part of potential infringers, who might use the possibility of undercompensatory damages as a weapon.[101]

Likewise, in standard-setting organizations, some of the problems of opportunism can be handled by equity. Doctrines like unclean hands and estoppel—in addition to the real, traditional approach to injunctions—can counteract unfair surprise that may come up.[102] Limited enforcement of custom can also have an anti-opportunism effect.

CONCLUSION

Property rights involve separation along various dimensions, promoting specialization at the cost of inviting strategic behavior. Because separation is especially difficult and multiple use is especially important in fluid resources, fluid property is likely to be subject to a semicommons. In property—"regular," intellectual, and entity—a range of governance regimes, some off the rack and some contractual, can deal partially with strategic behavior stemming from separation. These tools are especially prominent in both water law and intellectual property, as expected for a fluid property regime.

Indirectness in Intellectual Property, supra note 18, at 2131; Gergen, Golden & Smith, *supra* note 97; *cf.* ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY 165–69 (2011).

101. Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 IND. L. REV. 351, 390 (2007); *see also* Smith, *Property as Platform, supra* note 32, at 1084; *see generally* Smith, *Property and Property Rules, supra* note 36.

102. Smith, *Property as Platform, supra* note 32, at 1078–88.