

# Entitlements to Things in a Complex World

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June 15, 2023

## Introduction

Property rights economics generally treats property as a direct reflection of the complexity of the world. Under the heading of “entitlement,” various problems of transaction costs and hold-up can be managed in the manner of mechanism design. In this, institutional economics is like the economic analysis of law in dovetailing with the bundle-of-rights picture that traces back to early twentieth-century legal realism. In the bundle-of-rights picture, property and ownership are analyzed as collections of use rights and powers, with less (if any) focus on how these smaller constituents relate to each other. By contrast, actual property law and customs (as well as the theory of property in non-U.S. legal systems) persist in treating property as a “law of things”.

Legal and economic theorists typically cite “complexity” as a reason for their deflationary approach to things and their reductiveness about property rights. The Legal Realists and other reformers of the early- to mid-twentieth century cited “complexity” as justifying a less formal and more judicially dynamic law, and they specifically targeted the notion of thing as a handover from the horse and buggy era.<sup>1</sup> Further, thing-based property was too simple and even too simpleminded – the kind of lay notion that experts learn early in their careers as lawyers or social scientists to get beyond.<sup>2</sup> Property as a law of things was also guilty by association with the idea of “system” in the law. System was (wrongly, I will argue) assumed to imply rigidity, autonomy, and even deductive “legal science”. This disdain for property as a law of things carries over into law and economics and much of modern legal theory. And as in earlier eras, new problems, especially those generated by new technologies are widely considered to make

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<sup>1</sup> See, e.g., Thurman Arnold, *The Folklore of Capitalism* (Yale University Press 1937) 114-116; James E. Herget, *American Jurisprudence, 1870–1970: A History* (Rice University Press 1990) 146–147; G. Edward White, *The Evolution of Reasoned Elaboration: Jurisprudential Criticism and Social Change, in Patterns of American Legal Thought* (Bobbs-Merrill Co. 1978) 136, 139; see also Richard A. Posner, *Reflections on Judging* (Harvard University Press 2013) (arguing from complexity against formalism and for a new judicial realism); see also *Report of the Committee on the Establishment of a Permanent Organization for the Improvement of the Law Proposing the Establishment of an American Law Institute* (Feb. 23, 1923) 12, reprinted in: *The American Law Institute 50th Anniversary* (2d ed. 1973); Henry E. Smith, “Restating the Architecture of Property” in 10 *Modern Studies in Property Law* 19 (Sinéad Agnew and Ben McFarlane eds., Hart 2018).

<sup>2</sup> Bruce A. Ackerman, *Private Property and the Constitution* (Yale University Press 1977) 26-29 (reporting that the bundle-of-rights conception of property is so pervasive that “even the dimmest law student can be counted upon to parrot the ritual phrases on command”); Thomas C. Grey, “The Disintegration of Property” (1980) 22 *NOMOS* 69 (J. Roland Pennock and John W. Chapman eds., NYU Press); see also Thomas W. Merrill and Henry E. Smith, “What Happened to Property in Law and Economics?” (2001) 111 *Yale L.J.* 357-398.

thinghood obsolete. How can a law of things tracing back to Roman law and perhaps into the mists of prehistory handle everything from drone overflights to new intangibles supported by blockchain?

This essay argues that this view, intuitive as it is, has things completely backwards. A better account of complexity, based on complex systems theory, allows us to see that system in the law is very different from the one assumed in the Realist-inspired deprecation of property as a law of things. In modern systems theory, a system is a set of interconnected elements.<sup>3</sup> A complex system is one in which the interconnections are numerous and dense enough that the system can show properties that cannot be traced to the contribution of individual elements of a system. Such system properties are not the additive sum of the contributions of the elements; instead, they are emergent. The function of a car is not the sum of the functions of its parts acting separately. Water is wet even though molecules aren't. Consciousness can be seen as an emergent property of (highly interconnected) neurons. The action is in the interconnections.

This better view of complexity and system is the key to seeing how property as a law of things functions – and how things are central to the flexibility and subtlety of property law. The bundle-of-rights picture is thought to be flexible, and as we will see its “flexibility” spuriously stems from how it more or less assumes away the connections between the “sticks” in the bundle: the effect of individual rights is treated as additive.

The starting point to improving the bundle picture is to realize that there are different degrees of complexity which end up differing in kind. A literal bundle of sticks is a collection of elements that are not interconnected, and the bundle is the simple sum of its parts. The opposite of a collection of additive elements is maximum interconnection, in which a small change anywhere can cause massive and unforeseeable ripple effects. This can be termed chaos. In between simplicity and chaos is organized complexity, in which interconnection is important but not maximal, and the patterns of interconnection are not random but form clusters or “communities,” to use the term in network theory.<sup>4</sup> Many systems show such community structure, and this structure can be the basis for modularity: patterns of interaction that are intense within a module but sparser across interfaces.<sup>5</sup> A car is a modular system because the brake system and the windshield wipers show intense interaction of their internal parts without the two subsystems interacting much. A modular system can evolve through a certain range because change can happen within a module, or modules can be swapped without causing massive and unpredictable changes to the rest of the system.

This essay will argue that things, entitlements and property doctrines like possession are part of a system that helps manage the costs of organized complexity by providing a flexible and

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<sup>3</sup> Melanie Mitchell, *Complexity: A Guided Tour* (Oxford University Press 2011); Herbert A. Simon, *The Sciences of the Artificial* (2d ed., MIT Press 1981).

<sup>4</sup> Warren Weaver, “Science and Complexity” (1948) 36 *Am. Scientist* 536. On community structure, see Matthew O. Jackson, *Social and Economic Networks* (Princeton University Press 2008) 443-457; M. E. J. Newman and M. Girvan, “Finding and Evaluating Community Structure in Networks” (2004) 69 *Physical Rev. E* 026113.

<sup>5</sup> See, e.g., I Carliss Y. Baldwin and Kim B. Clark, *Design Rules: The Power of Modularity* (MIT Press 2000); Richard N. Langlois, “Modularity in Technology and Organization” (2002) 49 *J. Econ. Behav. & Org.* 19.

dynamic modular platform for both impersonal and personal interactions.<sup>6</sup> To show this, I will begin with the bundle picture on its own terms. As in property rights economics, we can analyze things themselves as collections of attributes.<sup>7</sup> An apple has color, taste, texture, etc. These attributes do not act in isolation, though, especially when it comes to their value to people. The attributes can be substitutes or complements, and the use of one may conflict with use of another. From a functional point of view, the attributes that make up a thing are interconnected. Soil quality, moisture, exposure to sun, and aeration are all interacting functional attributes of land. Attributes may but need not be spatial. The surface of land is complementary to near airspace but not to high altitude airspace. The use of underground space is complementary to the surface in some ways and not others. The leg of a chair is clearly part of a chair, a slipcover less so. The law of fixtures deals with many such problems, and the family of doctrines that sometimes goes under the heading of “accession” is about exactly this.<sup>8</sup>

Entitlements to such interconnected attributes form a system in the architectural approach to property. This system consists in part of the attributes of resources and the entitlements over them, which are highly interconnected and in a structured way. This contrasts to conventional theory in both law and economics in which entitlements are treated as discrete and highly separable: such entitlements, sticks if you will, can be collected and the property label affixed at will. Thus, this essay will ask what would happen if we took seriously the connections of attributes and entitlements and will argue that this alone helps make sense of some traditional doctrine in property related to thinghood and lumpy but contextualized entitlements.

This essay will set the question of entitlements in property theory in the context of property as a complex system. Part I will begin with existing reductionist economic and legal approaches to things and entitlements and enrich them in the direction of true complexity, with the result that the nature of system in property law and its function become more apparent. Part II applies this theory to the question of intangible property rights, where some of the issues in entitlement definition and thinghood are most salient and difficult. Part III will then contrast the complexity oriented architectural theory with some illustrative examples of current property theories that have trouble with the relation of the micro and the macro in property law and institutions, because such approaches do not capture the true role of complexity in property.

## **I. The Thing about Things and Entitlements to Them**

The role of things in property theory has veered from something like an axiom on the one hand to a taboo on the other. This Part will set forth three pictures of the thing in property and how in each the thing of property relates to legal entitlements. These three pictures are the robust and exogenous view, the deflationary and reductionist view, and the architectural

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<sup>6</sup> Henry E. Smith, “Property as the Law of Things” (2012) 125 Harv. L. Rev. 1671.

<sup>7</sup> Yoram Barzel, *Economic Analysis of Property Rights* (2d ed., Cambridge University Press 1997); Yoram Barzel and Douglas W. Allen, *Economic Analysis of Property Rights* (3d ed. forthcoming, Cambridge University Press).

<sup>8</sup> Restatement of the Law Fourth, Property Vol. 1, Div. III (Am. L. Inst., Tent. Draft No. 4, 2023).

view. I will then elaborate on the architectural theory and argue that it alone fits comfortably within law as a complex system.

### A. Three Views of Entitlements

What is the nature of entitlements? Broadly speaking, an entitlement in the economic sense is an expectation of being able to undertake an activity or bring about a state of affairs with respect to a resource. These activities and actions are valuable to people, and people correspondingly have an interest in dealing with resources. Resources can be used in different ways, and these uses can be protected by a potentially wide variety of methods. Legal property rights are one mechanism for protecting economic and moral rights.

Although I used the neutral term “resources,” methods of protecting people’s interests in using resources presuppose that such resources can be perceived, measured, and so forth. We don’t need to get very philosophical before it becomes necessary to have an ontology for property law and institutions to work from. This is where controversies over things and their role on property begin.

There are three broad classes of views about things in property. These three views correspond to some major strands in property theory.

First, the robust or exogenous view of things and entitlements takes them as given in some sense. Although some might call this naïve, this view benefits from working in practice and dovetailing with lay intuition in everyday life.<sup>9</sup> More foundationalist versions of thinghood and the legal relations that key off them have also been offered. For example, Kantians see the right to exclude as inherent in certain interpersonal relations that involve individuals located in space with respect to resources.<sup>10</sup> These views accord an important place to things and corresponding entitlements like the right to exclude. Various legal ontologies could be said to be realist in the philosophical sense (in which Legal Realism is not realism but nominalism).<sup>11</sup> And if things and a right to exclude from things are identified with formalism, as they sometimes are, there is nevertheless a large range of “formalisms,” ranging from doctrinalism, pragmatism, legal axiomatization, to natural law and natural right.<sup>12</sup>

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<sup>9</sup> One might call this the “higher naïveté,” which is a term used by some historians (as a tweak on the “higher criticism”), to denote the acceptance that there is something to a source if there are no reasons to discount it. See, e.g., Donald Kagan, *The Outbreak of the Peloponnesian War* (Cornell University Press 1969) 378 (arguing in favor of that something like the Spartan Assembly of 475 BC, reported only Diodorus Siculus 11.50, actually occurred, in accordance with “the higher naïveté”); see also Peter Gay, “Rhetoric and Politics in the French Revolution” (1961) 66 *Am. Hist. Rev.* 664, 676 (invoking “the higher naïveté” in arguing for taking political rhetoric of the French Revolution more on its own terms rather than in light of later developments).

<sup>10</sup> See, e.g., Arthur Ripstein, “Possession and Use” in James Penner and Henry E. Smith (eds.) *Philosophical Foundations of Property Law* (Oxford University Press 2013) 156. Perhaps this space need not be physical and could include abstract spaces that are the subject of intangible entitlements.

<sup>11</sup> Adolf Reinach, “The A Priori Foundations of Civil Law,” (1913) John Crosby (trans.), (1983) 3 *Aletheia* 1-142; James Toomey, “Property’s Boundaries” (2023) *Va. L. Rev.* 131.

<sup>12</sup> Paul B. Miller, “The New Formalism in Private Law” (2021) 66 *Am. J. Juris.* 175.

Set against this robust version of things are the deflationary and reductionist approaches. By far the most well-known and accepted version is the bundle-of-rights picture, or more metaphorically the bundle of sticks. In the bundle picture, notions like property and ownership are broken down into more fine-grained rights (and sometimes other legal relations).<sup>13</sup> Thus, if A owns a bicycle, A can ride it, paint it, sell it, and so forth because A has the right to use, the right to alter, the right to sell, etc. In some versions of bundle picture, the right to exclude is particularly prominent but it is still one of a cluster of rights.<sup>14</sup>

The constituents of the bundle of rights are sometimes taken to be the “atomic” legal relations identified by Wesley Hohfeld – right-duty, privilege-no-right, power-liability, immunity-disability – and Hohfeld is often invoked as the inspiration for the bundle-of-rights picture. It is not clear how reductionist Hohfeld himself was about the bundle, and there are hints that he was interested in developing a theory of aggregates of legal relations when he died.<sup>15</sup> One can also ask how reductionist the bundle picture is in both theory and practice. As the metaphor of the bundle of sticks suggests, in practice, the bundle picture often assumes that the sticks, i.e. the individual rights, are separable.<sup>16</sup> There are advantages. To begin with, isolating the part of the law responsible for a given result makes analysis of legal problems much easier. This malleability is directly related to complexity: if the sticks are not connected to each other, then each stick (right) contributes to the bundle additively. So optimizing a stick is to optimize the whole, because improvement in a component is automatically an improvement in the whole. Relatedly and more normatively, one of the main motivations for the bundle picture has been to make reconfiguration easier to contemplate.<sup>17</sup>

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<sup>13</sup> Grey (n 2). See also Symposium, *Property: A Bundle of Rights?*, (2011) 8(3) Econ J. Watch, <https://econjwatch.org/issues/volume-8-issue-3-september-2011?ref=issue-archive>; J.E. Penner, “The ‘Bundle of Rights’ Picture of Property” 43 UCLA L. Rev. 711.

<sup>14</sup> See, e.g., Simon Douglas and Ben McFarlane, “Defining Property Rights,” in James Penner and Henry E. Smith (eds.), *Philosophical Foundations of Property Law* (Oxford University Press 2013) 219; Thomas W. Merrill, “Property and the Right to Exclude” (1998) 77 Neb. L. Rev 740.

<sup>15</sup> Ted M. Sichelman, “Very Tight ‘Bundles of Sticks’: Hohfeld’s Complex Jural Relations” in Shyamkrishna Balganesh, Ted M. Sichelman and Henry E. Smith (eds.), *Wesley Hohfeld a Century Later: Edited Work, Select Personal Papers, and Original Commentaries* (Cambridge University Press 2012) 345.

<sup>16</sup> See, e.g., Carol M. Rose, *Property and Persuasion: Essays on the History, Theory, and Rhetoric of Ownership* (Westview 1994) 280 (arguing that the bundle of sticks picture implies that rights making up ownership are separable and “all more or less alike” and that seeing ownership rights as more like “[t]oys in a toy chest” would be truer to their heterogeneity and interdependence); Thomas Ross, “Metaphor and Paradox” (1989) 23 Ga. L. Rev. 1053, 1061-1062 (arguing that the bundle of stick metaphor strong emphasizes separability and makes it hard to see how the removal of one stick in the bundle could affect the others); Henry E. Smith, “Property beyond Flatland” (2021) 10 Brigham-Kanner Property Rts. J. 9, 16-22; see generally Grey (n 2) (arguing for disaggregation of property bundle based in part on separability).

<sup>17</sup> Grey (n 2) 81.

For similar reasons, the deflationary and reductivist picture of things and property is also influential outside the law. The first institutional school of economics adopted the bundle of rights, and like the Legal Realists they were interested in reform. The bundle has more recently taken on a new life in economics, because it is also analytically convenient. Coase adopted an extreme version of the bundle of rights, as did most of the law and economics movement in the decades that followed his famous article on transaction costs.<sup>18</sup> For economists, the bundle picture was made to order, because it allows one to model property as a set of constraints that form a simple additive system. One can ask whether allocating the right to paint the bicycle to A or someone else will maximize the value of the bicycle, and bicycles in general. Moreover, one could ask as between A and B whether the right to do X with respect to resource R is “efficient” compared to other allocations, based on the incentives that it affords A and B.

In principle, the rights in the bundle could be more connected than this picture assumes. To the extent that the rights refer to attributes of the resource – the soil moisture, its nutrients, exposure to sun, etc. – then the rights to those attributes will interact, especially through the value of the uses that can be made of them. In the case of the soil moisture, nutrients, and aeration, the attributes are complementary. And often rights will interact because they are difficult to delineate in a way that keeps the contributions and activities of various actors separate. Once A has access to the parcel B owns, delineating and enforcing separate use rights over berries, small game, and so forth will be more difficult, because the proxies used for violation will have to distinguish good versus bad behavior among those with access.<sup>19</sup> This is not an unfamiliar problem.

It is, however, a systematic problem, and one that points to a different, more architectural, view of property things and entitlements. Both the robust and deflationary views of things and property entitlements pay insufficient attention to the internal and external structure of things and entitlements, and therefore to how the micro of property relations relates to their macro effects. In particular, the tools of complex systems theory can be used to analyze the structure of property law.<sup>20</sup> The set of rights in the bundle and the attributes they relate to (and hence the set of actors at the poles of the legal relations) are all not only connected but connected densely enough that properties can emerge at the system level that cannot be traced easily (or at all) to particular elements. Property is a complex system.

One way of seeing this is to enrich given bundle-style models with the interactions that are key to the nature of a complex system. As noted, the bundle-of-rights picture seeks to break what we refer to as “rights to things” into constituent parts: rights to use resource attributes in particular ways availing against particular others. The uses are thinner than the broad right to exclude (which protects a wider less specified range of uses). If having one right in the bundle

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<sup>18</sup> Merrill and Smith (n 2); Merrill and Smith, “Making Coasean Property More Coasean” (2011) 54 J.L. & Econ. S77. The FCC article out of which the social cost article grew was even more explicit in its adoption of the bundle of rights.

<sup>19</sup> Robert C. Ellickson, “Property in Land” (1993) 102 Yale L.J. 1315, 1327–1328.

<sup>20</sup> Henry E. Smith, “Systems Theory: Emergent Private Law” in Andrew Gold et al. (eds.), *The Oxford Handbook of the New Private Law* (Oxford University Press 2020) 139.

affects another, we can say that they interact or, to borrow a term from biological evolution, that they are “epistatically” connected.<sup>21</sup> This has implications for the contours of rights and evolution. If rights are connected in this way, then optimizing a given right may or may not improve the bundle overall, because the effect on other rights might be negative. Instead, we have many local maxima (of fitness, whatever that is taken to be), and the global optimum might be quite distant hard to reach across many valleys. However, if the patterns of connections among the rights is patterned – if they cluster – then we can organize them into modules. Within the bundle, interactions among rights is intensive relative to the connections between the rights in the bundle and other rights (and context) at the “interface” of the bundle.<sup>22</sup> In the case of land, this means that privileges of use (growing a tomato plant, building a residence, walking around, etc.) will cluster because the uses impact each other and may even have permanent physical effects on the resource with implications for future use. And these clusters interact in more stylized but important ways with other uses of other resource attributes clusters (entering as a trespass, odors and noise as nuisances, etc.). Without assuming the bundle exogenously, we can explain why we see the bundles we do and why their aggregate nature is so important.

## **B. Property, Context, and System**

In property theory, schools of thought can be distinguished by their “formalism.” Realist-inspired and sociologically oriented theories emphasize social context. More formal theories focus on – or are caricatured as obsessing over – system in the law. The architectural approach allows us to see this as a false dichotomy: systems in property law, properly understood, is how the law deals with social context.

Sociologically-inspired property theory tends to emphasize context without apparent limit. The idea is that what property means is inextricably tied up to the social context of those in legal relations, including the community. How a resource is defined is contextual, and has meaning only within the community.<sup>23</sup>

The social theorists share something in common with the “formalism” they use as a foil: the assumption that law is homogeneous. Thus, custom is highly embedded in community and presupposed much background knowledge. However, when such norms are to be applied to third party outsiders, there is a tendency of courts and legislatures to simplify – to formalize – the customs in order to be processed by this group of more socially distant duty bearers.<sup>24</sup> Mining

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<sup>21</sup> Lee Alston and Bernardo Mueller, Towards a More Evolutionary Theory of Property Rights, (2015) 100 Iowa L. Rev. 2255, 2262-63, 2265-68; Henry E. Smith, The Complex Architecture of Property Rights, in Eric Alston, Lee Alston, and Bernardo Mueller (eds.), Handbook on Institutions and Complexity, Edward Elgar, forthcoming).

<sup>22</sup> One can figure out the degree of modularity by measuring the betweenness of edges (how many paths they are one between nodes) and then compare the betweenness of actual links in a module compared to what would be expected at random. Ted Sichelman and Henry E. Smith, A Network Model of Legal Relations (ms., May 2023)

<sup>23</sup> See, e.g., Nicholas Blomley, “The Boundaries of Property: Complexity, Relationality, and Spatiality” (2016) 50 Law & Soc’y Rev 224. See also Peter S. Menell, “Intellectual Property and the Property Rights Movement” (2007) 30 Reg. 36, 41 (arguing for that intellectual property needs to pay attention to the “interdependency conception of resources”).

<sup>24</sup> Henry E. Smith, “Community and Custom in Property” (2009) 10 Theoretical Inquiries L. 5.

law is a prime example in which devices like “the spot” one was working are intuitive to other miners, but a more in rem law will tend to favor claim boundaries as more legible.

An environmentally-oriented version of post-Realist property theory emphasizes the interconnectedness of elements of the environment. This idea goes back at least to the early environmentalists like Aldo Leopold (if not the romantics), and it too has much truth to it.<sup>25</sup> Nevertheless, the question is what the pattern of interactions is, and which institutional devices work best in response. There may be no one-size-fits-all answer, and through some range, traditional modular structures may work well precisely because they are easily redeployed and adjustable. Or, as I have expressed it elsewhere, the common law is a system itself and even can be said to have its own “ecology.”<sup>26</sup>

Property entitlements, the doctrinal system, and the social context all interact but not necessarily maximally. How entitlements are embedded in a social context is familiar although as we have just seen in certain ways and not others. Another important interface lies between entitlements and other property concepts and doctrines. Possession and accession both key off things and help define them. Possession is so central that it has been a touchstone for legal theorizing, especially about system in property since at least the nineteenth century. Possession links legal things to social context through the norms of what counts a control for purposes of gaining possession and the norms of abandonment for when possession ends.<sup>27</sup> Possession links up the property torts, adverse possession, security interests, and various aspects of transfer. Possession is neither totally formal nor a matter of deduction. Nor is it a matter purely of law. Possession is emblematic of the system in property because while it is interconnected and so helps manage complexity, it is non-deductive, semi-formal and somewhat open-ended.

### **C. The Emergence of the Residual Claim**

Before turning to how all this works out in practice, let me offer a word on things and residual claims. Things can be regarded as aggregates of resource attributes, and residual claims may be extensionally equivalent to a collection of micro-entitlements. I return to the idea of property as a law of things below. As for residual claims, in the property rights framework developed by Yoram Barzel, residual claims over collections of attributes should go to that person who can most affect the mean return from the resource attributes.<sup>28</sup> If the attributes are connected in terms of their usefulness, then things and by extension the entitlements to them should show a community structure. The residual claim strengthens the signal between the collection of attributes and the residual claimant.

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<sup>25</sup> Aldo Leopold, *A Sand County Almanac* (Oxford University Press 1949) 239-40; John Muir, *My First Summer in the Sierra* (Houghton Mifflin 1911) 211; see also Steven J. Eagle, “The Common Law and the Environment” (2008) 58 Case W. Rsr. L. Rev. 583, 594–95 (discussing the views of Aldo Leopold and John Muir).

<sup>26</sup> Smith (n 16).

<sup>27</sup> Restatement of the Law Fourth, Property Vol. 1, Div. II, § 1.1 (Am. L. Inst., Tent. Draft No. 2, 2021) (possession); *ibid.* Cmts. a, b.

<sup>28</sup> Barzel (n 7) 9.

Both things and residual claims are more modular than the attributes and entitlements, respectively, which underlie them (and on some accounts, constitute them). If modularity has benefits and costs that explain its degree, we can explain and partially justify these structures. Complex systems theory allows us to see how the Realist-inspired bundle picture and property-rights economics lead to a less reductive and more realistic approach once interactions between the constituent elements of the model and hence complexity are added in.

The point is not simply to justify property as a law of things. Instead, the architectural theory allows us to make sense of where property is and where it is not modular, where it is customizable and where it is mandatory, and how it might change with technological advances of various kinds. In network theory, the notion of modularity is not on/off but one of degree.<sup>29</sup> And moreover, not all modular structures are equally effective. Using such tools, the architectural theory can achieve a much more accurate and useful account of things and entitlements.

## II. Thinghood and Intangibles

The architectural approach to property might be thought to be tailored to traditional physical things and face difficulties when it comes to newer and less tangible property rights.<sup>30</sup> Quite the contrary. Because we are working upward from attribute to things and from micro-entitlements to ownership, there is nothing in the theory that depends crucially on physicality or received notions. The architectural theory is flexible without being vacuously so.

Traditional things are easy to take for granted and are compatible with many origin stories. None of these are directly verifiable, because often the thing in question was designated as a thing long before recorded history. Or the legal thing corresponds so closely to a thing identified in everyday ontology or even its more sophisticated version, that the law just adopts such things as givens. Intangibles are another story.

Intangible things need to be designed, or they have to emerge from some kind of spontaneous evolutionary process. Design and evolution can also be combined. And it is in understanding this process and the structures we do – and don’t – see that complexity considerations and the architectural theory based on them come into their own. Issues of complexity arise both on the benefit and cost side in extreme ways when the law provides mechanisms for tailoring. The question is how to maximize these benefits net of the costs of complexity. And without physical boundaries or a pre-made ontology, complexity can get out of control unless the law (or other constraint) provides some guiderails.

As is often remarked, intangible property is not new. Famously, earlier English property law provided for a variety of nontangible property rights. For example, the advowson was the

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<sup>29</sup> Mark Newman, *Networks* (2d ed., Oxford University Press 2018) 494-568.

<sup>30</sup> Katrina Wyman argues that intangibles should be taken as the central case for property. Katrina M. Wyman, “Property as Intangible Property” in Paul B. Miller and John Oberdiek (eds.), (2020) 1 *Oxford Studies in Private Law Theory* 81. In this Part, I show that the architectural theory can accommodate an important, even central, role for intangibles under some circumstances.

right to a priest to a church, which was a property right.<sup>31</sup> Likewise, so-called incorporeal hereditaments, such as rents or rights of way, were property rights relating to real property that were nontangible. These property rights grew up in an era in which those having to deal with them were closer socially and impersonal markets were less important. The anti-feudalism of the *numerus clausus* was a reaction to this complexity problem that arose when the detail became a problem in the face of a greater need for transmissibility and impersonal interaction. By the same token, when contract rights, which are in personam and make reference to personal information in the smaller context in which they rise, are transferred or get more property-like treatment, they tend to be depersonalized.

To tell whether complexity considerations point toward more modularity and of what kind, we need to know the benefits of different alternative configurations, and what they are costs are and for whom. Contrary to the slogans of the Realists, complex problems do not necessarily call for more context and less formalism in the law. As we have seen, one relevant variable is on whom complexity costs fall. If it is unnecessary for third parties to deal with complexity, it makes sense to cabin it in modular structures for certain actors – owners, members in a common pool, easements holders, etc. – to deal with it while the rest of the world can largely be told to keep off. Likewise, for a car in a parking lot, in which one can respect owners’ rights without know anything about them, their uses, the history of transactions, etc.<sup>32</sup>

Dramatic examples of such complexity management is the trust. In the trust, much of the robustness of property protection can be achieved without the implications for third parties from *in rem* rights.<sup>33</sup> The legal title in the trustee is a clean interface to the outside world, other than transferees who either do not give value or have knowledge. Trespassers and other transferees need not concern themselves about the potentially complex divisions of rights within the trust. And yet the fiduciary duties the trustee owes the beneficiary can achieve most of the benefit of a right in the asset without a direct right in the asset. The structures of trust law and the doctrines around them give rise in their complexity to a property-like effect while minimizing complexity costs for nonconsensual third parties.<sup>34</sup>

As mentioned earlier, entitlements interact with the law of possession. This has come to the fore with intangibles and the law of conversion. Because intangibles do not exist in the physical realm, they lack the “natural” boundaries or division into things we see to a greater or lesser extent in tangible property. Moreover, property torts that key off possession do not literally apply to intangibles. And yet wrongdoers can derive value from an intangible. One peril is that if

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<sup>31</sup> Joshua C. Tate, *Power and Justice in Medieval England: The Law of Patronage and the Royal Courts* (Yale University Press 2022) (arguing that the common law courts developed an approach to “possession” for advowsons as intangibles rather than merely as right to land).

<sup>32</sup> J.E. Penner, *The Idea of Property in Law* (Clarendon Press 1997) 75-76.

<sup>33</sup> Thomas W. Merrill and Henry E. Smith, “The Property/Contract Interface” (2001) 101 Colum. L. Rev. 773, 843-849; Henry E. Smith, “Equitable Meta-Law: The Spectrum of Property” in Ben McFarlane and Seven Elliott (eds.), *Equity Today: 150 Years After the Judicature Reforms* (Hart 2023).

<sup>34</sup> Jessica Hudson and Charles Mitchell, “Justificanda” in Simone Degeling, Jessica Hudson and Irit Samet (eds.), *The Philosophical Foundations of the Law of Express Trusts* (Oxford University Press 2023).

any unauthorized use of an intangible could be conversion, we would run the risk of very expansive liability and open a kind of back door to a second intellectual property system with all the problems that would entail. That information cannot be possessed is related to its nonrival nature, making property in general and conversion in particular potentially less attractive some of the time. One way to target liability where it need without letting it get out of control is to distinguish the tort of misappropriation (with unjust enrichment) from conversion. The former already exists and we are familiar with how to cabin it. As for conversion, we might look for analogues of possession in certain kinds of control that deserve protection.<sup>35</sup> Thus, we might say that an intangible cannot be converted unless the converter not only uses the asset but also deprives the owner of it, as by deleting a file. Or if a someone can deny a rightholder all access to the intangible, that could be conversion.

The problem here is not that the notion of thing is too rigid. Instead, as Katrina Wyman argues,<sup>36</sup> on the “essentialist” or architectural view,<sup>37</sup> the notion of thing is much more flexible and responsive to plural values than is usually thought, and goes on to argue that it is as plastic as the bundle it is meant to replace. Is the notion of thing on the complexity-based approach so flexible as to be as indeterminate and ultimately just as useless in providing answers as the bundle theory it is meant to supersede (or supplement)?

To see why this is not the case, we need to dig into complexity again. To begin with, Wyman frames the question in Realist fashion: if there are edge cases in which thinghood is not clear, then the concept never helps, and property has no stability. However, all sorts of concepts have stable central swaths and fuzzy borders. Thus, the tension that Wyman detects in the architectural theory between formalism and functionalism can be overcome.<sup>38</sup> Complexity theory offers us a functionalist account for formalism – and when it runs out.

On the architectural theory, things are not exogenously given but emerge endogenously. This does not mean that at the level of law one can apply the theory on a case-by-case basis to discover thinghood.<sup>39</sup> Theory is a meta level of explanation and justification, not something that

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<sup>35</sup> Restatement of the Law Fourth, Property (Prelim. Draft No. 4, Sept. 2018). For another method of achieving such a result, see James Grimmelman and Christina Mulligan, “Data Property” 72 Am. U. L. Rev. 829. For a proposal to redefine possession to cover some but not all intangibles, see João Marinotti, “Tangibility as Technology” (2021) 37 Ga. St. U. L. Rev. 671.

<sup>36</sup> Katrina M. Wyman, *The New Essentialism in Property*, 9 J. LEGAL ANALYSIS 183 (2017).

<sup>37</sup> On why the latter term is preferable, see Thomas W. Merrill and Henry E. Smith, “The Architecture of Property” in Hanoah Dagan and Benjamin Zipursky (eds.), *Research Handbook on Private Law Theories* (Elgar 2020) 134.

<sup>38</sup> Wyman (n 36) 205. Wyman is correct to detect a rough lingua franca style cost-benefit test in the architectural theory, *id.* at 212-18, but the stability of thinghood depends on the patterns of interconnections and whether they lead to emergent modularity. Thus, it does not follow that “their willingness to limit owner authority when the benefits exceed the costs means that there is no stable core right to exclude under Merrill and Smith’s approach, and that the scope of owner authority is continually at risk” *Ibid* at 212. That might or might not turn out to be true. The claim seems to rest on the assumption that property has to be homogeneously interconnected (or not connected). Again, that is an empirical claim – one I am arguing against.

<sup>39</sup> Thus, there is no reason, pace Wyman, *ibid* 207, for seeing in the multifactor test in *Murr v. Wisconsin*, 137 S. Ct. 1933 (2017) anything that the architectural approach to property would have to endorse.

can be employed or applied in a court or a legislature.<sup>40</sup> There are rules of thumb for thinghood that can receive some explanation in terms of complexity but are somewhat sticky. Legal thinghood may not be immediately responsive to changes in background conditions. The complexity theory points to the importance of this kind of context, without devolving into a chaotic morass.

The proof – and the theme, if any – is in the pudding. The idea that network models and module-seeking algorithms can detect clusters of attributes that can serve as things, depending on our purposes, is at least a theoretical possibility. And there are grounds for seeing it as plausible. For everyday objects our “common sense” as to what an object is will often do. It is for collections and improvements of items of personal property that we will face more difficult questions. Land boundaries are socially constructed,<sup>41</sup> and boundaries for fluid property (water, radio spectrum, intellectual resource) are highly socially constructed.<sup>42</sup> Even here the architectural theory points to a range of answers that is well short of anything goes.

Wyman rightly takes as aerial trespass and hydraulic fracturing a provisional test of the architectural theory the current American Law Institute project for a Fourth Restatement of Property.<sup>43</sup> Since then, these provisions have been approved by the membership.<sup>44</sup> In both cases, the notion of thing interacts with articulated possessory concepts to yield a common law baseline. In both areas we can distinguish space that by social norms and practical considerations is possessed (in which per se trespass) applies and a zone beyond that of “possible effective possession” to which an owner only has the right to possess. In this more attenuated zone, which itself peters out, the owner has the first right to build and can sue for substantial harm in the subjacent possessed space.

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<sup>40</sup> FELIPE JIMÉNEZ, *THE PLURALISM OF CONTRACT: A THEORY OF CONTRACT LAW* (JSD dissertation, N.Y.U. School of Law 2019).

<sup>41</sup> Maureen E. Brady, *The Forgotten History of Metes and Bounds*, 128 YALE L.J. 872 (2019). For a philosophical account, see Barry Smith and Leo Zaibert, “Real Estate: Foundations of the Ontology of Property”, in Heiner Stuckenschmidt, Erik Stubjkaer and Christoph Schlieder (eds.), *The Ontology and Modelling of Real Estate Transactions* (Ashgate, 2003) 51–67.

<sup>42</sup> Henry E. Smith, “Semicommons in Fluid Resources” (2016) 20 Marq. Intell. Prop. L. Rev. 195.

<sup>43</sup> Wyman (n 36). The author is the Reporter.

<sup>44</sup> Restatement of the Law Fourth, Property Vol. 2, Div. I, §§ 1.2A-1.2F (Am. L. Inst., Tent. Draft No. 4, April 2023). In a much-anticipated decision, the Pennsylvania Supreme Court has adopted an approach very similar to that proposed in the Fourth Restatement Council Draft. *Briggs v. Southwestern Energy Production Company*, 224 A.3d 334 (Pa. 2020) (upholding rule of capture and holding that invasion by drilling equipment, fluids or proppants, would be trespass but invasions by cracks alone are not). Wyman’s other test case is taxi medallions, about which she has written previously. Katrina M. Wyman, “Taxi Regulations in the Age of Uber” (2017) 20 N.Y.U. J. Legis. & Pub. Pol’y 1; Katrina Miriam Wyman, “Problematic Private Property: The Case of New York Taxicab Medallions” (2013) 30 Yale J. on Reg. 125. As she notes, courts have almost uniformly dismissed such claims. The level of regulatory approval for transfers and the retained right of the municipality to issue more medallions make such claims difficult even as so-called deregulatory takings (which are themselves difficult).

Ultimately, the architecture of property in this sense does reflect the state of the world. The set of resource attributes and uses exhibits organized complexity, and that calls for a law that is neither super simple nor maximally interconnected. Moreover, it is the patterns of connections – and lack of connections – that makes the system navigable. The people inhabiting the system should be able to focus their attention where it is beneficial and be able to ignore aspects that are not worth considering. To be sure, there will be issues at the margin of this cost-benefit analysis, but the gross picture is robust. In Coasean fashion, we could say that if handling information were free, the property system could be much more (maximally?) connected. Or if the world were simple, it could be totally disaggregated. Neither is true of our positive-transaction-cost world with its organized complexity. It is the organized complexity of the world that leads to property’s architecture, which mediates between the micro and the macro.<sup>45</sup>

One might think, as some have argued, that with decreases in the cost of computing, constraints on tailoring don’t matter and the spontaneous order and evolution facilitated by modular property rights is no longer important.<sup>46</sup>

We have seen this movie before. Legal Realism was inspired in part by the greater complexity of society and a great ability to control variation, and hence engage in explicit planning. The socialist calculation debate in economics was a prime arena for debating these ideas. As is often the case, new technology is altering the benefits and cost of complexity. Let us briefly consider how to frame this question with the rise of computing power and “big data.” There are reasons to think that computing power will alter but not abolish the importance of complexity and architecture in property law.

First, some of the architecture of property can be seen as aiming at preventing ordinary problems from becoming intractable. Computational complexity theory shows that framing seemingly ordinary problems can result in requiring more computing time than the life of the universe up to now.

Second, black box models are of inherently limited usefulness to property theory. First, because they do not reflect a theory of the phenomenon, they fail as internal accounts. It is hard to see how they dovetail with an imminent morality of the law on accounts that stress the relation of law and morality. And black box models do not provide much ex ante guidance. More importantly, black box models and associated AI work best over defined domains. In a sense, property law provides such a domain, and there is little reason to except AI to supply it for itself

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<sup>45</sup> Andrew S. Gold and Henry E. Smith, “Sizing Up Private Law” (2020) 70 U. Toronto L.J. 489.

<sup>46</sup> See, e.g., Omri Ben-Shahar and Ariel Porat, *Personalized Law: Different Rules for Different People* (Oxford University Press 2021). [Acemoglu on Hayek]

at this point. And it is also worth remembering that property taps into a morality and a psychological process that does not calculate the best response to existing preferences.<sup>47</sup>

From an evolutionary point of view, we can ask what combination of design and spontaneous order, what mix of mandatory and default features, and what degrees of formalism and contextualism will allow the property system to explore the space of possibilities in the best way over the long term. This is a question laced with uncertainty and guesswork. Perhaps the best property theory can do is help understand what we have done and avoid some of the most obvious pitfalls.

### III. The Micro-Macro Problem with Property Entitlements

The debate over entitlements in property theory faces the problem of relating the micro to the macro.<sup>48</sup> In the architectural approach, microstructure, sometimes but not always simple, scales up to produce effects that may not be easily traceable to one or a few features at the micro level.<sup>49</sup> Thus, an invocation of the law of trespass may not embody justice writ large, but in tandem with the rest of property law it may produce a stability that is an ingredient of justice. While there is no a priori reason distributive justice must be confined to the tax system (for example), the architectural approach is open to the specialization of different components of the law and even areas of the law.<sup>50</sup> Not everything we might desire at the social level need be reflected in every corner of private law, nor does every detail of private law imbue the system as a whole with its character. (It may or may not.)

Existing property theory does not do well at relating the micro and the macro. Usually, one is assumed to follow from the other in a direct way. In law and economics and much social science-oriented realism, the problem is a reduction to the micro and an assumption that the macro is the unproblematic sum of the micro. In other property theories, often those inspired by the softer social sciences, the macro is given primacy and is extended to the micro in a problematic fashion.

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<sup>47</sup> In Austrian economics, institutions shape processes which themselves help people develop information and make decisions. See, e.g., James Buchanan, *Order Defined in the Process of Its Emergence*, [https://www.econlib.org/library/Essays/LtrLbrty/bryRF.html?chapter\\_num=1#book-reader](https://www.econlib.org/library/Essays/LtrLbrty/bryRF.html?chapter_num=1#book-reader) (comment on Norman Barry, “The Tradition of Spontaneous Order” (1982) 5 *Literature of Liberty* 7-58). For Austrian economists, the market does not reflect preexisting preferences but is a process of self-discovery. Like markets, the law and a range of other institutions are not there to act as a massive calculator for “given” information dispersed among many people. If it were, a highly capable AI could infer much of this information and figure out the “efficient” solution, with allocation to follow. However, if the property system allows for the discovery of radically new information including human preferences themselves, the process is the point. If so, the architecture is not a potentially outmoded calculator but is something of inherent worth.

<sup>48</sup> Gold and Smith (n 45).

<sup>49</sup> Richard Epstein argues for the scaling up of more static version of simple rules, less based on interactivity and emergence. Richard A. Epstein, *Simple Rules for a Complex World* (Harvard University Press 1997); Richard A. Epstein, “The Static Conception of the Common Law” (1980) 9 *J Leg Stud* 253.

<sup>50</sup> Fields of law can also be regarded as modules. Andrew S. Gold, “Private Law’s Choice of Private Law,” in Samuel L. Bray et al. (eds.), *Interstitial Private Law* (forthcoming).

## A. Micro Analysis Failing to Scale Up

Many property theories start with two-person interactions or the shape of an entitlement. In this sense their focus is on the macro. Often these theories pay insufficient attention to how these microstructures might scale up to the societal level.

One problem with the bundle picture I have already mentioned is that it sees the components of the bundle as additive. If so, the bundle scales up unproblematically. Fix each stick, allocate it correctly, and add up fitness (social welfare or whatever it is) in order to optimize at the societal level. In law and economics, representative agent models are made to order.

In property theory, this approach is sometimes associated with liability rules, which can be tailored in various ways.<sup>51</sup> In complex liability rule regimes,<sup>52</sup> entitlement structure is assumed in these theories to handle complexity, without any reason to think that it actually does.

I will focus on one such scheme that has been recently proposed, both because it is unusually well thought out and because it aims through micro design to provide a better version of markets and social organization at the macro level. I will also show that for reasons of complexity it does not scale well.

Eric Posner and Glen Weyl propose a self-assessment mechanism by which owners would set a valuation for both taxation and for potential takings, a kind of “Harberger tax.”<sup>53</sup> Set the value too low and the asset can be taken; set it too high and you pay high taxes. The purpose is to overcome the “monopoly” afforded by property rights that receive stronger protection, so that assets can move to more valued uses. They envision the system as applying very broadly to property rights in general.

What this model has in common with other post-realist hard-social science-oriented approaches is the key assumption that what counts as a thing is stable and that the interactions between and among attributes and between and among collections of attributes (things) are not dense enough to matter. Indeed, allowing what counts as something of a given kind is a notorious

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<sup>51</sup> Guido Calabresi and A. Douglas Melamed, “Property Rules, Liability Rules, and Inalienability: One View of the Cathedral” (1972) 85 Harv. L. Rev. 1089. The framework sometimes assumes away complexity considerations. Henry E. Smith, “Complexity and the Cathedral: Making Law and Economics More Calabresian” (2019) 48 Eur. J. L. & Econ. 43.

<sup>52</sup> See, e.g., Ian Ayres, *Optional Law: The Structure of Legal Entitlements* (University of Chicago Press 2005); Ronan Avraham, “Modular Liability Rules” (2004) 24 Int’l Rev. L. & Econ. 269.

<sup>53</sup> Eric A. Posner and E. Glen Weyl, *Radical Markets: Uprooting Capitalism and Democracy for a Just Society* (Princeton University Press 2018) 30-79; Eric A. Posner and E. Glen Weyl, “Property Is Only Another Name for Monopoly” (2017) 9 J. Legal Analysis 51; see also Arnold C. Harberger, “Issues of Tax Reform for Latin America” in *Fiscal Policy for Economic Growth in Latin America* 116 (Joint Tax Program of the Organization of American States, eds., 1965). For other applications of self-assessment to law, see, e.g., Lee Anne Fennell, “Revealing Options” (2005) 118 Harv. L. Rev. 1399; Saul Levmore, “Self-Assessed Valuation Systems for Tort and Other Law” (1982) 68 Va. L. Rev. 771.

problem in taxation: per unit taxation of lightbulbs can lead to inefficiently longer-lasting lightbulbs, and ad valorem taxes on cars can lead to sound systems sold separately.<sup>54</sup> This can lead to inefficiencies and difficulty in even tracking the effects of taxes and liability rules.

Not surprisingly, the Harberger tax is vulnerable to just this kind of gaming. For example, developers have recently tried including private transfer fee covenants, in which the seller in all future sales no matter how far downstream would owe a percentage (usually one or two percent) of the sales price to the developer, even though the developer may not (and probably has not) retained any interest in nearby land. One effect of such covenants is to remove value from the tax base. As Freyermuth points out, the private transfer fee covenant depresses the price of the real estate and so its assessment.<sup>55</sup> In theory, the taxing authority could treat the “interest” (the covenant itself) retained by the developer as a taxable asset, but this is highly unlikely – and it would introduce complexity not internalized to the parties to the transactions. In a sense, the private transfer fee covenants would be having the exact quality-reducing effect of ad valorem taxes – lowering quality by removing attributes from the taxable bundle – that Barzel captured in his original model.<sup>56</sup> The doctrine of touch and concern, often criticized for being needless and formalistic, can serve to head off these and like configurations of rights that are likely to cause complexity externalities.<sup>57</sup>

More generally, the Harberger tax raises issues of complexity stemming from the endogeneity of things, collections of things, and the property “bundles” over them. Consider an actor who holds ten things (owns them). Now it could be that they are like staples, notepads, and (most) chairs, somewhat complementary but with ready substitutes. Or they could be like the paintings in a collection, the basis for Lon Fuller’s famous example of a polycentric task: if a will leaves a collection of paintings to two museums, the problem is “polycentric” because the value of any painting to a museum depends on which others it gets.<sup>58</sup> In computational terms, as  $n$  increases, the problem probably becomes intractable and can only be solved by approximate means.<sup>59</sup> But Fuller’s example is a lot like some property holdings, where assets are being integrated into the actor’s plans.

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<sup>54</sup> Yoram Barzel, “An Alternative Approach to the Analysis of Taxation” (1976) 84 J. Pol. Econ. 1177, Henry E. Smith, “Ambiguous Quality Changes from Taxes and Legal Rules” (2000) 67 U. Chi. L. Rev. 647.

<sup>55</sup> R. Wilson Freyermuth, “Private Transfer Fee Covenants: Cleaning Up the Mess” (2010) 45 Real Prop., Trust & Estate L.J. 419, 429, 463-64 & n.181.

<sup>56</sup> Barzel (n. 54).

<sup>57</sup> Henry E. Smith, Property as a Complex System (ms.)

<sup>58</sup> Lon L. Fuller, *Principles of Social Order* (Kenneth J. Winston ed., Duke University Press 1981) 87-88.

<sup>59</sup> Keith Devlin, *The Millennium Problems: The Seven Greatest Unsolved Mathematical Puzzles of Our Time* (Basic Books 2002) 105-130.

The Harberger tax would also be vulnerable to the “rhino’s horn” problem identified by Douglas Allen.<sup>60</sup> One method of protecting property rights is to degrade the asset. If degrading the asset reduces its utility to the present holder by less than the saved expected costs of theft and other prevention measures (through its reduction in value to thieves), then an owner will find it worthwhile. To degrade the asset at some positive cost (in effort and reduced asset value). A conservation park might saw off a Rhinos horn to prevent poachers from killing the rhino for its horn (which is valuable in an illegal market). In the Harberger tax, an owner of an asset might decide to damage the asset in a way that reduced its value to the owner by some amount but that reduces its value to other holder by even more. This is a cost of the Harberger tax system (either the waste itself or the measures taken to police such behavior), and it is a cost based on the endogeneity of “things.”

Posner and Weyl are not unaware of the issue of complementarities and substitutes. Under their scheme, an owner can put a collection of assets on the rolls as a group or value items conditional on whether other items are sold or not. To begin with, note that Posner and Weyl assume the definition of things given by property law: why not allow owners to slice and dice their property on the metaphorical auction (and taxing) block? The problem is that the complexity involved in collections of assets is an extension of the complexity that gives rise to legal things. Indeed, it is for this reason that Posner and Weyl allow for super-thing collections to be treated as a unit. It is an empirical question whether, with a little leeway for grouping by owners and conditional valuation, the complexity problem can be solved. But the lesson of complexity theory is that it does not take very many interdependencies for the problem to begin to veer in the direction of intractability. If so, the question will then be what limits to place on groupings and interdependencies. (Posner and Weyl also briefly mention the possibility of allowing recorded valuations for “subentitlements” to solve the regulatory takings problem, but they do not pursue the idea.<sup>61</sup>) Those limits in turn will have costs: if you don’t like the standardization in property law now (*numerus clausus*),<sup>62</sup> what will standardization motivated by a clean Harberger tax look like and how many frustration costs will it entail?

Returning to the hypothetical collection of ten items, if the value to owner O of Item 1 depends on the presence of Item 4, then how should Item 1 be valued? Or perhaps Item 4 can be replaced but not quickly. Worse still, what if someone knows O’s special vulnerability and bids for the property under Posner and Weyl’s scheme? Can an opportunistic taker extract all of O’s surplus? (Would that include the government itself?) Posner and Weyl say that the owner can simply raise the price (and tax) and be compensated if a sale occurs. As we will see, these distributional effects will need to be accounted for. Overall, we have to ask whether in some

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<sup>60</sup> Douglas W. Allen, “The Rhino’s Horn: Incomplete Property Rights and the Optimal Value of an Asset” (2002) 31 J. Legal Stud. S339-358

<sup>61</sup> Posner and Weyl, “Property” (n 53) 109.

<sup>62</sup> See, e.g., Bram Akkermans, “The *Numerus Clausus* of Property Rights” in Michele Graziadei and Lionel Smith (eds.), *Comparative Property Law: Global Perspectives* (Elgar 2016) 100; Avihay Dorfman, “Property and Collective Undertaking: The Principle of *Numerus Clausus*” (2011) 61 U. Toronto L.J. 467; Thomas W. Merrill and Henry E. Smith, “Optimal Standardization in the Law of Property: The *Numerus Clausus* Principle” (2000) 110 Yale L.J. 1.

sense “property theory world” is assuming a sort of constant “mark to market” approach to all of one’s assets, no matter how intertwined they are with one’s plans or with each other. Even in the best case, financial assets subject to tax, this is a devilishly hard problem, as attested to by the difficulty of periodic (and so far unrealized) proposals to tax assets on a mark-to-market basis.<sup>63</sup> We can look to other areas of law that present these “simpler” problems to see how much more difficult this approach would be in contexts with less fungible assets.

One macro (and micro) problem that arises is the overall regime of privacy. What happens with assets that are associated with trade secrets?<sup>64</sup> If I have a large stock of a mineral that is associated with a secret process, the transparency of the Harberger tax is a problem even from mere disclosure. If my privacy interest is associated with an idiosyncratically high value on an asset, the high price I might have to set is also a problem. If the secrecy interest can be betrayed by contract damages,<sup>65</sup> it is a bigger problem with the Harberger tax. Indeed, even the relatively barebones land records give rise to severe privacy problems.<sup>66</sup> Now imagine the government knowing about everything you own and your valuations.

Scaling up often involves distributional issues. The distributional concerns here are pervasive as well. Posner and Weyl address worries that the poor and less sophisticated will not fare well and they take comfort in the compensation that such persons will receive if they are forced into a high valuation. But there is a deeper problem here, and one not unrelated to the complexity problem. Consider two people with different life plans. For A these life plans require ownership of some external things. For B, the life plan is more to do with the life of the mind – writing articles and books and gaining a scholarly reputation. The Harberger tax will scoop up much of A’s surplus but not B’s.<sup>67</sup> It is hard to see the normative attractiveness in systematically favoring intellectuals over others.<sup>68</sup> In theory, we might define an asset like scholarly reputation and put it up for tax or sale. Of course, we don’t and can’t, because it is too personal to someone like B: the connections are super dense and can’t be separated. (And coming up with a compensating payment to non-intellectuals for the Harberger tax burden isn’t likely to be much easier.) Human capital is notoriously something that in theory should be taxed but is fiendishly

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<sup>63</sup> For a discussion of the difficulties involved, see Charles Delmotte and Nick Cowen, “The Mirage of Mark-to-Market Taxation: Distributive Justice and Alternatives to Capital Taxation” (2019) 25 *Critical Rev. Int’l Soc. & Pol. Phil.* 211.

<sup>64</sup> See Edmund W. Kitch, “The Law and Economics of Valuable Rights in Information” (1980) 9 *J. Legal Stud.* 683.

<sup>65</sup> Omri Ben-Shahar and Lisa Bernstein, “The Secrecy Interest in Contract Law” (2000) 109 *Yale L.J.* 1885).

<sup>66</sup> Reid K. Weisbord and Stewart E. Sterk, “The Commodification of Public Land Records” (2022) 97 *Notre Dame L. Rev.* 507.

<sup>67</sup> Assuming that intellectual B is not engaging in a pure self-sacrifice solely for humanity’s sake.

<sup>68</sup> In the book version, Posner and Weyl do invoke the idea of making society less materialistic and promoting “optimal Buddhism.” Posner and Weyl (n 53) 75. Not only is it impossible for a framework grounded purely in efficiency to be used to justify a foundational change in the meaning of human flourishing, Jacob Eisler, “Book Review: The Limits and Promise of Instrumental Legal Analysis” (2020) 47 *J. L. & Soc’y* 499, 505, the idea of anti-materialism on offer here looks like an unsurprisingly thin conception, much less an optimal anything.

difficult to do so, both for delineation and political reasons.<sup>69</sup> This problem lurks pervasively in any system that wants to push property law to look like the most blackboard-like tax schemes.

In property theory world, we'd have self-assessment, average-harm liability, dual-chooser rules, and the like, which would solve all the problems. Except that they wouldn't. As we've seen, the results that support such solutions depend on treating assets as exogenously given. As Barzel demonstrated, measurement cost is a major source of transaction costs, and all sorts of costly and sometimes seemingly inefficient devices from warranties to actual suppression of information are employed to prevent wasteful measurement.<sup>70</sup> Markets are but one method of such measurement, as the timing and amount of measurement can quickly become more costly than they are worth. There are to be sure many instances of people contracting into liability rules. However, here the exercise of powers is consensual, and it is unlikely that parties will agree to rearranging the structure of entitlements if most of the ripple effects cannot be predicted and contained. Court-imposed or nonconsensual exercises of powers are on a completely different footing. And constantly valuing assets at the demand of someone other than the holder is almost guaranteed to push us beyond the point of optimal amount of measurement effort.

If assets were generally quite separable, then we could use liability-rule devices to value them. But if classes of attributes or sets of uses are easily separable, then the problems involved in using the mix of property and liability rules and market mechanisms would be easily solved as well. We can't assume high transaction costs in markets and then assume them away in devising liability-rule mechanisms as substitutes for markets.<sup>71</sup> As usual, firms, household, markets, courts and regulation – as well as custom – have to be evaluated in a comparative fashion using a consistent set of assumptions, including about the level and kinds of complexity involved in composing and grouping assets together and disaggregating them.

## **B. Macro Analysis Distorting the Micro**

The softer versions of post-Realism tend to be “holistic” and to focus on how large-scale variables play out in micro-entitlements or how societal level values are or could be reflected at the micro-level. Such theories include those that take micro concepts to refer to collective analogs, and those that assume that each micro interaction or individual concept partakes of society-level properties. This direct connection of the micro and macro brings us back in many cases to the bundle-of-sticks metaphor, which wrongly posits a straightforward – and unrealistic – relationship of micro to macro.

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<sup>69</sup> Here is a flavor: “Perhaps the most provocative issue raised by considering the application of an ideal income concept to human capital is the propriety of taxing individuals on their period 0 wealth – that is, their expected future earnings, evaluated at birth. Setting aside problems of feasibility and liberty – which may be alleviated by applying an appropriate multiplier to earnings – the question remains whether such treatment is desirable in principle.” Louis Kaplow, “Human Capital Under an Ideal Income Tax” (1994) 80 Va. L. Rev. 1477, 1513-1514.

<sup>70</sup> Yoram Barzel, “Measurement Cost and the Organization of Markets” (1982) 25 J. L. & Econ. 27.

<sup>71</sup> See James E. Krier and Stewart J. Schwab, “Property Rules and Liability Rules: The Cathedral in Another Light” (1995) 70 N.Y.U. L. Rev. 440.

Property theory abounds with theories that employ large considerations to explain the smallest parts of property law. Thus, the law of waste reflects ideological currents. Or capitalist or other forms of exploitation can be seen baked into the current law of property. More normatively, constitutional values should inform the contours of particular doctrines. Here I will focus on the nature of the variable that can be used at the macro and macro levels in property theory. I will illustrate the macro to micro problem with a well worked out sociologically inspired account of entailments employing large social variables.

In recent work, Taisu Zhang has argued that standardization in property law is self-equilibrating because various variables are systematically related.<sup>72</sup> However, these variables mix the macro and the micro in problematic ways.

Zhang argues that a theory of preference satisfaction leads to the forces promoting and undermining standardization to balance out.<sup>73</sup> This startling claim stems from a misidentification of highly complex micro-level preference structures as an attribute of societal groups. Instead of standardization responding (in part!) to the frustration costs of limiting forms (conversely, the benefits of allowing forms) and the information costs of additional forms on third parties, according to Zhang, information effects tend to be offset by preference diversity.<sup>74</sup> When sociopolitical cohesion decreases, information costs will increase but preference diversity will also increase. If the two balance each other out, standardization would not change even if the number of forms is immediately responsive (something Zhang wrongly assumes).<sup>75</sup> That is, information costs rise (fall), preference diversity effects at the same are asserted to have an “often systemic” link to a fall (rise) in frustration costs (the benefits of more forms), potentially canceling out, and leaving standardization, sometimes identified with the number of permitted property forms, at the same level.<sup>76</sup>

The claim that this counterbalancing effect has to happen or usually happens is based on a misconception of how complex systems work. The world does not come in packages called “information costs” and “preference diversity” at the societal level. Preference diversity can increase over some matters (mores, style of dress) and decrease in others (forms of ownership). Likewise, the idea that preference diversity and information cost are as tightly linked as Zhang claims is patently false. Information costs were higher in the broadcast television era, which reinforced a more uniform culture. In recent times sociopolitical cohesion has decreased at the

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<sup>72</sup> Taisu Zhang, “Beyond Information Costs: Preference Formation and the Architecture of Property Law” (2020) 12 J. Legal Analysis 1.

<sup>73</sup> Ibid.

<sup>74</sup> Ibid 2, 6, 19-31.

<sup>75</sup> The increase in information costs would push in the *MB-MC* model toward more standardization (a smaller list of forms in the *numerus clausus*) but greater preference diversity would mean higher frustration costs, which would push for less standardization.

<sup>76</sup> Zhang’s uses of “often systemic” and similar barely qualified phrases in the article are to be taken as asserting an iron law that works except when it doesn’t, rather than a law that is systemic on some days of the week and not others. Ibid. at 65. (That would be systemic!)

same time that information costs have decreased. Increases in preference diversity simply do not correlate with increases in information costs in the way Zhang envisions. Sociopolitical cohesion is hard to relate to information costs in any given micro context.

Frustration costs are also micro in a way obliterated on Zhang's model. It is hard to say that anyone's property preferences have been frustrated by the current degree of standardization in property. The problem is that information costs are quite diverse at the societal level and may have little to do with preferences for property forms: preferences for property forms are but a small contributor at the societal level.

Moreover, both changes in technology and in legal technology can break the assumed association between preferences and property forms. That is, a greater divergence of preferences need not be directly reflected in more forms. If so, there is little reason to think that the shifts work closely in tandem, keeping standardization constant. Let us consider technological and legal reasons for preferences and forms to be in a nondirect, even complex, relationship.

First, consider changes in technology and society. The idea that information costs and preference diversity always offset fits badly with recent developments. With the rise of IT, there has been a cycle (both virtuous and vicious) of lower information costs promoting preference diversity, and preference diversity calling for innovation in communication. Zhang focuses on legal and group social dynamics (or state capacity and communal cohesion), but technological change is also crucial. Again, with the rise of the Internet, information costs have arguably decreased, but the ability to furnish content on a targeted basis has probably increased, thereby possibly *raising* preference diversity. And IT has probably facilitated actors' ability to get what they want within existing forms: the basic set of property forms does not prevent the rise of Uber or the Internet of Things. Even Blockchain promises (so far just that) to facilitate transactions in a way that bypasses exiting legal infrastructure. Indeed, as we noted with the Harberger tax inspired by technological advances, technology can lower some information costs so much that systemic complexity is caused, making the case for standardization along other margins.

An architectural theory of property focuses on both the benefits and costs of complexity and associated information, and on how property does and does not manage that complexity and solve the information-cost challenge. The *numerus clausus* or asset of property forms is but one aspect of standardization,<sup>77</sup> and expecting major (and ill-specified) "forces" like societal preference diversity and (societal) information costs and state capacity to determine the basic set of forms – a set that responds to concerns in a more context-specific way and through a more nuanced set of structures (combinations of contract and property, the trust, etc.) is simply to look in the wrong places. Not only does the *numerus clausus* as a list of approved forms act as a substitute and a complement to land records, there are non-legal modes of standardization as well.<sup>78</sup> Again, there is a non-trivial micro-macro relationship here, between how instances of forms are implemented and the navigability and usefulness of the system as a whole.

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<sup>77</sup> Henry E. Smith, "Standardization in Property Law" in Kenneth Ayotte and Henry E. Smith (eds.), *Research Handbook on the Economics of Property Law* (Elgar 2011) 148.

<sup>78</sup> For citations to the literature showing that countries with an officially open list of property forms manage to standardize by other means. See Yun-chien Chang and Henry E. Smith, "Convergence and Divergence in Systems

Legal technology makes the micro-macro relationship indirect. As noted earlier, property forms satisfy preferences (if that's what they do) in complex ways. Notably, the trust allows for lots of tailoring and preference satisfaction with one in rem property form (the fee simple or full ownership). Standardization is a complex question, because counting property forms as a proxy for preference satisfaction will ultimately not reflect preference satisfaction or information cost. The model has to be relativized to the legal technology, which can ameliorate some of the tradeoffs involved: in rem benefits of preference satisfaction benefits at closer to in personal costs of information.<sup>79</sup>

## Conclusion

No one will deny that property law achieves complex results, deals with complex problems, and is in some sense complex. However, it also manages complexity and takes advantage of and reinforces organized complexity in order to allow it to be simpler at a local level than would be possible if the world were a more unstructured and unstructurable, more random, place. And property law begins to handle complexity by defining things and entitlements in such a way that they interact with social context and the rest of the system of property law in a fruitful but manageable way.

To see how property produces complex results at reduced cost we have to avoid making naïve assumptions about how property law reflects and shapes the world. Precisely because property law and institutions are complex, they can achieve the benefits of great complexity through the interaction of sometimes locally simple parts. Micro and macro may be non-trivially connected by virtue of the interconnections within the law and within the sets of interactions the law governs, thus leading to emergence. We have to focus on these interactions and how they lead to the emergence of system properties.

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of Property Law: Theoretical and Empirical Analyses” (2019) 92 S. Cal. L. Rev. 785, 798 & nn. 36-38 (discussing Spain, South Africa, and Norway). Especially interesting is Norway, where there is an official *numerus apertus*, but a close-knit legal and social situation precludes new forms. When I asked one Norwegian lawyer, who was explaining the *numerus apertus*, what would happen if someone tried to create a new property form, he responded indignantly that “no one would do that!”

<sup>79</sup> Smith (n 33).