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PROPERTY AS THE LAW OF THINGS

*Henry E. Smith**

INTRODUCTION

Private law deals with the interactions of persons in society. If we think about all the effects produced by the relation between each pair of persons and then unlimited chains of such interactions — *A* sells Blackacre to *B*, who sells to *C*, who mortgages to *D* and rents to *E*, and so on — then prescribing results for such interactions is a potentially intractable problem. Private law would be an impossible enterprise. This is where property comes in.

Property is a platform for the rest of private law. The New Private Law takes seriously the need for baselines in general and the traditional ones furnished by the law in particular. And nowhere is this issue of baselines more salient than in property. I argue that the baselines that property furnishes, as well as their refinements and equitable safety valves, are shaped by information costs. For information-cost reasons, property is, after all, a law of things.

Property as a law of things, however, suffers from a serious image problem in American legal theory. In stark contrast, other legal systems treat property as a right to a thing and property law as the “law of things.”¹ An “in rem” right originally meant a right “in a thing,” and I argue that it is the mediation of a thing that helps give property its in rem character — availing against persons generally.

But if legal realism and its progeny insisted on anything, it was that property is *not* about things.² According to this conventional wisdom, property is a bundle of rights and other legal relations availing between persons. Things form the mere backdrop to these social relations, and a largely dispensable one at that. Particularly with the rise of intangible property, so this story goes, the notions of ownership

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¹ See, e.g., NIGEL FOSTER & SATISH SULE, *GERMAN LEGAL SYSTEM AND LAWS* 493 (4th ed. 2010) (explaining *Sachenrecht* in accordance with its name as the law of things); 2 A.N. YIANNOPOULOS, *LOUISIANA CIVIL LAW TREATISE: PROPERTY* §§ 12, 15 (4th ed. 2011); Yun-chien Chang & Henry E. Smith, *An Economic Analysis of Civil Versus Common Law Property*, *NOTRE DAME L. REV.* (manuscript at 37–39), available at <http://ssrn.com/abstract=2017816>.

² See, e.g., Felix S. Cohen, *Transcendental Nonsense and the Functional Approach*, 35 *COLUM. L. REV.* 809, 815 (1935) (“The circularity of legal reasoning in the whole field of unfair competition is veiled by the ‘thingification’ of *property*.”); see also *infra* Part I.

and property have become so fragmented and untethered to things that property is merely a conclusion, a label we affix to the cluster of entitlements that result from intelligent policymaking.³ By contrast, according to the realist and postrealist conventional wisdom, the traditional baselines provided by property law not only were undertheorized and underjustified, but also represented a pernicious superstition and an obstacle to clear thinking and progressive remaking of the social order.⁴ An inclination to take traditional property baselines seriously can then be dismissed as a failure to get with the program and a reflection of lack of sophistication or a partiality for entrenched interests.

I want to suggest that this familiar picture has things exactly backward. It is the extreme realist picture that is myopic, inflexible, and ultimately unworkable and the traditional baselines that, while in need of constant improvement, are very worthy of explanation and a good deal of respect. The point is not to restore prerealist formalism but to ask why property sometimes is formal and sometimes is not.

The first step toward understanding private law is to try not to take things for granted and to be as attentive to how things are *not* as to how things are. As we will see, this type of detachment makes some room for formalism, which is somewhat ironic because commentators since the legal realist era have generally criticized prerealist “formalism” for being complacent and taking traditional baselines and doctrine as given. Whether that was ever so, it is first of all important to distinguish between, on the one hand, making open-ended inquiries about property law and, on the other, building open-ended inquiry into the decisionmaking processes of judges and others operating the system of property law. There is nothing inconsistent about a highly contextual explanation of a system that itself eschews context — is “formalist” — in important respects. One might have a highly complex theory of traffic patterns and still conclude that it is best to promulgate flat speed limits and a duty to stop at red traffic lights and stop signs regardless of the amount of traffic in the other direction. We must avoid confusing the ordinary level of analysis *within* a system with the metalevel of propositions *about* that system. In this Article I argue that at a metalevel, the bundle of rights is hardly a theory of property at all and that an architectural approach to property can do much better.

To get anywhere, we have to be clear about the difference between means and ends in property. Property has purposes and employs vari-

³ Thomas C. Grey, *The Disintegration of Property*, in NOMOS XXII: PROPERTY 69 (J. Roland Pennock & John W. Chapman eds., 1980).

⁴ *Id.*; Cohen, *supra* note 2, at 815–16; see also Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 357–58, 365 (2001).

ous means to serve them. The purposes of property relate to our interest in using things.⁵ Desirable features of a system of property — stability, promotion of investment, autonomy, efficiency, fairness — relate to the interest in use. There is no interest in exclusion per se. Instead, exclusion strategies, including the right to exclude, serve the interest in use; by enjoying the right to exclude through torts like trespass, an owner can pursue her interest in a wide range of uses that usually need not be legally specified. For certain important potential use conflicts, the law specifies uses more directly, either through private law (property governance regimes, torts, contracts), public regulation, or custom. What realism and the bundle of rights typically fail to do is to distinguish between the purposes of property and the various means — trespass, nuisance, servitudes, zoning, and custom — to achieve them. Realism tends to assume a one-to-one and relatively direct relationship between the features of property and the purposes they serve, and not surprisingly, realists also regard property as plastic and responsive to policy-oriented refashioning. Once we recognize the distinction between our interest in using things and the institutions that property law sets up to serve those interests, the role of property baselines as a means for achieving property's ends becomes clearer.

This Article argues that an information-cost account of the means property uses to serve its ends helps explain many features of property — and how they work together to achieve property's purposes. Property is a shortcut over the “complete” property system that would, in limitlessly tailored fashion, specify all the rights, duties, privileges, and so forth, holding between persons with respect to the most fine-grained uses of the most articulated attributes of resources.⁶ Property starts by taking advantage of the fact that some connections among people, uses, and attributes of things are more important than others. Property organizes this world into lumpy packages of legal relations — legal things — by setting boundaries around useful attributes that tend to be strong complements. The law of property in effect encapsulates these lumpy packages, or modules, semitransparently from other modules and the outside world generally.⁷ Thus, property defines things using an exclusion strategy of “keep off” or “don't touch” and then enriches the system of domains of owner control with interfaces using

⁵ J.E. PENNER, *THE IDEA OF PROPERTY IN LAW* 70 (1997); Christopher M. Newman, *Transformation in Property and Copyright*, 56 *VILL. L. REV.* 251, 260 (2011); Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 *YALE L.J.* 1742, 1751–53 (2007).

⁶ See Thomas W. Merrill & Henry E. Smith, *Making Coasean Property More Coasean*, 54 *J.L. & ECON.* (forthcoming 2012) (Harvard Law & Econ. Discussion Paper No. 688, 2011; Columbia Pub. Law Research Paper No. 11-262, 2011) (manuscript at 25–27), available at <http://ssrn.com/abstract=1758846>.

⁷ Smith, *supra* note 5, at 1748–49.

governance strategies.⁸ These strategies zoom in on relations between neighbors in the case of land, and between owners (and their things) and other parties in the case of both land and personal property.

Importantly, taking the architectural view raises the overlooked question of why things could not be otherwise. Why not use governance rules all the time? Why does property seem to be related to the notion of a thing and to residual claims? Why is the right to exclude important but also easy to overstate as the be-all and end-all of property? I will show that an architectural theory of property based on information costs and the advantages of using modularity to manage complexity can help answer those questions in a unified fashion. At the same time, such a theory shows how property fits, with its thing-based baselines, into the larger picture of private law.

Part I argues that much of what travels under the heading of “property theory” fails to be a theory. The bundle picture in particular lacks a parsimonious account of the structure of property. By contrast, Part II shows how an information-cost account of property does provide an explanation — even if only a partial one — for many of property’s features and their interrelation. The complexity of interactions among legal actors is managed by breaking them into components, in a modular system of law, and this process begins with defining the modular things of property. Part III evaluates the modular theory in terms of its explanatory power and draws out some of its implications in areas from trespass to entity property. Part IV shows how regarding property as a law of modular things helps define the baselines needed for private law in general.

I. WHAT IS A THEORY OF PROPERTY?

What makes for a good theory of property is not different from what makes for a good theory of anything else. But the advent of the New Private Law is a good occasion for taking stock of how current property theories stack up as theories. I argue that the bundle of rights by itself is more of a description than a theory and that the more

⁸ See Steven N.S. Cheung, *The Structure of a Contract and the Theory of a Non-Exclusive Resource*, 13 J.L. & ECON. 49, 64 (1970); Barry C. Field, *The Evolution of Property Rights*, 42 KYKLOS 319, 321–29 (1989); Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 9–36. See generally Henry E. Smith, *Exclusion Versus Governance: Two Strategies for Delineating Property Rights*, 31 J. LEGAL STUD. S453 (2002). It is worth noting that strategies for managing rights to use open-access resources tend also to rely on simple, easily known rules, which also economize on information costs. See, e.g., Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1322–23, 1334–35 (1993) (discussing conditions under which internal social control can handle large events); Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 739–49 (1986) (describing simple regimes employed by a self-organizing public to manage open-access resources).

extreme versions of the bundle of rights fail to be a theory at all — in contrast to a modular theory of property, and to property as a thing in particular.

The bundle-of-rights picture of property draws on social science and accordingly aspires to be a scientific theory of property.⁹ To be sure, other types of theorizing, based on a more interpretative methodology and seeking coherence as a main goal, are also compatible with the New Private Law. But in this Article I accept the social-scientific theoretical style of the bundle in order to show that an information-cost theory succeeds better on those terms.

As with scientific theories in general, a property theory should aim to explain more facts with less machinery.¹⁰ Multiple criteria make theories harder to compare. The difficulty of testing a theory in isolation from a research program and the very nature of theory testing can be glossed over for now because I argue that the modular theory both captures more facts and uses less machinery than the pure bundle of rights. A good theory should also not be purely reactive: at the very least, the theory should frame what would count as counterevidence,¹¹ or the research program of which the theory is a part should lead to the discovery of new facts.¹² A theoretical description should have some predictive value in that it should correctly lead us to expect certain property systems under a new set of conditions and to predict what if anything should be invariant across legal systems. In other words, a parsimonious and accurate description of the existing property system or systems should generalize in a straightforward way to new circumstances.

Does the bundle meet these criteria for good theorizing? The bundle has at its core a basic ambiguity: it is both an analytical device and a family of theories of property that elevate that analytic device to a central place. As an analytical device, the bundle of rights theory harks back to Wesley Newcomb Hohfeld and before, in attempts to

⁹ See, e.g., BRUCE A. ACKERMAN, PRIVATE PROPERTY AND THE CONSTITUTION 26–31, 97–103 (1977) (contrasting the “scientific” perspective that views property as a bundle of rights with the “layman’s” perspective that persists in thinking of property as rights to things).

¹⁰ See BAS C. VAN FRAASSEN, THE SCIENTIFIC IMAGE 87 (1980) (“When a theory is advocated, it is praised for many features other than empirical adequacy and strength: it is said to be mathematically elegant, simple, of great scope, complete in certain respects: *also* of wonderful use in unifying our account of hitherto disparate phenomena, and most of all, explanatory.”); see also RICHARD S. RUDNER, PHILOSOPHY OF SOCIAL SCIENCE 11 (1966).

¹¹ For a strong version of this criterion, see KARL R. POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY 41 (1959) (“I shall require [of a scientific system] that its logical form shall be such that it can be singled out, by means of empirical tests, in a negative sense: *it must be possible for an empirical scientific system to be refuted by experience.*”).

¹² See generally 1 IMRE LAKATOS, THE METHODOLOGY OF SCIENTIFIC RESEARCH PROGRAMMES (John Worrall & Gregory Currie eds., 1978) (discussing progressive and degenerating research programs).

analyze legal relations into their smallest atoms.¹³ Hohfeld disliked ambiguity in terms like “right” and thought that concepts like property were collections of more fundamental legal relations that were related to each other as correlates and opposites.¹⁴ Thus rights, privileges, powers, and immunities in one party corresponded to duties, no-rights, liabilities, and disabilities in the party at the other end of the relation. And the scheme was quite elegant in that rights were the opposite of no-rights, and privileges the opposite of duties; similarly the pairs power-disability and immunity-liability were also opposites. In an attempt to capture the in rem aspect of some relations — that a right, for example, could avail against others generally — Hohfeld treated those relations as collections of in personam relations: a “multital” relation was a collection of many similar “unital” relations, and a “paucital” relation was the collection of few similar unital relations.¹⁵

As an analytical device, the bundle picture can be very useful. It provides a highly accurate description of who can do what to whom in a legal (and perhaps nonlegal) sense. It provides an interesting theoretical baseline: how would one describe the relation of a property owner to various others if one were writing on a blank slate and doing the description in a fully bottom-up manner, relation by relation, party by party? In this, the Hohfeldian world is a little like the Coasean world of zero transaction costs¹⁶ — a useful theoretical construct.

The resemblance is no accident. Like the zero-transaction-cost world, no property system ever has or will build up legal relations smallest piece by smallest piece. Interestingly, in a zero-transaction-cost world, one could do just that, and any benefit to be secured by parsing out relations in a fine-grained manner could be obtained at zero cost. That is not our world.

¹³ The roots of this conception of property can be traced to Hohfeld’s work, although he did not use the metaphor of a bundle of sticks. See Max Radin, *A Restatement of Hohfeld*, 51 HARV. L. REV. 1141, 1146–63 (1938) (interpreting the Hohfeldian scheme from a legal realist’s point of view). Gregory Alexander has traced the first known use of the bundle-picture metaphor to a late nineteenth-century treatise on eminent domain. See GREGORY S. ALEXANDER, *COMMODITY & PROPRIETY: COMPETING VISIONS OF PROPERTY IN AMERICAN LEGAL THOUGHT*, 1776–1970, at 455 n.40 (1997) (citing JOHN LEWIS, *A TREATISE ON THE LAW OF EMINENT DOMAIN IN THE UNITED STATES* 43 (Chicago, Callaghan & Co. 1888)); see also JAMES W. ELY, JR., *THE GUARDIAN OF EVERY OTHER RIGHT: A CONSTITUTIONAL HISTORY OF PROPERTY RIGHTS* 3–9 (3d ed. 2008).

¹⁴ Wesley Newcomb Hohfeld, *Some Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 YALE L.J. 16, 28–59 (1913).

¹⁵ Wesley Newcomb Hohfeld, *Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 26 YALE L.J. 710, 718–33 (1917). The problem with reducing property’s in rem aspect to numerosity of duty bearers is that it fails to capture the indefiniteness and open-endedness of the class of duty bearers. See Albert Kocourek, *Rights in Rem*, 68 U. PA. L. REV. 322, 335 (1920); see also Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 780–89 (2001).

¹⁶ See R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 7 (1960).

The problem with the bundle of rights is that it is treated as a theory of how our world works rather than as an analytical device or as a theoretical baseline. In the realist era, the benefits of tinkering with property were expressed in bundle terms without a corresponding theory of the costs of that tinkering. Indeed, in the most tendentious versions of the picture, the traditional baselines of the law were mocked, and the idea was to dethrone them in order to remove them as barriers to enlightened social engineering.¹⁷ In this version of the bundle picture, Hohfeldian sticks and potentially others are posited to describe the relations holding between persons; the fact that the relations hold with respect to a thing is relatively unimportant or, in some versions, of no importance.¹⁸ “Property” is simply a conclusory label we might attach to the collection.¹⁹ In its classic formulation, the bundle picture puts no particular constraints on the contents of bundles: they are totally malleable and should respond to policy concerns in a fairly direct fashion. These policy-motivated adjustments usually involve adding or subtracting sticks and reallocating them among concerned parties or to society.²⁰ This version of the bundle explains everything and so explains nothing.

But the bundle is nothing if not protean. In recent times, various commentators have argued that property is not fully captured by the bundle picture. Going beyond the bundle usually involves emphasizing exclusion or some robust notion of the right to use. It can be motivated by analytical jurisprudence,²¹ natural rights,²² or information-cost economics.²³ The bundle theory can incorporate some of these

¹⁷ See, e.g., Cohen, *supra* note 2, at 809, 833–49.

¹⁸ See, e.g., Arthur L. Corbin, Comment, *Taxation of Seats on the Stock Exchange*, 31 YALE L.J. 429, 429 (1922) (“Our concept of property has shifted [P]roperty’ has ceased to describe any *res*, or object of sense, at all, and has become merely a bundle of legal relations — rights, powers, privileges, immunities.”).

¹⁹ See, e.g., Edward L. Rubin, *Due Process and the Administrative State*, 72 CALIF. L. REV. 1044, 1086 (1984) (“[P]roperty is simply a label for whatever ‘bundle of sticks’ the individual has been granted.”); Joan Williams, *The Rhetoric of Property*, 83 IOWA L. REV. 277, 297 (1998) (“Labeling something as property does not predetermine what rights an owner does or does not have in it.”).

²⁰ See, e.g., Grey, *supra* note 3, at 69–70; Merrill & Smith, *supra* note 4, at 365. See generally BARBARA H. FRIED, *THE PROGRESSIVE ASSAULT ON LAISSEZ FAIRE* (1998).

²¹ See, e.g., J.W. HARRIS, PROPERTY AND JUSTICE 30–32 (1996); PENNER, *supra* note 5, at 68–74; Shyamkrishna Balganes, *Demystifying the Right to Exclude: Of Property, Inviolability, and Automatic Injunctions*, 31 HARV. J.L. & PUB. POL’Y 593, 593 (2008); Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 731 (1998); Eric R. Claeys, *Exclusion and Exclusivity in Gridlock*, 53 ARIZ. L. REV. 9, 17–28 (2011) (book review).

²² See, e.g., Eric R. Claeys, *Jefferson Meets Coase: Land-Use Torts, Law and Economics, and Natural Property Rights*, 85 NOTRE DAME L. REV. 1379, 1398–1420 (2010); Adam Mossoff, *What Is Property? Putting the Pieces Back Together*, 45 ARIZ. L. REV. 371, 395–97 (2003).

²³ See, e.g., Benito Arruñada, *Property Tilling and Conveyancing*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 237, 237–40 (Kenneth Ayotte & Henry E. Smith eds., 2011); Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property*:

perspectives. Consider, for example, the recent resurgence of interest in the *numerus clausus*; this principle that property forms come in a finite and closed menu can be added onto the bundle theory as a “menu” of collections of sticks.²⁴ Bundle theorists can accommodate this development.²⁵ But they are being reactive in this regard: it is hard to say that the bundle picture would have led anyone to view the *numerus clausus* as important in the common law.

In this Article, I present a theory that aims higher. At the most basic level, the extreme bundle picture takes too little account of the costs of delineating rights. The stick-by-stick, party-by-party “complete” method of delineation is a nonstarter. Delineation involves defining the object of property, specifying the legal interests in it, and providing notice to the relevant parties, including duty bearers and enforcers. If so, then we need a theory of starting points and shortcuts over the hypothetical complete but infeasible system. As I also argue, once we do take the costs of delineation — information costs in particular — into account, then the baselines of traditional property, including property as a right to a thing, become easier to understand and to justify.

Relatedly, if property is more than a collection of sticks, then a theory of property must address how the features of property relate to each other. Many aspects of property are only fully describable at the

The Numerus Clausus Principle, 110 YALE L.J. 1, 8 (2000); Smith, *supra* note 8, at S454–55; see also Peter Lee, *The Accession Insight and Patent Infringement Remedies*, 110 MICH. L. REV. 175, 190, 199–200 (2011); Christopher M. Newman, *Patent Infringement as Nuisance*, 59 CATH. U. L. REV. 61, 93–120 (2009); Note, *A Justification for Allowing Fragmentation in Copyright*, 124 HARV. L. REV. 1751, 1755–63 (2011).

²⁴ See, e.g., Nestor M. Davidson, *Standardization and Pluralism in Property Law*, 61 VAND. L. REV. 1597, 1597–1603 (2008); Avihay Dorfman, *Property and Collective Undertaking: The Principle of Numerus Clausus*, 61 U. TORONTO L.J. 467, 491–95 (2011); Henry Hansmann & Reinier Kraakman, *Property, Contract, and Verification: The Numerus Clausus Problem and the Divisibility of Rights*, 31 J. LEGAL STUD. S373, S416–17 (2002); Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1193–94 (1999); Merrill & Smith, *supra* note 23, at 3–9; Francesco Parisi, *Entropy in Property*, 50 AM. J. COMP. L. 595, 595–96 (2002); Joseph William Singer, *Democratic Estates: Property Law in a Free and Democratic Society*, 94 CORNELL L. REV. 1009, 1023–29 (2009).

²⁵ See Davidson, *supra* note 24, at 1605 (“[B]undles retain great flexibility, but are nonetheless standardized.”). It is worth noting that the bundle picture has had little currency outside the United States. There are faint echoes in the Commonwealth, but the most famous exposition of the bundle by an English scholar was oriented toward finding universal features of ownership in mature legal systems. See A.M. Honoré, *Ownership*, in OXFORD ESSAYS IN JURISPRUDENCE 107, 107, 113 (A.G. Guest ed., 1961) (analyzing ownership in a “mature legal system” by isolating eleven elements); see also Chang & Smith, *supra* note 1, at 14 n.31, 17–18; J.E. Penner, *The “Bundle of Rights” Picture of Property*, 43 UCLA L. REV. 711, 737 (1996) (“Honoré was concerned to show that there were common features or standard incidents of ownership that did not ‘vary from system to system in the erratic, unpredictable way implied by some writers but, on the contrary, have a tendency to remain constant from place to place and age to age.’” (quoting Honoré, *supra*, at 109)).

level of the property system as a whole, and some of property's desirable (and undesirable) effects emerge holistically. The right to exclude, the residual claim, and so on are not detachable sticks serving detachable purposes. They are integral — but not absolute — aspects of property that follow from its architecture. That architecture responds in turn to the problem of managing the complexity of interactions between private parties with respect to a variety of attributes of resources in a world of positive delineation costs, or so I argue.

The importance of explaining why structures are not otherwise than they are can be illustrated with an analogy to the study of language. Traditional grammarians studied languages like English and French, or even non-Indo-European languages, using the categories developed to describe Latin. In describing a language in this fashion, one would focus on the differences between the language and Latin, whereas the similarities could be taken for granted. For example, one would look for the traditional parts of speech (noun, adjective, verb), and sometimes even the cases (nominative, genitive, accusative, dative, and ablative), as a starting point for analysis. The great innovation of modern linguistics, from structuralism to generative grammar, was to take less for granted, in a radical way.²⁶ Not only is Latin a completely arbitrary starting point for cross-linguistic analysis, but we need to step back even further. If all languages have a certain feature but languages could have been otherwise, *that* is a fact worth explaining. In other words, we want to explain why universal structures are universal and why we do not find the ones that are universally absent.

I argue that the New Private Law and realist-derived approaches stand in a similar relationship, only with the New Private Law in the role of generative grammar and legal realism in the role of traditional grammar. If one bundle is in principle as expected as another and the theory that leads us to select one bundle over another is informed mainly by the benefits to be attained, there is little to explain why we have entitlements in the form of rights.

Something similar to the shift to more explanatory modes in linguistics also happened in institutional economics. It was once very easy — and common — to take for granted transaction costs as well as the institutions they gave rise to. The importance of Ronald Coase's work was to show that the world would look very different without

²⁶ For example, the approach aims to be less language-specific. See, e.g., WILLIAM CROFT, SYNTACTIC CATEGORIES AND GRAMMATICAL RELATIONS (1991); GERALD GAZDAR ET AL., GENERALIZED PHRASE STRUCTURE GRAMMAR (1985); Noam Chomsky, *Remarks on Nominalization*, in READINGS IN ENGLISH TRANSFORMATIONAL GRAMMAR 184 (Roderick A. Jacobs & Peter S. Rosenbaum eds., 1970); András Kornai & Geoffrey K. Pullum, *The X-bar Theory of Phrase Structure*, 66 LANGUAGE 24 (1990).

transaction costs.²⁷ Devices like firms exist in the first place because of the costs of transacting outside versus inside the firm.²⁸ The irony is that Coase adopted an extreme version of the bundle picture.²⁹ In a sense, the New Private Law can be seen as adopting the Coasean perspective, taking institutional constraints seriously as a source of explanation of what we do and do not find, and then turning the perspective onto the notion of property itself.³⁰ Property itself could and would be otherwise in the absence of transaction costs.

By contrast, the bundle view, I claim, fails to be a theory. There is a basic architecture of property, and many features of property follow from it. They can be tweaked, but they are not as detachable as the bundle view would have it. Property is a holistic system made up of interactive components, not a system in which anything can in principle relate to anything else. Further, property law provides for actual bundles of rights (or legal relations) that exhibit features relating to their completeness not captured as the sum of their parts. No reasonable version of the bundle view, thankfully, fully exploits unconstrained interactivity, and that is the point: the bundle-of-sticks picture does not explain the organization and structure of property, but seems to take it for granted. Property as a bundle of sticks could be a partial outlook, but is not a theory.

II. THINGS AS MODULES

The alternative to the bundle should not be a return to prerealism or to pure doctrinalism. Unreflective conceptualism or formalism is a nonstarter and is not what the New Private Law is about. Here, I present an alternative to the bundle picture that I call an *architectural* or *modular* theory of property. This theory responds to information costs — it conceives of property as a law of modular “things.”

In this Part, I focus on one aspect of modularity in property: the contribution that *things* make to the operation of property law. Many aspects of property law may well operate as semiautonomous devices, and the whole idea of differential formalism leads us to expect that the property system as a whole will be modular in this sense. Modules may overlap too: one need not expect that there is some physical or metaphorical space that a component of the property system must inhabit. Rather, following recent developments in cognitive science, I

²⁷ Coase, *supra* note 16, at 15.

²⁸ See generally R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937).

²⁹ Merrill & Smith, *supra* note 6, at 12–23.

³⁰ *Id.* at 29–42; Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 *U. PA. L. REV.* 2083, 2090–2103 (2009).

would expect that modules be defined by their function.³¹ But I focus on the modularity of things and, by extension, the legal relations defined in terms of them, which are among the most straightforwardly modular and most basic aspects of the property system.

A. Property as a Nearly Decomposable System

Modularity is key to managing complexity. A system is complex when it has many interdependencies. In a nonmodular system any change to any element can in principle impact another element directly, or through any path, however long. This pattern of dense interdependencies makes such systems either unpredictable if changed, or excessively rigid in order to avoid unpredictable change from these ripple effects.³² Complex systems often have clusters whose elements have dense and intense interactions among themselves but relatively sparse interactions with elements outside the cluster; such systems are what Herbert Simon termed “nearly decomposable.”³³ A nearly decomposable system allows chunks or components of the system to be partially walled off and the interconnections between these chunks and the rest of the system to be deliberately limited (sometimes even at the expense of interdependencies that might have some value).³⁴ In such systems we can impose a modular structure that encapsulates the clusters — that is, hides much of their internal information — and defines the interactions of clusters through their interfaces. Modularity manages complexity, because the ripple effects of modifications to one module have more defined consequences (through interfaces) than they would in an unconstrained system. Think about a car: changes in the brake system mostly do not affect the fuel injection system and vice versa. By ruling out such interactions, the system is easier to understand and to modify, and less vulnerable to shocks. Interactions and interdependencies can be intense within such modules but are defined and relatively sparse across the interface with other modules.³⁵ The key is that the interface allows only certain information through; the rest is “hidden” in the module.

Consider some examples of modularity from organizations.³⁶ A simple premodern example would be a team of smiths making an iron

³¹ See, e.g., H. Clark Barrett & Robert Kurzban, *Modularity in Cognition: Framing the Debate*, 113 PSYCHOL. REV. 628, 629–30 (2006) (reviewing the modularity-of-mind debate).

³² 1 CARLISS Y. BALDWIN & KIM B. CLARK, DESIGN RULES: THE POWER OF MODULARITY 58–59, 236–37, 257 (2000).

³³ HERBERT A. SIMON, THE SCIENCES OF THE ARTIFICIAL 210 (2d ed. 1981).

³⁴ See *id.* at 209–11. See generally BALDWIN & CLARK, *supra* note 32.

³⁵ See SIMON, *supra* note 33, at 198–99.

³⁶ These examples are drawn from Carliss Y. Baldwin, *Where Do Transactions Come From? Modularity, Transactions, and the Boundaries of Firms*, 17 INDUS. & CORP. CHANGE 155, 166–74 (2007).

pothook for a team of cooks. Within each team, the members interact intensively on the production process. But the smith-cook system is nearly decomposable into a smith module and a cook module.³⁷ At the interface, the design specifications of the pothook (strength, resistance to heat, size, shape) travel from cooks to smiths (along with payment), and the pothook travels in the reverse direction.³⁸ All the other details of the production process are relevant only within the smith module, and the details of how the hook is used in cooking food are relevant only within the cook module.³⁹ Activities in each module can take place independently as long as the interface conditions — notably the design parameters of the pothook — are respected.⁴⁰ An innovation within one team module can take place without that team's worrying about ripple effects on the other team. To take a more recent and more complex example, the production of a laptop with a disk drive involves multiple teams that interact much more intensively than the smiths and cooks.⁴¹ Nevertheless, modularity can play some role in creating options for flexible actions within teams in this more complex setting. Because the interaction across interfaces is more intense, interfaces may require more elaborate transactions and even formal contracts to govern potential opportunistic behavior.⁴² Modularity is a key design principle in many areas and is important in evolutionary theory, cognitive science, and computer hardware and software, as well as in engineering and architecture.

B. *The Modular Things of Property*

The modular theory is more explanatory than the bundle picture. It helps explain the structures we do *not* find, shows how property can be used to maximize option value, and demonstrates why innovation in property takes the institutional paths it does.

Because it makes sense in modern property systems to delegate to owners a choice from a range of uses and because protection allows for stability, appropriability, facilitation of planning and investment, liberty, and autonomy, we typically start with an *exclusion* strategy — and that goes not just for private property but for common and public property as well.⁴³ “Use” can include nonconsumptive uses relating to conservation. The exclusion strategy defines a chunk of the world — a thing — under the owner's control, and much of the information about

³⁷ See *id.* at 166–67.

³⁸ See *id.* at 167–68.

³⁹ See *id.* at 168.

⁴⁰ See *id.* at 167–68.

⁴¹ See *id.* at 169–70.

⁴² See *id.* at 172–74.

⁴³ See generally Henry E. Smith, *Property and Property Rules*, 79 N.Y.U. L. REV. 1719 (2004).

the thing's uses, their interactions, and the user is irrelevant to the outside world.⁴⁴ Duty bearers know not to enter Blackacre without permission or not to take cars, without needing to know what the owner is using the thing for, who the owner is, who else might have rights and other interests, and so on. But dividing the world into chunks is not enough: spillovers and scale problems call for more specific rules to deal with problems like odors and lateral support, and to facilitate coordination (for example, covenants, common interest communities, and trusts).⁴⁵ These *governance* strategies focus more closely on narrower classes of use and sometimes make more specific reference to their purposes, and so they are more contextual.⁴⁶

The exclusion-governance architecture manages complexity in a way totally uncaptured by the bundle picture, and importantly, the former is modular while the latter is not. The exclusion strategy defines what a thing is to begin with. A fundamental question is how to classify “things,” and, hence, which aspects of “things” are the most basic units of property law. Many important features of property follow from the semitransparent boundaries between things. Boundaries carve up the world into semiautonomous components — modules — that permit private law to manage highly complex interactions among private parties.

Property clusters complementary attributes — land's soil nutrients, moisture, building support, or parts of everyday objects like chairs — into the parcels of real estate or tangible and intangible objects of personal property. It then employs information-hiding and limited interfaces to manage complexity. For example, if a car is not mine, I do not need to know who owns it, whether it is subject to a security interest or lease, and so forth, in order to know not to take or damage it.⁴⁷ When *A* sells the car to *B*, many features of *A* and *B* are irrelevant to each other, and most are irrelevant to in rem duty holders, who only need know not to steal the car. Many details about *A* and *B* are irrelevant to their successors in interest. In the case of negotiable property (cash being the extreme example), most information about predecessors in interest is irrelevant to the current holder: one can gain good title to cash even from a thief. Because we want money to be easy to evaluate and to plug into transactions, it is the most modular property of all.

⁴⁴ See Smith, *supra* note 8, at S469; Henry E. Smith, *Community and Custom in Property*, 10 THEORETICAL INQUIRIES L. 5, 17 (2009) [hereinafter Smith, *Community and Custom in Property*]. The definition of a legal thing is facilitated by the identification of separable collections of resource attributes. See, e.g., PENNER, *supra* note 5, at 105–27; Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381, 417–19 (2005); Emily Sherwin, *Two- and Three-Dimensional Property Rights*, 29 ARIZ. ST. L.J. 1075, 1080–92 (1997).

⁴⁵ See Smith, *supra* note 8, at S470.

⁴⁶ See *id.* at S455.

⁴⁷ PENNER, *supra* note 5, at 75.

Again, property works the same way. When O_I owns Blackacre, the exclusion strategy for delineating her rights, implemented through devices like the tort of trespass, protects a range of actions A_1, A_2, A_3, \dots , without the law's needing to specify these actions. Indeed, O_I may know more about the actions than anyone else. Action A_2 may result in a nuisance to O_2 , who owns neighboring Whiteacre, and O_3 , who owns Greenacre. But O_I can take actions A_1, A_3, \dots , without consulting or needing to coordinate with O_2 or O_3 . O_I can delay taking an action until the optimal time. In other words, the modular architecture, by reducing the dependency of actions A_1, A_3, \dots , on elements outside the Blackacre module, preserves options in O_I . By contrast, if more of the set of A_1, A_2, A_3, \dots , depended on actions in the corresponding sets of O_2 and O_3 or yet other persons, A_1 would have to be determined at a time that compromises between the need for decision on O_I 's part and the timing of those other persons' related actions. Moreover, as a thing of modular property, Blackacre can easily be transferred from O_I to others because nothing in the specification of the package makes it context-dependent on the status of the owner. Likewise, nonowners of Blackacre — everyone other than O_I — have less to be on the lookout for, and need not make their decisions and their timing depend in any way on A_1, A_3 , and so forth, in O_I 's set.⁴⁸

The modular theory explains property's structure, which includes providing some reason why those structures are not otherwise. In a zero-transaction-cost world, we could use all governance all the time, whether supplied by government or through super fine-grained contracting among all the concerned parties.⁴⁹ That is not our world, and the main point of exclusion as a delineation strategy is that it is a *shortcut* over direct delineation of this more "complete" set of legal relations. Analytically, it might be interesting to think of property as a list of use rights availing pairwise between all people in society, but actually creating such a list would be a potentially intractable problem in our world. On the other hand, exclusion is not the whole story either. Causes of action like trespass implement a right to exclude, but the right to exclude is not *why* we have property.⁵⁰ Rather, the right to exclude is part of *how* property works. Rights to exclude are a means to an end, and the ends in property relate to people's interests in using things.

The architecture of property emerges from the process of solving the problem of how to serve use interests in a roughly cost-effective way. In modern societies, the solution usually involves first the appli-

⁴⁸ For how property creates options through modularity, see Smith, *supra* note 30, at 2104–13.

⁴⁹ See Merrill & Smith, *supra* note 6 (manuscript at 32–33).

⁵⁰ See sources cited *supra* note 5.

cation of a use-neutral exclusion strategy, and then refinement through contracts, regulations, common law doctrine, and norms.⁵¹ Exclusion is at the core of this architecture because it is a default, a convenient starting point. Exclusion is not the most important or “core” value because it is *not a value at all*. Thinking that exclusion is a value usually reflects the confusion of means and ends in property law: exclusion is a rough first cut — and only that — at serving the purposes of property. It is true that exclusion piggybacks on the everyday morality of “thou shalt not steal,” whereas governance reflects a more refined Golden-Rule, “do unto others” type of morality in more personal contexts.⁵² It may be the case that our morality itself is shaped to a certain extent by the ease with which it can be communicated and enforced in more impersonal settings. I leave that question for another day. But the point here is that the exclusion-governance architecture is compatible with a wide range of purposes for property. Some societies will move from exclusion to governance — that is, some systems of laws and norms will focus more on individuated uses of resources — more readily than others, and will do so for different reasons than others.

At the base of the architectural approach is a distinction that the bundle theory — along with other theories — tends to obscure: the distinction between the interests we have in using things and the devices the law uses to protect those interests. Property serves purposes related to use by employing a variety of delineation strategies. Because delineation costs are greater than zero, which strategy one uses and when one uses it will be dictated in part by the costs of delineation — not just by the benefits that correspond to the use-based purposes of property. To take a simple example, the benefits of multiple use must be compared with the cost of delineation. Sometimes a fee simple in *A* and an easement in *B* will suffice, sometimes co-ownership by *A* and *B* will be required (a commons of *A* and *B* with an internal arrangement to coordinate use), and sometimes a complex mixture of common and private property — a semicommons — may be required, as in the open fields of medieval and early modern England.⁵³ These very different arrangements combine different mixes of exclusion and governance. What one does not find is a totally piece-by-piece, synthetic bundle of use rights in *A* and *B* couched as a list of all the actions either individ-

⁵¹ Cf. Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 VA. L. REV. 965, 1023–24 (2004) (explaining how the shift from exclusion to governance occurs within the law of nuisance).

⁵² See generally Thomas W. Merrill & Henry E. Smith, *The Morality of Property*, 48 WM. & MARY L. REV. 1849, 1852, 1890–94 (2007).

⁵³ See Henry E. Smith, *Semicommon Property Rights and Scattering in the Open Fields*, 29 J. LEGAL STUD. 131, 131–34 (2000).

ual could take that would impact the other, along with how to resolve the conflict.⁵⁴

The traditional definition of property is a right to a thing good against the world — it is an in rem right. The special in rem character of property forms the basis of an information-cost explanation of the *numerus clausus* and standardization in property.⁵⁵ In rem rights are directed at a wide and indefinite audience of duty holders and other affected parties, who would incur high information costs in dealing with idiosyncratic property rights and would have to process more types of information than they would in the absence of the *numerus clausus*. Crucially, parties who might create such idiosyncratic property rights are not guaranteed to take such third-party processing costs into account. There is thus an information-cost externality, and the *numerus clausus* is one tool for addressing this externality. Other devices include title records and technological changes in communication.

Modules help contain third-party information costs. I know not to enter Blackacre without permission and not to steal a car from a parking lot without needing to know what the land or the car is being used for, how virtuous the owner is, or who (or what) the owner is. Nor need courts delve into these matters. The things defined by the basic exclusion strategy mediate the relations between often anonymous parties.

More generally, situations between the fully in rem and the fully in personam present themselves, and a preliminary inquiry reveals that intermediate situations are handled with less formalism and less rigid standardization than in rem situations but do not allow the degree of customization possible in contract law. As Thomas Merrill and I have shown, in rem rights avail against many parties, and those duty holders tend to be anonymous or indefinite.⁵⁶ But rights can avail against duty holders that have only one of these properties: the class of duty holders may be large but definite, as in mass contracts, or the duty holders may be indefinite but not numerous, as with successors in interest. And each of the features — numerosity and indefiniteness — falls along a spectrum.⁵⁷ Information costs rise as we increase

⁵⁴ See Merrill & Smith, *supra* note 4, at 397–98. Property systems in close-knit contexts can afford to delineate less in terms of exclusion and more in terms of use rights, but they face the same trade-off of intensive communication with a limited audience versus more formal messages directed at more extensive sets of duty bearers. See, e.g., Smith, *Community and Custom in Property*, *supra* note 44, at 12–24.

⁵⁵ Merrill & Smith, *supra* note 23, at 8, 26–34.

⁵⁶ Merrill & Smith, *supra* note 15, at 783–86.

⁵⁷ On how these features fit into a communicative trade-off between intensity of information and extensiveness of audience, see Henry E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105, 1148–57 (2003).

numerosity and indefiniteness. In situations falling between in personam and in rem, we tend to find intermediate levels of mandatoriness and standardization.⁵⁸ And in these situations, those aspects of the institution that implicate third parties are more formal and standardized than those that affect only smaller and more definite groups of people. These intermediate approaches usually take the form of protective strategies, which make certain forms of legal relations difficult or prohibitive where we fear that the duty holders will not understand the content of the legal relation at reasonable cost. The implied warranty of habitability in landlord-tenant law, in which minimum standards (usually drawn from a local housing code) are read into leases as a warranty, protects tenants as purchasers of housing services.⁵⁹ This interpretation of the implied warranty of habitability makes it a close cousin of consumer protection law. Other protective strategies exempt the potential duty holder from an obligation to inquire. Thus, tortfeasors must respect property rights but have no duty to inquire into the contractual arrangements surrounding property that the tortfeasor might damage (for example, tortfeasors are equally liable for damaging a rental car as they are for damaging an owned car).⁶⁰ The other class of intermediate strategies also is reminiscent of consumer protection law: rules mandating the giving of notice. So for example, equitable estates in trusts, which are mostly in personam (against the trustee), often cannot be enforced against third parties unless the third party has notice of the beneficial interest.

Modularity plays a key role in making the standardization of property possible. First, modularity makes it possible to keep interconnections between packages of rights relatively few, thus allowing much of what goes on inside a package of property rights to be irrelevant to the outside world. Second, property rights “mesh” with neighboring property rights and show network effects with more far-flung property rights. The outside interfaces make this possible at reasonable cost. Third, the processes of property are simple enough that they *can feed into themselves*. Many modular structures are hierarchical in that they have modules composed of other modules. This hierarchy happens by very regular rules because the modules themselves present a clean interface. Consider the system of estates and future interests. Crucially,

⁵⁸ Merrill & Smith, *supra* note 15, at 803–09. For a discussion of a range of further examples relating to property protection of contract rights that show this pattern of intermediate standardization in situations between the in rem and in personam, see generally P.G. Turner, Proprietary Modes of Protecting the Performance Interest in Contract (July 2011) (unpublished manuscript) (on file with the Harvard Law School Library).

⁵⁹ Merrill & Smith, *supra* note 15, at 825–27.

⁶⁰ See Henry E. Smith, *Modularity and Morality in the Law of Torts*, J. TORT L., no. 2, art. 5, Oct. 2011, at 25–28.

they have the property of *recursion*: the interests can nest within themselves, as where a life estate is followed by a remainder in life estate followed by a remainder in life estate, and so forth, followed by a remainder (in fee simple). Generally, a small set of rules (as small as one rule) can generate an infinite set of outputs if one of the rules is recursive (that is, it can apply to its own output, or, in other words, the rule feeds itself).⁶¹ Many linguists take it to be true of natural language that a finite grammar can capture the infinite set of sentences of a language like English in part because some rules, such as the rule that forms subordinate clauses, can be repeatedly used on themselves: Pat said that Chris believed that the cat is sick.⁶² Property forms have a LEGO-like interface with each other that allows the generation of complex structures out of a small set of simple parts. In this respect, property forms are like a basic grammar or “pattern language” of property.⁶³ Property has this self-feeding or recursive aspect along multiple dimensions. Not only can we create nested sets of interests, but we can also subdivide parcels and subdivide them further. Property can be fragmented, and the law limits the types of fragmentation. But because of recursion, even this limited fragmentation allows for great flexibility in creating complex but modular structures. Modularity and its standardization of the “outsides” of property packages allow achievement of a wide range of objectives (lowering frustration costs), while keeping information costs under control, relative to a system of more tailored packages.⁶⁴

⁶¹ For an engaging introduction to recursion, see DOUGLAS R. HOFSTADTER, GÖDEL, ESCHER, BACH 127–57 (1979). See also, e.g., JOSEPH R. SHOENFIELD, RECURSION THEORY (photo. reprint 2001) (1993).

⁶² See, e.g., IVAN A. SAG & THOMAS WASOW, SYNTACTIC THEORY: A FORMAL INTRODUCTION 36, 259 (1999). Despite the conventional wisdom to the contrary, infinitude is not an empirically demonstrated fact about natural language, and the need for recursion in syntax is loosely related at best to the creativeness of language. See Geoffrey K. Pullum & Barbara C. Scholz, *Recursion and the Infinitude Claim*, in RECURSION AND HUMAN LANGUAGE 113 (Harry van der Hulst ed., 2010).

⁶³ The notion of a “pattern language” has been influential in architecture. See CHRISTOPHER ALEXANDER ET AL., A PATTERN LANGUAGE: TOWNS, BUILDINGS, AND CONSTRUCTION (1977). More generally, what I am suggesting is that property has an architecture, so the analogy is quite apt. Furthermore, modularity serves a very similar role in all fields where an “architecture” is used to manage complexity, including most clearly computer hardware and software. See SIMON, *supra* note 33, at 209–17; see also BALDWIN & CLARK, *supra* note 32, at 5–11. See generally CHRISTOPHER ALEXANDER, NOTES ON THE SYNTHESIS OF FORM (1964) (exploring design principles from mathematics and logic in particular).

⁶⁴ See Merrill & Smith, *supra* note 23, at 38–42; Smith, *supra* note 57, at 1139–48. See generally Henry E. Smith, *Standardization in Property Law*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW, *supra* note 23, at 148 [hereinafter Smith, *Standardization in Property Law*].

C. *The Structure of Property*

The modular theory analyzes property into features, but these features are not just a collection, unlike the sticks in the bundle picture. Far from denying that property has “features,” the modular theory seeks to show how they emerge and how they relate to one another. By analogy, one could analyze a diamond as a collection of carbon atoms. A diamond does consist of carbon atoms, but there is a lot more to a diamond. The relations among the atoms help distinguish it from graphite. A diamond’s hardness and light dispersion are emergent properties from the overall structure. The bundle-of-rights picture of property treats property in atom-counting fashion, which is fine as far as it goes. But what we still need is a theory of how the pieces fit together.

The exclusion-governance architecture of property sets up a platform that presumptively provides a simple package whose features need minimal delineation because they come along for the ride. These features can be grouped into basic features, secondary features, and higher-level features.

1. *Basic Features.* — The basic features are the *in rem* aspect of property, the right to exclude, and the residual claim. None of these features is absolute, but their perceived centrality to property is no accident either.⁶⁵

Property is *in rem*. It gives an owner control over uses of a thing by defining the thing in an on/off manner that indirectly relates to those uses, thereby sending a simple message to outsiders to respect the boundary — the *in rem* aspect of property.⁶⁶ Modular things are suited for sending an “*in rem*” message. The need for far-flung and sometimes socially distant persons to respect property rights calls for simplification and standardization.⁶⁷ The optimal combination of such standardization and notice-giving devices (like land records) is an empirical question.⁶⁸

In the *right to exclude*, the owner has the gatekeeper right over the boundary and can permit or reject potential licensees, lessees, and the like.⁶⁹ Again, there is no interest in exclusion, but exclusion strategies

⁶⁵ For an analysis that places the *in rem* aspect, the right to exclude, and the ability to run to successors as “*sine qua non*” features that automatically follow from property as a structured bundle of legal relations, see Chang & Smith, *supra* note 1, at 28–34.

⁶⁶ See Smith, *supra* note 57, at 1111–12; Smith, *Standardization in Property Law*, *supra* note 64, at 149–50.

⁶⁷ See Merrill & Smith, *supra* note 23, at 24–42.

⁶⁸ See *id.* at 50–51; Smith, *Standardization in Property Law*, *supra* note 64, at 166–67.

⁶⁹ See, e.g., HARRIS, *supra* note 21, at 30–32; PENNER, *supra* note 5, at 68–74; Larissa Katz, *Exclusion and Exclusivity in Property Law*, 58 U. TORONTO L.J. 275, 289–90 (2008); Merrill, *supra* note 21, at 731; Smith, *supra* note 8, at S469. Trespass is a sovereignty-based tort. See generally Arthur Ripstein, *Beyond the Harm Principle*, 34 PHIL. & PUB. AFF. 215 (2006). For use-

indirectly protect interests in use. The exclusion strategy implemented as a right to exclude is at the core of the mechanism property uses to serve owners' and society's real interests. The right to exclude does not require an owner, whether it be an individual, a group, or the state, to actually exclude others; the gatekeeper can decide to *include*. Nor does the fact that a right to exclude follows automatically from the organization of modular things through an exclusion strategy mean that the right to exclude is absolute. The system of interactions between persons with respect to things is nearly decomposable — not totally decomposable. Modules in property law have rich interfaces; they are not windowless monads.

Property is often identified with the *residual claim* as well.⁷⁰ The uses inside the boundaries usually need not be separately delineated: the exclusionary protection of uses automatically includes unspecified uses that the proxy sweeps in — giving rise to the residual claim. Defining a thing, then carving out specific rights, and leaving the residual behind is more cost-effective than delineating sticks and then grouping some into a big bundle called the residual. As its name suggests, the residual claim is bound up tightly with the delineation of a thing.

None of these features — the in rem aspect, the right to exclude, and the residual claim — is absolute. At some cost, specific people in the large and indefinite set of in rem duty bearers can be singled out for special treatment. As for the right to exclude, *O* can give *A* an easement, and necessity law can give *A* the right to enter to save his life (think cabin in the woods after an avalanche). The exceptions and limitations on the right to exclude are also limitations on the in rem status of the right and the residual claim. Why? Because governance strategies — implemented by nuisance law, covenants, and regulations — take exclusion as a platform and modify its features when it is important to do so. It is no accident that governance impacts in rem status, the right to exclude, and the residual claim at the same time: the basic features of property are not sticks, but automatic, presumptive features of an exclusionary modular strategy.

2. *Secondary features.* — The secondary features follow from the decontextualization of the exclusion strategy. They are alienability, persistence, and compatibility. The point of defining things on the basis of exclusionary proxies is that uses and attributes on the “inside” are complementary, but the need to track connections between inside attributes and the outside world can be limited to those connections built into the interface between modules (which correspond to the most

based critiques of emphasizing exclusion, see, for example, Claeys, *supra* note 21, at 17–28; Mossoff, *supra* note 22, at 395–97.

⁷⁰ See, e.g., YORAM BARZEL, *ECONOMIC ANALYSIS OF PROPERTY RIGHTS* 3 (2d ed. 1997).

important spillover effects). The decontextualization means that in property we try to keep the interface simple and standardized (for example, through the *numerus clausus* principle) and ration its complexity. Property law is formal in the sense of relative invariance (not complete invariance) to context.⁷¹ What are the implications of formalism?

First, the formalism of the exclusion strategy and modesty in the governance strategy make property more *alienable*. If property rights interlock, they will vary upon their “transport” to a new owner to serve new uses. For example, making the history of transactions involving a piece of property less relevant, as through negotiability rules, facilitates alienability. As noted earlier, strong examples would be checks and cash.

By contrast, property rights in common pools or even water rights in prior appropriation systems are necessarily connected to the characteristics of other users and their rights, making those rights much harder to detach and less property-like than prototypical property. Because of its fluid nature, it is more difficult to treat water as a thing, and exclusion strategies play a correspondingly lesser role.⁷² Even the law of prior appropriation is more based on governance of uses than is usually appreciated. Because water rights are more contextual in their definition (have a richer interface with other rights), most prominently in allowing downstream appropriators to gain rights to return flows, transfers of water rights are correspondingly trickier than most other types of property transfers.

Even more so than with water, it is possible but difficult to treat information as a thing — that is, to find an on/off proxy for violation of rights to that information.⁷³ As with water and other resources calling for interacting rights that cannot be spatially separated, one finds a mixture of common and private rights — a semicommons reflecting a system that is less decomposable than in the prototypical real property situation.⁷⁴ In semicommons and purer commons, the governance rules that permit effective use of the resource may make redeployment more difficult as conditions change.

Second, formalism in property promotes the feature of *persistence*. Defining a simple baseline of entitlement makes a property right easier

⁷¹ Cf. Francis Heylighen, *Advantages and Limitations of Formal Expression*, 4 FOUND. SCI. 25, 27, 49–53 (1999) (defining formalism in language); Smith, *supra* note 57, at 1112–13, 1135–36 (discussing “differential formalism,” the concept that formalism is a matter of degree).

⁷² See Henry E. Smith, *Governing Water: The Semicommons of Fluid Property Rights*, 50 ARIZ. L. REV. 445, 448–49 (2008).

⁷³ Smith, *supra* note 5, at 1792–98; see also Balganesch, *supra* note 21, at 627–28.

⁷⁴ See Robert A. Heverly, *The Information Semicommons*, 18 BERKELEY TECH. L.J. 1127, 1164–83 (2003); Smith, *supra* note 53, at 131–32; see also James Grimmelman, *The Internet Is a Semicommons*, 78 FORDHAM L. REV. 2799, 2799–2800 (2010).

to trace through proceeds and into remote hands.⁷⁵ For example, when a thief steals a diamond, sells it for cash, and uses the cash to bet successfully at the racetrack, the victim of the theft can try to get the diamond back or can go after the thief to compel the thief to disgorge the “victim’s” money plus the proceeds.⁷⁶ Defining things makes identification easier.

Relatedly, the issue of whether a right — for example, a covenant — runs to successors can be regarded as one of persistence. If so, then perhaps doctrines like “touch and concern” might furnish the formalism that makes them easier to use as modifications of the basic package of rights in land.⁷⁷

Third, formalism and modularity promote *compatibility* of rights. Joining parcels of land generally is not a problem because the legal relations associated with them do not conflict. Compatibility has been a problem in intellectual property, where licenses may indeed conflict more easily. In open-access licensing, a problem has arisen where a license requires that incorporating works be licensed on the same terms as the incorporated works.⁷⁸ If another component of the work has a similar restriction that is not otherwise identical, a conflict may arise. If this incompatibility is a large enough problem, it points away from a contractarian model and toward greater property-like standardization.⁷⁹

A particular kind of compatibility leads to systemic scalability, taken up in the next section. Parcels are largely associated with reciprocal rights and duties, and larger combined parcels easily inherit the features of the smaller parcels that have been joined together and present the same face to the world as the old collection did. Joining parcel *A* and parcel *B* means the new parcel has the same sets of rights and duties in nuisance with respect to neighbors, the same rights and duties of lateral support, and so on.⁸⁰

3. *Higher-level architectural features.* — Modularity also promotes higher-level architectural features — recursion, scalability, and resilience — that preserve options and make property more useful. It bears

⁷⁵ See Smith, *supra* note 30, at 2116 n.111. On “persistent rights,” see BEN MCFARLANE, *THE STRUCTURE OF PROPERTY LAW* 364–423 (2008).

⁷⁶ See RESTATEMENT (THIRD) OF RESTITUTION & UNJUST ENRICHMENT § 59 (2011).

⁷⁷ Alternatively, the ability of a right to run with assets might be regarded as a basic feature of property. Chang & Smith, *supra* note 1, at 23–24.

⁷⁸ See Molly Shaffer Van Houweling, *The New Servitudes*, 96 GEO. L.J. 885, 943–46 (2008); see also Niva Elkin-Koren, *What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons*, 74 FORDHAM L. REV. 375, 413–14 (2005); Zachary Katz, *Pitfalls of Open Licensing: An Analysis of Creative Commons Licensing*, 46 IDEA 391, 391 (2006).

⁷⁹ See Van Houweling, *supra* note 78, at 938–39.

⁸⁰ Where this compatibility is not present, major problems can ensue. For example, the law seeks to prevent manipulation of riparian parcels to maximize the benefits of “reasonable use.”

emphasizing how these features are emergent: they emerge from the modular property system.

First, property rights are *recursive*, as discussed earlier. The rules for dividing property can feed themselves (life estate followed by a remainder in life estate, followed by a remainder in life estate, . . .), making the *system* highly generative and able to capture an infinite set of structures with a small set of rules. Even defining modular things is a recursive process, as is the case with trusts of trust rights. As in other systems, recursion is an important property that increases the power of the system despite a relatively small number of rules.

Second, property rights are *scalable*, as is dramatically true in the rectangular survey system and in the case of combined (or divided) plots mentioned earlier.⁸¹ Scalability is the systemic consequence of a certain kind of compatibility of components, in which features of the whole are inherited from its parts. The rights and duties of owners under nuisance and lateral support scale up and down. Large or small, whole or divided, rectangular parcels have the same geometry and ease of location in the rectangular survey system.

Third, property rights are robust and *resilient*. Events like a local odor affect property owners in a small radius, without upsetting larger sets of legal relations.⁸² All the divisions, combinations, contracting, and so forth, are largely limited in their effects to the owners and those in privity with them, again because of the modular structure of property. As in other arenas, modularity preserves options, because decisions over small numbers of components can be made at the optimal time without worrying about far-flung ripple effects.⁸³

D. Exclusion, Governance, and Safety Valves

In property law, the exclusion strategy is implemented through a variety of doctrines that work in tandem. Trespass, as traditionally defined, is a voluntary crossing of a boundary of a parcel by means of a visible object.⁸⁴ The boundary is defined by a system of surveying and the *ad coelum* rule, which makes the boundary extend to the space above and below the parcel.⁸⁵ Some of the more on/off aspects of the

⁸¹ Cf. Gary D. Libecap & Dean Lueck, *Land Demarcation Systems*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW, *supra* note 23, at 257, 285–87 (describing the establishment and coordination advantages of the rectangular survey).

⁸² See Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. (PAPERS & PROC.) 347, 350 (1967); Ellickson, *supra* note 8, at 1323–32.

⁸³ BALDWIN & CLARK, *supra* note 32, at 90–91, 234–37, 256–62.

⁸⁴ See THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 938–48 (2007).

⁸⁵ The full maxim, *cujus est solum, ejus est usque ad coelum et ad inferos*, translates as “one who owns the soil owns also to the sky and to the depths.” See, e.g., *United States v. Causby*, 328 U.S. 256, 260–61 (1946) (discussing how high-altitude flights do not violate landowners’ rights

law of nuisance likewise implement an exclusion strategy.⁸⁶ Robust remedies like injunctions back up trespass and (to a lesser extent) nuisance, while disgorgement and punitive damages also back up trespass. Thus, if someone enters land, there is a trespass. If a company deliberately drags a mobile home across a snowy field over the objection of the owner, punitive damages might be available.⁸⁷

But many problematic interactions are not solvable using boundaries and are important enough to call for enriching the interface between property modules. Much of the law of nuisance is prototypical: offensive odors, vibrations, and smoke particles disturb wide classes of normal uses of adjacent parcels and may be enjoined or give rise to liability for damages. Even more detailed are covenants and zoning, which are provided by the parties themselves and the government, respectively. For example, rules about building heights and door colors are part of a governance regime at the interface between property in parcels, which is supplied in part by parties and in part off the rack through regulation. In other work, I have addressed the problem of figuring out when to shift from exclusion to governance.⁸⁸ In principle, the costs and benefits of singling out particular uses for particular treatment are measurable, making for a straightforward application of microeconomic analysis. In practice, however, many of the considerations are not measurable,⁸⁹ leading to a need for legal designers to combine rough guesses, presumptions that have worked in successful legal systems, and rules of thumb about when to look to custom as a source of law.⁹⁰

Part of the system importantly involves safety valves, which make possible property's simple structures. Law from before the realist era is often misinterpreted as involving wooden and remorseless application — furnishing a reason to rip it up rather than to reform it. Building encroachments and nuisances will illustrate. For building encroachments, the law of trespass is clear: an invasion by a visible object voluntarily put there is a trespass. Moreover, it is a continuous

under *ad coelum* doctrine); *Brown v. United States*, 73 F.3d 1100, 1103–04 (Fed. Cir. 1996) (reversing grant of summary judgment for the government in case of military overflights because of genuine issue about substantial interference with owner's recreational use of land); *Edwards v. Sims*, 24 S.W.2d 619, 620 (Ky. 1929) (applying *ad coelum* doctrine to cave); see also MERRILL & SMITH, *supra* note 84, at 9–15, 175–83; Thomas W. Merrill, *Trespass, Nuisance, and the Costs of Determining Property Rights*, 14 J. LEGAL STUD. 13, 35–36 (1985).

⁸⁶ Smith, *supra* note 51, at 975–90; see also Richard A. Epstein, *Nuisance Law: Corrective Justice and Its Utilitarian Constraints*, 8 J. LEGAL STUD. 49, 53–56 (1979).

⁸⁷ See, e.g., *Jacque v. Steenberg Homes, Inc.*, 563 N.W.2d 154, 156 (Wis. 1997).

⁸⁸ See generally, e.g., Smith, *supra* note 8.

⁸⁹ See *id.* at S467–78.

⁹⁰ See *id.* at S477 (rough guesses); Smith, *supra* note 51, at 1021–45 (presumptions); Smith, *Community and Custom in Property*, *supra* note 44, at 12–24 (custom).

trespass and so is presumptively a candidate for an injunction. According to a false view of earlier law, the result would be a senseless, wooden issuance of an automatic injunction.⁹¹ Instead, equity would provide a limited safety valve in situations of disproportionate hardship (where the benefit of the injunction to the victim would be slight compared to the cost to the defendant), sometimes called “undue hardship.”⁹² (Likewise, the encroached-upon party’s unclean hands would disqualify that party from obtaining an injunction.) Nevertheless, if the encroachment was in bad faith — meaning, done knowingly — the equitable safety valve would not apply, and the injunction would issue. The structure is a simple one and tailored to the problem of potential opportunism on both sides.⁹³ It makes those undertaking a building project responsible but not paranoid, which is probably the best one can expect.⁹⁴ Importantly, the equitable safety valve makes the simple baselines of the common law less vulnerable to opportunists.⁹⁵ A similar story can be told for nuisance. Contrary to the myth that *Boomer v. Atlantic Cement Co.*⁹⁶ relaxed an automatic injunction rule in nuisance cases,⁹⁷ the equitable defense of undue hardship was always part of the law’s treatment of nuisances.⁹⁸ Nuisance depends

⁹¹ *Pile v. Pedrick*, 31 A. 646 (Pa. 1895), which granted an injunction where defendant, acting in good faith, had erected a foundation wall that extended onto plaintiffs’ property by one and a half inches, *id.* at 646, is sometimes used to illustrate the phenomenon of automatic injunctions. But it is far from clear how representative this case is. Controversy over a party wall may have shaped the suit, and the court may have granted a longer time for compliance and employed its discretion over cost-shifting in order to force a settlement. I thank Brian Lee for sharing with me his insights into the case. At any rate, someone suffering a good faith encroachment would not be entitled to an injunction if he were subject to a defense of unclean hands or laches. The real question is how disproportionate or undue hardship was treated in routine pre-twentieth-century encroachment cases.

⁹² See, e.g., Douglas Laycock, *The Neglected Defense of Undue Hardship (and the Doctrinal Train Wreck in Boomer v. Atlantic Cement)*, 4 J. TORT L. (forthcoming 2012) (manuscript at 2–7); see also 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, 226 (2012). For a development of the safety valve idea in the context of accession doctrine, see Yun-chien Chang, *An Economic Analysis of the Accession Doctrine: A Case for the Property Rule* 4, 16 (Feb. 11, 2010) (unpublished manuscript), available at <http://ssrn.com/abstract=1576426>.

⁹³ Henry E. Smith, *An Economic Analysis of Law Versus Equity* 3–6 (Oct. 22, 2010) (unpublished manuscript), available at http://www.law.yale.edu/documents/pdf/LEO/Hsmith_LawVersusEquity7.pdf.

⁹⁴ For an argument in favor of use of damages based on excessive private benefits of inquiry into boundaries, see Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty about Property Rights*, 106 MICH. L. REV. 1285, 1288 (2008).

⁹⁵ Smith, *supra* note 93, at 4, 14–15.

⁹⁶ 257 N.E.2d 870 (N.Y. 1970).

⁹⁷ See, e.g., Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1106 & n.34 (1972).

⁹⁸ See Richard A. Epstein, *A Clear View of The Cathedral: The Dominance of Property Rules*, 106 YALE L.J. 2091, 2102 (1997) (“[E]ssentially the appropriate solution is to allow injunctive relief when the relative balance of convenience is anything close to equal, but to deny it (in its en-

on boundaries but is more complex in that it evaluates uses against a backdrop of community norms.⁹⁹ Whatever the nature of this evaluation is — and it rarely takes the form of explicit cost-benefit analysis — the danger stems from the potential disproportionate hardship of an injunction whose costs far outweigh its benefits. The issues are not identical to those in building encroachments because the line between the permissible and impermissible is less clear in the first place, making bad faith harder, but not always impossible, to pinpoint.¹⁰⁰

III. IMPLICATIONS OF THE MODULAR THEORY

Despite its avowal of nuance, the bundle picture does not stack up well against the modular theory when it comes to explanation. Information costs and the need to manage complexity shape property in its implementation.

A. Explanatory Power

The modular theory I propose makes a clear contrast with conventional property theories, which are captured in the slogan “bundle of rights” or “bundle of sticks.” Sticks are seen, according to the conventional view, as detachable and customizable, and as serving purposes in a freestanding fashion. When it comes to the relation of these sticks to the outside world, however, the bundle picture is assumed to be as contextual as possible. Features of other people, actions, and resources are of limitless relevance to each stick, which transparently reflects its purposes. The purposes can include autonomy, privacy, investment, planning, and appropriability, and the criteria for evaluating whether the goals are being met are drawn from a large set including efficiency, fairness, and many forms of morality. Disagreement centers on what the goals are and whether they can be reduced to a single metric.¹⁰¹

tirety if necessary) when the balance of convenience runs strongly in favor of the defendant. The usual presumption is that the exploitation risk is greater than the holdout risk. This presumption can be reversed by a showing of the dramatic difference in values”); Laycock, *supra* note 92. In previous work I have argued that in effect *Boomer* applies too loose a version of the defense. See Smith, *supra* note 51, at 1037–45.

⁹⁹ See Robert C. Ellickson, *Alternatives to Zoning: Covenants, Nuisance Rules, and Fines as Land Use Controls*, 40 U. CHI. L. REV. 681, 728–33 (1973); see also Smith, *supra* note 51.

¹⁰⁰ See Daniel B. Kelly, *Strategic Spillovers*, 111 COLUM. L. REV. 1641, 1660–63 (2011); Smith, *supra* note 51, at 992–1005. See generally Gregory C. Keating, *Nuisance as a Strict Liability Wrong*, J. TORT L. (forthcoming) (Univ. of S. Cal. Ctr. in Law, Econ. & Org. Research Paper Ser. No. C11-11; Univ. of S. Cal. Legal Studies Research Paper Ser. No. 11-19), available at <http://ssrn.com/abstract=1924519>.

¹⁰¹ See, e.g., HANOCH DAGAN, PROPERTY: VALUES AND INSTITUTIONS (2011); Gregory S. Alexander, *The Social-Obligation Norm in American Property Law*, 94 CORNELL L. REV. 745, 753–73 (2009); Nestor M. Davidson, *Standardization and Pluralism in Property Law*, 61 VAND. L. REV. 1597, 1624–55 (2008).

The bottom line is that each stick is seen as a dial or lever for achieving goals or meeting criteria, and each stick can be trimmed in isolation from the others. So commentators are led to ask questions such as whether exceptions for trespass or the balancing test proposed for nuisance are efficient, fair, moral, or conducive to human flourishing.¹⁰² That style of analysis ignores the costs of and even the choice of methods for achieving these objectives, especially when results emerge from the system as a whole rather than its specific parts. In the service of transparent purposes, the bundle picture usually assumes a very unconstrained use of context. If trespass and conversion send a simple message of “keep off” and “don’t take” (without permission), other aspects of property like nuisance (which, not coincidentally, tend to involve neighbors rather than the world at large) involve more information about the value of uses, their harm, and the nature of the surrounding area. If delineation cost is left out of the picture, it becomes deceptively attractive to move in the direction of more governance-style contextualized inquiry into all such matters. Suggesting the importation of copyright’s notoriously fuzzy and mysterious fair use doctrine into the law of trespass in order to capture all and sundry societal interests in potential boundary crossings is but an extreme example.¹⁰³ Promoting the promiscuous employment of contextual information in property is in keeping with ignoring the cost of delineation in the process of serving the purposes of property.

Legal realists and their successors object to delineation strategies that are not fully congruent with these purposes for being too formalistic or conceptualistic. The implication is that right-thinking people would want to serve the purpose in question — say a right of access for hikers — and any reluctance to define this stick is mere apology for the owner class. Furthermore, in designing a right to roam, one could take all sorts of context into account, like the relative needs of the parties and so on (and on).¹⁰⁴ The right to roam, as famously implemented by statute in Scotland, winds up being a complex governance regime requiring interest-balancing that fits uncomfortably in the existing “bundle.”¹⁰⁵ The postrealist reply is simply that the law has to be contextual, and more generally, a realist-style leap of logic has it

¹⁰² See, e.g., Alexander, *supra* note 101, at 747–50, 779–82, 801–10; Eduardo M. Peñalver, *Land Virtues*, 94 CORNELL L. REV. 821, 830–32 (2009). *But cf.* Eric R. Claeys, Response, *Virtue and Rights in American Property Law*, 94 CORNELL L. REV. 889, 892, 934–35 (2009).

¹⁰³ See Ben Depoorter, *Fair Trespass*, 111 COLUM. L. REV. 1090, 1114 (2011).

¹⁰⁴ See Jerry L. Anderson, *Britain’s Right to Roam: Redefining the Landowner’s Bundle of Sticks*, 19 GEO. INT’L ENVTL. L. REV. 375, 404–09 (2007); John A. Lovett, *Progressive Property in Action: The Land Reform (Scotland) Act 2003*, 89 NEB. L. REV. 739, 777–90 (2011).

¹⁰⁵ See Joseph Cooper, *The Scottish Right of Access: Symmetry, Reciprocal Causation and Compromise in the Context of an Atypical Rule 3 Property Rule 25–26* (May 2011) (unpublished student paper, Harvard Law School) (on file with the Harvard Law School Library).

that because the law sometimes uses context, its use should always be feasible.¹⁰⁶ The burden is shifted to anyone who wants to deny the relevance of context, and when using context can be shown to be congruent with a virtuous purpose, objections are labeled as formalistic or worse.

On the architectural theory, the pattern of standardization is no accident. The most basic aspects of property — “don’t trespass,” “don’t steal” — are the ones most likely to be parsed by distant and impersonal audiences. This pattern of standardization is highly consistent with the basic architecture of property in terms of exclusion and governance.¹⁰⁷ An exclusion strategy defines a thing and uses rough proxies to announce generally a rule of “keep off.” Trespass to land is the paradigmatic example. By contrast, a governance strategy focuses in on given uses and prescribes proper behavior with respect to the resource. Governance rules are more tailored and context-specific. Often they are directed to a smaller, more defined group of duty holders. Thus, in nuisance, a governance regime holds between neighbors. In covenants, the right holder and duty holder are defined by the contract. (And covenants only run — that is, bind successors in interest — if certain standardizing requirements like “touch and concern” are met.) Zoning too is more fine-grained than a basic exclusion regime. Thus, those aspects of property that are aimed at the widest and most impersonal audience tend to be the most standardized, and we allow greater information intensiveness as we move out from this core to the refinements that are relevant to more defined subgroups.

B. Means and Ends in Property

Many of the properties of property are emergent. Just as water molecules do not have to be wet for water to be wet, so each stick in the bundle and each doctrine of property need not have the desirable features we want the system to have. Wetness is an emergent property of water. So with property law. Allowing owners to exclude others seems nasty and selfish, but whether it is efficient, fair, just, or virtue-promoting is sometimes only assessable in the context of the system as a whole. For example, the law of trespass in its individual applications can look very arbitrary, unfair, and even irrational, but it permits owners the space (literally, in the case of land) to pursue projects without having to answer to others, thus generally promoting efficiency and liberty. One need not endorse the reasons invoked by the Jacques

¹⁰⁶ See, e.g., Smith, *supra* note 57, at 1180–81 (narrating how the logic of realist contract theory led to the rejection of the plain meaning rule).

¹⁰⁷ See Smith, *supra* note 8, at S467–71.

in *Jacque v. Steenberg Homes, Inc.*¹⁰⁸ for excluding Steenberg Homes to see the Jacques as deserving robust protection for their refusal.¹⁰⁹ Likewise, where courts hold the line on the *numerus clausus* principle and deem leases “for the duration of the war” or “for life” to be at-will tenancies, the result looks weird if it does not contribute to the maintenance of a standardized system of property rights that eases informational burdens more generally.¹¹⁰

Properties like efficiency, fairness, justice, and virtue promotion are emergent properties of the property system. It is certainly relatively easy to ask whether isolated individual rules — like the doctrine of necessity, antidiscrimination law, and the exemption of high-altitude airplane overflights from trespass — serve a given purpose. And sometimes isolating the purposes of individual rules makes some sense, but it makes more sense if we realize that our decision in any such situation is not a freestanding one but one that impacts the rest of the owner’s rights and the working of the system. By making the pieces of the bundle fully congruent with their purposes and obscuring the means-ends relation between property law and the purposes it serves, the bundle theory leads to a fallacy of division — like expecting a water molecule to be wet. Requiring that each piece of the system and each stick in the bundle transparently reflect or promote our purposes is not necessary.

Nor is it wise. Again, some features of the system are emergent properties. Take stability. A realist might want to treat stability as yet another detachable feature or lever to be dialed up or down.¹¹¹ But things don’t work that way; stability is a feature that can only be evaluated as an aspect of the system. Nor is stability a factor to be balanced whenever we are deciding how to trim and parcel out the supposedly separable sticks in the bundle. To assert that doctrines are part of an issue-by-issue balancing of values like community, autonomy, efficiency, personhood, labor, and distributive justice is to commit the fallacy of division. These are all important values for the system to serve, but the bundle picture creates the expectation that the pieces of the system will serve these values individually and separably as well as collectively. Little attention is directed toward the possible specialization of the parts in achieving the goals of the whole. Thus, trespass

¹⁰⁸ 563 N.W.2d 154 (Wis. 1997).

¹⁰⁹ See *id.* at 156–58; see also Merrill & Smith, *supra* note 52, at 1871–74 (discussing how the *Jacque* decision demonstrates the element of moral decisionmaking inherent in the law of trespass); Smith, *supra* note 51, at 983–84 (defending *Jacque* based on information costs).

¹¹⁰ Merrill & Smith, *supra* note 15, at 832–33; see also Merrill & Smith, *supra* note 23, at 11–12. Courts may redefine a term of years to include such leases without entirely giving up on standardization, although it requires additional effort to design and implement such a lease. *Id.* at 35.

¹¹¹ See, e.g., DAGAN, *supra* note 101, at 43 (asserting that contextualized inquiry leads to stability of property law).

may contribute relatively more to owner security and autonomy, and the implied warranty of habitability may specifically promote fairness and protection of tenant expectations; but if so, they do so in tandem (and with other rules). There is little reason to expect trespass law itself, for example, to be as fair or nuanced as property law as a whole.¹¹² Many of the features of property law are emergent, and an architectural theory can help explain how they emerge from the working of the system.

C. *Implications: Ordinary Property, Custom, and Entity Property*

The implications of the modular theory for property as a law of things are many, and I draw out a few here. It bears repeating that some very basic facts about property — its lumpiness and its protection in the first instance through a very simple regime of trespass — receive an explanation. Likewise, the tendency of nuisance to track boundary invasions more than is conventionally expected also receives an explanation: the semitransparent modules are important for managing the complexity of land use interactions.¹¹³

Some striking patterns in the incorporation of custom into law reflect the nature of the modular things of property. I have argued that in the course of adapting the mining custom of *pedis possessio* into the law, parcel boundaries have been surprisingly important.¹¹⁴ Under the *pedis possessio*, a miner without a valid claim against the government has prelocation rights against other miners to the spot he is working on. Evidently, miners had a common notion of what a “spot” was, but when the custom was adopted by courts, the *pedis possessio* referred to the boundaries of the unperfected claim. Interestingly, in modern times, uranium mining companies have been unsuccessful in getting the *pedis possessio* to apply beyond the boundary of a single claim and have thus been forced to do a lot of unnecessary make-work. The thing of property, here the parcel boundary, again has a greater gravitational pull than a narrow cost-benefit test keyed to the sticks in the bundle would lead one to expect.

Further suggestive evidence of the role of modular things in property law and norms abounds. Consider how parcel boundaries and the

¹¹² The alternative is to invoke a plethora of general principles to be balanced as specific situations present themselves. For a famous but unusual example of such an approach, see *State v. Shack*, 277 A.2d 369, 372–75 (N.J. 1971). See also Henry E. Smith, *Mind the Gap: The Indirect Relation Between Ends and Means in American Property Law*, 94 CORNELL L. REV. 959, 982–84 (2009) (discussing *Shack*). One can declare by fiat that such a system is not an ad hoc, unstructured bundle, see DAGAN, *supra* note 101, at 43, but ad hocery itself is not a feature that can easily be dialed down!

¹¹³ See generally Smith, *supra* note 51.

¹¹⁴ See Smith, *Community and Custom in Property*, *supra* note 44, at 32–34.

exclusion strategy exercise a gravitational pull in unintentional cattle trespass: it appears that fencing in, which accords with general possessory norms, is more prevalent than a narrow balancing of the relative values of crops and cattle would call for, and the informal norms almost always call for fencing in.¹¹⁵ Consider also the law of takings, in which an exercise of eminent domain requires just compensation in the amount that the parcel is valued according to the fair-market-value standard as if the parcel were held in fee simple, and assembly gain from unifying lesser interests in a fee simple goes to the condemnees.¹¹⁶ In a fashion reminiscent of the economic loss rule, a lease whose value exceeds the fair market value of the parcel-in-fee goes uncompensated under the “unit rule.”¹¹⁷ There are many possible arguments for and against each of these results,¹¹⁸ but it is interesting that traditionally the rationale was that condemnation was an in rem action (against the thing), making internal (and external) considerations irrelevant.¹¹⁹ Whatever else might be said here, the law of just compensation is highly modular.

One major advantage of the modular theory is that it easily captures the very types of property that have been thought to present the biggest challenge for traditional notions of property and consequently are considered to furnish a rationale for moving to the bundle picture. Thomas Grey pointed to the rise of abstract rights from increasingly sophisticated contracting and financial engineering as incompatible with any robust notion of property, or any picture of property other than as a label for any collection of features resulting from private and public efforts at tailoring entitlements.¹²⁰ On this view, the bundles

¹¹⁵ See Merrill & Smith, *supra* note 4, at 388–91.

¹¹⁶ See generally Victor P. Goldberg, Thomas W. Merrill & Daniel Unumb, *Bargaining in the Shadow of Eminent Domain: Valuing and Apportioning Condemnation Awards Between Landlord and Tenant*, 34 UCLA L. REV. 1083 (1987) (discussing how to calculate just compensation in various leasehold situations). External assembly gain from joining parcels goes to the condemnor. See *United States v. Causby*, 328 U.S. 256, 261 (1946) (“It is the owner’s loss, not the taker’s gain, which is the measure of the value of the property taken.”). This discrepancy is less related to internal modularity of parcels, and indeed it has come under heavy criticism. See, e.g., Michael Heller & Rick Hills, *Land Assembly Districts*, 121 HARV. L. REV. 1465, 1468–69 (2008); Amnon Lehari & Amir N. Licht, *Eminent Domain, Inc.*, 107 COLUM. L. REV. 1704, 1706–07 (2007).

¹¹⁷ *City of Milwaukee Post No. 2874 Veterans of Foreign Wars v. Redev. Auth. of Milwaukee*, 768 N.W.2d 749, 751 (Wis. 2009).

¹¹⁸ THOMAS W. MERRILL & DAVID A. DANA, *TAKINGS* 169–79, 185–90 (2002).

¹¹⁹ *Crane v. City of Elizabeth*, 36 N.J. Eq. 339, 343 (Ct. Err. & App. 1882) (“[Condemnation] has thus the distinctive qualities of . . . a taking, not of the rights of designated persons in the thing needed, but of the thing itself”); MERRILL & DANA, *supra* note 118, at 187 (noting traditional explanation based on in rem nature of condemnation). As with a fencing-out regime in cattle trespass, which holds one liable for intentionally inducing cattle to graze on the land of another, the unit rule might be expected to apply if the prime motivation of the taker is to wipe out the favorable contract of the holder.

¹²⁰ See Grey, *supra* note 3, at 78.

labeled “property” have no independent or essential content. Interestingly, Grey’s concerns have their antecedents in Adolf Berle’s and Gardiner Means’s treatment of the modern corporation.¹²¹ Now most well-known for their highlighting of the problem of the separation of ownership and control in corporations (what we could call the agency problem), Berle and Means principally argued that the separation of ownership and control in corporations was calling into question the notion of private property.¹²² The title of their work is after all *The Modern Corporation and Private Property*.

For what Merrill and I have called entity property, regular property rights are encapsulated in another layer of modularization.¹²³ Henry Hansmann’s and Reinier Kraakman’s theory of asset partitioning takes the essential role of organizational law to be the defining of pools of assets for availability to some creditors and not others (especially the immunity of a firm’s assets from the claims of its owners’ creditors).¹²⁴ The creditors of one firm can concentrate on the assets of that firm without worrying about the creditors of the owners or unrelated businesses. Asset partitioning is a higher-level modularization. It allows for information specialization. It also permits convenient substitution of one creditor for another without the need for coordination — just as modular structures do generally.

More generally, entity property involves modularization, but it is modularization of a different sort than in regular property. The literature on the modular theory of organizations, which has been growing rapidly,¹²⁵ can be brought together with the modular theory of property: entity property is carved up differently and has a hierarchical structure that makes it special, but it crucially relies on modularity to manage complexity.

¹²¹ ADOLF A. BERLE, JR. & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* (1932).

¹²² *Id.* at 333–39.

¹²³ I also hypothesize that beneficial interests in trust and other equitable property rights can be captured as an iterative use of the recursive process of making a modular thing (reification). Cf. Ben McFarlane & Robert Stevens, *The Nature of Equitable Property*, 4 J. EQUITY 1 (2010) (attempting to analyze equitable rights as “rights against rights”).

¹²⁴ See Henry Hansmann & Reinier Kraakman, *The Essential Role of Organizational Law*, 110 YALE L.J. 387, 390 (2000).

¹²⁵ See, e.g., BALDWIN & CLARK, *supra* note 32; MANAGING IN THE MODULAR AGE (Raghu Garud et al. eds., 2003); Richard N. Langlois, *Modularity in Technology and Organization*, 49 J. ECON. BEHAV. & ORG. 19 (2002); Ron Sanchez & Joseph T. Mahoney, *Modularity, Flexibility, and Knowledge Management in Product and Organization Design*, 17 STRATEGIC MGMT. J. (SPECIAL ISSUE) 63 (1996).

IV. PROPERTY AND PRIVATE LAW

If property is the law of modular things, this has implications for the rest of private law and for its relation to public law. Let me end with some speculative thoughts on the bigger picture, mainly by raising some open questions.

Modular property feeds into tort, contract, and restitution in a simple fashion. Modular rights are more alienable and are less costly to protect (as through the tort of trespass). They are also easier to identify and trace as part of restitution, as in mistaken transfers and wrongful takings.¹²⁶

The interface between private and public law is more problematic. In England, private law operates in a public context, as exemplified by ultra vires transactions by local authorities, in much the same fashion as between private parties, whereas in the United States, the tendency since the realist era has been to define problems at the interface of private and public law in public law terms. Let me highlight one issue.

The modular theory opens up a range of approaches to the public-private interface. One major cluster of issues centers on how the Constitution constrains the application of private law. Much post-New Deal writing downplays or denies the public-private distinction.¹²⁷ And yet the courts have been reluctant to efface the distinction altogether. In the context of applying due process and equal protection to the enforcement of racially restrictive covenants, the consensus agrees with the Supreme Court's result in *Shelley v. Kraemer*,¹²⁸ but the question of when judicial enforcement of private law entitlements is state action has involved a difficult exercise in line drawing.¹²⁹ The Court has shied away from holding that judicial enforcement of trespass in a purely private context (for example, exclusion from a dinner

¹²⁶ Cf. Daniel Friedmann, *Restitution of Benefits Obtained Through the Appropriation of Property or the Commission of a Wrong*, 80 COLUM. L. REV. 504 (1980) (presenting a property-based theory of restitution).

¹²⁷ See generally ACKERMAN, *supra* note 9; see also Cass R. Sunstein, *Lochner's Legacy*, 87 COLUM. L. REV. 873, 875–82, 902–04, 917–19 (1987). Most of these authors assimilate the private to the public, but the public has sometimes been analyzed as a scaled-up version of the private. See Richard A. Epstein, *Playing by Different Rules? Property Rights in Land and Water*, in PROPERTY IN LAND AND OTHER RESOURCES 317 (Daniel H. Cole & Elinor Ostrom eds., 2012).

¹²⁸ 334 U.S. 1 (1948).

¹²⁹ See, e.g., LAURENCE H. TRIBE, *CONSTITUTIONAL CHOICES* 259–60 (1985); Robert J. Glennon, Jr. & John E. Nowak, *A Functional Analysis of the Fourteenth Amendment "State Action" Requirement*, 1976 SUP. CT. REV. 221, 228–31; Louis Henkin, *Shelley v. Kraemer: Notes for a Revised Opinion*, 110 U. PA. L. REV. 473, 490–91 (1962); Louis H. Pollak, *Racial Discrimination and Judicial Integrity: A Reply to Professor Wechsler*, 108 U. PA. L. REV. 1, 6–9 (1959); Carol M. Rose, *Servitudes*, in RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW, *supra* note 23, at 296, 310–11.

party) would be state action.¹³⁰ One might argue that there is no such thing as private law, or one might go back to a prerealist idea of the inviolability of private law. The modular theory points in neither direction. It suggests that it is possible to make such a distinction and suggests where the distinction would be drawn if it is to be drawn. Trespass is mechanical for the reasons we have discussed, and it delegates control to an owner. It has involved less evaluation of the reasons for its invocation even than contract enforcement, which is more fine-grained and in particular calls for evaluation of agreements for violations of public policy. So, state action could be found in the judicial enforcement of covenants because the state has long been in the business of supervising contracts and covenants for violations of public policy, unlike with claims of trespass. The modular theory does not dictate a result, but it makes the trespass-covenant distinction a plausible one.

Another intersection between public and private has to do with changes to the property system itself. Private parties can contract at the interfaces between modular rights, within the constraints of the *numerus clausus* principle. Delegation to owners, including modification of property packages, is sometimes appropriate. It makes possible many of the benefits of private property in terms of individuals' engaging in decentralized decisionmaking with their own special information.¹³¹ Likewise, courts can innovate in property law but are not supposed to create new property forms.¹³² The literature on modular systems suggests that they are very good at evolving through a range of environments, but they can be trapped at a local maximum.¹³³ Evolutionarily, one may not be able to get to a new optimum by the kinds of tinkering that parties and courts can do to the modular structure. For major changes remodularization is necessary. In our legal system this type of change is typically channeled to legislatures.¹³⁴ When and how legislatures should engage in such remodularizations and whether transition relief is appropriate reflect a trade-off between the need for stability and precommitment to private parties on the one hand and the need for flexibility to remodularize when necessary on the other.¹³⁵ This Article is not the place to develop such a theory, but

¹³⁰ See MERRILL & SMITH, *supra* note 84, at 465–67.

¹³¹ See F.A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 524 (1945).

¹³² Merrill & Smith, *supra* note 23, at 9–10, 23–24.

¹³³ See, e.g., Stefano Brusoni et al., *The Value and Costs of Modularity: A Problem-Solving Perspective*, 4 EUR. MGMT. REV. 121, 129–30 (2007).

¹³⁴ Merrill & Smith, *supra* note 23, at 58–68.

¹³⁵ See, e.g., THOMAS W. MERRILL & HENRY E. SMITH, *THE OXFORD INTRODUCTIONS TO U.S. LAW: PROPERTY* 223–58 (2010).

it is worth noting that the modular theory does bring to bear a set of theoretical tools that may prove useful.¹³⁶

Finally, the information-cost theory helps hold the New Private Law together. Conventionally it is thought that moral and philosophically oriented theories of property (and private law) are incompatible with law and economics and other related functional or consequentialist approaches. But if information costs and the need to manage complexity through modularity in particular are brought into the picture, the lumpiness of property, the bilateral structure of private law, and the heavy reliance on everyday morality — features thought to be the unique province of corrective justice and its relatives — receive a high-level utilitarian explanation.¹³⁷ I am not arguing for utilitarian foundations in a philosophical sense. If explanations based on information costs, complexity, and the nearly decomposable system of social interactions dovetail with moral theories, it is quite likely not an accident. This convergence is a consequence of complexity. As Herbert Simon pointed out, complexity can lead us to be “in-principle” reductionists and “practical” holists.¹³⁸ When we approach information costs in a reductionist fashion, property is naturally and for practical purposes seen as a holistic law of things.

CONCLUSION

Property law is a modular system. It helps define what a thing is in the first place and why we should care. It gives content to the notion of a “law of things.” Content is what is lacking in the bundle picture — so lacking that the bundle fails to be a theory of property at all. Instead of positing detachable sticks that directly serve goals like autonomy, privacy, investment, planning, and appropriability according to criteria of efficiency, fairness, and morality, the modular theory of property explains how property law furnishes some basic building blocks of private law. Modular property manages the complexity of human interactions by using exclusionary strategies to treat these interactions as nearly decomposable and by delineating semitransparent

¹³⁶ See, e.g., Oliver Baumann & Nicolaj Siggelkow, *Dealing with Complexity: Integrated vs. Chunky Search Processes* (Sept. 29, 2011) (unpublished manuscript), available at <http://ssrn.com/abstract=1104617> (modeling modular or “chunky” versus integrated search).

¹³⁷ See Merrill & Smith, *supra* note 52, at 1850–52 (arguing that, because property rights are in rem, they present an information problem that calls for heavy reliance on everyday morality); see also Smith, *supra* note 60, at 30–31 (“If we add a concern with information costs to the law and economics of torts, then the economic explanations and justifications of tort law look less different from those based on corrective justice and civil recourse. Law and economics can give an account of the bilateral structure of tort law and gives information cost reasons for moral rights and duties to be woven into tort law.” (footnote omitted)).

¹³⁸ SIMON, *supra* note 33, at 195 (“In the face of complexity an in-principle reductionist may be at the same time a pragmatic holist.”).

boundaries around complementary clusters of attributes. It then specifies the interface between the modular components of property through governance strategies that make more direct reference to uses and purposes, as in the law of nuisance, covenants, and zoning. This interface also contains the very important equitable safety valves that allow the baselines of property to be simple without being vulnerable to opportunists. In contrast to the bundle-of-rights picture, the modular theory captures how a great number of features of property — ranging from its *in rem* aspect, the right to exclude, and the residual claim, through alienability, persistence, and compatibility, and beyond, to deep aspects like recursion, scalability, and resilience — follow from the modular architecture. The modular platform allows communication with actors near and far in a parsimonious manner. Modular property is neither absolute nor formal across the board, but it helps explain how and when we incur the cost of delineating property rights in a complex world. It furnishes the things that property as a law of things contributes to private law.