
MISMATCHED PROPERTY RIGHTS

Property Rights: Long and Skinny

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This paper explores the relationship between private and common property. It starts with the state of nature, works its way through Roman law, and finishes with a discussion of the application of these principles in a modern context. It explains how the intensification of property use often leads to the need for a public trust doctrine for common pool assets, and explains why long and skinny assets have single dedicated uses, chiefly for communication and transportation which enable them to link together productive property sites used for residence, manufacture, and farming. These long and skinny assets have a large perimeter relative to area, which makes them difficult to defend on the one side, and often exposes them to multiple legal regimes with inconsistent commands. It deals with such specific issues as the distinction between alluvion and avulsion, and offers a detailed analysis of the difficulty of permitting oil and gas pipelines in the United States.¹

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The purpose of this paper is to expand an inquiry that has occupied me for many years, which is to explain the intellectual, physical and economic unity behind the various branches of law across all legal systems.² In this essay I shall extend that approach to deal with the longstanding differences between common and private property, all in the effort to isolate some of the key features of common property that are easy to lose sight of in the close analysis of particular cases. In order to do this, I shall proceed as follows. First, I shall talk about the relationship between the commons and private property in the state of nature. This analysis follows the natural law tradition, which explains commonalities found in all successful legal systems. Second, I shall draw a distinction between types of property based on their shape—long and skinny, versus short and squat—and discuss the challenges associated with their governance that stem directly from that geometry. Finally, I shall apply my theoretical framework in a detailed analysis of present-day permitting for pipelines, long and skinny assets, that are uniquely vulnerable to duplicative and inconsistent regulations and procedures.

State of Nature: Private property and the Commons

The state of nature refers to those cases in which there is no central authority that can organize and shape individual rights. The rights formations in these cases are of necessity relatively simple in form, so that typically the rules on priority of ownership have either a strict priority, as with the acquisition of land, or no priority, as with the ability to gain access to the common or, under the English riparian system, to draw water from it (Epstein, 2015).

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² For the most recent piece, see Richard A. Epstein, *The Necessity of Convergence in Private Law*, 92 So. CAL. L. REV. 751 (2019).

The natural law tradition was dominant up to the early twentieth century, and it is not possible to understand the earlier literature while ignoring this conception.³ But while the system of natural rights supplies the baseline against which these systems of private property are developed, they are subject to constant modification as the demands for their utilization increase. At some point, often sooner than later, it becomes necessary to devise public rules that regulate the commons, which in the course of things necessarily requires that some centralized authority—the newly arrived state—takes control of the particular asset in question. That point has already been developed in the economic literature by Professor Brett Frischmann (2005) who, using the tools of modern economics comes up with the right conclusion for “why, for some classes of important resources, there are strong economic arguments for managing and sustaining the resources in an openly accessible manner” (918–19). That inquiry in turn requires that one look to “demand-side considerations” (Frischmann, 2005, p. 919), which for these purposes covers any increase in the intensity of use of any such resource. In this paper, I accept that conclusion, but seek to examine the legal framework by which that evolution takes place, from the very simple model of an open access regime without public investment to a more mature system that deals with just this type of consideration. This transition involves complex legal maneuvers to ensure that any public authority will necessarily be endowed with the monopoly of force,⁴ which, since the seminal work of Max Weber (1919), has been regarded as the hallmark of the state. Accordingly, the state will typically be subject to correlative duties to help ensure that it does not misfire in its management of these resources, which is why the term “public trust” is often used to impose a set of duties on the government that parallel the duties imposed on private trustees, most notably duties of care and loyalty in the handling of these assets.

At this point, it is helpful to distinguish the subject of this paper from the important work that Henry Smith (2000) has done on the “semicommon,”⁵ which bears a superficial resemblance to the types of arrangements that are discussed below. Smith’s paper addresses the medieval open-field system that had the following notable characteristic. In the summer, when crops were grown, the land in question was divided into private plots of land, each with a distinct owner. In that setting, the maxim *you should only reap where you sow* has maximum power and limits each landowner to agricultural activities on his own parcel. But this configuration that stresses private partitions is highly inefficient when grazing animals, especially sheep, come down from the hills in winter. Sheep do not prosper in these confined spaces, so the same amount of land has a far higher carrying capacity if the internal partitions are removed and all animals are allowed to occupy the whole commons. At this point, the central challenge is to determine how many animals each landowner is allowed to incorporate into the commons, which depends on their fractional interest in the land.

This alteration between private and common rights is not, however, the situation faced here because we are dealing with a closed commons, where some combination of explicit agreements and customary practices can solve the allocation problem. In this case, the change in the structure of property rights does not lead to an implicit wealth transfer between parties. Nonetheless, Smith’s notable contribution is also orthogonal to the problems addressed here, because the commons at issue are those created in a state of nature where the entry rights belong to all individuals, wholly without any requirement of citizenship, as there are no citizens in a state of nature. It is not possible under these circumstances to have contractual solutions, either express or customary. It is therefore necessary to figure out how property rights in such resources evolved in early times, and then to develop arguments for how best to govern modern infrastructure.

Natural law: Commonalities Found in All Legal Systems

In developing a comprehensive approach to understanding the evolution of property law, I take an approach to comparative law that stresses the common elements across legal systems. In contrast, the

³ For one discussion, see EDWARD S. CORWIN, THE “HIGHER LAW” BACKGROUND OF AMERICAN CONSTITUTIONAL LAW (1955). For one early application of the natural law tradition as requiring compensation in the government alteration of water rights, see *Gardiner v. The Trustees of the Village of Newburgh*, 2 Johns. Chancery 162, 166 (N.Y. Ch. 1816). (“*Grotius*, (*De Jur. B. & P. b. 8. ch. 14. s. 7.*) *Puffendorf*, (*De Jur. Nat. et Gent. b. 8. ch. 5. s. 7.*) and *Bynkershoek*, (*Quæst. Jur. Pub. b. 2. ch. 15.*) when speaking of the eminent domain of the sovereign, admit that private property may be taken for public uses when public necessity or utility require it; but they all lay it down as a clear principle of natural equity, that the individual, whose property is thus sacrificed, must be indemnified.”). That principle was then correctly applied to a diversion of water from a river that made “no provision for indemnifying the owners of lands through which the stream flowed, and, from such spring, had run, from time immemorial, for the injury they must suffer by diverting the course of the stream from their farms;...” *Id.* Note that the obligation to provide compensation was read into the New York Constitution in the context of a water law case. For further discussion on diversion, see *infra* at 12.

⁴ Weber defines the state as “a human community that (successfully) claims the monopoly of the legitimate use of physical force [das Monopol legitimen physischen Zwanges] within a given territory” (92).

⁵ Early notable contributions in this tradition are found in Martin J. Bailey, *Approximate Optimality of Aboriginal Property Rights*, 35 J. LAW & ECON. 183 (1992); Robert C. Ellickson, *Property in Land*, 102 YALE L. J. 1315 (1993).

modern tendency in comparative law is to focus on the differences in doctrine and practice that necessarily arise across different legal systems, especially as they relate to the use of formalities (to make transactions more certain) and procedures (to enforce them). But that focus on such small differences necessarily ignores the large points of similarity that arise in the operation of successful legal systems. It is important to stress the implicit unity between utilitarian concerns and the general principles of natural law.⁶

It was just this view that animated the Roman thinkers, starting with Gaius, who thought that the principles of natural law transcended the particulars of time and space (Scott, 1932).⁷ There is today a widespread, often mocking, skepticism about his devotion to natural law principles that are necessarily embodied in virtually every successful legal system. The dictates of any legal system are driven by constants that are derived from the universal principles of physics and biology, which constrain the choices that can be made in any legal system, ancient or modern. Thus laws that depend on those principles, chiefly those relating to the use of force, are common across the world.⁸ Moreover, any system of language that is useful in describing the outside world (upon which any nontrivial system of law necessarily relies) must understand and respect these similarities, which is why all ancient systems of law focus heavily on such notions as the use of force and the change of position to generate the rules of liability for physical injuries. The basic linguistic distinction, existent across languages, between transitive and intransitive verbs reflects a deep physical regularity. The use of force always has a direct object, as do transitive verbs. Changes of position have no direct object; nor do intransitive verbs that refer to them. And because the passive voice depends on the existence of a direct object, there can be no passive voice for intransitive verbs: “I have been goed” is not English; nor do its parallel constructions make sense in any other language. There is thus a tight relationship between physics, grammar, and law that transcends social and cultural differences.

This universalist approach to legal studies generally meets with disfavor with the rise of field specialization in virtually all disciplines. One notable exception to that trend is the iconoclastic Duke engineer Adrian Bejan (2016) who has worked to see universal connections that run across physical and human systems. Much of his concern deals with the organizations that are critical to the dissemination and use of information, which in his view lead to the emergence of hierarchical systems that necessarily require inequalities in position of power and wealth. The argument for hierarchy is uniform across all settings. Choose any number of individuals n which is large—say over 100 persons. If there is a flat structure with no leader, coordination is impossible. If there is a flat structure with one leader, there are too many individuals for that leader to effectively control. If there is a vertical arrangement with 99 links, nothing gets done by moving from top to bottom. So in the end, every organization has to adopt a pyramidal structure to allow for coordination and an effective span of control. It is an open question as to how many layers the structure must take, and how many nodes report at each level. Those differences matter, but they do not deflect from the central necessity of some hierarchical arrangement. Just as these arrangements depend only on the size of n , they will tend to be universal. Bejan spends little time on the system of legal rules that develops to deal with these imperatives. In this article I hope to fill that gap by looking at the interaction of two systems of property rights—private property and the commons—to show how these complex set of institutional arrangements work. In one sense, these two forms of property rights are the ultimate mismatch in property, for it becomes necessary to forge both separations and linkages between two systems of differing geometries—one short and squat and the other long and skinny.

These problems are not human contrivances. Indeed, in this regard it is useful, in the spirit of Bejan, to make explicit comparisons between property systems on the one hand and the human body on the other. In earlier writing, I have put the connection in explicit form:

If you want to understand the interdependence of the distribution between the commons and private spaces, it is often helpful to think about how the human body (indeed those of all advanced animals) serves as a template for larger social structures. We basically have two kinds of systems in our bodies: the long and skinny, and the short and squat. The long and skinny are the neural systems and the blood systems: information and nutrition, as it were. The short and squat are the organs that have various kinds of specialization: bodily factories like livers, hearts and lungs. If you do

⁶ For my earlier effort in this direction, see Richard A. Epstein, *The Utilitarian Foundations of Natural Law*, 12 HARV. J. OF LAW & PUB. POL'Y 713 (1989). For a more recent extension, see Richard A. Epstein, *The Not So Minimum Content of Natural Law*, 25 OXFORD J. LEGAL STUD. 219 (2005); Richard A. Epstein, *From Natural Law to Social Welfare: Theoretical Principles and Practical Applications*, 100 IOWA L. REV. 1744 (2015).

⁷ There is a parallel passage in JUSTINIAN, INSTITUTES, Book I, ¶ 1 (J. B. Moyle, trans., 2009) https://www.gutenberg.org/files/5983/5983-h/5983-h.htm#link2H_4_0002.

⁸ See Richard A. Epstein, *The Necessity of Convergence in Private Law*, 92 SO CAL. L. REV. 741 (2019).

not have the long and skinny, there is no way in which you can coordinate activities between solid organs; there is also no way in which you can keep supplying them with the fuel that they need to run. But if you only have a bunch of roadways going back and forth, there will be no productive sites that will allow for digestion, mentation, and all vital bodily functions. So the body basically organizes itself by evolutionary forces into a commons, which is designed to deal with the communications and transportation, and the solid organs, which essentially allow for specialized development of the activities for survival (Epstein, 2016).

A basic caveat applies to some key forms of common property that are not all that distinctive. Government buildings and public theaters, for example, are in some sense owned by all. Nonetheless, they are not structures to which open entry is secured. Rather, public functions are performed in buildings that are governed by the usual rules of exclusion and admission, which will obviously differ between the Pentagon and the Smithsonian. But the elements of the common that are subject to examination here have to do with communication and transportation. Almost by definition, these have to be long and skinny. Things short and squat have no extension to them, and the long and fat take up so much extra space that transportation and communication become unruly and uncontrollable. So the question then arises, what are the distinctive features of this correlated system? How does each operate internally, and what are the connections between the two systems? These questions arise both in organic and social systems.

It turns out that the only way to answer this question is by a form of disaggregation. Different situations require different responses and it is important to tease out the relevant issues. The first line of distinction is across different resource types. For these purposes, I shall stress the differences between land and water, with some passing reference to the air, which operates under somewhat different principles. The second has to do with the difference between the operation of these systems by a central authority and the operation in a state of nature—that is, in cases where there is no active government that can assume different forms of management responsibilities for what goes on. In the former, the government not only manages natural commons, but it also engages in conscious planning efforts, including the structure of roads and canals where no natural commons previously existed. The impulse for the creation of these new facilities is the same as that for the more extensive management of new ones. Both are driven by an increase in the intensity of use, which results in, roughly speaking, the difference between a simple commons and a public trust doctrine, where the latter has a centralized management that the *res commune* lacks. In effect, it becomes a governance structure not all that different from any kind of private trust arrangement, including of course corporations—where the issuance of shares replaces the creation of beneficial interest under the trust.⁹ I shall take some of these issues in turn.

Long and Skinny in the State of Nature

There are many illustrations of things long and skinny, with rivers and oceanfront beaches being common examples. For these purposes I do not put oceans themselves in the class of long and skinny because they are vast open systems that are never subject to the control of any sovereign. Although the ocean can be regarded as a commons, it has very different kinds of constraints precisely because it is not long and skinny. Ocean-goers can go in any-which-way, and the likelihood of any chance interaction between them is sufficiently small that it is usually not necessary to create elaborate governance structures to deal with the problem. A set of conventions on the right of way (pass starboard to starboard) generally suffice, and usually there is no reason for any ships to hold out from that solution because it generates benefits across the board. Moreover, the ocean is a place where it is unlikely that anyone can make extensive investments to improve the basic situation, which is one of the problems that the public trust doctrine addresses with trails and rivers. Finally, there is no single sovereign over an ocean, which precludes any strong governance solution. The closest substitutes are imperfect treaty arrangements, which are used to deal with such matters as whaling and mining in international waters,¹⁰ without having power to bind nonsignatories. Indeed, it is the fact that oceans are *not* long and skinny, which puts them outside the jurisdiction of any state. Lakes occupy something of an intermediate position, but they are far smaller than oceans, even if

⁹ For a general account of the origin of this substitute for a business corporation, see Wheeler A. Rosenbalm, *The Massachusetts Trust*, 31 TENN. L. REV. 471 (1964).

¹⁰ For whaling, see *International Convention for the Regulation of Whaling with Schedule of Whaling Regulations*, 2 December 1946, 62 Stat. 1716, 161 UNTS 72. For mining, see *Part XI, 1982 United Nations Convention on the Law of the Sea*, International Seabed Authority (1994).

they are far wider than rivers. It is perhaps for that reason that the terminology shifts from riparian rights to littoral rights, whose content is far closer to riparian rights than to the open ownership regimes.¹¹ With small lakes it is often the case that the lands beneath are treated as owned individually because private ownership is as efficient for mining as it is for farming.

So here it is useful to start with beaches which permit facile movement along the shore. Beaches in general are long and skinny, whether shore is expanding or contracting. Much simplified, when a beach gets too wide, the top portions of it remain relatively dry so that vegetation starts to take over, which then is eliminated if water rises. Yet if the water level falls, the ground coverage will follow it down, so that either way, beaches tend to be, relatively speaking, long and skinny. It is for that reason that from the earliest times that the seashore and the beach were thought to be public property.

The relevant rules were set out with great precision as early as Book II of Justinian's Institutes:

1. Thus, the following things are by natural law common to all – the air, running water, the sea, and consequently the sea-shore. No one therefore is forbidden access to the sea-shore, provided he abstains from injury to houses, monuments, and buildings generally; for these are not, like the sea itself, subject to the law of nations.
2. On the other hand, all rivers and harbours are public, so that all persons have a right to fish therein.
3. The sea-shore extends to the limit of the highest tide in time of storm or winter.
4. Again, the public use of the banks of a river, as of the river itself, is part of the law of nations; consequently every one is entitled to bring his vessel to the bank, and fasten cables to the trees growing there, and use it as a resting-place for the cargo, as freely as he may navigate the river itself. But the ownership of the bank is in the owner of the adjoining land, and consequently so too is the ownership of the trees which grow upon it.
5. Again, the public use of the sea-shore, as of the sea itself, is part of the law of nations; consequently every one is free to build a cottage upon it for purposes of retreat, as well as to dry his nets and haul them up from the sea. But they cannot be said to belong to any one as private property, but rather are subject to the same law as the sea itself, with the soil or sand which lies beneath it (Moyle, 1913, Book II, ¶ 1–6).¹²

The use of beach for littoral transportation was always great, and its use for agriculture or permanent structures was always low, as all such activities could be washed away by the tides. The law therefore developed a set of rules, largely customary, to demarcate the beach from the private lands that abutted it, and those boundary lines moved quite literally up and down with the tides. These beaches had to be open to all for access and for movement from point to point, which could not happen if they were privately-owned subject to the standard right to exclude. Instead, the presumption reversed so that these properties were open to all. While access to beaches from the sea is easy, access from land is not. Often there is some need to move across private property in order to get public access, and in these cases, it is important to develop rules that seek to maximize the gains from access while controlling against losses to private parties. Any natural access way—e.g. an animal trail to the beach— meets that test, but if there is none, the best solution is for the state to condemn the needed land, so that the price system will induce it to take into account both the private losses and the social gain.

Speaking more generally, the only way in which to have efficient use of common property is to allow for some limited private uses, provided that those uses do not interfere with the free flow of traffic. Along beaches, for example, the mooring of boats or unloading of cargo were routinely allowed, as long as those private uses were carried out in accordance with the non-interference principle. In addition, a more extensive set of uses was allowed under conditions of necessity—i.e., covering situations where person or property were placed in imminent peril by the forces of nature—at which point it was permissible to build temporary shelters along the beach. These of course did not block traffic along the beach, which would have been at a low ebb during a storm. So once normal conditions were restored, the huts came down so that free transportation was once again possible. Justinian thus showed how to create the elements of a mixed public and private regime, where the public rights dominated, but the carefully bounded set of private rights was allowed to continue until an implicit equilibrium was reached, whereby any extension of either public or private rights would diminish the overall value of the resource. The same mixed-use approach applies to private lands, where the right to exclude is suspended in times of imminent peril, when ordinary persons

¹¹ See, e.g., *Stop the Beach Renourishment v. Florida Dep't of Environmental Protection* 560 US 702 (2010).

¹² Note the one obvious mistranslation in line 5, i.e. the word "cottage," which presupposes the construction of some permanent site. The more accurate translation of "casam" is "hut."

are allowed to enter the land of others (even against the will of the owner) for self-protection, which often carries with it a duty after the fact to compensate for any losses that are incurred.¹³ Similar mixed solutions are thus available in both directions.

The Transition to State Governance

Common property is also found in nature trails that are usually created and used by wild animals, which then supply modes of transportation and communications for the human beings that follow them. Here too it would be foolish to allow any private landowner to block movement along these natural arteries. But in these circumstances, it is far less likely that these trails will be subject to a regime of mixed uses, given that they border or are contained within private lands and are not the common property of the sea. At this point, the major challenge is often to figure out what to do when the human traffic along the road increases, so that it is not fit in its current shape to handle all the traffic. This problem of density, moreover, applies to both waters and land, so that in each case the question is how to organize the needed level of improvements to cope with higher demand levels. At this point in time, we leave the state of nature, and must replace simple open access requirements with conscious rules that seek to generate both the revenue and governance structure needed to make sure that these improvements are properly done.

The doctrinal way to capture the transition is to note the movement from the common property by nature, to public trust property, both of land and water. It is sometimes said that the English common law doctrine of the public trust, under which the sovereign owns “all of its navigable waterways and the lands lying beneath them as trustee of a public trust for the benefit of the people,” traces its roots to Justinian’s statement in *Institutes* 2.1.1.¹⁴ But the needed transformations are more complex than this simple evolution suggests. The Roman system took place in a state of nature, so there was no sovereign to own the property. The need to deal with the various problems of public waterways became so acute that once sovereignty was established, the government, to the exclusion of any private party, was charged with the management and operation of the commons.¹⁵ The key point here is to take the word “trust” in public trust literally, so that it is possible to look to the private law of trust to understand the key duties that are incumbent upon those persons chosen as public trustees. In general, the best way in which to state these duties is to divide them into duties of care and loyalty. Under the first, the trustees in charge of a river have to make sure that it takes those needed expenditures to maximize its value for the full class of users. The second is a duty to make sure that the decisions in question serve all of the individuals within the class, so that there is through the management of the process no diversion of wealth from one group of users to another by any form of self-dealing. In earlier work I have tried to capture this principle in the short phrase, “nor shall public property be given to private use, without just compensation” (Epstein, 1987).

Discharging these tasks is harder here than for directors of corporations whose characteristics are uniform relative to one another, so that the built-in conflicts of interest are much less acute than they are with water. Put otherwise, the great challenge with a waterway is that key asymmetries are built into their design and operation from the ground floor. Rivers necessarily flow downward so that it becomes a real challenge to balance off the claims of those at different points along the river. The situation is still made more complex because water enters and leaves the system at multiple points, as tributaries enter the main stream, and surface and underground water sources constantly intermingle. The situation is still more fraught with difficulty because these resources are capable of multiple uses—transportation, recreation, fishing, watering riparians, and supporting key ecological functions—all of which have to be balanced off against one another. At this point the government is protected by a good faith business judgment rule, because there is no way that these divergent functions can be discharged simultaneously, without making some necessary adjustments among the various uses and users.

Yet the constant theme in these cases is that the government as trustee over public spaces cannot use its power to impose disproportionate burdens on private property owners whose land abuts the public waterways. In many cases, one use becomes sufficiently dominant, so that others are often choked off, which is what happens whenever the government decides to increase the flow by building barriers along the edge of a waterway that prevent riparian access.

¹³ See *Ploof v. Putnam*, 71 A. 188 (Vt. 1908) (privilege to enter land in time of necessity); *Vincent v. Lake Erie Transp. Co.*, 124 N.W. 221 (Minn. 1910) (duty to compensate).

¹⁴ See, e.g., *National Audubon Society v. Superior Court*, 658 P. 2d 709, 718 (Cal. 1983) (internal citations omitted).

¹⁵ For the seminal case, see *Illinois Central R. v. Illinois*, 146 U.S. 387 (1892). For influential commentary, see Joseph Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970) (advocating aggressive application to prevent private abuse when public lands are sold for private use); criticized in Joseph D. Kearney & Thomas W. Merrill, *The Origins of the American Public Trust Doctrine: What Really Happened in Illinois Central*, 71 U. CHI. L. REV. 799 (2004).

Thus in *United States v. Rands* (1967), the United States condemned some riparian lands, for which it was prepared to compensate the owners for the value of the minerals located on the site, but not for its value as a port, which would allow movement from the land to the sea. One of the key features of all legal systems is that they necessarily have these transition points, and the question is whether these should be protected. The answer in principle has to be yes. Let any private person seek to block the access from a river to a port facility and that disruption would be tortious, requiring compensation for the lost profits. Why then is the position any different for the state, when the greatest value for the asset is its use as a port? The answer that is customarily given dates back to the decision of Justice Robert Jackson in *United States v. Willow River* (1944), where he makes the fatal mistake of insisting that how property rights are organized between private persons bears no relationship to the way in which these rights should operate against the United States.¹⁶

That disjunction is fatal, for it unmoors the state power to conduct eminent domain from any neutral definition of private property of the sort that necessarily has to be incorporated into the Fifth Amendment prohibition: “Nor shall private property be taken for public use, without just compensation” (U.S. Const. amend. V). The classical view of eminent domain, which I have long embraced, takes the position that the definition of property rights, implicitly endorsed in the Constitution, remains constant whether some purported attack against a property right comes from either a private or a public source.

The point of this conscious parallelism is to eliminate the arbitrage that otherwise arises when one such party is not subject to the same restraints as the other, at which point the path of least resistance will be taken. Under Jackson’s formulation in *Willow River* (1944), there are essentially no constraints on how the government can define property rights in its own interest, so that it can engage in activities that force one individual (or a small group) to bear the costs of socialization of given types of resources.¹⁷ The lost port site value is important in all these situations, so that the government’s claim that this asset could be priced at zero in order to minimize its burden has to be rejected. But a moment’s reflection should point to the folly in that position, for the same argument could be made with respect to cases in which the United States allows access to public waters from a private marina only if its owner allows other craft to use that private space free of charge. Fortunately that position was rejected in the Supreme Court in *Kaiser Aetna v. United States* (1979). The same argument could be used to govern the intersection of common and private property in land, where the claim could be made that the government need not pay any compensation at all if it blocks the access of a business or home to the public streets. To let that happen, however, is to open the door to wholesale government extortion—here defined not as physical force but as the use of state monopoly power—because the government announces that it will condition the access to public roads on the willingness of the landowner to let others park on his property, walk across his land, or sleep in the spare bedroom. The entire doctrine of unconstitutional conditions is intended to make sure that the exercise of that monopoly power is only used to achieve efficiency objectives in the coordination between private and common spaces, so that it is permissible to require a private owner to allow access to property to cover health and safety inspections, and to make sure that its use does not create leakage of waste.¹⁸

Distinctive Problems of the Long and Skinny

How long, how skinny?

The first question that one has to ask is just how long and how skinny any common element could be. The question is surely not one of simple geometry, as everyone knows—or should know—that a point has no area or volume and a line has no thickness. That conclusion arises mathematically because it is not possible to give any positive dimensionality to either of these notions that serves as a lower bound; it is always possible to generate some positive measure that is smaller than the chosen amount but still greater than

¹⁶ The target of Jackson’s disapproval was the opinion of Pitney, J. in *United States v. Cress*, 243 U.S. 316 (1917), which took the opposite view.

¹⁷ The famous expression of this opinion is found in Justice Hugo Black’s oft-quoted refrain, in *Armstrong v. United States*, 360 U.S. 40, 49 (1960):

The Fifth Amendment’s guarantee that private property shall not be taken for a public use without just compensation was designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.

¹⁸ For my book-length treatment of this subject, see RICHARD A. EPSTEIN, *BARGAINING WITH THE STATE* (1993). The shortest form of the proposition is that the state in its exercise of monopoly power over any asset may only impose conditions that advance the efficient use of the relevant asset, which means that it can control for private force, fraud, and monopoly, but cannot use its own monopoly power to transfer wealth across private groups. The proposition takes private antitrust principles and applies them to all public monopolists.

zero. As this is an iterative process, the only number that does not have that characteristic is zero, which is a limit that is *never* reached and yet represents the dimensions of points and lines.

Clearly this definition of point sources or lines will not do for any real-world setting, where the ratios are what matter. In these cases, long and thin thus raises in theory a question about what ratio is needed to qualify as long and skinny. But in practice most cases are pretty easy, and the difficult ones that remain are not all that important. In rivers, extrinsic constraints often determine the flow. If rivers are narrow, their dimensions necessarily limit the flow traffic. If there are other competing uses, the traffic may be compromised to achieve other ends. If the rivers are wide, it is then likely that rules of the water will be used to increase the flow of traffic, especially as densities get heavier—passing starboard to starboard is one such rule. Tides can add another element of complexity. And where the traffic gets heavier, or where there are dangerous places for passage, even greater controls can be imposed, starting with buoys that set out consistent lanes, or even special pilots to navigate particular difficult stretches of water.

The same type of tradeoffs exist on roads and tracks. These have two great advantages over water. The first is that there is greater ability to specify the ideal dimensionality. Second, it is now possible to put a limit on multiple forms of inconsistent use so as to ease the flow. At this point, the question is: Just what are the determinants of the long and skinny? This depends in large measure on what is being moved from one point to another.

The first inquiry concerns just what is being moved along some long and skinny pathway. If it is information and electrons, we can quickly think of thin wires that quite easily do the trick, even after making allowances for insulation. But for transportation, the skinny portion of the inquiry is necessarily limited by the need to make the railroad or highway wide enough so that it can transport usual vehicles. For a train, that tends to lead to a uniform width of 4 feet, 8.5 inches—which today (after much historical evolution) is kept uniform so that all rolling stock from all carriers can move up and down the grid without alteration.¹⁹ Similarly roadways are usually wider to accommodate cars and trucks, and their distance is set, at least on major arteries, at 12-feet (3.7 meters) to allow for separation among vehicles.

There is obviously more fluidity in road widths, but there are real constraints. Too tight a restriction and there is only one lane. Too wide a demarcation and people will start doubling up within single lanes. As a further caveat, there should be no lanes that accommodate at high speeds different sizes of vehicles that snake in and out opportunistically and that do not fit comfortably within the grid. In cities such as Delhi, the same roads carry everything from three-wheeled vehicles to larger rigs, but this accommodation only works (after a fashion) because of the glacial nature of the traffic. Once the traffic starts to speed up, these mixed uses become a thing of the past. Thus in dealing with interstate highways where speed is at a premium, a useful measure of safety is the variation around the median speed. As that goes up, the likelihood of collision increases as the slower vehicles operate like fixed obstacles for the faster vehicles, which is one reason why people who drive under the speed limit when the median speed is ten or fifteen miles over it are a safety hazard, as other vehicles have to break and switch lanes in order to avoid contact. Hence, the faster the road, the more uniform the use, which is why bicycles and pedestrians are not allowed on freeways. Put otherwise, the protection of the commons depends on the exclusion of certain kinds of traffic.

The next problem in system design has to address the question of redundancy. In principle a single lane could be sufficient to move all the traffic in both directions. But that will happen only with low frequency uses, for otherwise, long sidings and frequent stops are needed to allow the system to operate at all. To be sure, there are some transportation systems, e.g. pipelines, through which crude oil is moved in only one direction—from the fields to the refineries—so here this problem is solved. In addition, the construction of two rival pipelines is prohibitive in cost so that intensive monitoring of the single pipeline becomes the order of the day.

In most systems, however, two-way traffic is needed, for which a total separation is required when densities get larger. But how many lanes should be used? The cheapest solution is one lane in each direction. However, the difficulty with that solution is a version of the “convoy principle”: traffic over that artery will move only at the rate of the slowest vehicle.

One inexpensive way to deal with this issue is to have turnouts at periodic intervals, which allow the slower vehicles to pull over so that the accumulated traffic behind them can pass. These are used both for vehicles and for railroad sidings. As traffic gets heavier extra lanes are clearly required, but at this cost:

¹⁹ For discussion, see George W. Hilton A History of Track Gauge: How 4 feet, 8-1/2 inches became the standard, TRAINS, May 1, 2006, available at <http://trn.trains.com/railroads/abcs-of-railroading/2006/05/a-history-of-track-gauge>. For a period narrow gauge trains survived in mountainous regions, with their own attendant dangers. See, e.g., *Titus v. Bradford, B. & K. R. Co.*, 20 A. 517 (Pa. 1890).

the wider the road, the shorter the length for any given amount of material. Hence there is a tradeoff that happens here as well. Use a single lane, track, or a single wire and the distance covered can be greater. But the safety of the system is compromised by the lack of any redundancy in its operation. A single break stops the entire operation until the gap can be closed, which could take some time if the gaps take place at some distance from repair facilities (this is why many roads and pipelines, for example, today are inspected by air, so that helicopters can quickly come to the site to make the repairs). In the end it should be possible to optimize the design solution subject to any initial cost constraint on the operation of the system as a whole.

External threats

The next important problem with respect to these common elements concerns their vulnerability to external threats, whether they be acts of God or human actions that range from invaders and marauders on the one side, and the political protestors and activists on the other side. The problem here is easy to state in mathematical terms: the smaller the perimeter that is needed to defend any fixed area, the easier the task. Geometrically, that would point to a circle as the ideal defense fortification, yet these arrangements are largely rejected in favor of more rectilinear arrangements like squares and rectangles for at least two reasons. First, circles leave useless gaps between neighboring properties. Square out the perimeter and there is no longer any vacant space between neighboring territories.

Second, the control of each of these territories is not randomly assigned. It is common for kin and friends to act as neighbors to each other, at which point the burdens of defense are eased. Thus while one person against the world has to defend four sides, two neighbors who are allies have to defend only three sides each. In addition, they can pool their resources so as to respond to any point where the external threat is the greatest. Within the city limit, the agglomeration of many small properties is most efficiently protected by a city wall that surrounds all properties, and which is funded by taxes levied on all of them. Going back to Roman times, these city walls, called *res sanctae*—sacred things—were regarded as a form of common property.²⁰ But in the usual case of common property, the owners are free to divide up the property by partition or sale. Indeed, a single disaffected owner is usually in a position to force one or the other of those results.²¹ But that result is literally suicidal with a defensive wall, for partition leads to dismantling of a common protective barrier, rendering it worthless. Hence that option is firmly prohibited by calling these walls sacred,²² as the nature of the property right is driven by the kind of resource that it is intended to protect.

Now note the situation with respect to roads, trains, and pipelines. By definition they have long, narrow areas that cannot be efficiently protected by any fixed fortification. To render the operation largely useless, it is necessary only to cut it in a single place, at which point movement from one end to the other becomes an impossibility. To be sure, each of the segments that remain may have some residual use equal to a small fraction of its original value. But a second and third cut could prove fatal, and even if it does not reduce the value to zero, the prospect that these cuts could take place is enough to deter any investment in these facilities so long as the threat remains. It therefore follows that for the most part investments in long and skinny infrastructure have to be protected, not by specific measures of self-help, but by locating them in places that are able to protect any given road, track, or wire as part of the overall protection of the squarish territories of which they are a part. The most obvious manifestation of this is the utter unwillingness to string copper wires for telecommunications in many unstable African countries “Telkom” (2014). They will be ripped apart by desperate persons seeking to survive. Hence there is a shift to alternative technologies that require less of a front-end protective system. Thus cellular facilities can broadcast in all directions, and they operate from fixed points which do have defensible borders. Light air transport similarly moves from protected location to protected location, as airports and their support facilities are relatively squarish so that they too can be defended. Massive instability could neutralize both of these responses to the long and skinny problem. But the choice of property form is always an exercise in playing the odds, which means a reduction of investment in the long and skinny in any territory plagued by chronic disorder.

Jurisdictional difficulties

The difference between short and squat and long and skinny also has huge ramifications in dealing with the legal protection afforded to various kinds of property. Normal land is located within a single jurisdiction, for there are few activities involving either the surface or underground that extend beyond a

²⁰ See Gaius, at II.1.8.

²¹ For a discussion of the relative merits of partition by sale and in kind, see *Delfino v. Vealencis*, 436 A.2d 27 (Conn. 1980).

²² See Gaius, at II.1.8.

single jurisdiction. That simple fact makes it easier to organize the protection and regulation of any given property system. The single sovereign issues a set of commands, and it is those and only those that have to be obeyed. The situation is quite different with the long and skinny, for these elements commonly cross local, state, and national borders, and thus require systems of coordinated governance in order to unlock their full potential. In this case, each sovereign continues to have a monopoly of force in its own jurisdiction, and hence any system of transportation and communication has to secure the cooperation of two or more entities to make the results come out. The problems arise in a variety of contexts: I shall examine transportation and pollution, which are two of the most important.

Transportation

In one sense the easiest of the elements to deal with is that of transportation. In principle, it is possible to adopt as a focal-point solution a regime in which each government allows the activities of some other government on the same terms that it allows those activities by its own citizens, wholly without cash or other payments moving in either direction. Note that I use the phrase, as is common in the area, as a nondiscrimination protection, not an absolute license to engage in certain activities.²³ The reason for this is that even local commerce along roads, tracks, and rivers is subject to extensive regulation for matters of health and safety. There are also commonly-found rules that limit the kinds of goods that can be shipped by these means, including rules that prohibit the shipment of goods that are made with certain materials or by certain persons. Historically, in the United States, the Motor Vehicle Act carefully prescribed what kinds of carriers could ship what goods in what direction, all in the effort to maintain a cartel in the trucking industry,²⁴ or more recently rules governing the sale of conflict diamonds.²⁵

The nondiscrimination principle, which finds active voice in the American constitutional cases decided in connection with the dormant commerce clause,²⁶ goes a long way to solving the coordination problem—at least for those states that want to find a solution. It leaves every state freedom of choice in its selection of substantive rules, but it does not allow a state to favor the activities of its own citizens and firms over those of its rival. The fact that the two systems stand together and fall together goes a long way to create a stable environment for these coordinated activities. In addition, the principle is also scalable, so that similar arrangements can also be established among three or more such states. It was just this kind of arrangement that was embodied in the Treaty of Westphalia, which removed the various toll booths along the Rhine River in ways that disrupted the flow of commerce traffic.²⁷ The gains from this system are enormous, because the norms in question are easy to identify, as is the occurrence of any breach. In addition, the gains on all sides of the transaction are so large that in general there is little reason to worry about which nation will in the long- (or even short-) run get some relative advantage over another.

In this as in other areas, the ability to have intergovernmental treaties over flowing water is more difficult than it is for highways because of the problem, alluded to earlier, of multiple inconsistent resource uses. Hence the full specification of these rights requires that the regime deal with external threats, most notably the risk of pollution.

Protection against Pollution and Similar Ills

The first of these problems is the protection of common resources against outside dangers. The system that is used with great effectiveness to deal with this is a combination of public and private rights against various users whose activity is the source of pollution. An early case in this vein is *Strobel v. Kerr Salt Co.* (1900), which was a suit brought by fourteen plaintiffs against the defendant company engaged in the manufacture of salt, for the diversion and pollution of the river. Both of these activities are especially

²³ Just that nondiscrimination principle is active in international trade; the World Trade Organization lists trade without discrimination as one of its fundamental principles. See *Principles of the Trading System*, WORLD TRADE ORG., https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm.

²⁴ The Motor Carrier Act of 1935 (P.L. 74-255, 49 Stat. 543); for a brief discussion, see *Motor Carrier Act (1935)*, ENCYCLOPEDIA.COM (Dec. 19, 2019) <https://www.encyclopedia.com/history/united-states-and-canada/us-history/motor-carrier-act>.

²⁵ See *The Blue Nile Conflict-Free Diamond Policy: Ethical Sourcing*, BLUE NILE, available at <https://www.bluenile.com/policies/ethical-sourcing>.

²⁶ See *Dean Milk Co. v. City of Madison* 340 U.S. 349 (1950); see also *HP Hood & Son v. Du Mond*, 336 U.S. 525 (1949).

²⁷ Treaty of Westphalia, art. 89, Oct. 24, 1648 ("Above all, the Navigation of the Rhine be free, and none of the partys shall be permitted to hinder Boats going up or coming down, detain, stop, or molest them under any pretence whatsoever, except the Inspection and Search which is usually done to Merchandizes: And it shall not be permitted to impose upon the Rhine new and unwonted Tolls, Customs, Taxes, Imposts, and other like Exactions; but the one and the other Party shall contented with the Tributes, Dutys and Tolls that were paid before these Wars, under the Government of the Princes of Austria.")

easy targets for regulation. Diversion of a river is equivalent to the expropriation of land, for once the water is taken out of the river, the downstream riparians have nothing left to use, and the entire system of correlative rights among the various owners is necessarily destroyed. The per se prohibition against this activity thus makes good sense.

The problem of pollution also raises difficult questions in connection with long and skinny resources. One common possibility is that the vessels used for transportation are the source of pollution, at which point they should be subject to the usual tort and criminal sanctions. In addition, the jurisdictional element can loom large here, for any discharge or release that begins in one jurisdiction can easily migrate downstream to another, such that it causes harm to public resources not only in two or more jurisdictions, but also to multiple private landowners as well as to river resources. In principle it is possible to impose a strict liability regime for all discharges or releases attributable to a defendant. That regime has two features.²⁸ First, there is some sort of injunctive relief to eliminate or reduce the level of pollution. Second, there is an award of damages to cover past pollution and the lower levels of pollution, if any, permitted once the injunction is granted. The point here involves the usual balance of equities with which injunctive relief is given until the point where it becomes prohibitive in cost, after which the damages take over. In these systems, the injunction is awarded on a showing of substantial harm caused by releases from the defendant, without the need to prove negligence in the conduct of operations or an intention to harm. Where the damage is to public resources, a public nuisance action brought by the state follows along conventional lines, only with a public plaintiff, with the power to impose fines as well as injunctions (Anonymous, 1536).²⁹ In addition, to the extent that any individual has been subjected to special damages, those are allowed alongside any public fine in an effort to create some measure of optimal deterrence.

Once there are two or more jurisdictions involved, two problems quickly arise. The first is: how and where do parties in the injured state get some relief? The second is: what body of law do they look to? In the United States, these questions have undergone a major change with the demise of so-called federal common law, which was commonly used in these cases before the Supreme Court handed down its decision in *Erie R. Co. v. Tompkins* (1938), which held that the judicial power conferred on the courts by Article III of the United States Constitution—the judicial power of the United States shall extend to all cases in law and equity—did not allow the federal courts to create common law rules (U.S. Const. art. III). The earlier practice was quite the opposite. For example, in *Missouri v. Illinois & Sanitary Dist. of Chicago* (1900),³⁰ decided before the change in legal regimes, the Court used basic principles of common law to decide these cases, wholly without reference to the law of any particular state.³¹ This regime made sense for two reasons. First, the general principles of common law nuisance were sufficiently well-established and neutral that they furnished a sensible baseline on which these questions could be resolved. Second, it meant that no particular state could introduce by statute or common law decision a rule that bended the outcome in its favor—at least on the assumption that its state law controlled under the decision in *Erie*.

Indeed, exactly this same principle was introduced to deal with yet another question that arises in connection with water rights, namely the distinction between alluvion, which involves a gradual movement of the edge of a river or lake, and avulsion, which involves a violent change of course by natural means, which are set out with commendable clarity in *Nebraska v. Iowa* (1892). The usual rule between private landowners is that the boundary shifts with the edge of the river in alluvion cases, so that there are not constantly moving slivers of land that are subject to occupation. But when the shift is violent, the old riverbed is divided as between its neighbors, and a new river is established subject to the same rules as before. It is just these rules that were in place, before the adoption of *Erie*, to decide boundary decisions between states. Thus in *Nebraska*, the elimination of an oxbow did not change the previous boundary line between the two states.

²⁸ For an account of balancing equities, see A. Leo Levin, *Equitable Clean-Up and the Jury: A Suggested Orientation*, 100 U. PA. L. REV. 320 (1951).

²⁹ The approach is embodied in Restatement (Second) Torts, §§ 821B-821E.

³⁰ Note in a subsequent case, Holmes gives the evidence a good hard look and concludes that the pollution did not originate from Chicago, and thus dismissed the case on the facts. See *Missouri v. Illinois*, 200 U.S. 496 (1906), an excellent factual dissection by Holmes, J.

³¹ The legal principle was stated by Holmes in *Missouri v. Illinois* as follows:

The Constitution extends the judicial power of the United States to controversies between two or more States and between a State and citizens of another State, and gives this court original jurisdiction in cases in which a State shall be a party. Therefore, if one State raises a controversy with another, this court must determine whether there is any principle of law and, if any, what, on which the plaintiff can recover. See *Missouri v. Illinois*, 200 U.S. at 519.

It is a classic illustration of how rules developed since Roman times³² to deal with private disputes, and how they can be pressed into service to deal with, and diffuse, those that deal with neighboring states—of which there are numerous water law decisions.

A similar case, *International Paper Co. v. Ouellette* (1987), involved pollution from New York to Vermont. Again the individual actors were suppressed by the court in the interest of efficiency, so that the two states went toe-to-toe. The question was clouded by the introduction of comprehensive federal regulation, which leaves open any question about the role of private actions against polluters—a position that I have long favored.³³ The Court in *Ouellette* did not have the federal common law option before it, and concluded that “[i]f a New York source were liable for violations of Vermont law, that law could effectively override both the permit requirements and the policy choices made by the source State” (*Ouellette*, 1987, p. 495). But that ignores the opposite risk that New York law, including its statutory law, could be applied in ways that tilt the balance too far in the opposite direction. The neutral set of federal common law rules do a far better job of policing the balance.

Permitting Paralysis

The final and most important piece of the commons puzzle relates to the requirement of multiple permits for the completion of any project. Permitting involves many of the unique problems and jurisdictional challenges associated with long and skinny property. The permit requirements are, quite literally, a thousand times more important than the nuisance rules that are invoked after the occurrence of injury.³⁴ The mere prospect of any such relief even under the most permissive legal arrangement is a strong incentive for any producer to avoid getting too close to the line, so that the number of cases that approach or reach actual and imminent harm is small. The permitting process runs in the opposite direction, for here an extensive set of permits are required in all cases, whether they present any risk of actual or imminent harm. Even for compact projects that lie within a single jurisdiction, there is always the risk that duplicative and inconsistent permitting requirements and procedures can slow down the rate of project development, with little or any social gain to show for the costly public interventions. But the problem of slowdown is increased for any long and skinny project, such as a pipeline, that has to run through large numbers of jurisdictions to move crude oil from one location to another.

The situation is made even more complex by the application of the National Environmental Policy Act of 1970 (NEPA), which has revolutionized the permitting process. The implicit premise of NEPA is that information should be collected before any administrative decision is made to allow for the completion of any major project. Initially, the legislation allowed for private parties to present their views on proposed projects, but it made no provision for any private right of action to challenge an administrative decision after it had been made. The effect of that approach would have been to give greatest weight to those parties whose views lay in the middle of the distribution, so that a few intense voices in opposition, e.g., Earthjustice,³⁵ could not have delayed the completion of the project, even if they might have influenced the conditions on which these permits were granted.

The ink was barely dry on the books when the District of Columbia Circuit Court decided *Calvert Cliffs' Coordinating Committee, Inc. v. United States Atomic Energy Commission* (1971), which allowed—indeed welcomed—private objectors to the final decision to have their day in court. At this point, the locus of power shifted from the middle of the distribution to the extreme opposition tail—pro-development forces never resort to court to stop projects that they support. The critical element in this attack is a “merely” procedural (*Calvert*, 1971, p. 1117) feature that is intended to force the agency in question to make an intelligent decision about the matter *before* any work, without asking the courts to substitute their views of the matter for those of the agency.³⁶ In its pristine form, NEPA allows for a court to enjoin all work on a given project if those requisites are not met. The strength of that remedy is to stop a project in its tracks, even in those cases in which work has been undertaken—perhaps in some other jurisdiction—on the project at hand.

³² See, e.g., GAIUS, INSTITUTES, II.70–75.

³³ See Richard A. Epstein, *Federal Preemption, and Federal Common Law, in Nuisance Cases*, 102 NORTHWESTERN U. L. REV. 551 (2008).

³⁴ For my extended critique of many of the issues summarized in this section, see Richard A. Epstein, *The Many Sins of NEPA*, 6 TEXAS A & M LAW REV. 1 (2018).

³⁵ See the Earthjustice website, at <https://earthjustice.org>, which states “Because the earth needs a good lawyer.” The organization is strongly in favor of clean energy solutions that do not involve the use of fossil fuels. *Focus Area: Clean Energy*, EARTHJUSTICE, <https://earthjustice.org/climate-and-energy/clean-energy>.

³⁶ See *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs*, 255 F. Supp. 3d 101, 112–13 (D.D.C. 2017).

The implicit assumption behind this state of affairs is that it is better to be safe than sorry (Lazarus, 2012). But the economic reality is the opposite. NEPA is wrong in its assumption that the baseline of inaction leads to zero levels of pollution or other forms of environmental harm. In practice, many projects, including pipelines, are intended to displace older and more dangerous forms of transmission, which can include truck and rail, and even older pipelines. Modern technology obviates the risks associated with those older methods. Yet the skewed form of a cost/benefit analysis that is offered under *Calvert* fly-specks proposed plans for any low-probability event that might result in harm, in order to block them on just those grounds. The larger gains from the removal of collateral damages are *never* taken into account in these studies, which fundamentally skews the inquiry in favor of preserving the status quo, which increases overall harms.

The correct solution in most cases is to start projects quickly, insist that the parties take out insurance against various kinds of harm, and then to wait until some sign of trouble arises during the course of construction or operation—both of which should be subject to constant supervision and inspection, both public and private—and then fix it all when there is more information about what has gone wrong and what could be done to correct it. That is just the way in which major construction projects are overseen in the private sector, and it works largely because everyone understands the large tort liabilities and regulatory sanctions at the end of the day should something go wrong. Focusing on a diffuse *ex ante* survey only reduces the resources available for more focused examinations down the line.

At this point, it is useful to make this comparison. In dealing with cases of *admitted* patent infringement, *eBay v. MercExchange* (2006) holds that typical injunctive relief is too potent a remedy because it puts the infringer at the mercy of the patent holder. That position is in general wrong because it assumes, in line with the false dichotomy between property rules (injunctions) and liability rules (damages) of the Calabresi/Melamed framework, that the two remedies are strict substitutes for each other, when in fact they are complements.³⁷ Thus an injunction can, and often is, delayed or subject to conditions, with cleanup damages. The irony of course is in the environmental context the injunction becomes a remedy even in circumstances where there is no evidence whatsoever of any immediate harm—which manages to aggravate the hold-out risk while, far from protecting against real harms, exacerbates them.

As might be expected there is in fact an important exception to this basic rule that in some cases at least softens injunctive relief where the burdens of its application are thought to be too great relative to the gains which are obtained.³⁸ *Allied-Signal v. U.S. Nuclear Regulatory Commission* (1993) articulates this test: “[t]he decision whether to vacate depends on ‘the seriousness of the order’s deficiencies (and thus the extent of doubt whether the agency chose correctly) and the disruptive consequences of an interim change that may itself be changed’” (*Allied-Signal*, 1993, p. 150–51). *Allied-Signal* allows for some play in the joints, but it is discretionary rather than systematic, and any such flexible rule cannot resist the pummeling that it takes when environmental risks are overestimated in terms of immediacy, frequency and severity. The good news is that this doctrine was invoked in both the Dakota Access Pipeline (DAPL) and the Bayou Bridge Pipeline (BBP) cases, so as to allow completion to take place (*Standing Rock Sioux Tribe v. U.S. Army Corp of Eng’rs*, 2017; *Atchafalaya Basinkeeper v. U.S. Army Corps of Eng’rs*, 2018). The bad news is that the burden is set in the wrong direction so that another judge in another case could easily come up with the opposite conclusion, precisely because the original problem is analyzed in the incorrect way.

All of these difficulties are magnified with property that is long and skinny, for now the owner of the pipeline or similar facility has to be able to obtain all the needed permits in order for the project to be completed. Any single break will usually end the movement, because pipelines are not railroads and as such they do not have intermediate stops. Instead they typically have one or two remote designations, so that if the break comes before those points are reached, the pipeline is worthless. And if it comes before the final destination, subsequent shipment by rail, train or boat is usually highly expensive. Hence the need to make the entire project work.

At this point, there is a simple question that faces the applicant, which is when to start construction when some permits are granted but others remain in limbo. The standard environmentalist response is that you should wait until all permits are granted before beginning work so that if you begin sooner, you take the risk of stranded capital. But that strategy guarantees that nothing will ever get built, because of the certainty that approvals will be staggered, and that the permits so granted could easily contain provisions that they are valid (given the risks of changed conditions) only if the work begins promptly after the permit is issued.

³⁷ See generally Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, And Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

³⁸ For a more complete discussion of the pipeline cases, see Richard A. Epstein, *The Many Sins of NEPA*, 6 TEX. A&M L. REV. 1 (2018).

Hence for pipeline construction to take place, it must begin on key segments before all permits are issued, which only increases the leverage from a single holdup along the route.

We can see how these difficulties played out in connection with the DAPL, where the concentrated resistance effort to block completion was taken in those areas where it was thought the odds of obtaining injunctive relief were greatest. The critical juncture came when the pipeline path was situated within one half-mile of the Standing Rock Sioux Tribe (SRST) reservation (*Standing Rock*). In the case of the BBP it came where the pipeline crossed the bayou, where there were extensive fishing and ecological issues (*Atchafalaya*). But the actual state of play indicates the danger in these objections to pipeline construction. With respect to the SRST, the pipeline was buried deep, and extensive evaluation was given to all alternative routes that were found to be longer and more dangerous than the path chosen, which had been followed by eight preexisting pipelines in the area. The Army Corps of Engineers approved the site, but when Judge Boasberg in September 2016 gave his approval, the Obama Administration through its Attorney General, Secretary of Interior and head of the Civil Division of the Army Corps of Engineers asked DAPL owners to back off their victory voluntarily.³⁹ The length of pipeline involved in this dispute was about 1,100 feet. The Obama Administration's purpose was to secure better relations with the Tribes, even though they had engaged, as a reading of the Boasberg opinion shows, in a systematic strategy of noncooperation and delay, which was made worse by the SRST's onsite physical protests that often resulted in arrests and property damage. When the issue came up again in December 2016, the Assistant Secretary of the Department of the Army, Jo-Ellen Darcy, overrode the Army Corps recommendation that the completion of the pipeline over federal lands be approved. Instead, she demanded that a full environmental impact statement be prepared that could take several years, to go over alternate routes that had already been decisively rejected.⁴⁰ It was only a last minute reprieve by the Trump administration in January 2017 that obviated that order and allowed the normal process of Congressional approval to permit the completion of the DAPL.

Even here the full process had not run its course, for when the case came back to Judge Boasberg again, on June 14, 2017, he found that there were gaps in the Environmental Assessment on such topics as fishing rights and environmental justice that needed further work, but he invoked *Allied Signal* to allow the work to continue while these issues were addressed (*Standing Rock*, 2017). The environmental justice issue is worth a brief comment, because it plays out fundamentally differently with long and skinny pipelines than with waste dumps and other short and squat facilities. The story begins with Executive Order 12898 that then-President Bill Clinton signed in February 1994, whose object was to make sure that minority and low-income populations did not suffer from "disproportionately high and adverse human health or environmental effects" from new projects (Clinton, 1994). That issue is critical for many waste facilities and dump sites, where government locational decisions can have just those effects, especially if the effort is made to reduce the cost of land acquisition by buying cheaper properties nearer to marginal communities.

There is, however, no such quality control with pipelines. A long, connected pipeline has very few degrees of freedom in its location, and it must be of uniform quality along its entire length in order to operate at all. There is thus no reason to think that DAPL, for example, poses any greater risk to SRST than it does to the thousands of other landowners who own farms and facilities along its path. The standard construction offers complete protection in this regard, especially since the areas of greatest sensitivity in the construction of pipelines are their beginning and end points. It seems clear that this simple fact should have allayed Judge Boasberg's fear on this point, but in fact he made no reference to the ways in which a long and skinny project is likely to prove safer than those which are short and squat.

Long after this article was first prepared, on July 6, 2020, the latest chapter in the DAPL saga emerged. Judge Boasberg held that the delay by the Army Corps of Engineers in submitting a revised version of the Environmental Assessment called for a drastic remedy: he ordered that the pipeline, which had been in operation without serious incident for three years, be shut down by August 4, 2020 (*Standing Rock Sioux Tribe v. U.S. Army Corp of Eng'rs*, 2020).⁴¹ The sole ground on which he made that judgment was a cross between two factors. The first was that the project was sure to be highly controversial. The second was that

³⁹ See generally Richard A. Epstein, *Why the DOJ Order to Shut Down Construction On The DAPL Pipeline is Legally Indefensible*, FORBES (Sept. 14, 2016), <https://www.forbes.com/sites/richardepstein/2016/09/14/why-the-doj-order-to-shut-down-construction-on-the-dapl-pipeline-is-legally-indefensible/#24ef9ef24d27>.

⁴⁰ See Richard A. Epstein, *Lawless Bureaucratic Obstruction Is No Substitute For the Rule of Law In the Dakota Access Decision*, FORBES (Dec. 9, 2016), <https://www.forbes.com/sites/richardepstein/2016/12/09/lawless-bureaucratic-obstruction-is-no-substitute-for-the-rule-of-law-in-the-dakota-access-decision/#7a35d70e1b9d>.

⁴¹ For my critique, see Richard A. Epstein, *Fossil Fuel Strangulation by Judicial Decree*, DEFINING IDEAS, July 13, 2020, available at <https://www.hoover.org/research/fossil-fuel-strangulation-judicial-decree>.

he wanted the Army Corps to address the possibility that in some kind of bizarre physical equilibrium, the pipeline could spring a tiny hole which, without expanding into a larger leak, would allow for the continuous daily release of some 6,000 barrels of crude oil that could in principle reach the boundary line of the SRST reservation.⁴² To see the extreme reach of that estimate, note that the average release of pipeline leakage since 1986 has averaged, for the *entire system*, 76,000 barrels per year (Stover, n.d.). The ostensible shutdown is to last thirteen months until the report is revised, but at that point further legal maneuvers could shut it down for a longer time, and should Democrats win the White House, the permit could be revoked entirely.

In sum, one major difference between long and skinny on the one side, and short and squat on the other, lies in the application of the permitting process. Yet there is nothing in NEPA, or in the received wisdom that defends this statute, that takes these differences into account, with immense resources wasted because of the magnification of all the errors built into the basic operation of NEPA.

Conclusion

It should be apparent that the ancient distinction between common and private property that was first articulated by Justinian in his Institutes continues to exert a powerful influence today. It is clear why two different regimes of entitlements are needed. Land could not be developed under an open-access regime; rivers cannot be exploited unless they are open to all. There is no question that in both systems adaptations have to be made from the basic starting points. But even after these adjustments are made, it still remains the case that long and skinny projects, which often receive far less public attention, are in need of legal rules and social institutions that preserve their value.

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Competing Interests

Prior to the preparation of this paper, I had done consulting work with the GAIN Coalition (Grow Our Infrastructure Now) on both the Dakota Access Pipeline and the Bayou Bridge Pipeline. The present paper was prepared after those assignments were finished and solely reflects my own views.

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⁴² Judge Boasberg was concerned that because DAPL's leak-detection system is incapable of detecting leaks of less than 1% of its flow rate, there could be a doomsday scenario of 6,000 barrels per day leaking into the environment without detection. It is wildly contradictory to assume that there would be an oil leak that is both so severe that it would cause disaster and so controlled that it would avoid expansion and detection.

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