PROPERTY AND INFORMATION

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INTRODUCTION

Over the past quarter-century, Professor Henry E. Smith, sometimes in conjunction with Professor Thomas E. Merrill, has propounded a path-breaking account of property law, designated the information cost theory.[1] Professor Smith correctly rejects the "bundle-of-sticks" metaphor for property that has dominated American scholarship. He restores property to its traditional understanding as the law of *things*.[2]

The information cost theory aims to explain why the concept of *in rem* rights (i.e., property) has content distinctive from the law pertaining to *in personam* rights (i.e., contract). In Professor Smith's theory, delineating and interpreting information is costly for both the speaker and the audience, as there is a "scarcity of mental resources."[3] The cost of information becomes greater the bigger the audience.

Contract directly involves a small number of identifiable persons, often only two. Contracting parties can "afford" to create complex, idiosyncratic legal rights. Property rights, in contrast, are "good against the world,"[4] i.e., a very large, indefinite class of other persons. Without property, communicating with the world to allocate the right to use things would cost more than the benefits gained. Property law minimizes these costs. The core of property is possession (i.e., the right to exclude). Possession indicates that the owner of Blackacre ("*O*") owns *all* the uses to which Blackacre might be put. The right to exclude permits the omission (or "hiding") of

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1. Lior Jacob Strahilevitz, *Information Asymmetries and the Rights to Exclude*, 104 MICH. L. REV. 1835, 1840 (2006) ("I believe that Smith has done serious intellectual heavy lifting in these articles, and his papers should become foundational texts in short order.").

2. Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1704 (2012) [hereinafter Smith, *Law of Things*]. One of us has argued strenuously against the bundle-of-sticks metaphor. *See* Jeanne L. Schroeder, *Chix Nix Bundle-O-Stix*: *A Feminist Critique of the Disaggregation of Property*, 93 MICH. L. REV. 239 (1994) [hereinafter Schroeder, *Chix*]; JEANNE LORRAINE SCHROEDER, THE VESTAL AND THE FASCES: HEGEL, LACAN, PROPERTY, AND THE FEMININE (1998) [hereinafter SCHROEDER, VESTAL]. Of course, like all law, property is a relationship between and among legal subjects. However, what makes property unique is that it concerns the possession, use and alienation of things. In this context, the term "thing" is not limited to physical objects but refers to anything that is not itself a subject. Intangibles are as much "things" as tangibles. Indeed, following G.W.F. Hegel, we believe that intangibles should be considered the characteristic object of property because it helps avoid the common conflation of the right of possession (exclusion) with the empirical fact of physical possession of tangible things. *See* Jeanne L. Schroeder, *The End of the Market: A Psychoanalysis of Law and Economics*, 112 HARV. L. REV. 483, 502–503 (1998) [hereinafter Schroeder, *End of the Market*]. Nevertheless, following Professor Smith, we will typically refer to Blackacre, i.e., real estate, as the archetypical object of property rights. Professor Smith does give some consideration to other forms of property, especially intellectual property, but that will not be our primary interest in this Article.

3. Henry E. Smith, *Standardization in Property Law*, *in* RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 148, 157 (Kenneth Ayotte & Henry E. Smith eds., 2011).

4. Henry E. Smith, *Self-Help and the Nature of Property,* 1 J.L. ECON. & POL'Y 69, 79 (2005).

information about those uses,[5] so there is less speaking, less comprehension, and less cost. Absent the right of possession, *O* would have to contact everyone in the world in order to claim the uses in Blackacre she was reserving for herself. Since these are infinite, a world without property would be too expensive.

This theory is not entirely wrong. Property is informative. But property also empowers. To the extent property empowers, it is not just about information. Because this point is neglected, the information theory is at best incomplete.

In this article, we analyze the strengths and weaknesses of the information theory. Our principal criticism is that the information theory focuses on the maintenance and continuation of possessory rights. It does not and cannot account for alienation or markets for property rights (wherein property is mediated by contract).

What drives the information theory is an imaginary anthropology—an etiology for the disease of property. According to Professor Smith, property law is a problem under the famous Coase theorem. In Professor Smith's reading of Coase,[6] in a world of no transaction costs (TC_0), we could do without property; we could organize the economy by contract alone.[7] If we did so, *O* could contact every person in the world and specify which uses of Blackacre *O* reserved for herself and which uses were assigned to another. But in a world *with* transaction costs—i.e., our world—property saves information costs. *O* simply excludes all others, which implies *O* is claiming all the uses that would otherwise have to be delineated. Therefore, we owe the institution of property to the avoidance of information costs.

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5. Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PA. L. REV. 2083, 2088 (2009) ("Crucially, much of the time property forces nonowners *not* to know, and in this sense property involves information hiding, a key aspect of modularity.").

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

7. But Coase insisted that he was no Coasean. Coase's point is that a world without transaction costs does not, and could not, exist. *See* Schroeder, *End of the Market*, *supra* note 2, at 521–23.

We think this is deeply flawed. Following the personality theory of property propounded by G.W.F. Hegel,[8] we maintain that property precedes contract, as Professor Coase well understood. In TC_0, property is presupposed. It is therefore wrong to imagine human beings emerging from a scenario in which property and contract are in competition as paradigms for economic organization. Property has always been. Contract is no competitor. Contract is a function of property.

Professor Smith presents formal models to explain the trade-off between the marginal costs and benefits of delineating property rights, given the "processing" (interpretation) costs borne by non-owners. The idea is that property constitutes cheap delineation of possessory rights to large audiences. We argue, however, that these models are poorly designed. These models assume that communication of property rights is a marginal cost which is borne only when justified by an expected marginal benefit of delineation. In fact, communicating a possessory property claim is a sunk cost. Once property is acquired, property law sustains possessory rights with no further communication required. Going forward, there are no marginal

8. G.W.F. HEGEL, ELEMENTS OF THE PHILOSOPHY OF RIGHT (Allen W. Wood ed., H.B. Nisbet trans., 1991). For Hegel, property begins with claims to possession and use. Property is perfected in alienation through contract. To simplify, Hegel's is a personality theory of property. He argues that the individual posited by classical liberalism of Immanuel Kant is too abstract to bear rights and freedom. She only becomes a concrete subject who can actualize her freedom through relationships with others. Specifically, she becomes a rights-bearing subject by being recognized as such by another rights-bearing subject. The most "primitive" form of such a relationship of mutual recognition is "abstract right", basically the private law of property and contract. The first step in achieving recognition is to make oneself recogniz*able*. That is the abstract Kantian individual takes on concrete substance by identifying itself as the owner of specific objects.

Non-Hegelians often assume that Hegel adopts a first-adopter theory of property like John Locke. This is a misreading of one sentence in *The Philosophy of Right*, namely "[t]hat a thing . . . belongs to the person who happens *to be the first* to take possession of it is an immediately self-evident and superfluous determination, because a second party cannot take possession of what is already the property of someone else." HEGEL, *supra*, at 81. This is incorrect if it implies that a first-occupier has a *rightful* claim to property in the Lockean sense. Rather, this sentence is merely a definition of what a claim of possession is—i.e., first-in-time, first-in-right.

If one continues reading further, Hegel contends that first-occupation is not rightful. It is his example of abstract wrong. It is violent because it imposes the occupier's will onto others in violation of their autonomy. Consequently, a claim to property can only become rightful retroactively when others freely choose to recognize it. Jeanne L. Schroeder & David Gray Carlson, *The Appearance of Wrong and the Essence of Right: Metaphor and Metonymy in Law*, 24 CARDOZO L. REV. 2481 (2003); JEANNE LORRAINE SCHROEDER, THE FOUR LACANIAN DISCOURSES OR TURNING LAW INSIDE-OUT 173–75 (2008) [hereinafter SCHROEDER, DISCOURSE]. As we shall see, this view is completely diverse from Professor Smith's view. Although he recognizes that communication takes effort on the part of both the speaker and the audience, in property, he treats the audience as completely passive, merely interpreting (processing) the messages conveyed by the speaker. To Hegel, the "audience" is active. It bestows rights on the speaker by recognizing her claims.

information costs in *continued* possession.[9] Additional marginal costs are only incurred when the owner seeks to alienate her property. But at that point, we have segued from property to contract.[10]

The article proceeds as follows. As the information theory is a reaction to legal realism, Part I explores its antecedents in the work of Wesley Newcomb Hohfeld and Ronald H. Coase. Part II presents the information theory as arising from Professor Smith's interpretation of the Coase theorem.[11] In the imaginary world of TC_0, we are supposedly indifferent to organizing by property and organizing by contract. Property eclipses contract as the organon of the economy because property reduces the cost of delineation and processing—of speaking and comprehending. We show that this theory is founded on a misunderstanding of Coase.

Part III sets forth the jurisdiction proper to an information theory of property. This part borrows a distinction invented by J.L. Austin—the difference between constative and performative speech. Professor Smith's information theory of property is constative.[12] That is, he posits *O* informing the "world" of a static underlying reality—*O*'s possessory right. But some speech does not report; it creates. To the extent speech creates a new reality, speech is performative. Performativity is out of bounds for Professor Smith's information theory. As a result, an information theory does not capture an aspect of what is distinctive about property, which is empowerment of the owner against all others and the power to alienate.

I. LEGAL REALISM AND THE DEATH OF PROPERTY

The information theory is reactionary, in the sense that it "reacts" to legal realism from the earlier and middle parts of the 20th century. As Professor Smith sees it, legal realism denied any essential content to the word "property."[13] For realism, property is a contingent and arbitrary congeries

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9. Jonathan Sarnoff, *The Information Costs of Exclusion*, 91 U. CHI. L. REV. 1021, 1049 (2024) ("Learning rules is a start-up cost of a system of property rights: though individuals bound to respect these rights must first learn what those rules are, the costs of learning them are paid once, when they are learned, after which no further costs are normally incurred.").

10. Of course, property can also be alienated through *inter vivos* gifts and bequests. But the recipient's information costs can be expected to be *de minimis* in that he need only accept the transfer.

11. One of us explores the radical implications of the so-called Coase theorem which posits not an empirically impracticable, but logically impossible ideal world in Schroeder, *End of the Market*, *supra* note 2.

12. J.L. AUSTIN, HOW TO DO THINGS WITH WORDS (J.O. Urmson & G.J. Warnock eds., 1962); *id*. at 1. A performative statement creates something new, as when a minister says, "I pronounce you man and wife." *Id*. at 99–103. As is well known, he ends his famous lecture series distinguishing between constative and performative speech with a twist worthy of O'Henry or M. Night Shyamalan—there is no *purely* constative speech. *Id.* at 132, 144–46.

13. Henry E. Smith, *The Persistence of System in Property Law*, 163 U. PA. L. REV. 2055, 2056 (2015) [hereinafter Smith, *System*] ("Nowhere was the realist attack on formalism and classical legal thought more vehement than in the area of property.").

of *in personam* rights that can be disassembled and reassembled as desired—a mere bundle of sticks. According to legal realism, "property" *labels* but does not itself *determine* legal results.[14] Law is an illusion, masking other political programs of the common law—such as welfare maximization.

Two legal theorists are responsible for the collapse of property theory—Wesley Newcomb Hohfeld[15] and Ronald H. Coase.[16] These are the villains who have provoked Professor Smith to formulate the information theory.

A. Hohfeld

The precursor of legal realism, Hohfeld reduced all law to eight terms, grouped into two tetrads. In Austinian terminology, the terms in the first tetrad are constatives, and the terms in the second are performatives.

Hohfeld's first tetrad belongs to the legal present. These are "right" versus "no-right" and their corollaries, "duty" versus "privilege." Hohfeld uses these four "present" terms to describe correlatively the relations of any two legal subjects.[17] If *A* has a right against *B*, *B* has a duty to *A*. If *A* has no right against *B*, *B* is privileged against *A*.

Four other terms describe the power to change the legal present. Suppose *A* presently has no right against *B* and *B* is privileged against *A*.[18] But, presently, *A* (or someone else) may have a power to change *B*'s privilege against *A* into a duty to *A*. The legal present stands as is until the empowered person uses that power. Once used, the power evaporates and disappears from the scene, but a new legal present has emerged. Now *B* has a duty to *A* and *A* has a right against *B*. Presently, *A* (or some other) is either powerful against *B* or *A* is disabled. If *A* has a power over *B*, *B* is liable to *A*. If *A* has a disability with regard to *B*, *B* is immune from *A*.

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14. *Id*. at 2056–57 ("[To realists], property is not merely a bundle of rights, but it has even fragmented to the point that there is nothing holding it together other than the state of current policy judgments or prevailing political winds."). Probably the acme (or nadir, depending on your point of view) of this denial of property is Thomas Grey's famous essay *The Disintegration of Property*, *in* PROPERTY, 22 NOMOS 69, 74 (1980). One of us critiques Professor Grey in Jeanne L. Schroeder, *Death and Transfiguration: The Myth that the U.C.C. Killed "Property"*, 69 TEMPLE L. REV. 1281 (1996) and SCHROEDER, VESTAL, *supra* note 2, at 156–220.

15. WESLEY NEWCOMB HOHFELD, FUNDAMENTAL LEGAL CONCEPTIONS AS APPLIED IN JUDICIAL REASONING AND OTHER LEGAL ESSAYS (Walter Wheeler Cook ed., 1923); *see also* Thomas W. Merrill & Henry E. Smith, *Why Restate the Bundle? The Disintegration of the Restatement of Property*, 79 BROOK. L. REV. 681, 682–83 (2014) [hereinafter Merrill & Smith, *Why Restate*] ("Hohfeld's analysis of legal concepts was associated with a substantive theory of property as a formless and infinitely malleable collection of rules to be shaped in accordance with ad hoc perceptions of public policy.").

16. Coase, *supra* note 6.

17. HOHFELD, *supra* note 15, at 46.

18. *Id.*

Hohfeld borrows these eight terms of art from ordinary English, which is an express ticket to confusion. Lay people, and probably most lawyers, use "privilege" in a way that overlaps with Hohfeld's "right." But, in the realm of definition, the author is king. Hohfeld's definitions are rigorous if we don't confuse them with ordinary English usage. The eight terms have become quite standard in Anglo-American property jurisprudence.

Hohfeld did not live long enough to observe the new universe of legal theory that he engendered,[19] but the legal realists embraced his system. According to Professor Smith and his frequent coauthor Professor Merrill (whom we shall refer to as "Merrill-Smith"), Hohfeld abolished the concept of property rights.[20] The political program served by this dissolution was the dethronement of libertarianism, wherein property is a natural right immune from government intervention. With libertarianism successfully dethroned, the government could intervene to redistribute property.[21]

What then about *in rem* rights that are good against the world? Hohfeld addressed this with some terminology that has not caught on, though Merrill-Smith are fond of it.[22] Hohfeld wrote that some rights are *multital*—that is, rights of *A* good not only against *B,* but also against *C* and a multiple of others in a large, generalized class—i.e. the "world."[23] When only *A* and

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19. For example, the Hohfeldians grabbed power in the First Restatement of Property, of which Professor Smith is a critic. Merrill & Smith, *Why Restate*, *supra* note 15.

20. Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 364 (2001).

21. *Id*. at 365; Grey, *supra* note 14; Anna di Robilant, *Property: A Bundle of Sticks or a Tree?*, 66 VAND. L. REV. 869, 873 (2013) ("Progressive property scholars resort to the bundle of sticks concept because it allows the state to bind up and rearrange an owner's entitlements to achieve a variety of regulatory and redistributive goals.").

22. Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 786 (2001).

23. In Hohfeld's words: "A paucital right, or claim (right *in personam*), is either a unique right residing in a person (or group of persons) and availing against a single person (or single group of persons); or else it is one of a few fundamentally similar, yet separate, rights availing respectively against a few definite persons. A multital right, or claim (right *in rem*), is always one of a large class of fundamentally similar yet separate rights, actual and potential, residing in a single person (or single group of persons) but availing respectively against persons constituting a very large and indefinite class of people." HOHFELD, *supra* note 15, at 72.

B and just a few others are involved, *A*'s rights are *paucital* (from "paucity" or few). For Hohfeld, *in rem* rights are multital rights gone wild.[24]

Hohfeld was so enamored of his relational understanding of law that he rejected the necessary objective aspect—he denied that property rights are rights with respect to *things*.[25] As such, property loses its uniqueness as Hohfeld lumped it together with a number of other multital *in personam* rights including the right not to be libeled and, shocking from a 21st century standpoint, "the right of a father that his daughter shall not be seduced."[26]

Though Hohfeld never used the phrase "bundle of sticks,"[27] Merrill-Smith lay the bundle at Hohfeld's doorstep and lit fire to it.[28] By dissolving property into a bundle of sticks, the legal realists denied the very essence of property law.

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24. *See* J.E. Penner, *The Bundle of Rights Picture of Property*, 43 UCLA L. REV. 711, 724–31 (1996). Merrill and Smith offer four "clarifications" of the Hohfeldian way of talking in order to preserve the concept of *in rem*:

> (1) in rem rights are characterized by both an indefinite class of dutyholders and by large numbers of dutyholders; (2) in rem rights are not simply aggregations of in personam rights but are quantitatively different in that they attach to persons through their relationship to particular things rather than as persons; (3) in rem rights are numerous and indefinite in two directions – not only does each in rem right give rise to a large and indefinite number of dutyholders, but also each dutyholder holds such duties to a large and indefinite number of rightholders; and (4) in rem rights are always claims to abstentions by others as opposed to claims to performances on the part of others.

Merrill & Smith, *supra* note 22, at 783. The first three are healthy suggestions, though (4) is wrong. Robert C. Ellickson, *Two Cheers for the Bundle-of-Sticks Metaphor, Three Cheers for Merrill and Smith*, 8 ECON. J. WATCH 215, 220 (2011); Bernard Rudden, *Economic Theory v. Property Law: The* Numerus Clausus *Problem*, *in* OXFORD ESSAYS IN JURISPRUDENCE 242–43 (John Eekelaar & John Bell eds., 3d Ser., 1987). Equitable servitudes are *in rem* rights. They can impose affirmative duties. Suppose *A* owns Blackacre and *B* owns Whiteacre next door. *A* and *B* contract to contribute to the repair of a party wall, intending to bind successors and assigns to this program of positive duty. *A* has a property right in Whiteacre and *B* has a property right in Blackacre. How do we know this? If *B* conveys Whiteacre to *X* and *X* does not consent to the servitude, *X* is nevertheless bound. *X* must contribute to the party wall, though she never consented to do so. This *in rem* right of *A* against *X* requires a performance by *X*. For the contrary British position, see *Rhone v. Stephens*, 2 AC 310, 321 (1994) ("For over a hundred years it has been clear and accepted law that equity will enforce [only] negative covenants against freehold land."). For successful efforts by English courts to evade this rule, see Chris Bevan, *The Doctrine of Benefit and Burden: Reforming the Law of Covenants and the Numerus Clausus "Problem",* 77 CAMBRIDGE L.J. 72 (2018).

25. HOHFELD, *supra* note 15, at 85. This is partially because he conflates the concept of "thing" with tangibility. SCHROEDER, VESTAL, *supra* note 2, at 174–75. But, philosophically and legally, an object (a "thing") is anything that is not a subject. *See supra* note 2.

26. HOHFELD, *supra* note 15, at 85.

27. Merrill & Smith, *Why Restate*, *supra* note 15, at 704; Merrill & Smith, *supra* note 20, at 365.

28. Merrill & Smith, *Why Restate*, *supra* note 15, at 683.

B. Coase

If Hohfeld is a proto-villain in the information theory of property, Coase is the archvillain-in-chief.[29]

Coase is famous in legal scholarship for the hypothetical thought experiment he borrowed from Arthur C. Pigou. According to Mark Blaug, a historian of economic theory:

> Take Pigou's own example of a railway damaging nearby fields: the argument is that if the railway could make a bargain with farmers having property adjoining the railway line, it would not matter that the railway cannot be charged for damage caused by fire and smoke; if the damage suffered by farmers were greater than the benefits reaped by the railway, the farmers could pay a sum sufficient to induce the railway to close down the line; if the damages were less than the benefit, aggregate welfare would be raised if the railway line were to bribe the farmers to tolerate the damage.[30]

This hypothetical is the core of the famous Coase article. Blaug acknowledges (barely) the "so-called" Coase Theorem,[31] but Blaug holds Coase a minor figure who critiqued Pigouvian advocacy of government regulation of externalities.[32] According to Blaug:

> Thus, Pigou's general prescription of a tax to deal with external diseconomies assumes that the party imposing the diseconomies and the party suffering them cannot negotiate to their mutual advantage. Furthermore, it assumes that the administrative costs of achieving optimum allocation by means of a specific tax is always less than the external diseconomy itself.[33]

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29. Coase is taken to the woodshed in Thomas E. Merrill & Henry E. Smith, *Making Coasean Property More Coasean*, 54 J.L. & ECON. S77 (2011) [hereinafter Merrill & Smith, *Coasean Property*].

30. MARK BLAUG, ECONOMIC THEORY IN RETROSPECT 600 (4th ed. 1985).

31. *Id*. at 596.

32. *Id*. at 599.

33. *Id.* at 600. For the view that Pigou never advocated a Pigouvian tax, see A.W. Brian Simpson, *Coase v. Pigou Reexamined*, 25 J. LEGAL STUD. 53, 66–73 (1996).

The Coase-Pigou Theorem is usually thought of as asserting that "in a perfect world without transaction costs, it does not matter how the law allocates entitlements because people will always contract to reallocate entitlements in an economically efficient manner."[34] The law-and-economics movement has generally taken this as a call to identify and eliminate transaction costs.

Nothing can be further from Coase's point: that we do not, and cannot, live in a world without transaction costs.[35] In our world, all of the costs and all of the benefits must be considered. In this way, transaction costs are no different from any other cost of production.[36] Coase states:

> A better approach [than studying ideals] would seem to be to start our analysis with a situation approximating that which actually exists, to examine the effects of a proposed policy change and to attempt to decide whether the new situation would be, in total better or worse, than the original one. In this way conclusions for policy would have to some relevant to the actual situation.[37]

He continues: "the whole discussion of [ideal worlds] is largely irrelevant for questions of economic policy since whatever we may have in mind as our ideal world, it is clear that we have not yet discovered how to get to it from where we are."[38] In other words, Coase believed a so-called Pigouvian tax may actually make things worse.[39] One cannot decide whether it would or would not as a matter of *logic*. It depends on the facts.

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34. Schroeder, *End of the Market*, *supra* note 2, at 521. Years ago, our colleague Charles M. Yablon summarized the Coase Theorem as follows: In a world with no transaction costs, who the heck cares what the law says? But in a world *with* transaction costs, who the heck knows what's going on? We find this highly accurate. *Cf.* R.H. COASE, THE FIRM, THE MARKET, AND THE LAW 14 (1988) [hereinafter COASE, THE FIRM] ("[I]n the absence of transaction costs, it does not matter what the law is, since people can always negotiate without cost to acquire, subdivide and combine rights whenever this would increase the value of production."). But even more succinctly: in a world that instantly corrects error, errors don't matter.

In fact, the Coase Theorem was only later "discovered" and named by George Stigler. *See* GEORGE J. STIGLER, THE THEORY OF PRICE 113 (1966). In fact, Coase's statement in *The Problem of Social Costs* of what would be known as the Coase Theorem is almost an aside in his discussion of costs: "It is always possible to modify by transactions on the market the initial delimitation of rights. And, of course, if such market transactions are costless, such a rearrangement of rights will always take place if would lead to an increase in the value of production." Coase, *supra* note 6, at 15.

35. DAVID CAMPBELL, A CONTRIBUTION TO THE CRITIQUE OF THE CLASSICAL LAW OF CONTRACT 199–200, 377 (2024).

36. Schroeder, *End of the Market*, *supra* note 2, at 530.

37. Coase, *supra* note 6, at 43.

38. *Id*.

39. David Campbell, *Ronald Coase's "The Problem of Social Cost"*, 35 U. QUEENSLAND L.J. 75, 76 (2016); David Campbell, *The Sense in Coase's Criticism of Pigou: The Ceteris Paribus Case for Intervention*, 13 J.L. ECON. & POL'Y 39 (2017).

Be that as it may, Merrill-Smith fault Coase for embracing the bundle of sticks; they

> trace the decline of the conception of property as a distinctive in rem right in Anglo-American thought, and the rise of the view amount modern legal economists that property is simply a list of use rights in particular resources . . . . [T]his view finds its roots in Ronald Coase's seminal article, *The Problem of Social Cost*.[40]

Merrill-Smith thus interpret Coase as a hyper-realist[41] who did not recognize property in the possessory sense. Rather, Coase believed in *usufruct*. For Coase there is no such thing as Blackacre. There are only the uses to which Blackacre may be put.[42] In Coase's words: "We may speak of a person owning land and using it as a factor of production but what the land-owner in fact possesses is the right to carry out a circumscribed list of actions."[43]

Thus, the farmer plagued by railroad sparks either did or did not own the right to grow crops free of the danger they would be burnt. The railroad either did or did not own the right to shoot sparks onto Blackacre free of liability for burnt crops. Who owns Blackacre itself was irrelevant to Coase. Who owned the uses of Blackacre was also irrelevant in TC_0. "All that this initial allocation specifies is which of the parties needs to start the bargaining, if it sees scope for economic gain by engaging in market exchange."[44] If the farmer owns the right to grow wheat unmolested and if the cost to the railroad of preventing sparks is prohibitive, the railroad bribes the farmer to permit the sparks. If the railroad owns the right to shoot sparks onto Blackacre, depriving the farmer of a profit, the farmer (via instant risk-free financing that is available in TC_0) bribes the railroad to guard against

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40. Merrill & Smith, *supra* note 20, at 359.

41. *Id*. at 366; Henry E. Smith, *Law and Economics: Realism or Democracy?*, 32 HARV. J.L. & PUB. POL'Y 127, 129 (2009).

42. Merrill & Smith, *supra* note 20, at 366 ("The legal realists succeeded in promoting a rival conception—that of property as a bundle of legal relations. Coase took the realists one step further, implicitly conceiving of property as a list of particularized use rights that individuals have in resources.").

43. Coase, *supra* note 6, at 44.

44. David Campbell & Matthias Klaes, *What Did Ronald Coase Know About the Law of Tort?*, 39 MELB. U. L. REV. 793, 802 (2016).

sparks, provided the bribe is less than the profit.[45] Bribery greases the wheels in TC_0.[46]

In the Eden of TC_0, who cares about pre-existing entitlements to uses? If resources are misallocated, the market instantly corrects the error. But alas, we live in a fallen world where transaction costs are inescapable (TC_+). Because *O*, *A*, *B*, *C* . . . are plagued by transaction costs, the law condemns them to the world of property. Either the farmer is entitled to farm in safety or the railroad is entitled to spark freely, because the gains from contracting are overcome by the cost of transacting.[47] Private side deals cannot be relied on to correct allocative error.[48]

Merrill-Smith incorrectly assert that "in a world with zero transaction costs, it would not matter whether we had anything like property at all."[49] This is a profound misinterpretation of Coase. In TC_0, entitlements exist. It's their initial assignment that is irrelevant. In TC_0, economically rational actors will bargain to trade entitlements. But in order to bargain, the parties must start by owning something to bargain with, and afterwards the bargaining parties will own something as a result of their bargain. Once the bargain has been reached, entitlements will continue to exist, albeit now reallocated. This is the point that Professor Smith entirely misses, and it is fatal to his proprietal anthropology.

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45. Professor Smith wittily observes that in TC_0, Soviet-style central planning works just as well as contract to sort out the ownership of land uses. Henry E. Smith, *Ambiguous Quality Changes from Taxes and Legal Rules*, 67 U. CHI. L. REV. 647, 681 (2000). Indeed, this is the implication of Coase's Nobel-Prize winning work. R.H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386 (1937); *see also* COASE, THE FIRM, *supra* note 34, at 14 ("[I]n the absence of transaction costs, there is no basis for the existence of firms."); CAMPBELL, *supra* note 35, at 348.

46. Strictly speaking, Coase models a "pure exchange economy in which there is no production. Consumers are endowed with an initial allocation of goods. The only possible economic activity is trade." MICHAEL CARTER, FOUNDATIONS OF MATHEMATICAL ECONOMICS 138 (2001).

47. In unfolding this vision, Coase reveals a Humean skepticism about causation. Nature does not stipulate whether the sparks cause the farmer's loss or whether the farmer's crops cause the railroad's loss. Smith, *supra* note 4, at 73 ("Where it is not wealth-maximizing for cattle and crops . . . to occur simultaneously, the source of the conflict is equal in each of the parties. . . . [W]hen A punches B in the nose, A is usually regarded as causing the harm, not B (or B's nose). By contrast, in [TC_0] Coase is right that location [of fault] is irrelevant."). Merrill & Smith favor "natural" causation. Merrill & Smith, *Coasean Property*, *supra* note 29, at S97 ("Once we have a system of in rem property rights in place, it makes no sense to be causally agnostic, for transaction costs reasons."). *See also supra* text accompanying notes 43–45.

48. COASE, THE FIRM, *supra* note 34, at 28 ("[T]he initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates.").

49. Merrill & Smith, *Coasean Property, supra* note 29, at S95.

II. DELINEATION AND PROCESSING COSTS

A. Introduction and Definitions

The information cost theory posits delineation costs and processing costs. Delineation costs are borne by a speaker in delineating a legal claim to property. Processing costs are the costs incurred by an audience in interpreting the claim. Professor Smith asserts that one of his innovations to information theory is the recognition of processing costs. Linguistic theory, he asserts, emphasizes the role of the *speaker* and has "only recently" discovered the *audience*.[50]

Professor Smith is correct that, in communication, the role of the audience is crucial. For example, Lacanian discourse theory, building on the work of Ferdinand de Saussure, concentrates less on speaking and more on interpretation by an audience. As Professor Smith and modern linguists note, there is no natural or necessary connection between any word and the world. The connection between a signifier and that which is signified is artificial and contingent.[51] This means that signification is notoriously slippery and ambiguous.[52] Despite this, communication occurs, as the interpreter imposes—if only temporarily—stable meaning on to signification.[53] Professor Smith recognizes this in his repeated example of a

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50. Henry E. Smith, *The Language of Property: Form, Context and Audience*, 55 STAN. L. REV. 1105, 1106, 1108 (2003) [hereinafter Smith, *Language*]. Professor Smith cites Allan Ball as identifying four different potential audiences—addressees, auditors, overhearers, and eavesdroppers—for a statement in order to consider how the speaker should style his mode of address. *Id.* at 1134 (citing Allan Bell, *Language Style as Audience Design*, 13 LANGUAGE SOC'Y 145, 158–61 (1984)).

51. Modifying Ferdinand de Saussure's linguistic theory, Lacan expresses signification as S/*s*—a signifier (S) stands for a signified (*s*). JACQUES LACAN, ÉCRITS: A SELECTION 149 (Alan Sheridan trans., 1977) (hereinafter LACAN, ÉCRITS). "[T]here is no necessary, natural or simple one-to-one relationship between signified and signifier. Any relationship is logically arbitrary and contingent." SCHROEDER, DISCOURSE, *supra* note 8, at 10.

52. As one of us said elsewhere, "[l]anguage does not have any *direct* relationship to the external world. Although a signifier stands for a signified, each signified is itself a signifier, standing for another signified, in turn standing for another signifier *ad infinitum* in an unending chain of signification. Consequently, signification is always in a state of "'slippage' and ambiguity." SCHROEDER, DISCOURSE, *supra* note 8, at 10.

53. "To communicate and interpret is to momentarily stop slippage. In legal terminology, although laws may be indeterminate *ex ante*, they are nevertheless determined *ex post* in their application." *Id.* Lacanian theory in part seeks to explain how stable *meaning* is nevertheless imposed at least temporarily upon slippery signification by the interpreter. *Id.* at 135–37; BRUCE FINK, LACAN TO THE LETTER: READING *ÉCRITS* CLOSELY 81–89 (2004).

listener who understands a speaker's utterance, "it's cold in here," as a request that the audience close the window.[54]

But, in his contrast between contract and property, Professor Smith does not fully internalize the implications. Negotiated contracts are conversations.[55] Because, by definition, contracts are exchanges, each of the two (or more) counterparties are alternately speaker and audience. Communication is, therefore, a collaboration. This is to be contrasted with Professor Smith's concept of property as a refusal to engage. His understanding of property is possession, where the speaker communicates his claim of ownership to a passive audience. Property is reduced to the message "keep off!"

In his discussions, Professor Smith will often conflate property and contract. From the perspective of Hegelian theory, this is not problematic. Hegel argued that property consists of possession—the logically "first" element. But property also entails two other necessary elements—use and alienation. Moreover, the "logic of property"—namely the creation of personhood through mutual recognition—is consummated through *contractual* alienation.[56] That is, property and contract are necessarily intimately intertwined. You cannot have one without the other.

In contrast, Professor Smith tries to disentangle property and contract. He reduces property to the right to exclude others ("keep off"). To put this in Austinian language, Professor Smith seems to see property language as constative, not performative. Famously, Austin's ultimate conclusion is that, after introducing his dichotomy, no communication is purely constative.[57] Communication always has a performative aspect to it. However, Professor Smith's concept of property is nevertheless constative.

The reduction of property to constativity contradicts Hegel's personality theory of property. The philosophical *telos* of property is the creation of that

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54. Smith, *Language*, *supra* note 50, at 1112–13, 1131–32, 1135, 1164. Specifically, Professor Smith uses this to show how one may convey a lot of meaning in a small number of words to a small number of listeners who share a context, as opposed to a larger number of people who do not share the same context. For example, one might have to "say something like, 'I hereby request that you, being closer to the window than I, please close the window.' Of course, in addressing someone who had never seen a window before, the longer version might be more effective." *Id.* at 1131. We might add that, if the audience had *literally* never seen a window before, even this sentence would probably make little sense.

55. Of course, not all contracts permit negotiation. Although one must have an ability to review the "terms and conditions" of on-line contracts before one clicks to accept, they are "take-it-or-leave-it" contracts of adhesion—which is probably why very few consumers stop to read them. In this country where haggling in most consumer contracts is rare, one normally must accept or reject the prices offered in stores (although, one of us has a friend who insists that, if you have the nerve and are willing to walk away, you can bargain over price in the most exclusive and expensive stores in New York City).

56. SCHROEDER, VESTAL, *supra* note 2, at 48–52.

57. *See supra* note 12.

aspect of personhood that we refer to as legal subjectivity—the ability to bear rights and duties—through mutual recognition between and among other subjects. Through possession—the identification of certain objects to a specific person—one makes oneself unique and identifiable.[58] Possession is necessary but inadequate because it is not reciprocal. The owner imposes duties on others ("keep off"). The audience is not called upon to respond. Use is inadequate standing alone because it is solipsistic; the user ignores others rather than engaging with them[59]—Professor Smith's concept of modularity.[60] It is only through the collaborative, formal mutuality of contract that each counterparty can recognize the other, and can be recognized by the other, as a rights-bearing person.

B. Information and Costs

The very heart of Professor Smith's information theory of property is this: It would be impracticably expensive to list every use of Blackacre and who owned it. The great genius of property law is that it allows for succinct delineation of *O*'s rights. In property discourse, *O* owns *all* the uses. It is shorter to say *O* owns them all than it is to list the uses *O* owns in Blackacre—a list of infinite length. As Professor Smith puts it, "[e]mploying things as a starting point also makes defining in rem rights easier because communicating the boundaries of a thing . . . is easier than promulgating lists of permitted and forbidden actions with respect to resources and parties."[61]

Coase is a theorist of nuisance law,[62] and nuisance law may cramp the usufructuary style of *O*. Suppose *O* elects to use Blackacre to construct an odiferous factory. *W*, who owns Whiteacre next door, may have a remedy against *O* to prevent the pollution. If so, *O* does not own at least this one

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58. *See supra* note 8. Because, to Hegel, property is about the creation of personality through recognition by others, communication is of the essence. That is, one must communicate one's claims to property to others in order to be effective. Taking physical possession of tangible things is only one way to do this. Hegel thinks that, although physical possession might be the most determinate way to manifest possession, it is the least adequate in that it can be destroyed by a thief. More adequate means for making ones claims identifiable are by marking or giving notice through a means established by law. For example, from a Hegelian perspective, perfecting a security interest through filing under Article 9 of the UCC is not an alternative or substitute for perfecting by possession, it is itself a form of possession. SCHROEDER, VESTAL, *supra* note 2, at 41–42, 146–48.

59. SCHROEDER, VESTAL, *supra* note 2, at 44–45.

60. *See infra* text accompanying notes 65–70.

61. Smith, *System*, *supra* note 13, at 2066.

62. A surprisingly large portion of Coase's article reviews English nuisance cases, though his farm-ranch and farm-railroad-sparks examples probably sound in trespass. The economics in the article consumes a minority of the text. *See* Campbell & Klaes, *supra* note 44, at 813 ("It can hardly be denied that 'The Problem of Social Cost' is a poorly organised article and we wish to argue here that this poor organisation has played a considerable part in the widespread misunderstanding of its argument."). For tart criticism of Coase's prowess as a legal scholar, see Simpson, *supra* note 33.

use—building odiferous factories. So now we can say *O* owns all the uses *except* the factory. Property yields to what Merrill-Smith calls "governance":

> Under a governance strategy, rights to resources are defined in terms of permitted and restricted uses. Some examples of governance include the in personam rights imposed by contracts, the in personam rights imposed by torts, government licenses and some of the informal norms and formal regulations relating to particular uses of resources. Governance rules typically specify particular uses in some detail, including often the identity of the rightholder and the dutyholder.[63]

"*O* owns all the uses" is the discourse of property. It is a "shortcut" that replaces intoning all the uses. The exception for polluting factories belongs to the discourse of governance. Exclusion (with governance exceptions) saves words of delineation. Words are disutilities. Property discourse therefore minimizes costs.

In TC_0, saving words is not an issue. *O* may as well prattle on about all the uses to which Blackacre may be put. Why not? Time is super-cheap—in fact non-existent. *A*, *B*, *C*, . . . , *N* are content to listen. In TC_0, they have the patience of saints. Processing costs are zero.[64] Because lack of information is a transaction cost, in a world without information costs every party knows everything including the desires of every other parties. Telepathy reigns in TC_0. In TC_+, however, speaking and listening are costly. Thanks to property discourse, *O* can say *O* owns it all, subject to "governance" exceptions. In TC_+, *O* saves delineation costs and *A*, *B*, *C*, . . . , *N* save processing costs. Speaking and comprehending are minimized.

C. Modularity

A major theme in Professor Smith's work is that property law is modular. Because the world is partitioned into Blackacre, Whiteacre, Greenacre, etc., we need not deal with the infinite uses to which these plots of land can be put. *O*, as owner of Blackacre, has all the uses, subject to governance exceptions. *O* has the privilege to use Blackacre as she sees fit, so long as *O*'s use does not constitute a nuisance.

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63. Merrill & Smith, *supra* note 22, at 791.
64. Smith, *Language*, *supra* note 50, at 1151.

This obsession with modules is part of Professor Smith's rebellion against Hohfeld. In Hohfeldian thought, in determining *O*'s *in rem* right to Blackacre, we must deal with *O* v. *A*, *B*, *C*, . . . , *N* (*N* ≈ 8.1 billion). But thanks to property law, we need only deal with *O*'s right to use Blackacre. *A*, *B*, *C*, . . . , *N* may be ignored. If we had to deal with *A*, *B*, *C*, . . . , *N* all the time, there would be no property law and nonmodularity would reign. Information costs would be impossibly high.

Figure One[65] shows the information costs in the Hohfeldian universe, where the world population is assumed to be ten.

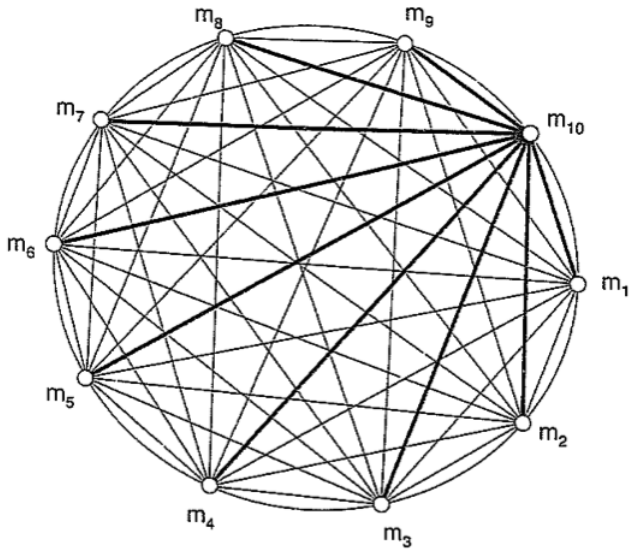

Figure One
Property in the Hohfeldian Universe

In order to establish her right to Blackacre as against her nine colleagues, m_1 must communicate with $m_{2\text{-}10}$. Imagine Figure One with not ten but billions of colleagues.[66] Outside of TC_0, property becomes impossible if it depends on bargaining with *A*, *B*, *C*, . . . , *N*.

65. Henry E. Smith, *Toward an Economic Theory of Property in Information*, *in* RESEARCH HANDBOOK ON THE ECONOMICS OF PROPERTY LAW 104, 110 (Kenneth Ayotte & Henry E. Smith eds., 2011).

66. "[E]ach added node mn adds *n*-1 links to the system." *Id*.

Compare the simpler world of property, illustrated in Figure Two.[67]

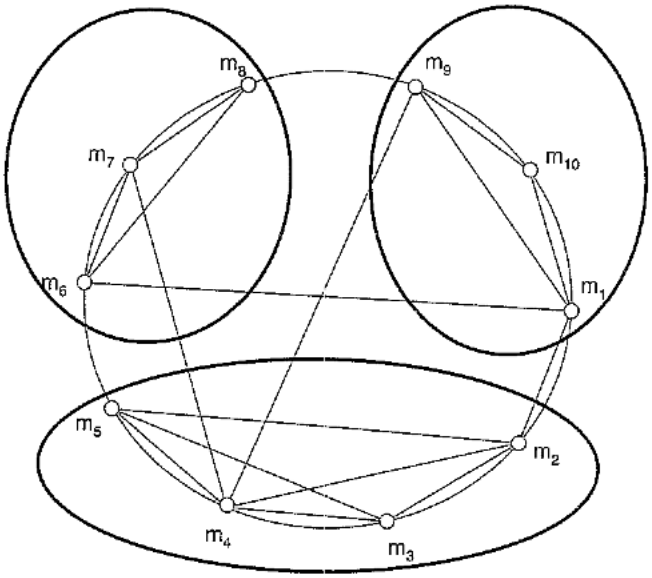

Figure Two
Property in the Modular Universe

Here, we can imagine that m_1 claims the exclusive right to use Blackacre, but m_1 has granted easements to m_9 and m_{10}. Within the module, m_1 must communicate with $m_{9\text{-}10}$ but m_1's need to communicate with the others is more limited. Because ownership of Blackacre has been allocated to m_1, costly communication is reduced. Modularizing legal discourse, then, saves enormous amounts of speaking and comprehending.[68]

The question arises, however, whether property has the unique feature of being modular, or whether all discourse is modular. "Module" for Professor Smith seems to be another word for "set"—the set of all uses to which Blackacre might be put. Language generally uses single sets to refer to multitudinous individual entities in the supra-linguistic universe. In set-

67. *Id.* at 111.

68. In abstract algebra, a "module" is a set in which the actions in a ring (addition and multiplication) act, producing a sum and/or a product that is itself internal to the module. In algebra, the module is a galaxy unto itself that never communicates extra-modularity. DAVID S. DUMMIT & RICHARD M. FOOTE, ABSTRACT ALGEBRA 336 (3d ed. 2003) (modules are the "representation objects" for rings, i.e., they are, by definition, algebraic conditions on which rings act).

theory terminology, language is intensive.[69] Linguistic concepts use *rules* to save information expense. We say, "the set of uses of Blackacre," instead of listing "parking blue cars, parking green cars, . . . , parking *n* cars; growing wheat, growing chaff, . . . , growing *n* crops." The set of uses is intensive. It depends on a rule of recognition: *x* is in the set because *x* is a use to which Blackacre may be put. The infinite list is extensive. No rule operates to constitute the list. Because language has words like "all" and "them," it is intensive and therefore modular. It is not clear that Professor Smith has said anything useful by claiming that property discourse is modular when all discourse is modular. In his article on standardization of boilerplate, Professor Smith confesses that contract is also modular.[70] As such, modularity cannot *distinguish* property from contract. All language is modular.

D. Anthropologizing Property

Upon reading Coase, the profound mystery for Professor Smith is why TC_+ is not organized solely by contract. Why does TC_+ resort to property?

This turns out not to be a well-formed question. A careful consideration of Coase indicates that in TC_0, property already exists,[71] as Professor Merrill (once upon a time, before co-authorship) saw.[72] Professor Smith thinks property is not necessary in TC_0 and that the very foundation of property lies in transaction costs, or more precisely, the subset of transaction costs

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69. Willard V. Quine describes intension as follows: "for any condition you can formulate, there is a class whose members are the things meeting the condition. This principle is not easily given up." W.V. QUINE, THE WAYS OF PARADOX AND OTHER ESSAYS 11 (1966). In set theory, intension refers to Frege's Axiom Schema of Comprehension. "If P is a property, then there exists a set $Y = \{x : P(x)\}$." THOMAS JECH, SET THEORY 4 (3rd Millennium Edition 2006). Bertrand Russell responded to this by proposing that P might designate "not-belonging." Thus $Y = \{x : P(X)\}$ is the set of all sets that do not belong to themselves—a contradiction. The Axiom Schema of Comprehension was therefore false. In the early 20th century, it was replaced with the Axiom Schema of Separation: "[i]f P is a property, then for any X there exists a set $Y = \{x \in X : P(x)\}$." *Id*. This was a mere conditional truth. The significance of this is that set theory has no theory of the set. David Gray Carlson, *Legal Positivism and Russell's Paradox*, 5 WASH. U. JUR. REV. 257 (2013).

70. The confession is in the title of the piece: Henry E. Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICH. L. REV. 1175 (2006) [hereinafter Smith, *Boilerplate*].

71. Coase remarks: "if market transactions were costless, all that matters (questions of equity apart) is that the rights of the various parties should be well-defined and the results of legal actions easy to forecast." Coase, *supra* note 6, at 19. The well-defined rights are obviously property rights, without which there could be no transactions.

72. Thomas W. Merrill, *Trespass, Nuisance, and the Costs of Determining Property Rights*, 14 J. LEGAL STUD. 12, 21 (1985) (property rights in TC_0 are "clearly delineated"); *see also* Abraham Bell & Gideon Parchomovsky, *A Theory of Property*, 90 CORNELL L. REV. 531, 535 (2005) ("In Coase's view, property rights are simply background rules—legally created entitlements awaiting reallocation through contract."); Simpson, *supra* note 33, at 60 (in Coase's view, "rights have to be defined or allocated before you can have bargains").

involved in the transmission and interpretation of information. According to Professor Smith:

> Consider for a moment the world of zero transaction costs (including processing costs), in which everyone could have a contractual duty to the owner of Blackacre to stay off and this duty could be tailored individually to each right-duty relationship holding between *O* and every other member of society. At the other extreme, *O* might decide just to keep everyone off and use Blackacre by himself. This requires everyone else simply to keep off what they do not own—a principle that applies . . . to all nonowners of Blackacre. . . . These two approaches would cost the same (nothing) in a zero-transaction cost world. But, in [TC_+] the tradeoff between intensiveness[73] and extensiveness[74] of information does not matter. For rights to assets that can elicit value from a small number of people having special access, it makes sense for the rights involving those few to be *in personam* and of high information content relative to delineation cost[75] (and to the value of the asset). For the audience of people who can contribute to output by simply staying away from the asset, we would expect an *in rem* duty of low information content relative to delineation cost and asset value.[76]

Not to be missed in this account is that property is theft in the sense that the original first appropriation cannot be consensual since no one had anything to exchange. This is why Hegel rejected the Lockean notion that first appropriation *justifies* claims to property. Hegel thought that all property is born in the original sin of abstract wrong—it is a unilateral imposition of

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73. Professor Smith's definitions are not those of set theory. He defines "intensiveness" as "the amount of information . . . per unit of delineation cost." Smith, *Language*, *supra* note 50, at 1110. It is crucial to Professor Smith that intensiveness involves the amount, and not the content of information. *Id.* at 1108. Quantity, not quality. *Id.* at 1127.

74. "Extensive" means large number. Thus, a crowd of 100 listeners is more extensive than a crowd of 10 listeners. Smith, *Language*, *supra* note 50 at 1113, 1117, 1121, 1126–27. To be more precise, Professor Smith recognizes that extensiveness is a "blend" of "factors directly or indirectly relevant to processing includ[ing] the audience's size, background knowledge, heterogeneity, and "definiteness." *Id* at 1111. He notes that these factors can "go together but they can sometimes point in different direction." *Id.* As a practical matter, when he develops his models, he will use size as a proxy for extensiveness.

75. Delineation costs are the costs of speaking words. *Id.* at 149 ("Generally, we expect assets of higher value to be subject to regimes of rights that involve greater delineation and greater information costs."). Thus, where a small audience is in the know "greater amounts of information can be processed by the few, and greater reliance on context allows more information content to be achieved through less delineation." *Id*. at 1150.

76. *Id.* at 1151.

duties against others in violation of their essential freedom and independence.[77] It is only through the subsequent baptism in the intersubjective recognition by others in a regime of private law that the original sin of property is washed away, being retroactively made rightful.[78]

In TC_0, Professor Smith portrays *O* as indifferent between universal consent and excluding others. In TC_+, *O* prefers to exclude others. What authorizes *O* to expropriate Blackacre when *O* has no pre-existing claim to it? The fact that *O* has succeeded in the expropriation is excused because, going forward, *O*'s costs of delineation and the public's cost of comprehending is reduced.[79] *O* is like a thief who tells his victims, "It's conceptually simpler if I just take stuff."

Professor Smith said similarly,

> In property, the exclusion strategy results in property's being not just a bundle of sticks but something more that high transaction costs prevent us from fully achieving by contract. Property functions in part as a shortcut over all the regulations or bilateral contracts that would have to be devised to govern all members of society in all their interactions.[80]

Merrill-Smith further state, "because of transaction costs, we delegate to owners a range of sovereign authority over their property."[81] They continue: "[F]or transaction costs reasons, we start with sovereign owners exercising the right to exclude over clearly delineated things."[82]

Professor Smith's idea that we can do without property in TC_0 is a fundamental error. According to Professor Smith, in TC_0, *O* contracts with *A* to keep off. Then *O* contracts with *B* to keep off. Then *O* and *C* contract, etc. Eight billion-plus contracts later, *O* has rights against all the world (of other human subjects).[83] But, on further consideration, why should *A*, *B*, *C*, . . . , *N* agree that they will keep off Blackacre? The standard economic answer is that *O* must *pay* them for the surrender of their (pre-existing) right.

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77. *See supra* note 8.

78. *See supra* note 8.

79. For a slightly different apologetic, owners know how to maximize value better than strangers. "[P]roperty's core is a right to things against the world, which is a rough cut at dealing with a wide, indefinite, and open-ended set of problems by delegating . . . information about it." Henry E. Smith, *Mind the Gap: The Indirect Relation between Ends and Means in American Property Law*, 94 CORNELL L. REV. 959, 964 (2009).

80. Henry E. Smith, *On the Economy of Concepts in Property*, 160 U. PA. L. REV. 2097, 2117 (2012).

81. Merrill & Smith, *Coasean Property*, *supra* note 29, at S95.

82. *Id.* at S96; *see also id*. at S99 (In TC_0, "one could redescribe in rem rights against all the world in terms of a congeries of in personam rights, as Hohfeld imagined.").

83. If *D* is a minor or insane, *O* costlessly locates *C*'s guardian and contracts with her.

But the fact that *O* must pay presupposes that *O* already has something with which to pay them. Property must already be present in TC_0. Thus, Professor Smith's proprietal anthropology fails. Property precedes contract and property precedes transaction costs because property transfers are what is being transacted in the first place. Property does *not* arise because speaking and comprehending are disutilities.

III. THE JURISDICTION OF INFORMATION THEORY

A. Establishing Property

Property is about power. Reducing the exercise of power to information is positively misleading. In all the writings of Professor Smith, *O* emerges as owner in order to save information costs. Concealed is the fact that *O*—or his predecessors—has seized power over Blackacre, i.e., property begins as wrong. The act of expropriation is papered over by the observation that, once accomplished, processing costs are reduced.

Properly, Professor Smith's information theory cannot fathom the exercise of power. Power, when used, *changes* the underlying reality. Information, as understood by Professor Smith, *reports* and changes nothing. Information is constative, not performative. An information theory must concentrate on communication alone, understood as the conjugate costs of delineation and processing.

Many interesting economic questions are expelled from information cost theory by this restriction. For example, when it comes time for *O* to alienate property in a market transaction, a buyer faces a title risk. *O* cannot be trusted to report the true state of title, and warranties of title are useful but not enough, because *O* may not be solvent enough to cover damages, which may not surface for years after the transaction. Search costs are an alternative to bearing title risk.

Is search cost within the ambit of an information cost? We say not. Information cost theory concerns the cost of speaking and the cost of understanding. It concerns advertising who controls using a thing (such as Blackacre). Professor Smith is clear that *using* property is the key. The power to exclude (possession) is a means to this end.[84] The theory therefore does not comprehend issues surrounding the alienation (contract) of property. The information theory often segues from issues of possession to issues of market alienations without acknowledgment. Such a segue is

84. Smith, *Law of Things*, *supra* note 2, at 1704.

illegitimate because alienation is always performative and not merely informative.

Search costs go beyond this restriction. They have to do with market alienation. Search costs go to whether the seller is speaking the truth. Search has to do with the facts of where the border is or if *O* is the owner as she claims.[85] An information theory of property has to assume the truth of *O*'s in rem claim and isolate the cost of initiating communication to strangers and the cost to strangers of comprehending.

Professor Merrill, in contrast, distinguishes between costs of communicating ownership and costs related to the marketing of property. Property includes not merely possession as exclusion of others, and use of the excluded thing, but the third classical element of alienability.

> Once we understand that property has these two important audiences—the audience of strangers and the audience of potential transactors—we can see that possession and ownership constitute distinct rules operating in different social settings within the universe of property law. The concept of possession is a vital tool that allows people to navigate through the everyday world without interfering with the rights of others. Each person continually observes the objects around him or her and can tell at a glance based on physical cues whether they are possessed or not possessed. . . .
>
> The concept of ownership is a [different] tool that allows people to engage in exchanges of rights to things of significant value and durability. . . . To assure that the parties to an exchange have such rights, it will be necessary to conclude (to a satisfactory degree of confidence) that all relevant rights to a thing have been accounted for. . . . [A] more complete investigation of the chain of title . . . will be undertaken.[86]

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85. James Y. Stern, *The Essential Structure of Property Law*, 115 MICH. L. REV. 1167, 1210 (2017) ("[A]scertaining whose claims to a given asset are valid will be less a matter of legal uncertainty than of ascertaining the raw facts to which that law is to be applied. To put the matter more concretely, the question that will come up again and again won't be whether a security interest *must* be recorded to defeat a subsequent purchaser's claim but whether an interest *has* been recorded."). While these thoughts are valid, one must admit that, in Article 9 litigation, whether Article 9 applies at all is frequently litigated, as in leases that are security interests in disguise. These count as questions whether a security interest must be recorded as a matter of law.

86. Thomas W. Merrill, *Ownership and Possession*, *in* THE LAW AND ECONOMICS OF POSSESSION 32 (Yun-chien Chang ed., 2015).

Thus, Professor Merrill would place title search beyond the jurisdiction of an information theory of property.[87]

Professor Smith is keen to take jurisdiction over recording acts for real estate transactions and security interests in personal property. These, however, must be excluded because such legislation is performative. Recording acts are about power (in the Hohfeldian sense). They shift power away from secret equities (such as unrecorded mortgages) to buyers in the market. Whenever "power" raises its head, information cost theory turns and flees. Information cost theory cannot account for recording acts, which empower a grantor to convey what she no longer owns.

What then is an information cost, within the proper bounds of information theory? It is purely an announcement by *O* and recognition by an audience of a preexisting right. It is not about the seizing of property at the beginning of history. This original appropriation indeed required a speech *act*—a performative.[88] For Hegel, the intersubjective *communication* of a claim in a manner recognized in a legal system was the very definition of possession, thought of as the *right* to exclude others, as opposed to the mere empirical power to do so. Once this act is performed (say by *O*, a first owner), the need to broadcast is over. The boundaries of Blackacre have been set, and they are perpetuated with zero new broadcasting by *O.* When *O* is ready to sell, *A* (initially) bears costs in acquiring Blackacre from *O*, but these are search costs, not information costs. They belong to contract exchange. If we concede that, *in the past*, a speech act was necessary for *O*'s right to exclude others from Blackacre at the moment of first appropriation, these are not *marginal* information costs. They are sunk costs. Because *O* performed the costly speech acts that created property, *A*, as *O*'s successor, need do no further broadcasting to maintain ownership of Blackacre.

But mustn't *A* file the *O*-*A* deed? Indeed not! *A* owns Blackacre by virtue of the deed—itself a performative. Filing the deed exorcizes the power of *O* (itself created by the recording act, to incentivize recording). Unless *A* records, a double-dealing *O* retains the power to make subsequent grantees better owners than *A*. *O*'s power over unrecorded prior grantees affects the search costs prudent at the moment of acquisition. Once they are incurred and *A* successfully acquires property, these are *sunk* costs. Search costs are not about the need of *A* going forward to broadcast *A*'s right to exclude. *A* has the right to exclude whether the world knows about *A* or not.

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87. Professor Penner presumably would agree. He holds that the right to sell is not a necessary element of property (whereas the right to alienate is necessary). Penner, *supra* note 24, at 746–47. Therefore, title search is a contract question, not a property question.

88. Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73 (1985).

Therefore, within the restricted jurisdiction of information cost theory, *marginal* information costs do not exist. This constitutes a profound flaw in the information cost theory of property.

What about the processing cost of the audience? Professor James E. Penner discussed this in his parking lot anecdote of which Professor Smith is fond.[89] When one walks through a parking lot, one usually doesn't know who owns any of the cars other than one's own. But experience has taught that, cars being valuable, *somebody* probably owns them.[90] We know to not trespass upon these chattels because we were brought up by our parents to respect the property rights of others, or, if we are Holmesian bad men, we fear legal retribution that follows hard upon grand theft auto. Learning these lessons may have been hard and sometimes painful. But if these norms are internalized, they are sunk costs. Therefore, the *marginal* processing cost of property rules does not exist.

In short, within the constative bounds of the information cost theory, there are no marginal costs of speaking and comprehending at all. Our system of property is self-perpetuating without any form of communication.[91]

And yet Professor Smith has written a thousand pages or more expounding his theory. In these pages one reads of the rising marginal cost of delineating rights.[92] What is Professor Smith talking about?

There are two possibilities. First, Professor Smith is possibly aiming at an *anthropology* of property. How did mankind come to institute personal property? In the beginning, *O* had to speak and claim Blackacre. For example, *O* had to establish herself as a Lockean first possessor by building fences and making improvements. In such a view, the cost of broadcasting is performative, not constative, but at the dawn of history, before *O* starts building the fence, these speech acts could be considered marginal costs

89. Smith cites Penner's example numerous times throughout his oeuvre. *See, e.g.*, Smith, *Language*, *supra* note 50, at 1117, 1147; Smith, *supra* note 79, at 968 (citing J.E. PENNER, THE IDEA OF PROPERTY IN LAW 75–76 (1997)).

90. The car may be abandoned, but the chance that a well-maintained car parked in a Walmart parking lot is abandoned is remote.

91. Once again, this is diverse from a Hegelian personality theory which is based upon recognition in which the identity of the owner is of the essence. It is "logically" necessary for possessory claims to be to be communicated. Consequently, as discussed (*see supra* note 58) Hegel believes that marking or registration is a superior means of communicating to the brute fact of physical possession. However, as Penner's example illustrates, possession as exclusion does not necessarily identify the owner. As Professor Smith recognizes in his concept of modality, use can be private and non-communicative. It is only in contract, where the counterparties usually have to identify each other that full Hegelian recognition can occur.

92. *See, e.g.*, Smith, *Language*, *supra* note 50, at 1111.

needed to achieve a marginal benefit.[93] We then could add the institutional societal costs of protecting *O*'s holdings as forward-looking marginal costs. But once *O*'s speech acts and the institutions of enforcement are in place, they are sunk costs, anthropologically explanatory but useless in making policy going forward. As Professor D.R. Harris put it:

> [T]he law is concerned only with the acquisition and loss of possession, and not its retention. There is no need to ask what is necessary to 'retain' possession, since once the plaintiff is held to have acquired possession, he continues to be entitled in law to the benefit of the [a given] possessory rule, until he 'loses' possession, *e.g.*, when he abandons the chattel or a stranger acquired possession of it.[94]

To put this another way, once *O* has established a right of possession, *O* might incur costs in protecting the right. Professor Smith speaks of putting up fences to prevent the pilfering of one's crops.[95] But, these are *enforcement* costs, not information costs. The pilferer usually knows he is a pilferer, even though he may not know the identity of the pilferee. Building the fence might be prudent, but property law does not insist that ownership is contingent on the maintenance of fences.

A second possibility is that Professor Smith disagrees with the jurisdictional restriction to constative, not performative, speech. In that case, jurisdiction extends to the alienation of Blackacre. Sellers need to advertise Blackacre for sale, and buyers need to search for a suitable property to buy. Therefore, delineation costs include speaking about what's for sale, which would be a marginal cost of *alienation* going forward, not of possession. Processing costs include verifying that *O* is speaking truthfully

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93. PAUL A. SAMUELSON, FOUNDATIONS OF ECONOMIC ANALYSIS 36 (enlarged ed. 1983) ("In the long run, plant cannot be taken as fixed."). That Professor Smith has in mind original acquisition in a time of universal commons is supported by this passage:

> [P]ositive transaction costs help explain why we have property at all instead of an elaborate system of contracting over much more specific use rights to resources and activities. It is because of positive transaction costs that we think in terms of things and especially in terms of *in rem* rights to exclude others from them—i.e., those rights known as property.

Smith, *Self Help*, *supra* note 4, at 79.

94. D.R. Harris, *The Concept of Possession in English Law*, *in* OXFORD ESSAYS IN JURISPRUDENCE 73 (Anthony Gordon Guest ed., 1st Ser., 1961). This statement may be too strong. For instance, suppose *O* owns Blackacre and is ousted by a trespasser, *X*. If, prior to the lapse of the statute of limitations for ejectment, *O* incurs the expense of re-establishing possession, *X*'s "continuity" has been interrupted, and *X* must begin her adverse possession all over again.

95. Henry E. Smith, *Governing Water: The Semicommons of Fluid Property Rights*, 50 ARIZ. L. REV. 445, 460 (2008) ("[C]osts include, for example, the cost of marking a boundary and building a fence.").

about the state of title and, perhaps, investigating the substantive use to which the thing can be put. True, the recording acts that help establish title are performative, not constative. But was not the Austinian lesson that *all* speech is at least partly performative and none of it *purely* constative?[96]

If so, exclusion and use have zero marginal information costs going forward. Only alienation has costs going forward. In light of potential alienation, it makes sense to speak of marginal information costs.

But the information costs pertaining to alienation are very minimal. According to real property law, *O* must write a deed. And *A* must, arguably, read the deed. These costs are super-low. *O* can write on a napkin, "Blackacre now belongs to *A*," sign the deed, and hand the deed to *A*. *A* must understand what the deed means, since transferees have the power to refuse delivery of the deed. If *O* hands over the napkin and *A* accepts it, *O* has ceased to own Blackacre and *A* is the new owner. These costs of writing and delivering the deed are low because the skills of writing and reading English are sunk costs. Only where *A* looks to pay value and doesn't trust *O*'s account of title do the costs accelerate. These are indeed interesting economic issues worthy of discussing, but they don't speak to the minimal information needed to make alienation work.

Accordingly, if information theory is entitled to jurisdiction over alienation, the information demands of property law are decidedly low and cannot explain why property emerged from a state of nature.

B. Possession as Rough Proxy for Claims to Uses

According to the information theory of property, possession saves on delineation costs. In TC_0, *O* can recite the usufructs and does not mind doing so. But where *O* possesses Blackacre, *O* is delegated all the uses at small delineation cost. "In exclusion, decisions about resource use are delegated to an owner who, as gatekeeper, is responsible for deciding on and monitoring specific activities with respect to the resource. To set up such rights, rough proxies like boundaries . . . are used."[97] "Possession . . . tends to use very simple signals that are aimed at a large and indefinite (*in rem*) audience of those who have to 'keep off.'"[98] "[B]oundaries . . . are a more economical way to delineate entitlements than specifying all the activities holding between all pairs of people in society and assignment entitlements

96. *See supra* note 12.

97. Henry E. Smith, *Exclusion versus Governance: Two Strategies for Delineating Property Rights*, 31 J. LEGAL STUD. S453, S454–55 (2002); *see also* Henry E. Smith, *Intellectual Property as Property*, 116 YALE L.J. 1742, 1781 (2007).

98. Henry E. Smith, *Exclusion and Property Rules in the Law of Nuisance*, 90 VA. L. REV. 965, 990 (2004); *see also* Smith, *Language*, *supra* note 50, at 1116.

on that highly atomized basis."[99] The law of trespass "creates a simple message for potential trespassers."[100]

Note here Professor Smith's unacknowledged paradox. He argues that in contract we can communicate a lot of information but to only a few persons. In property we communicate a little information but to a very large group of persons—the world. In contract, two or more parties communicate with respect to specific rights in things. In property, at least in fee, *O* communicates to the world that *O* has all the rights. "All" is a lot of information.

It is odd that boundaries are conceived as signals concerning entitlements to uses. In signaling theory, *O* invests in an expensive signal to denote an underlying product. The fact that the signal is known to be expensive lends credibility to the signal. *O* advertises but does not change the product. Signaling is constative. Thus, in a famous signaling game,[101] a student goes to college to signal industriousness. Employers are impressed with the student, since college is a disutility. If the student can endure college, she must be an efficient and diligent worker. Employers hire the college graduate over the nongraduate. The one thing that does not happen in this model is that the student's quality as a worker in any sense changes. The student is precisely the same person before and after college.

In describing the parameters of signaling models, Professor Robert Gibbons writes:

> 1. Nature draws a type t_i for the Sender from a set of feasible types $T = \{t_1, \ldots, t_n\}$ according to a probability distribution $p(t_i)$, where $p(t_i) > 0$ for every i and $p(t_i) + \ldots + p(t_i) = 1$.
>
> 2. The Sender observes t_i and then chooses a message $M = \{m_1, \ldots, m_n\}$.[102]

That is, (1) nature endows the sender with property *t*. (2) The sender observes this and sends an expensive message. A signaling theory is strictly constative.

To say that boundaries are the signal is to conflate steps (1) and (2). Boundaries are not signals of underlying quality—they are what are being signaled. Boundaries are the underlying quality as such. Boundaries do not *signal* a preconceived, independent quality. Boundaries empower. If *O*

99. Smith, *Self Help*, *supra* note 4, at 73.
100. Smith, *System*, *supra* note 13, at 2065.
101. ERIC RASMUSEN, GAMES AND INFORMATION 49–57 (2d ed. 1994).
102. ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMICS 185 (1992).

owns Blackacre, *O* knows or at least hopes that when burglars besiege his home the police will come to the rescue. Or, if the police will not come, *O* may use reasonable force to defend her property. Ownership is what makes *O* (legally) powerful against the others.

To say that boundaries are a signal contradicts the notion that unintentional trespasses are, in the main, contrary to law.[103] If boundaries are a signal, then one would expect ignorance of the boundary to be a defense. One would expect that if *O* does not use reasonable care in advertising the border, *A* has a defense against trespass. This is not the law of trespass. *A* is usually liable even though *A* was ignorant of the border.

In the information theory, signals are expensive to send. But any cost incurred in establishing the borders of Blackacre is a sunk cost. The borders were perhaps set generations ago. A simple quitclaim deed by *O* (a fee simple owner) to *A* serves to convey Blackacre to *A* without any references to its borders. As grantee of a deed, *A* owns Blackacre even though *A* does nothing to advertise the borders. *A* is the owner, even if *A* has no knowledge where the borders are.

Let us put *O* back into possession and imagine that *X* is a trespasser. In a trespass suit, *O* does have to prove where the borders are. This is determined by the rules of pleading and of burden of proof. Borders are not entirely divorced from information. Borders must be proved in litigation. But this is required by the laws of civil procedure. Property law as such does not require *O* to broadcast a pre-existing possessory right.

When he discusses signaling and boundaries, Professor Smith seems to forget the implication of Professor Penner's parking lot example that Professor Smith repeatedly cites with approval. Penner's point is that property as exclusion requires *no* communication by the owner/claimant! Even though the message is "keep off!", in our society this never has to be expressed.

In the modern United States, there is no unclaimed real property. Everything belongs to a legal actor (perhaps the state). Consequently, when we walk down a street we, like Penner's car owner, know that we cannot legally enter into the abutting land without trespassing, with some exceptions such as necessity. We do not have to know the identity of the owner, or where the boundaries of one owner's claim begin or end. Communication is only needed when one party wants to change the status

103. There are exceptions, such as the doctrine of necessity.

quo—to engage in performative speech. Professor Smith expressly acknowledges this point. He states:

> It is easily overlooked that potential violators' information costs bear on the design of the law. Property presents a simple message to the outside world. As J.E. Penner notes, the dutyholder only needs to know that he does not own the asset in order to know that he must keep out.[104]

Later, he states:

> At the other extreme, *O* might decide just to keep everyone off and use Blackacre by himself. This requires everyone else simply to keep off what they do not own—a principle that applies not only all nonowners of Blackacre but also to all nonowners of most owned assets.[105]

That is, fee simple does not just have lower marginal costs, it has *zero* marginal informational costs, even in TC_+. Non-owners already know they should keep out.

IV. MODELS OF INFORMATION COSTS

A. Delineation Costs and Audience Size

In *Language of Property*, Professor Smith models the information cost theory of property.[106] In a nutshell, Professor Smith tries to show a tradeoff between property and contract. We believe the model adds nothing other than useless complexity to the simple intuitions that motivate it, which are themselves often challengeable. The model contains numerous contradictions, any one of which invalidates the model.

1. Production Frontiers

In constructing his model, Professor Smith utilizes a production frontier given budgetary restraints[107] in the nature of the Cobb-Douglas Production

104. Smith, *Language*, *supra* note 50, at 1147 (footnote omitted).
105. *Id.* at 1151.
106. The model is reissued in Smith, *Standardization*, *supra* note 3, at 162–64, with no changes.
107. *Id.* at 161 ("The isocosts reflect a budget to be allocated between average information rate (intensiveness) and compatibility with context (here extensiveness of the audience.").

Function.[108] The Cobb-Douglas model addresses how a producer optimally allocates its chosen budget between two (or more) different inputs to produce an output.

In this model, a ratio of inputs is observed, for instance, a ratio of materials x and labor y. The production function is a hyperbola ($x,y > 0$) defined by $f(x,y) = kx^a y^{1-a}$. By selecting quantities of x and y, according to the budget constraint, one can produce calculable amounts of product. The idea is to maximize production given the budget. In Figure Three, this constitutes securing a spot as far to the northeast as possible on a "linear expansion path" from origin.[109]

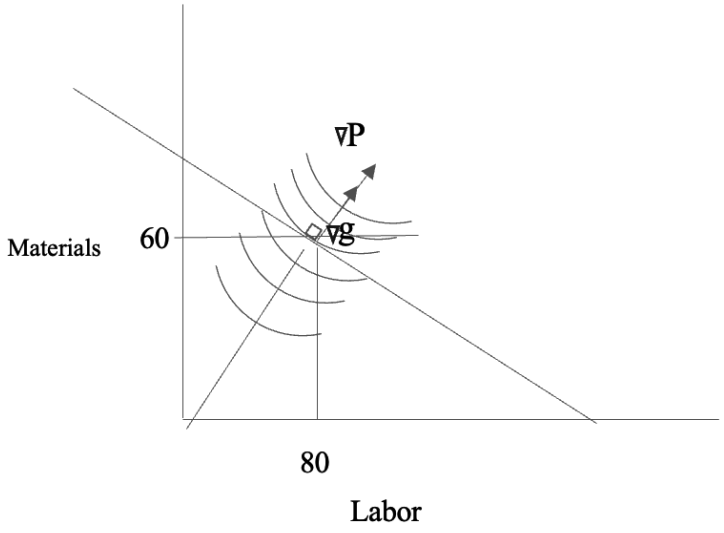

Figure Three
Cobb-Douglas Production Frontier

An example is given in the margin which assumes the project is building watches from material and labor inputs. In the example, $P(80,60)$ is the unique point where the budget line and the parabolic isoquant ("same quantity" of watches produced) are tangent.[110]

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108. *See* JON ROGAWSKI & COLIN ADAMS, CALCULUS: EARLY TRANSCENDENTALS 811–12 (2015).

109. *See* ALPHA C. CHIANG, FUNDAMENTAL METHODS OF MATHEMATICAL ECONOMICS 421–23 (3d ed. 1984).

110. Suppose watches $P(x,y)$ cost $50x^{0.4}y^{0.6}$ to make. The total cost of x units of labor and y units of materials is $100x + 200y$. We're to maximize $P(x,y)$ subject to the following budget constraint: $100x + 200y = 20{,}000$. This may be expressed as:

$$g(x,y) = 100x + 200y - 20{,}000 = 0$$

We make gradient vectors (∇P and ∇g) out of the partial derivatives:

$$Px(x,y) = 20x^{-0.6}y^{0.6}, \quad Py(x,y) = 30x^{0.6}y^{-0.4}, \quad gx(x,y) = 100, \quad gy(x,y) = 200.$$

$$\nabla P = \langle 20x^{-0.6}y^{0.6}, 30x^{0.6}y^{-0.4} \rangle, \nabla g = \langle 100,200 \rangle$$

Vectors have length and direction. When ∇P and ∇g are orthogonal to the budget line and also to a production isoquant, they are parallel but of different lengths. The lengths are related by a Lagrange multiplier λ.

$$\langle 20x^{-0.6}y^{0.6}, 30x^{0.6}y^{-0.4} \rangle = \lambda \langle 100,200 \rangle$$

Comparison of the two vectors identifies the unique point that is on the budget line and tangent to the isoquant. At that point, we maximize the production of watches, given the budget.

We find the intersection by comparing the partial derivatives of $P(x,y)$ and $g(x,y)$:

$$Px(x,y) = \lambda gx(x,y)\text{: } 20x^{-0.6}y^{0.6} = 100\lambda, \; Py(x,y) = \lambda gy(x,y)\text{: } 30x^{0.6}y^{-0.4} = 200\lambda$$

Solving for λ in terms of x,y,

$$\lambda = \frac{1}{5}\left(\frac{y}{x}\right)^{0.6}, \qquad \lambda = \frac{3}{20}\left(\frac{y}{x}\right)^{-0.4},$$

Equating these:

$$\frac{1}{5}\left(\frac{y}{x}\right)^{0.6} = \frac{3}{20}\left(\frac{y}{x}\right)^{-0.4} \quad (1)$$

To solve for x and y using the constraint, we multiply both sides of (1) by $5\left(\frac{y}{x}\right)^{0.4}$ to obtain $\frac{y}{x} = \frac{15}{20} \rightarrow y = \frac{3}{4}x$. That is,

$$\frac{1}{5}\left(\frac{y}{x}\right)^{0.6} \times 5\left(\frac{y}{x}\right)^{0.4} = 1 \times \left(\frac{y}{x}\right)^{0.6+0.4} = \frac{y}{x}$$

$$\frac{3}{20}\left(\frac{y}{x}\right)^{-0.4} \times 5\left(\frac{y}{x}\right)^{0.4} = \frac{3}{4} \times \frac{y^{-0.4+0.4}}{x} = \frac{3}{4}$$

We substitute $y = \frac{3}{4}x$ into the budget constraint

$$100x + 200y = 100x + 200 \times \frac{3}{4}x = 20{,}000 \rightarrow 250x = 20{,}000 \rightarrow x = \frac{20{,}000}{250} = 80$$

Thus, 80 is the value of x. Accordingly, $y = \frac{3}{4} \times 80 = 60$. (80,60) is the point on the budget line which is also a point on one of the isoquants. That is, $100 \times 80 + 200 \times 60 = 20{,}000$. Since $P(x,y)$ is increasing as x and/or y increases, the gradient ∇P points to the northeast. "[M]oving outward toward the northeast, each curve [isoquant] represents a higher level of benefit." Smith, *Language*, *supra* note 50, at 1153.

In Figure Three, each isoquant represents the production frontier, i.e., the number of watches that can be made by combining the two inputs. If we move to the left on an isoquant, we get the same number of watches, but we exceed the budget line. If we move right on the isoquant,[111] we again produce the same number of watches but, again, at greater expense.

Suppose we stick to the budget but unwisely choose a different point on the budget line—a different ratio of materials to labor. Materials and labor are not perfect substitutes; otherwise, the isoquant would coincide with the budget line, and any ratio of inputs would produce an equal result.[112] Because of inelasticity of substitution, the number of watches declines when we move off the unique optimal point consistent with the budget. Say that, after we choose a suboptimal ratio of inputs, we move up the linear extension path to the northwest. Then the earlier selected unwise point on the budget line intercepts a lesser isoquant and we have fewer watches. We have used too much material per watch. Similarly, if we move down the line to the southeast, we again encounter a lesser isoquant, meaning fewer watches. Too much labor has been purchased.

The maximum watch production given the budget is

$$P(80,60) = 50 \times 80^{0.4} \times 60^{0.6} = 3365.87 \text{ watches.}$$

The cost per watch is about $\frac{\$20{,}000}{3365} = \$5.94$. We must throw away .87 of a watch, since the budget is exhausted.

111. This implies increasing the labor component, which has the effect of decreasing the material component. CHIANG, *supra* note 109, at 361–62.

112. Smith, *Language*, *supra* note 50, at 1153 n.172 (the isoquants are concave "reflecting the fact that [the two inputs] are not perfect substitutes"). To state what should be obvious, at some point no matter how much labor one employs, one could not produce watches without materials and vice versa.

Professor Smith's *Language* model is shown in Figure Four.[113]

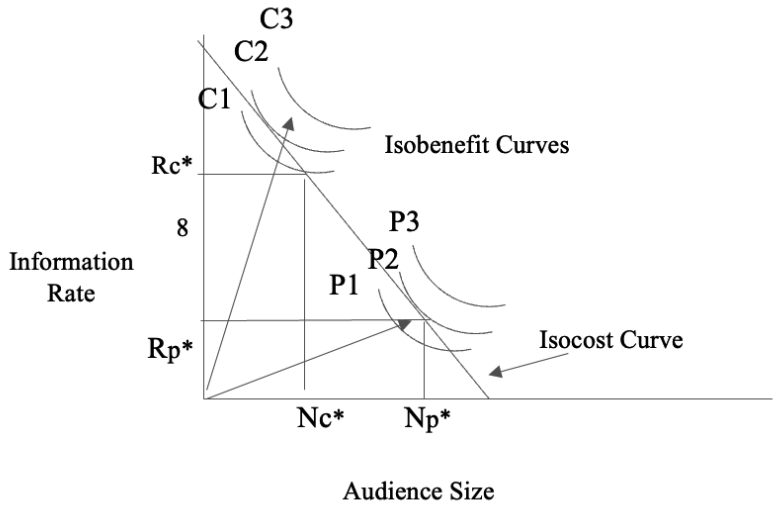

Figure 4
Smith Language Model

In the Cobb-Douglas model, the isoquant represents a return from a competitive market for watches, which compensates the producer for the cost of the two inputs. The *Language* model likewise imagines that there are two communication inputs. The Cobb-Douglas model posits a tradeoff between materials and labor. The language model posits a tradeoff between the intensiveness of speaking and the extensiveness of interpretation.

113. *Id.* at 1152.

"Intensiveness" is the ratio of information conveyed per unit of delineation cost.[114] "Extensiveness" means largeness of the audience.[115]

The inputs are information supplied by a speaker (delineation) and interpretation supplied by the audience (processing). "If we keep in mind that total communication costs involve both production and processing costs, then the nature of the audience becomes an important factor on the cost side. The cost of a message will depend on both its length and on the cost of deciphering it."[116]

These costs do not at first seem like they are borne by a single firm, as is true in Cobb-Douglas. Rather, Professor Smith imagines a collaboration—work by both the active speaker and the passive audience. A speaker incurs the cost of conveying information (speaking) and an audience incurs the cost of interpreting the information.[117] In a competitive market, however, the speaker—who imposes interpretive work on the audience—will internalize both the delineation and processing costs. Professor Smith discusses externalities only later, when the speaker forces the audience to bear some of its processing costs.[118] So far, externalities do not exist.

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114. "Intensiveness" is defined as "the amount of information . . . per unit of delineation cost." *Id.* at 1110. Intensiveness is therefore a ratio of amount of information conveyed divided by the amount of costly words needed to achieve communication.

115. *Id*. at 1113, 1117, 1121, 1126–27. We have already cited the set-theory definitions of intension and extension. Professor Smith's usages here are far from those of set theory. In one work, however, Professor Smith uses definitions much closer to those of set theory. Henry E. Smith, *Emergent Property*, *in* PHILOSOPHICAL FOUNDATIONS OF PROPERTY LAW (James Penner & Henry E. Smith eds., 2013). Professor Smith identifies intension as "law" and extension as a Hohfeldian legal present in which all the rights and powers of all people against all other people are fully fixed. Thus, many laws can produce the same extension. In TC_0, we can simply catalogue all of the desired extensions. "In [TC_0], we could afford to define property be defining each Hohfeldian relation individually." *Id*. at 321. In TC_+, we need an intensive function to select the proper extension. Candidates amongst the intensions that produce the same extension can be judged by their costs. *Id*. The choice between intensions reflects a trade-off between generality and accuracy. This essay can be criticized for treating intension and extension as blends. They are in fact qualitatively different. Extension can be viewed as a theory-free judicial intuition. Intension is the judicial opinion that tries to justify the intuition. Also, Professor Smith is confusing in labeling extensions "categories," a term he never defines. To our ear, "category" is an intensively designed set, whereas extensions pre-exist the set.

116. Smith, *Language*, *supra* note 50, at 1148.

117. Processing costs "include the costs incurred by a cognitive agent in receiving information from a message." *Id*. at 1108.

118. *See infra* text at notes 138–53.

2. The X-Axis

The size of the comprehending audience appears on the *x*-axis as a rough proxy for processing costs.[119] Professor Smith assumes that the larger the audience addressed by the speaker, the higher the aggregate processing costs imposed on the audience.[120] But because there are no externalities, the speaker bears the processing cost, which the speaker recovers from the market for the output. Covertly, the model adheres to Cobb-Douglas after all, wherein the producer internalizes all costs of production.

The *x*-axis is audience size.[121] It is arranged by what we will call "smarts"—by the degree that "audience members [are] most interested in the information [and] will be the best equipped to extract it (with specialized skills and experience, along with background knowledge)".[122] "[C]ommunication to socially closer audiences can rely more on background knowledge. In particular, messages can be compressed because it is not as costly for such audiences to 'fill in the blanks.'"[123] With "smart" persons, "great amounts of information can be processed . . . [with] greater reliance on context allow[ing] more information content to be achieved through less delineation (and delineation cost)."[124] The most "sophisticated" or closely related persons are on the x-axis just to the right of the origin.

"The wider the audience to which the message is broadcast, the less specialized background knowledge will be available to the average audience member to help make the message less ambiguous."[125] Persons whose relationship with the speaker is more attenuated are located on the x-axis further to the right. At the end of the line on the x-axis are persons who have less knowledge and struggle to understand or are less interested in the matter and whose attention is harder to attract.[126] The x-axis reflects Professor Smith's assertion that a high information rate *r* is associated with intensive communication: the "clever" audience catches on with very few words.

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119. Professor Smith explains, "[h]ere I model audience extensiveness based on *audience size*, but the model could easily be extended to create an index based not only on audience size but also on its heterogeneity, indefiniteness, and other *features implicating processing costs*." Smith, *Language*, *supra* note 50, at 1151–52 (emphasis added). The emphasized language justifies our interpretation that the *x*-axis represents processing costs of the audience.

120. As discussed in note 73, *supra*, Professor Smith calls the factors relevant to processing costs "extensiveness." These include, but are not limited to, the size of the audience.

121. Smith, *Language*, *supra* note 50, at 1151 ("[I]nformation rate (r) [is] on the *y*-axis and audience size (n) is on the *x*-axis.").

122. *Id.* at 1150.

123. Smith, *Standardization*, *supra* note 3, at 160.

124. Smith, *Language*, *supra* note 50, at 1150.

125. *Id.* at 1148.

126. Professor Smith cites Herbert Simon as pointing out, "information is not scarce but human attention is." Smith, *Standardization*, *supra* note 3, at 157.

Extensive communication is demanded by the larger, less clever audience. The audience members are heterogeneous in their skill in processing information.[127]

In contract, both parties—speaker and audience—desire to enter into a legal relationship and will invest in communication. Property, in contrast, involves no collaboration. Property imposes processing duties on uninterested third parties.

We observe that, with the very small contract audience, communication does not consist of the mere presentation of facts—it is not primarily constative. Certainly, some facts are conveyed. But far more significantly, at a key moment in a contract negotiation, one or the other will utter an "offer."[128] This is a performative act that changes the legal reality. Before the offer, the party of the second part has nothing. But when the offer is made, the offeree has the power to create the contract by accepting, thereby binding the offeror. The offeree may reject—also a performative act. The offeror, formerly liable in the Hohfeldian sense, can no longer be bound by (i.e. has immunity from) the rejector. The former offeree may tender a counter-offer[129]—still another performative act. The exchange of performative speech acts may carry on for some time. Eventually, an offeree may perform the speech act of accepting. The contract is formed and the legal present is changed. In the negotiation, the speaker (who is the acceptor-rejector) and the audience (who turns out to be the offeror) do not just claim rights, as in property, they *create* them. Communication in these contexts is performative. The audience, then, does not just interpret the words "I reject" or "I accept" (easy concepts to interpret). The audience both acts and is acted upon. It is therefore a defect in Professor Smith's model that the speaker is to be distinguished from the audience since both counterparties are alternately speaker and audience.[130]

No dynamic of negotiation occurs in property. *O* always already has the right of possession. Furthermore, *O*'s rights need not be advertised. Nor do we care whether the audience comprehends. The world must keep off, and this binds the uncomprehending multitude.

Two observations: First, contract is not strictly constative. Property is. Second, in a competitive market, the seller in the contract bears all

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127. Smith, *Language*, *supra* note 50, at 1111, 1155, 1158. This is at odds with the assumption that processing costs are equal among audience members, which justifies audience size as a proxy for total processing costs.

128. "An offer is the manifestation of willingness to enter into a bargain, so made as to justify another person in understanding that his assent to the bargain is invited and will conclude it." RESTATEMENT (SECOND) OF CONTRACTS § 24.

129. *Id*. at § 59 ("A reply to an offer which purports to accept it but is conditional on the offeror's assent to terms additional to or different from those offered is not an acceptance but is a counter-offer.").

130. An exception to this, of course, is form contracts of adhesion. *See supra* notes 72 and 112.

processing costs of the audience. But in property, there is no contract and no mechanism by which the speaker internalizes the processing costs of the audience. Property entails externalizing the cost of processing on a nonconsenting audience.

3. The Y-Axis

Figure Four shows information rate on the *y*-axis,[131] which is the ratio of information conveyed divided by the cost of delineating.[132] Delineation cost is the cost of communicating the right to use resources.[133] According to Professor Smith, "[t]he amount of information content can in principle be measured, for example, by the length of the shortest description in an agreed upon language."[134] "[T]he cost of a message will depend on both its length and on the cost of deciphering it."[135] So a unit of information is measured by words.

Words are "expensive," so length of message is the measure of cost. Information is the shortest message in the agreed-upon language. The shortest message constitutes the numerator in *r*. Delineation costs are the amount of words actually used to convey the perfect message. Thus, $0 \leq r \leq 1$.

Suppose the perfect, most concise way to communicate a thought can be accomplished in 10 words. These are the 10 words the speaker uses. Only one person is "smart" enough to get it. That person is *A*. She gets 10 units worth of information in ten words. Therefore, $r = 1$ gets an audience of one member. Suppose *B* requires 11 words to understand, producing $r = 0.90909$. When $r = .90909$, the audience doubles;[136] *r* declines while audience grows in size. The declining function connecting these points Professor Smith calls the "isocost" curve. That is, *A* and $A + B$ are connected by the isocost curve. The implication is that it costs the same to make *A*

131. Smith, *Language*, *supra* note 50, at 1127.

132. "The rate of information is the amount of information per unit of delineation cost." *Id*. at 1150.

133. Smith, *Self Help*, *supra* note 4, at 69.

134. Smith, *Language*, *supra* note 50, at 1150.

135. *Id*. at 1148.

136. "We expect high information rates to be associated with small audiences (information intensiveness) and we expect low information rates to . . . be associated with larger audiences." *Id.* at 1151.

understand and to make *A* and *B* both understand, which is clearly not the case, for reasons given in the margin.[137]

What Figure Four shows is that the speaker chooses the audience by selecting the choice variable *r*, which is associated with a delineation cost. In order to make *O* indifferent between property and contract, *O* must radically reduce information conveyed to the property audience.

This is consistent with Professor Smith's view that, given that property communicates to the world, property's message must be kept simple. But we point out that "keep out" stands for "I own *all* the uses." It strikes us that this is a *lot* of information—a stand-in for the infinite enumeration that would occur in TC_0. If this is right, property generates very high *r*, compared to contract, which invalidates the model. The model assures us that *r* in the property neighborhood is supposed to be low.

4. The Product

In Figure Four, two different results are portrayed: successful communication with a small audience (contract) and successful communication with a large audience (property). But what is the product? In Figure Three (the Cobb-Douglas model), the product was watches. In Figure Four (the Smith Model), there is no single product.

Professor Smith's basic position is that property involves inexpensive messaging compared to contract. Accordingly, the isocost line is not comparing the same product produced by different means. It is not comparing possession organized by contract and possession organized by

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137. It costs 10 words to reach *A*. It costs 11 words to reach $A + B$. The costs are not equal. Professor Smith errs in calling the declining linear function an isocost curve. The idea is to show that $r^c \times n^c = r^p \times n^p$. But in our super-simple model, if we let the audience of $A + B$ stand for "property," $r^c \times n^c = 1 \times 1 = 1$, but $r^p \times n^p = 0.90909 \times 2 = 1.8181$. Meanwhile, $r^c \times n^c$ costs the speaker 10 but $r^p \times n^p$ costs 11. Therefore, Professor Smith has not designed an isocost curve.

What does the isocost curve represent? If it is really an isocost curve, the denominator stays fixed. Therefore, the contract project and the property project are cost-neutral. The numerator (information as measured by the shortest message) shrinks are we move left on the curve, as well as the ratio r.

The speaker can double her audience by delivering the message in 11 words. The second smartest person now catches on. So, $r = 0.90909$. The first smartest understands this 11-word message too, though his patience is taxed by the addition of the superfluous word. Suppose one word adds one member to the comprehending audience. $A + C + \ldots + N = 100$ costs 10001 words to grasp the message. For *N*, $r \approx 0.0999$.

The speaker achieves a contract with $A + B$ (comparatively smart) for a rate of 0.90909 and a cost of 11. To keep the denominator fixed, the speaker must convey less information at a lesser rate per word. Since the price of indifference between contract and property is 11, the numerator must shrink from 10 to 0.1098. Thus, $0.1098 / 11 \approx .0099$. This implies *O* can form a contract with $A + B$ (smart) at the cost of 11 or *O* can seize control of Blackacre (costlessly) and advertise the conquest for the cost of 11. The conquest is blessed by the law but needs to be delineated to a crowd of 1,000. This justifies Professor Smith's remark, "[g]iven finite resources, one can communicate a lot to a few [the perfect message at 10 words] or a little to many [0.1098]." *Id*. at 1108.

property.[138] In Figure 4 we have two different products: the fine-grained legal rights of some abstract contract and the cruder rights of property. Contract can be any exchange.[139] Property is "keep off Blackacre."[140]

In the *Language* model, there are two separate production frontiers. To the northwest, there is a hyperbolic *C* function which implies a steeper slope to the expansion path (say $(k_c)x^a y^b$), ($k_c > 1$). To the southeast, a separate function *P* has lower sloped path (say $(k_p)x^a y^b$), ($k_p < 1$)).

The advantage of contract is that legal rights can be more precisely tailored to one's desires. A contract is relatively intensive. The disadvantage is that these rights can only be negotiated with a small number of counterparties—perhaps one or two. Contract is not very extensive.

The advantage of property is that it is enforceable against a large number or persons, i.e. "the world." The disadvantage is *O* must communicate to a great many people—billions of them. But not much need be said.

The point is, for the same "cost" you can either "buy" a complex, fine-grained legal relationship (i.e. contract) with lots of words, but it will only be binding against a few (perhaps one). Or you can "buy" a simple property relationship, with few words but spoken and understood by the "world."

In the model, the *speaker* chooses between contract and property. The audience has no say (which contradicts the consensual nature of contract formation). Comprehension is costly, but this cost is imposed on the audience without its consent. In the case of contract, the audience accepts the offer because the gains to the audience reimburse the costs previously incurred to grasp the offer. Processing costs are thus internalized without those processing costs appearing explicitly in Figure Four. But with property, there being no exchange, there can be no internalization. The

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138. In *Property of Language*, Professor Smith asserts that, in TC_0, *O*'s right to exclude others from Blackacre could be set up by a series of contracts (a claim we have challenged). But in TC_+ this is impossibly expensive.

> Consider for a moment the world of zero transaction costs (including processing costs), in which everyone could be tailored individually to each right-duty relationship holding between *O* and every other member of society. At the other extreme, *O* might decide just to keep everyone off. . . . These two approaches would cost the same (nothing) in a zero-transaction-cost world. But in a world of positive transaction costs, the tradeoff between intensiveness and extensiveness of information does matter.

Smith, *Language*, *supra* note 50, at 1151. This cannot be what Figure Four models. Holding the product constant between contract and property would result in low costs for contract communication and high cost for property communication—the opposite of what Professor Smith intuits.

139. "For some matters, the benefits of communicating about rights does not extend beyond a small group, and this is illustrated with isobenefit curve *C* (mnemonic for contract) and those parallel to it. Points along *C* represent the attainment of the same level of benefit in the contract-like situation and, moving outward toward the northeast, each curve represents a higher level of benefit." *Id.* at 1153.

140. "In other situations, there is a benefit to communicating with the world, as in the case of *in rem* rights, although not much information need be communicated. This is illustrated by the isobenefit curve P (mnemonic for property) and the curves parallel to it." *Id*.

public bears the processing costs of the property message as an externality.

But, as we have established, if *O* is already the lawful possessor, property law does not require *O* to advertise her right of possession. This is the point of the Penner parking lot. Accordingly, there are no speaking cost, no processing cost, and nothing to internalize. The model, however, is supposed to compare joint delineation-processing costs of speaker and audience together, such that the speaker (in charge of the product) is indifferent between making contracts and possessing Blackacre.

5. Externalities

In Figure Four, processing costs of the audience were internalized by the speaker. In Figure Five, Professor Smith expands the model to address speech externalities.

We know what externalities are in the market for commodities. If *O* owns a factory and fails to curtail pollution, *O*'s profit increases because *O* saves the cost of pollution control. The public suffers physical harm. *O* has externalized a cost of production.

But what are the externalized costs of communication? Earlier in *Language*, Professor Smith identifies as a potential externality the possibility of "bait and switch"—i.e. a speaker advertising one product but offering another.[141] Or, a speaker selling a product by the pound might privately define "pound" to mean something other than the conventional unit of weight.[142] These possibilities could increase the search costs for buyers as a class. But these are costs associated with *contracts* for sale (alienation), not claims to the possession of property. It is also hard to understand how bait-and-switch or the idiosyncratic use of the word "pound"—which are matters of fraud—are information costs in Professor Smith's information theory of property.

When it comes to property, Professor Smith theorizes that *O*, the owner of Blackacre, can increase the value of Blackacre by sending excessive "spam" emails. These excessive emails are conceived as exporting some of the costs of owning Blackacre to the public. Government intervention is required to prevent the spamming, thereby lowering the value of Blackacre to its socially optimal level.

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141. *Id.* at 1147.
142. *Id.* at 1148.

Professor Smith presents his model in Figure Five:[143]

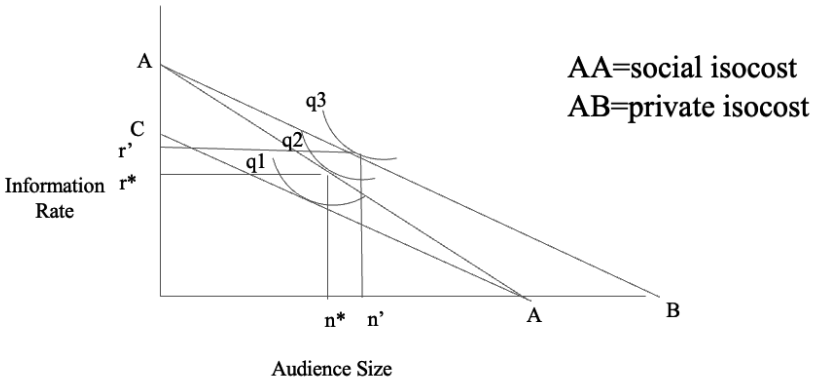

Figure Five
Divergent Communication Trade-Off

In Figure Four, the speaker was trying to choose between entering into a contract with a small audience or a property project with presupposed rights against a very large audience. Now, in Figure Five, the speaker is engaged only in a property project. The speaker is *O*, who possesses Blackacre.

The intent of Figure Four was to portray *O*'s choice of possession as founded on cheap messaging. *O* conveyed not much information ("keep off") in a few words (though we have suggested "keep off" conveys all the information there is). As externalities did not exist in Figure Four, somehow *O* compensated the audience for the cost of processing this message. Professor Smith never explains how this internalization worked.

Now it appears that *O* can increase the value of Blackacre by sending too many emails about the fact he owns all of Blackacre. Professor Smith writes that *O*

> could . . . be a junk faxer who does not have to pay for the paper, time, and machine wear and tear of the faxes whom he tries to reach, or a telemarketer who does not pay the opportunity cost of the called party's disputed activity. *Or it could be someone communicating a possessory claim to the world.*[144]

143. *Id.* at 1154.
144. *Id*. at 1153 (emphasis added).

Moreover:

> Spam e-mail is a prominent example where audience costs . . . are not internalized by the speaker.[145]

Thus, *O* can increase the value of Blackacre by sending excess emails. *O* has an incentive to overspeak the message "keep off."

It is a puzzle why Blackacre should increase in value because *O* sends spam demanding that everyone must keep off. One interpretation we initially entertained, but have rejected, is that *O* is not broadcasting "keep off." Rather, *O* is advertising that Blackacre is for sale. In a perfect market (presupposed in the Cobb-Douglas model), all potential buyers have perfect knowledge and *O* does not need to spam. Blackacre costlessly moves to the highest valuing user for a price. But in imperfect markets, the highest valuing user does not necessarily know that *O* wants to sell Blackacre. Therefore, *O* maximizes value by advertising that Blackacre is for sale (provided the cost of advertising is less than the anticipated gain from selling to the highest valuing user).

But this cannot be what the model means. This interpretation must be rejected because the property message has always been "keep off." *O* is "someone communicating a possessory claim to the world."[146] The message is not "want to buy?" This would constitute an offer to enter into a contract, and Figure Five shows *O* has already chosen the property project. The message is "keep off." But then why would repeating "keep off" more times than necessary increase the value of Blackacre? This is an unexplained assumption in the model.

In Figure Five, *O* faces a budget constraint of the line AA, which hits the isobenefit at q_2. The social utility of the usufruct is maximized when audience size is n^*. At this point, *O* is content with sending r^* to n^* people. What is r^*? It is the border message. The audience n^* has processing costs but these are "internalized." The model gives no clue as to how this internalization comes about. This was the dominant mystery in Figure Four, where the property project had no contract mechanism in a competitive market to assure internalization of costs.

Professor Smith addresses internalization in his article about boilerplate contract terms.[147]

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145. *Id.* at 1137.
146. *Id*. at 1153
147. Smith, *Boilerplate*, *supra* note 70.

> As we have argued [in *Language*], externalities emerge on the extensive margin [*n*'–*n** on Figure Five]. Those doing the communicating will worry most about those they deal with, but potential audiences that are more distant – especially those not in privity with the communicator – will incur processing costs not brought home to the communicator. This is the basic reason why property, directed as it is at the widest audience is most subject to informational externalities and is the most appropriate area for a mandatory rule like the *numerus clausus* that keeps the information rate down to manageable levels of remote audiences.[148]

For the moment, we leave to one side the mysterious reference to *numerus clausus*—the supposed rule that *O* may not carve out a new and strange estate for the benefit of a grantee.[149] We focus on the claim that property communication is more susceptible to externalities than contract communication, and the claim that a speaker worries more about those with whom the speaker is in privity.

According to Professor Smith, internalization is founded on *O*'s altruistic concern for those with whom *O* deals. Those who receive the unwanted spam are "distant" audiences not in privity with *O*. As in most economic models, *O* is a self-regarding fellow who will export costs whenever he can get away with it.[150] This is why legislation may be necessary to "bring home" these costs to *O*.

But the audience already knows to keep off. Culturally, *n** already believes that it is wrong to invade the property of others—the Penner parking lot example. Because of this internalized cultural norm, processing the message is a sunk cost, not a marginal cost. *n** need not process anew the property message.

But if *n** already knows to keep off, then it follows that *O* need not send any message at all. *O* enters the scene already possessed of Blackacre. Borders have already been delineated, and delineation too is a sunk cost. "Internalization" of the costs of *n** then means that there is no delineation cost and therefore no processing cost. *O*, already in possession of Blackacre,

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148. *Id*. at 1210.

149. *See infra* text accompanying notes 154–65.

150. Paul A. Samuelson, *Consumption Theory in Terms of Revealed Preferences*, *in* I COLLECTED SCIENTIFIC PAPERS 64 (1966). In defense of Professor Smith, however, "bringing home" externalities make more sense for contracts. If *O* deals frequently with the same customers, *O* has an incentive not to externalize against those parties. "Moreover, future dealings with the other party will make more contexts relevant to both parties." Smith, *Boilerplate*, *supra* note 70, at 1210.

need not say anything new to perpetuate possession of Blackacre.[151] But then, *O* need say nothing to *n*'–*n** — remote strangers to *O*. The marginal cost of delineation to sustain possession does not exist.

A different flaw in Figure Five is that extra speaking (presumably repeating "keep off" in many superfluous words) is shown to increase audience size. Optimal speech puts *O* at *n**, but extra speech puts *O* at *n*'. But the cheap border message was universally received. Property is "good against the world." How can extra speaking about borders increase audience size when "the world" already has the message? If the border message is universally received, *n** are all the people there are. The *n*'–*n** people do not exist. Yet, the model promises an increase in audience size if *O* sends spam.

In Figure Five, *O*'s budget is the AA line. But *O thinks* the budget is set by AB. "Thus, to this person, the isocost line appears to be AB rather than the actual line AA, which would reflect all the costs of the communication."[152] Professor Smith makes clear that *O chooses* AB.[153] AB is a *budget* line, and *O* controls the budget. In short, *O* steals funds from *n*'–*n** and increases the budget for advertising the possessory claim to Blackacre. But how do the emails add value to Blackacre?

We know, however, that extra emails are sent because the audience has increased from n* to *n*'. The audience is larger. *O chooses* the bigger audience: "The speaker's choice is skewed towards excessive extensiveness"[154] *O* sends expensive spam, which has the effect of making Blackacre more valuable.[155] If *O* is a wheat farmer, perhaps spam advertising wheat could increase the demand for, and thus the price of, wheat making Blackacre more profitable. But this communication does not relate to establishing *O*'s claim to own Blackacre.

In the model, *O* profits from more words to reach a larger audience. Where the audience is the world, *O* is obliged to speak a great many words. Property law intervenes to force *O* to cut it short—use just enough words to reach the audience of *n** < *n*'. But this means that *n*'–*n** people don't get the

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151. Technically if delineation cost is zero, r is undefined. r is a ratio of information divided by cost. If cost is zero, we cannot calculate *r*. Or, if cost approaches 0, r is an infinite number asymptotically approaching *r* = 1 on the *y*-axis. Either way, *O* is not at low *r** in Figure Five.

152. Smith, *Language*, *supra* note 50, at 1153; *see also* Smith, *Standardization*, *supra* note 3, at 164 ("The externality in each case stems from the fact that to a communicator the costs of reaching extensive audiences . . . will appear to be less than they are.").

153. Smith, *Standardization*, *supra* note 3, at 172 n.82.

154. Smith, *Language*, *supra* note 50, at 1154.

155. In a slightly different model, Professor Smith claims that the benefit curves shift outward "because of an increase in the value of a resource or the more intense use conflict . . . ." Smith, *supra* note 95, at 460. We do not see how "intense conflict" can raise the price of Blackacre, but the increase in resource value would seem to describe an increase in demand for wheat.

message. Does this mean *n*'–*n** are invited to trespass on Blackacre and trample the wheat? None of this is answered by the model.

To summarize, Professor Smith's model assumes words are expensive. The greater the audience, the more words are needed, because the world is extensive. In the case of possessory estates, *O* exports costs of production by speaking too many words. The law intervenes to silence *O* so the world can have some peace and quiet. This is what we make of the model.

6. Numerus Clausus

Professor Smith first reached prominence when he, together with Professor Merrill, published a seminal article elaborating the rule of *numerus clausus*. In a separate paper, we challenge the existence of such a rule.[156] But Merrill-Smith assert the rule exists and that it is the chief difference between property and contract law. In contract, the law admits potentially infinite forms (or perhaps finite forms but more forms than property allows).[157] Property permits only a finite menu of forms (shorter than the menu that contract permits).

According to Professor Smith's methodology, where a property rule exists, transaction costs must exist to explain why achieving the same result by contract is too expensive. Professor Smith adapts the *Language* model to answer the non-question of why *numerus clausus* exists.

Merrill-Smith refer to fancies—illegal property forms.[158] The example they use is time shares in watches, which courts supposedly will not enforce[159]—this in spite of the embarrassment that, empirically, we have found one seller of time shares in watches.[160] We have found no examples of a court refusing to enforce time shares in watches.

Time shares in watches are supposedly complex and make it difficult to have a market in watches. In a world where time shares in watches are prohibited, the delineation and comprehension costs of specific buyers and sellers of watches can be internalized. Merrill-Smith claim that fancies

156. Jeanne L. Schroeder & David Gray Carlson, *The Strange Career of Numerus Clausus* (forthcoming).

157. Smith, *Standardization*, *supra* note 3, at 148 ("One of the most striking features of property law is that it is far more standardized than contract law.").

158. "The concern with fancies forms the germ of the information-cost explanation of the *numerus clausus*." Smith, *Standardization*, *supra* note 3, at 152.

159. Thomas W. Merrill & Henry E. Smith, *Optimal Standardization: The Numerus Clausus Principle*, 110 YALE L.J. 1, 26–28 (2001).

160. *See* Robert Frank, *Watches Go Timeshare*, CNBC (Apr. 28, 2014), https://www.cnbc.com/2014/04/28/rent-a-rolex-luxe-watches-go-timeshare.html ("A start-up company called Eleven James has launched a timepiece timeshare that allows customers to get a new luxury watch every couple of months for an annual fee.")

create externalities for the entire world. It increases the processing costs for watches. Supposedly, the bare possibility of an exotic form of property is an externality—a deadweight loss of processing costs. *O* and *A* may be pleased by the time share, but society as a whole is poorer because it brings down the value of watches to all watch owners.[161] Therefore, the law (supposedly) prohibits watch time shares.

We believe that this is incorrect both from a legal and empirical standpoint. There is no prohibition of time shares in watches, and we do not believe that their mere existence would significantly lower the value of watches generally. Merrill-Smith nevertheless offer a rationale for the alleged prohibition.

Merrill-Smith suggest a fact pattern whereby *A* and *B* agree that *A* would own the watch six days a week and *B* would own it on Wednesdays. This would lower the value of all watches because when *X* purchases a watch, he would not know whether he was buying seven, six or a fewer number of days. *X* would, therefore, have to engage in additional search costs which will lower the price he is willing to pay for the watch. This impoverishes all the watch owners:

> The one out of one hundred [watch owners] who adopts a nonstandard form for property rights can increase the costs of processing the rights of ninety-nine others. . . . [N]inety-nine are worse off because of the possibility of the one-hundredth idiosyncratic right than they would be if that right could not be created at all.[162]

Note, once again, Merrill-Smith have segued from property to contract. The supposed ban on time shares in no way increases the costs of the claiming property interests in watches.

Whenever a person seeks to purchase something, she is subject to *title* risk. The watch may be stolen, or the possessor might be a lessee, to give just two examples. Since the buyer will already need to do research because title may fail totally or partially, what significant marginal costs is added by the possibility that the seller owns a short-term right that is a time share, as opposed to a standard leasehold?

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161. Merrill & Smith, *Coasean Property*, *supra* note 29, at S91 (2011) ("The added informational burden would affect not only future transactors in the property transferred from A to B but from all potential transactors who would have to be on the lookout for deviant forms of property or security interests in unrelated transactions.").

162. Merrill & Smith, *supra* note 159, at 47.

Back to the reason for the existence of *numerus clausus*, the model in Figure Six describes the choice between contract and property.

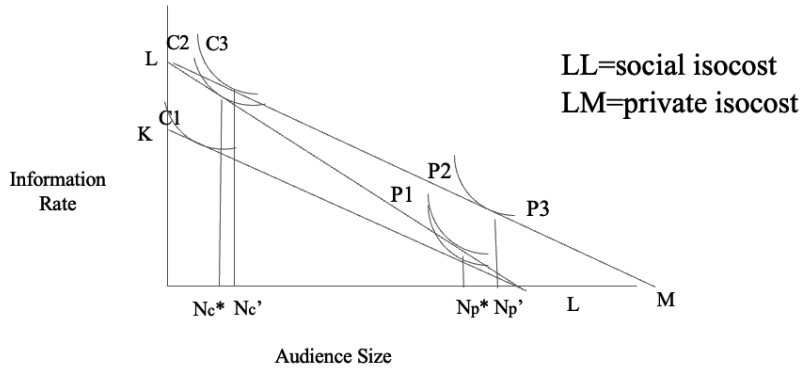

Figure Six
Communication Trade-Off (*Numerus Clausus*)

Information rate again appears on the *y*-axis. Audience size is again on the *x*-axis. Figure Six is similar to Figure Four, where *O* is faced with the contract strategy and the property strategy.

At *Nc**, *O* speaks the optimal amount and receives the C_2 benefit. When *O* is at C_2, the cost of listening is fully internalized. At *Nc** people are fully compensated for having listened.

Contract, it seems, has a *numerus clausus* rule too, which assures no externalities.[163] But where *numerus clausus* is not the rule, *O* increases the value of the contract project by speaking more, causing the isocost curve to shift up from LL to LM. This implies a bigger budget, which costs extra. One would expect that *O* would avoid this cost, but *O* is compensated for this cost by mysterious means. The point of Figure Six is to show that, with contract, the processing cost externality is borne by a smaller audience, compared to property.

In Figure Four, abstract contract was compared to abstract property. Contract resulted in internalized information costs. Externalities were produced only by property in Figure Five. In Figure Six, contract externalities are introduced for the first time.

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163. Incidentally, *numerus clausus* was introduced to *distinguish* contract and property. Now it appears that both property and contract have *numerus clausus* rules. Schroeder & Carlson, *supra* note 156.

It is very unclear what constitutes a contract externality. Since the information rate r is on the *y*-axis, the speaker makes the contract more valuable by speaking unnecessarily to comparatively few non-contracting parties. The content of this surplus speech is most unclear. But the targeted surplus audience is smaller for contract than the surplus audience for property. That there *is* a surplus property audience is a problem since the property message ("keep out") is universally received. The surplus audience for property would seem not to exist.

The point of the model is to show that *numerus clausus* is more significant for property than for contract:

> Because property is directed at the widest audience, it is most subject to informational externalities and is the most appropriate area for a mandatory rule like the *numerus clausus* that keeps the information rate down to manageable levels for remote audiences.[164]

Professor Smith continues:

> As the optimal degree of extensiveness increases (as it does in the property as opposed to the contract situation), the gap between the full and apparent budget line becomes larger; a larger and more indefinite audience . . . gives rise to additional costs that are not brought home to the communicator.[165]

That is, *numerus clausus* for contract results in modest social gain. But a greater gain is achieved by the property version of *numerus clausus*.

The model is defective for at least three reasons. First, the budget line KL is the line from the perspective of the public,[166] which has been robbed of value because the contract-speaker has engaged in surplus speech. The gain to the contract speaker is slight but the loss to the surplus audience ($Nc^* - Nc'$) is large. Compare this to the property project, where *O* can hypothetically time-share his watch. Whereas *O* is high up on P3, the public is low on P1. Eyeballing the graphs, it appears that the gain for *O* greatly exceeds the loss on third parties. Therefore, society *gains* when *O* has the capacity to time-share. At least this is so on visual inspection of Figure Six.

Second, the *numerus clausus* article emphasizes that third parties bear processing costs because of the abstract possibility that a "fancy" is possible. "Third parties incur heavier measurement costs in processing

164. Smith, *Standardization*, *supra* note 3, at 163.

165. *Id*. at 164.

166. Which is nonsense. How can the public have a budget line, when the public is being victimized against its will?

'notice' when the universe of property rights includes idiosyncratic servitudes . . . than when these are prohibited."[167] "The one out of one hundred [watch owners] who adopts a nonstandard form for property rights can increase the costs of processing the rights of ninety-nine others . . . . [N]inety-nine are worse off because of the possibility of the one-hundredth idiosyncratic right than they would be if that right could not be created at all."[168] Thus, if *O* says nothing and never enters into the time share, third parties still bear processing costs. The cost comes from the mere possibility of a fancy. Yet the model shows *O speaking extra words* to *extra audience members*. This makes no sense. The evils that *numerus clausus* is designed to abolish do not require *O* to speak at all. *Numerus clausus* concerns title risk, not speaking.

Third, on the property side, *O* is not responsible for the public loss. The public loses because of the bare possibility of time shares. This possibility cost exists even though *O* never executes a time share. If *O* executes a time share, the possibility cost neither increases nor decreases but remains as it was. Since the possibility of time share exists whether or not *O* executes a time share, it is impossible to say that the possibility cost is an externality of the time share.

We conclude that Figure Six fails to justify *numerus clausus*—a rule that doesn't exist in the first place.

CONCLUSION

The information cost theory of property has been greatly celebrated, but, as we have documented, many of its details are flawed and contradictory. Nevertheless, to end on a positive note, the theory succeeds to the extent it is founded on some solid intuitions. These include:

1. Simplicity is better than complexity, all else being equal (Occam's razor).[169]
2. Speaking and comprehending are disutilities to be minimized or, if possible, eliminated.
3. The *in rem* right in a thing requires others to discern what the thing is. Therefore, the concept of property is not entirely divorced from

167. Merrill & Smith, *Numerus Clausus*, *supra* note 159, at 45.

168. *Id.* at 47.

169. Taisu Zhang, *Beyond Information Costs: Preference Formation and the Architecture of Property Law,* 12 J. LEGAL ANALYSIS 141, 14–15 ("Contradictory or confusing laws increase information costs, while coherent and simple laws presumably lower them. This is a core premise of mainstream information cost theory . . . .").

information.

4. The right to exclude others implies that the owner reserves to herself all the uses.

5. Property duties apply in the absence of consent.

6. It costs more to gather a large audience than a small audience.

Beyond these intuitions, the information theory of property has nothing to contribute. It asserts that there is a marginal cost to delineating the right of possession going forward. Once the borders have been set, however, by Lockean original possession or by receipt of a deed by a grantee from a grantor, the cost of maintaining the borders is a sunk cost. Property law does not demand that an owner do anything informationally to sustain the right of possession. As a result, an information theory of property has little work to do.