From: Gillespie, T., Wired Shut (MIT Press: Cambridge, 2007), pp. 65-103.

3 The Speed Bump

Much of why the debates around digital copyright remain so intractable is that our commonplace ideas about technology and its consequences are similarly polarized: either technologies change the world, or technologies are neutral. If the first is true, then the most radical predictions, utopian and nightmarish alike, can seem imperative enough to overwhelm more careful consideration. If the second is true, then we can "stop worrying and love the bomb," overlooking the subtle ways in which the practices, policies, and expectations are changing around us. To fully investigate these disputes and their implications for digital culture requires more nuanced insights into the social embeddedness of technology, as well as an attention to how the political and social spaces from which technologies emerge shape their design and use.

Certainly, the effort to design technological fixes like DRM points to what sociologists of technology have been saying for some time: The material world regulates human activity, sometimes deliberately so. Human-made things are inserted into social contexts and organize both the practices that happen in and around them and the relations between the people involved. Walls and gates physically direct the movement of people who stand behind or pass through them. Prisons and asylums keep the inmates from the rest of the world and carefully choreograph their day-to-day lives. Industrial assembly lines draw people's hands and eyes into a precisely choreographed dance with machines. Lenses and screens urge people to gather in front of them. Voting machines mediate the conversation between citizen and government, and ensure (or sometimes undermine) the reliability and credibility of that communication. Technologies shape their use; architecture choreographs what's done amid it.

To return to Lessig, the way we design the manmade world in which we act means that "spaces have values. They express these values through the practices or lives that they enable or disable. Differently constituted spaces

enable and disable differently."[1] His point is simply to remind law scholars, judges, and software designers that, like the law, the construction and implementation of technology can be used productively as a way to regulate. And like law, technologies are the product of political choices and have political consequences that must be recognized and acknowledged. Another way to put this is that law is a technology too, an artificial apparatus designed by man to intervene in and organize human activity in a way that (ideally) produces more equitable human arrangements by prohibiting behaviors that its designers wish to prevent.

However, the consequences of a technology are complex, fluid, and hard to pin down. While our culture remains enamored with the promise of digital technologies and communication networks to offer interactivity, choice, speed, convenience, and freedom—the tools of our intellectual liberation—critics have noted a flipside of this optimism. These same technologies also offer more powerful ways to track and surveil, to direct and regulate the social and economic practices that depend on them. Moreover, technologies always intervene alongside the social and political dynamics that designed, implemented, and depended on them, so it is particularly difficult to separate out their particular impact—perhaps what we think of as the impact of the automobile is more the impact of the suburbanization that called it forth and fed off its use. We are drawn to these technologies as potential solutions to the crises we face, the levers that might move us toward some beneficial ends, whether that benefit is individual gain or social equity. And digital technologies seem to have a special capacity for regulating their own use, in more subtle ways than analog and non-informational tools ever could. In order to begin an analysis of the particular push toward technological solutions for the management of copyright, we must consider how technologies can more generally shape and restrict the practices to which they are put, and what made them that way. Lessig's concerns are of a piece with these broader inquiries into the relationship between technology and social activity.

What follows is a brief encounter with some of the scholarship concerning the sociology of technology and the cultural study of media and communication technologies, as a way to gather tools both for the consideration of technical copyright protection in particular, and for the study of communication and information technologies more generally. Drawing on the arguments and examples of Langdon Winner, Bruno Latour, Wiebe Bijker, Trevor Pinch, and John Law offers useful insights about the complex relationship between technology and society, a relationship that is prone to oversimplification in social science more broadly. We must avoid the claim that the design of a technology wholly determines what is done with it, while also recognizing that the shape of a tool can have real, political consequence; we must recognize that technology is shaped by its designers and its users in material and symbolic ways, while not also assuming that it is infinitely malleable and therefore of little concern.

If the major media industries and the U.S. Congress are in fact pursuing a shift in copyright that asks technology to serve as its leading edge, then it is essential that we draw on all available resources for thinking about the impact of technology. We must understand how the design of such technologies is a political and contested process, how the implementation of a technology can have consequences for its use, and how what looks like a technological fix in fact depends on more than just technology being put into place. In the end, I hope to demonstrate that this strategy depends not just on choosing the "right" technology for the job; it depends on the political mobilization of various partners and allies to hold this sociotechnical apparatus in place, and it requires the cultural legitimation of the strategy in order to convince the rest of us that it is a worthwhile and viable project to undertake.

Thinking about Technology

For centuries, philosophers, historians, and sociologists have struggled to characterize the relationship between technology and society. Too often, these inquiries have posited a neat, causal connection between new technologies and the social changes that followed, usually on a grand scale. Using the history of technological innovation as a timeline for broad historical changes—the era of print, the industrial age, the information revolution—has proven an all-too-compelling shorthand. Historians and social scientists, especially those interested in communication, have often chosen to explain grand societal shifts—the rise of agrarianism, the exploration of the New World, the Scientific Revolution, the Enlightenment, the Protestant Reformation, the post-industrial service economy—by linking them to the technologies that apparently made them possible.[2] Important technologies develop and proliferate, the logic goes, and the world changes in their wake.

This paradigm has a powerful corollary outside academia. The claim that technologies can alter the course of history, especially in its most utopian gloss, is a powerful tale for those who sell those technologies to us. What better ad campaign than one that suggests that a product is going to change the world. Typically, these promotional claims are focused on the

individual and interpersonal: Cell phones and e-mail will keep parents happily in touch with their college-bound kids, the new car will give the middle-aged man a sense of freedom—not unlike the claims that the latest kitchen appliance would finally end the suburban housewife's endless drudgery, and that the atomic bomb would end war. This same techno-optimism can be found in the work of futurists such as Alvin Toffler and George Gilder, and in *Wired*'s breathless coverage of the cyberspace revolution—which, in their own ways, are also linked to the marketing of new technologies and the improved forms of life they hope to provide.

The dystopian version has proven just as compelling. Politicians rail against the Internet for corrupting the fragile innocence of children; the press points to video games as the likely trigger of brutal school shootings; the medical journals warn of "Internet addiction." The power that both kinds of claims offer to the person making them—here's a tool that will dramatically change your world, here's the single cause responsible for a messy social phenomenon—is compelling enough that we're regularly tempted to overlook the way such claims simplify the technology itself, the social fabric in which it is embedded, and the complex give-and-take that occurs between tools, people, and events.

This perspective has been criticized as "technological determinism" by increasingly vocal scholars from a number of fields, including communication, sociology, history, and cultural studies. Their concerns are numerous.[3] The historical examples that "prove" these claims are often sketchy, simplified, or mischaracterized, and they sometimes overlook the inconvenient fact that the changes "caused" by the technology had actually begun to develop long before its invention. The periodization schemes that emerge from such thinking are, by necessity, oversimplified.[4] Similar inventions in different cultures are followed by very different social arrangements, suggesting that the technology does not have a single, universal outcome. Sometimes the "better" of two technologies loses out, suggesting that the adoption of technologies is never determined wholly by objective criteria of quality or efficiency, but can be driven by social practicalities that emerge around them.[5] Technologies change over time, often in response to these apparent consequences, such that a simple cause-and-effect explanation is necessarily incomplete. People experience technologies differently in different contexts, to the extent that they are almost different things for different people. Not least, the fact that such stories of causality fit so neatly into marketing discourse raises some suspicion as to their validity as social analysis.

However, as critics have challenged these determinist arguments, it can sometimes seem as if the only alternative is that technologies have no consequences at all, as if they are neutral tools that people put to whatever use they choose, for good or ill.[6] This position also has a familiar version outside academic arguments, the most well known perhaps being the NRA slogan, "Guns don't kill people, people kill people."[7] In other words, the atom bomb was bound to be invented, a neutral scientific act; the people who weaponized it and dropped two on Japan caused the destruction, not the bomb itself; the political decision to design a national defense policy around the threat of using those bombs caused the Cold War, not the bomb itself. Faith in technological progress, so endemic to Western society, requires its proponents to assert the neutrality of tools, laying blame instead on users for whatever direct or even structural consequences follow. Just as the claim that technologies have consequences can be compelling to a politician or activist looking to assign responsibility, the claim that technologies are neutral also has power, to the extent that it can deflect responsibility.

To carve out a space between these two conceptual poles, we need to hold onto the notion that technologies can be consequential, while asking something more specific than whether technologies can wholly explain epic societal upheavals. As Leah Lievrouw put it, we must avoid the either/or of social and technological determinism, focusing instead on the "dynamic relationship between determination and contingency."[8] We must look at how technologies subtly urge certain uses, how debates around their design concern how they should intervene into social activity, and how users orient themselves and their worldviews so as to best use the technologies. We need to question whether small pressures, applied regularly to many people over many moments, can end up having consequences not just for individuals but in the aggregate for the community and the culture. And we need to ask: If a technology renders certain tasks more or less feasible, giving some users more or less capacity to act, does this matter in ways that are culturally or politically significant? If so, should we say that the technologies themselves have a political valence in their design and implementation beyond the politics of their users? We need to inquire into the politics of design—who gets to design a technology and under what circumstances; why is a technology designed in a certain way; what do the designers hope to accomplish with it; and how do users find that these design choices both facilitate and constrain their practices? And we need to examine the continued negotiations that

surround a technology as it enters into the world of users, how the technology is taken up in meaningful ways, and how it is built into a sociotechnical matrix of practices, meanings, and institutions.[9]

Concrete Politics

Let's begin with the speed bump.[10] It is one of the simplest tools, a mere lump of concrete, strategically placed across a road such that it is inconvenient and uncomfortable for drivers to pass over it at otherwise normal speeds. A similar outcome could be achieved by posting a police officer at that particular point in the road, holding up a sign that says "slow down" and ticketing those who ignore his stern look. But this would be costly (the officer's salary, the costs of the judicial process of collecting fines and dealing with appeals, etc.) and far from perfect, as the officer might fall asleep on the job or be called away to handle a more pressing emergency. The speed bump, laid down once, applies to all drivers fairly, requires little upkeep, and simply and effectively regulates the behavior of all who pass. In fact, as Latour reminds us, it is common in the British vernacular to call speed bumps "sleeping policemen" even though, except for being prone, they're quite alert in their duties.[11] Most drivers obey not because slowing down at that point in the road strikes them as the right thing to do, necessarily, but because taking the bump at high speed could damage their car's suspension and will certainly rattle old bones. Yet the result is slower traffic and, hopefully, improved safety for pedestrians and other drivers.

This technological obstacle is not perfect, though neither are legal ones. Drivers can speed over the bump if they don't mind the consequences, and they're unlikely to be caught or punished for their minor crime. (In fact it's not a crime at all, unless the speed bump is accompanied by a posted speed limit to match.) Nevertheless, speed bumps are effective deterrents to speeding at the particular points in the road at which they're placed, because they render the unwanted behavior unlikely, if not impossible.

To begin to understand not only the effectiveness of technological regulations, but also their potential consequences, we must look at how such material artifacts are designed to intervene, and according to what criteria. Langdon Winner's insights, most explicitly articulated in the article "Do Artifacts Have Politics?" are a useful starting point. In answering yes to his own question, Winner reminds us that a technology could have been designed many different ways, even within the various material, economic, and physical constraints. The way the technology did end up being designed was the result of a series of deliberate choices, if not always with the benefit of foresight. Some of these choices were made to design the technology to intervene in the world in particular, deliberate, and thus political ways. Winner is challenging both the belief that technologies are neutral and the belief that technologies cause social change: "Rather than insist that we immediately reduce everything to the interplay of social forces, the theory of technological politics suggests that we pay attention to the characteristics of technical objects and the meaning of those characteristics. A necessary complement to, rather than a replacement for, theories of the social determination of technology, this approach identifies certain technologies as political phenomena in their own right. It points us back, to borrow Edmund Husserl's philosophical injunction, *to the things themselves*."[12]

Winner argues that these technological politics operate on two levels. First, a technology can be designed in order to close off certain options for its users and open others. A wall is designed to prohibit movement in a particular direction, while a door is designed to facilitate it. In this most general sense, nearly all technologies in some way choreograph human activity, though this in itself does not mean that the results are political. This should come as no surprise to, for instance, architects, who are constantly being asked to design spaces so as to choreograph the location and proximity of people to facilitate certain activity within: One floor is full of windowed offices for executives to have well-appointed, private spaces in which to conduct their business, another floor has modular cubicles and wheeled desks so that project teams can flexibly self-organize ad hoc collaborations—and, of course, the executive floor is built on top of the project floor, to symbolically represent the corporate hierarchy within which all of the employees are required to function. "All works of architecture imply a worldview, which means that all architecture is in some deeper sense political. 'To imagine a language,' Ludwig Wittgenstein famously wrote, 'is to imagine a way of life.' The same is true of buildings, parks, cities—anything conjured up by the human imagination and then cast into stone. The way we choose to organize our space says an enormous amount about the society we live in—perhaps more than any other component of our cultural habits."[13]

It certainly should come as no surprise that the design and implementation of certain material artifacts are decidedly political: Prisons, for example, are explicitly for enforcing incarceration, and have the political consequences of substantially restricting the freedom of their inmates and enacting the condemnation of society upon them.[14] But Winner also wants to point out the subtle consequences of technologies that their users don't

recognize as doing political work. To do this, he focuses on the bridges that pass over the Long Island Parkway, designed by notorious city planner Robert Moses. These bridges are substantially lower than bridges on most other New York highways, with what Winner suggests is a very particular result: While cars can easily pass beneath them, buses cannot. This technological restriction, he argues, has political consequences: The bridges prohibit buses from passing, and therefore discriminate against the working class and predominantly African American passengers who cannot afford cars. The suburbs and beaches of Long Island, largely the playground of a wealthier and whiter subset of New York's residents, enjoy a kind of quiet segregation, imposed not by law or force but by the design of the bridges themselves.

Winner finds these politics not only reprehensible, in that they may have exacerbated the racial and class tensions of twentieth-century New York City, but also insidious, because they took the form of brick and mortar. Because the political consequence of these bridges was submerged in a seemingly neutral material fact—the buses simply can't pass underneath—it is difficult to hold anyone accountable for the injustice. In fact, the very intervention is difficult to recognize, and the impact difficult to notice. "Not only (do) artifacts have politics, but it's the most perverse of all since they hide their biases under the appearance of objectivity, efficiency or mere expediency."[15] It is these stealth politics that separate Winner's bridges from a prison, whose politics are more transparent, and deliberately so.

It is important to note that several critics have raised concerns about Winner's particular example, though not necessarily about his underlying point. Bernward Joerges notes that while the story is compelling, it overlooks some extenuating factors—that commercial traffic, which would include buses, was restricted on parkways anyway, and that there are other routes for getting to the beaches Winner says were rendered inaccessible. Steve Woolgar and Geoff Cooper even challenge Winner's story at its most fundamental point, having heard from several sources that public buses in fact did travel the Long Island parkways.[16] We're left with the bridges not so much as evidence, but as a parable of the possible consequences of seemingly innocuous technologies—though since this particular example may be more urban legend than fact, we should tread carefully with this argument.

However, others have provided examples that also suggest that technologies can be designed to subtly intervene in the practices of users.[17] Batya Friedman and Helen Nissenbaum describe, for example, the way the

Sabre and Apollo airline ticketing and reservation databases (run by American and United Airlines) were challenged as antitrust violations in the 1980s for subtly privileging flights that were handled by one carrier, which put domestic carriers above foreign ones for international flights.[18] Similar ranking issues arose with search engines, which initially permitted commercial sites to pay to boost their ranking for a certain search term.[19] This practice was disliked by users, and although it still continues it is generally made explicit by demarcating those results as "sponsored links." Richard Dyer argues that photographic technology tends to represent Caucasian faces in a more naturalistic way than darker faces. This troubling fact, he suggests, stems from the early development of the chemistry of emulsive photographic paper; designers, seeing the popularity of portraiture, assumed that the human face would be the most common object of photography, and decided to use skin tone, which meant Caucasian skin tone, as their de facto reference point.[20] Rachel Weber makes a similar point about the design of cockpits in military jets, where an ergonomic layout based on the average pilot's body, assumed to be a male body, has worked against accommodating the smaller frames of female aviators.[21]

Beyond technologies that directly exclude or enforce, Winner also notes that some technologies are simply more compatible with certain forms of social organization. As we adopt and deploy a technology, we find ourselves persuaded or compelled to also adopt and deploy the social arrangement that best suits it at that moment. For example, unlike coal, oil, and solar power, nuclear energy involves the manipulation of decidedly hazardous materials, materials that could easily cause an environmental catastrophe if mishandled, or be built into weapons if they fell into the wrong hands. So, unlike its alternatives, nuclear power requires stricter security measures—more laws, harsher punishments, barbed wire, armed guards, training, public education, and so forth. In its current instantiation it is better suited to centralized energy production (i.e., we aren't likely to ever have consumer-grade nuclear generators in our garages) and to military-industrial states that already have the resources and cultural justification for the security infrastructure its volatile materials demand.

However, this link between a technology and the sociopolitical arrangements it requires is not natural or inevitable, but depends itself on the particulars of social context. For example, if the United States were to perilously drain its resources and find itself dependent on a desperate few hydroelectric power generators, these technologies might become targets of sabotage by political insurgents, and therefore also require a degree of security they do not require today.[22]

Technologies can have political consequences, then, both in the choice to adopt them at all and in the secondary arrangements they tend to require. Technical copyright protections certainly have both kinds of consequences. DRM systems are designed in particular ways to intervene in and regulate user behavior, a political choice legitimating some actions and rendering others impossible. This is both a political intervention into human activity and a means to intervene through the technology in a social dispute—that is, the battle over ownership and culture waged around the Internet, peer-to-peer technology, and popular entertainment, and more broadly around knowledge production and the circulation of information. But it is also a system that, if embraced, "requires the creation and maintenance of a particular set of social conditions as the operating environment of that system"[23]—conditions that are social, political, and economic. At the same time, it is crucial to note that while DRM makes demands of our political infrastructure, these demands can also be overstated. The presumption that DRM needs legal backing in the form of anticircumvention rules says little about how those rules should be crafted, what penalties should be imposed, or what exceptions should be allowed.

The resolve of this argument has been (and must be) regularly tested, since the claim can so easily slip into the very caricature it aims to challenge. The argument that artifacts have politics can sound, in less sure hands than Winner's, like a more adept version of technological determinism. Perhaps it was the tyranny of the automobile rather than specific bridges that had racially inflected political consequences for New Yorkers, and the design of the bridges, while embracing that arrangement, did not itself make it so. If we take into account the rise of the automobile and the massive expansion of the highway system, and beyond that the design and proliferation of the suburb, we might reveal a more complex but perhaps also more compelling sense of the ways in which material technologies intervene into social dynamics, often to the political benefit of some and the detriment of others. Perhaps Moses, although a powerful player in the construction of specific pieces of this matrix, was himself bound by the broader paradigm of the automobile and interstate road system, an instrument of a broader social politics of space and movement that had its own racial dimensions.

Further, the exclusive focus on a single technology and its impact may overlook the way technological systems, rather than individual artifacts, often have more dramatic and subtle consequences. While poor, black New Yorkers may have been materially blocked from Long Island beaches by a bridge, it would be more accurate to say that it was the combination of

bridge, road, and bus that did so. A speed bump is a meaningless obstacle without a curb to keep drivers from going around it, and is impotent without an automobile design that conveys the impact of significantly large bumps back to the driver. This may be a particularly important observation as we bring these insights to the study of digital technology and culture. As the technology we are most interested in, the Internet, is itself a "network of networks," a self-proclaimed technological system, we might use it as inspiration to pursue this insight, looking not only at the entire network and the system of artifacts it represents, but at the structure beneath the structures: The pathways, connections, standards, and boundaries built into the network itself that define the way the technologies interact.[24]

This attention to systems, however, opens up a subsequent question: What should we include in the definition of the "technology" as we look to uncover its consequences?[25] Once the circle is drawn more broadly than the single artifact, it can potentially be drawn anywhere; if it is not just the speed bump but also the road, the curb, the shock absorber, the bus, the suburb . . . why not include the mechanics of fuel and its extraction, refinement, and delivery, which now links our hapless Long Island bus passengers to the global geopolitical battle over oil? In a very important sense, the implications of a technological system depend on how that system is defined; as such, the choice of how to define it is itself political. To critique the U.S. reliance on automobiles and not talk about the infrastructure of fuel production is a political choice, as much of a choice as linking the two. These characterizations come not only from scholars, but from designers. Builders of these systems also build them in the rhetorical sense, drawing linguistic boundaries around them to indicate what is part of the system and what is not, shaping how the relationship between elements can and will be characterized.[26]

The Subtle Consequences of Mundane Things

Despite the hesitations, Winner's parable is a compelling one, in part because of the sense of real injustice involved—these bridges may have been steadfast bastions of a racist agenda in a time when racial equity was (at least nominally) a vital societal goal. Not only have white faces been overrepresented in U.S. media since its invention, but if Dyer is correct, even the black faces that did make it to the screen didn't look quite "right" to black audiences longing to see a glimmer of themselves somewhere in the cultural landscape. The feminist movement has worked tirelessly to

open up opportunities for women where once only men were permitted, even in male bastions like the Air Force, but it may not have counted on the way the jets retained the legacy of gender discrimination in their very design. The consequences, if indeed we can attribute them to the bridges and the film stock and the cockpit, are of a particularly political stripe, political in the classic sense of the rights of citizens and the equity by which those rights are assured.

The politics of copy protection technologies may be just as significant, but they need not be. Latour reminds us that any intervention into human activity enacts a kind of discrimination, allowing some uses and users and dissuading others. The result is a more mundane politics that is at play during nearly every moment humans interact with their built environment—less reprehensible, but much more pervasive.[27] Latour considers a more quotidian technology, the hydraulic door-closer at the top of many institutional doors, designed to gather up a small amount of energy from each person who opens the door and use that energy to return the door slowly to its closed position. While we may go through our entire lives without contemplating this nearly invisible object, Latour insists that it reveals the regular interchange between human and nonhuman fundamental to our manufactured and mediated world. He takes us along a mental exercise, imagining the underlying logic behind the installation of a hydraulic door-closer on the entrance of his building. Architects could have built only a wall, which would require patrons to destroy and rebuild it every time they came and went. The building owners could then either hire someone to regularly rebuild it, or could cut a hole and block it with a movable slab of wood or metal. Now residents would have a convenient opening, but a heavy object to remove and put back into place every time they passed; at that point, they could either hire a "door replacer" to stand there day in and day out, or they could add hinges. Then they'd have a door that swings open easily, but stays open after forgetful users pass through. Here the architects again may choose to delegate the task of closing the door to a human, or they may choose to install a mechanism like the hydraulic door-closer. Like the speed bump, this seemingly insignificant object is actually the latest decision in a massive chain of functions, some allocated to people and some to things, to accomplish a task together in a reasonable way.

Designers choose on a regular basis what combination of people and things a particular task will fall to, weighing the relative costs and benefits of every choice.[28] Though each new problem is solved at each stage of

this decision process, it is by no means without its trade-offs. The hydraulic door-closer is no exception: As Latour notes, "Neither my little nephews nor my grandmother could get in unaided because our groom needed the form of an able-bodied person to accumulate enough energy to close the door. . . . because of their prescriptions these doors discriminate against very little and very old persons. Also, if there is no way to keep them open for good, they discriminate against furniture removers and in general everyone with packages, which usually means, in our late capitalist society, working or lower-middle class employees."[29] At every step, decisions were made about who to help and who to discriminate against. Even a technology designed merely to make something possible must always render other actions less so. And "if, in our societies, there are thousands of such lieutenants to which we have delegated competencies, it means that what defines our social relations is, for the most part, prescribed back to us by nonhumans. Knowledge, morality, craft, force, sociability are not properties of humans but of humans *accompanied* by their retinue of delegated characters."[30]

While our speed bump may not have the kind of racially charged impact that Winner's bridges may, it also discriminates, and in potentially consequential ways. It imposes more impact (literally) on those with lower-quality shock absorbers, which may mean those who can't afford expensive cars or costly repairs when their axles crack. It discriminates against bicycle riders, who are not speeding yet are forced to endure a more visceral impact than drivers who are. In a culture that has a deep love for cars and a matching disregard for public transportation, the fact that our chosen method of slowing down drivers also works against bicyclists could be seen as politically and economically significant. These discriminations may be minor, not rising to the level at which the technology itself needs to be reconsidered. But the speed bump also discriminates against those who have an urgent need, and legal permission, to exceed the speed limit: the ambulance rushing a sick patient to the hospital, the fire engine racing to a burning building. These uses are as constrained as all other forms of speeding, but they are of far greater consequence; here the speed bump actually works against a legal right and a societal need we would otherwise want to protect.

Furthermore, technologies have a particular kind of permanence, or obduracy, which means they can impose these discriminations long after they are initially installed. Or as Latour puts it, "Technology is society made durable."[31] Of course, laws have a kind of permanence as well, designed to

persist until they are changed, setting precedent for court decisions and future laws that extend their influence. But it takes few additional resources to undo a law beyond making the decision to do so, whereas speed bumps must be physically removed. Combined with the stealth of their political intervention, this inertia can be significant. As Winner notes, "For generations after Moses has gone and the alliances he forged have fallen apart, his public works, especially the highways and bridges he built to favor the use of the automobile over the development of mass transit, will continue to shape that city. Many of his monumental structures of concrete and steel embody a systematic social inequality, a way of engineering relationships among people that, after a time, became just another part of the landscape."[32]

This notion of permanence is tricky business, though. Certainly, technologies and even material infrastructures do change, both physically and culturally. Their seeming permanence may be as much an illusion as the belief that laws can so be easily adjusted. Speaking of buildings, Thomas Gieryn argues, "Brick and mortar resist intervention and permutation, as they accomplish a measure of order. And yet, buildings stabilize *imperfectly*. Some fall into ruin, others are destroyed naturally or by human hand, and most are unendingly renovated into something they were not originally. Buildings don't just sit there imposing themselves. They are forever objects of (re)interpretation, narration and representation—and meanings or stories are sometimes more pliable than the walls and floors they depict. We deconstruct buildings materially and semiotically, all the time."[33] Conversely, the permanence of a technology can also impose its politics onto new populations, or impose unimagined politics long after design is complete. Latour notes that in his Parisian apartment building, the primary residents have a spacious elevator whereas the students living in the back apartments are relegated to climbing a cramped stairwell.[34] This discrimination is not ugly university politics exposed; the arrangement was designed to separate servants from residents in a building long ago used for very different purposes. (Of course, the fact that professors earn enough for the fancy apartments while students can only scrape together enough for the servants' quarters suggests that the current inequity is not entirely coincidental.) The speed bump may remain, but the community activity around it that once made its presence worthwhile may shift in ways the speed bump cannot adjust to. As we look at the politics of digital technologies, it would serve us well to remember that technologies may have politics, but those politics are not easily imposed, and time, use, and subsequent innovation can wreak havoc on even the best laid plans.

Anticipating the User

The most powerful way in which technologies regulate, then, involves rendering some actions impossible and, by extension, privileging others. If it is nearly impossible to avoid the speed bump with your car and nearly unbearable to go over it at high speed, then speeding is quite effectively sanctioned by this mere slab of cleverly placed concrete. Designing systems such that certain functions are simply unavailable is the primary way in which DRM hopes to regulate users. However, if we dig deeper into the politics of technology, we might also consider subtler ways in which technologies choreograph human activity; these will necessarily work alongside a system such as DRM to more thoroughly regulate users.

First, technologies "speak" in a number of ways, announcing what they do and who they're for. The most obvious examples of this are product names, symbolic elements, the claims made in promotional material, the ways in which they are offered. The packaging of a consumer technology is generally a glossy parable of and for its intended uses.[35] The symbols associated with a technology speak in coded ways about its purpose: The Nike swoosh is a significant cultural emblem not only because it is widely recognized but also because it symbolically suggests speed, reminding us of aerodynamic wings, racing stripes, even the winged shoes of the Greek goddess herself.

The purpose and value of a technology are also articulated in accompanying materials—instructions and technical support, examples offered, and the design of the artifact. This is not exclusive to digital tools, though the range of opportunities in which to make such suggestions, and the depth to which they may be articulated, may be expanding. Only retired photographers or newspaper editors are likely to understand the icon for the "crop" function in Adobe's Photoshop image software, which looks vaguely like the tool once found on drafting tables. The "desktop" and "files" and "trash can" icons of the PC and Mac operating systems metaphorically invoke a very particular idea of what is to be done with these tools; Microsoft's failed "Bob" interface attempted to appeal to home users by giving the desktop a more domestic look they might be more familiar with, but the office metaphors were simply too well established.[36]

These coded claims about what the tool is for can extend into the support materials that accompany the software; in help documents or user tutorials, evocative examples hint at the kinds of projects the designers expect users to undertake.[37] Roger Silverstone notes that, with media and communication technologies, this articulation of the tool and its proper

use occurs on two levels: Not only does the tool itself make oblique claims for its purpose and value, but the content can also comment on the proper use of the technology—from the sitcom family sitting in front of a television together to online web design tutorials, media content can often include subtle or explicit ideas about the manner in which it should be consumed.[38] This "double articulation" suggests that the semantics of technology, if not literally prohibiting certain uses, certainly map the terrain of possible uses in persuasive and subtle terms.

Technologies also anticipate and choreograph the actions of their users, building in roles for users to play and paths for them to follow. It can appear at first glance that the tool is simply moving the user toward a goal. But as with Latour's door-closer, facilitating some uses always means restricting others. And while we generally feel ourselves to be the masters of our own tools, we are usually quite willing to adapt what we do to what the tool does, rather than the other way around—especially to the extent that we desire the promised results. Of course, the cell phone has made it easier to call and be called at any hour of the day and in any place. At the same time, to best enjoy these benefits we are generally willing to accept not only the cost of the device and the burden of being reachable, but also the changing social rules about boisterous ring tones and loud conversations in public spaces, the prioritizing of incoming phone calls over ongoing face-to-face conversations, the abandonment of making and sticking to plans in exchange for the last-minute game of phone tag. Cell phones urge us to store our numbers on the device, making it both more handy for calling and at the same time more likely that we'll lose all of that accumulated information when the phone slips from our pockets. These trade-offs happen with every technology and are usually deemed worthwhile in light of the benefits they offer. But they always reorganize social activity to suit the features and requirements of the technology, often with oblique consequences.

This set of rewards and sanctions for appropriate use stems from a built-in vision of the users, their purposes, and their social world. Speed bumps expect drivers—and not just drivers, but drivers going about a set of predictable tasks, drivers who are generally law-abiding but have a tendency to hurry. Madeleine Akrich calls these "scripts" to indicate that they narrate the user's world as the designer imagines it: "When technologists define the characteristics of their objects, they necessarily make hypotheses about the entities that make up the world into which the object is inserted. Designers thus define actors with specific tastes, competences, motives, aspirations, political prejudices, and the rest, and they assume that morality, technology, science, and economy will evolve in particular ways."[39] Users are by no means bound by these characterizations, and can reject or modify them, but the invitation to inhabit these anticipated roles and contexts is a powerful one, as it comes with built-in as well as societal rewards and sanctions. As Woolgar observed, "Ways of using the software other than those the designers had in mind are possible, but they turn out to be prohibitively costly (since alternative sets of material resources will be needed to counter or offset the effects of the technology) and/or heavily socially sanctioned. The social relations confronting the user of technology are therefore relatively durable because they are not easily disrupted and repackaged."[40] In some sense the user is constructed inside of the technology.

This process is a powerful part of the design process; as Woolgar notes, the spaces in which technologies are designed depend themselves on a powerful distinction between the designer and user. Most designers take great pride in being unlike mere users, as a result of their technical expertise; when they build for users, they reenact this distinction. Explicit points of contact such as focus groups and beta testing, despite being moments where designers claim to want to know users better, are mapped over with presumptions about the user as a distinct category, defined in opposition to themselves. These moments of contact are many; thus designers encounter a multiplicity of user representations, all of which are incomplete, stylized, and dismissible.[41] The technology itself ends up negotiating and stabilizing the distinction between designer and user, assigning certain characteristics to the user (technically novice, result-oriented, easily confused) and "speaking" to the user in those terms.[42] Of course, considering all of the ways these roles can be articulated, from the interface to the advertising to the accompanying materials to the corporate symbology, it is not just designers doing the articulating, but also marketers, technicians, and retailers.[43]

The power of this kind of "inscription"[44] of anticipated roles for the user is different than the political impact of design described by Winner. Winner's bridges selectively exclude people from use; poor African Americans who could only rely on the bus for transportation simply would not get to the beaches beyond. This is the politics of walls, of locks, of turnstiles, of gates: the capacity to reject some users and thus forbid them from the benefits of use. It is the politics of the outer wall of the prison, but not the politics of its internal layout. A more powerful politics is to persuade a user to adopt the technology, but on specific terms. For the speed bump, the persuasive power is the value of wherever the road leads, paired with

the relatively minor inconvenience imposed, such that few drivers will look for alternate routes just to avoid it. Other technologies persuade by promising to facilitate a desirable and compelling task, to make possible an appealing activity, to get the job done. And sometimes, as in the prison, persuasion is compulsion through brute force, that is, dragging people there in shackles and chains.

Once use of the technology is assured, the technology's material and discursive arrangement can create provisions to urge the user to use it in particular ways, on particular terms. Because technologies that are not obligatory need the active consent of the user, they can rarely have the kind of comprehensive power of high walls and low bridges, since we can opt to do without them—although refusing a technology is not always simple if those around us have embraced it and built it into everyday practice, as cell phone holdouts have discovered. But even when it is entirely optional, the offer of a technology that will lead to a desirable outcome is also always an invitation to reach that outcome on the technology's terms. Digital technology in particular expands both the ability to attach provisions to the use of a technology (clickthrough licenses, limited function menus, etc.) and the ability to more richly "inscribe" the user and the world the designer predicted for them inside the technology itself—making possible technologies that regulate in both senses, through persuasion and obligation.

Things Made and Unmade

A rich understanding of technology cannot end with the realization that technologies may have political consequences. We must also consider the social and political valences that shape the technology itself. Technologies are not autonomous inventions. The particular trajectory of technological innovation is not the inevitable outcome of exclusively material or economic forces; according to John Law, "Artifacts and practices are underdetermined by the natural world."[45] They are built and deployed inside of social and political contexts that shape what gets designed, by whom, and to what ends. As Silverstone put it, "Technologies are themselves effects. They are the effects of social, economic and political circumstances and structures, decisions and actions. These in turn define, in their development, their implementation and their use, technologies' meaning and power."[46] Technologies also have different consequences in different settings; changes a tool can seem to cause by itself are more often a product of the social dynamics in which it is being incorporated. And the influence of a technology can never be separated from the social and political factors that surround its use, such that pointing to consequences as evidence of the technology's inherent character is a tremendously difficult task.

Let's return to our speed bump. For the moment, things are going well: Drivers are slowing down to the recommended speed as they pass over it, and the chicken is feeling safer as it crosses the road. Now let's imagine two incidents that might complicate the politics of this technology. First, a group of teenagers from the local high school take to what they're calling "bumpjumping," a game in which they race over a speed bump to see who can endure the jolt at the fastest speed possible. A few of them, having actually paid attention in shop class, are designing new "extreme" shock absorbers that will allow them to pass over the bump at high speeds without feeling much physical impact inside the car. Second, a young man rushing his pregnant wife to the hospital is forced to slow down to pass over the speed bump that interrupts his only route. His wife almost loses the baby due to complications that, their doctor suggests, could have been avoided if they had reached the hospital sooner. Now the couple is petitioning the city council to redesign all the local speed bumps to include small, tire-width portions made of Nerf foam, such that those with a legitimate need to speed can aim their car for those sections and pass over the bump quickly and comfortably.

Here we have efforts, along both authorized and unauthorized lines, to redefine the artifact. The bump may still have the same literal result, making the cars that go over it bump up and down, but it will no longer have the same experiential or political consequence, or the same meaning. For the teenagers, the speed bump has come to mean something different: a challenge, part of a game, a meeting place—a treasured object rather than a vaguely irritating one. For the young couple and their supporters the speed bump has also changed: It is now a nuisance, a liability, a menace—a disruption of civic life rather than a benefit to it. Technologies ancillary to the speed bump, but that helped it regulate, are being changed: The regulatory impact of the speed bump could be undone by changing the way shock absorbers work. And the grassroots movement to redesign the speed bump itself, fueled by the way it was redefined as a liability, could change the artifact materially.

Trying to pinpoint the political consequences of an artifact can often lead us to overemphasize a linear, singular, or intended purpose, overlooking not only the way a technology's impact is often diffuse and context-dependent, but also the fact that the thing, once embedded in

cultural activity, is never simply that which was designed. In a very real sense, the technology we encounter is the outcome of a cultural negotiation over not only how it should be designed but also what it should be and what it should be for. This negotiation dosen't end when the technology is built or deployed, but continues on through its use. That technologies are socially constructed, argued most forcefully by Trevor Pinch and Wiebe Bijker,[47] has opened up a new set of questions that, on first glance, seem to run counter to, or at least complicate, the claim that technologies have politics.

Pinch and Bijker suggest that the negotiation around the design, implementation, and use of a technology is a debate about what the thing is and what role it should play. This negotiation does not stop at alternative design plans and practical solutions; it includes questions about the meaning of the technology itself and the character of the society in which it is involved. We may think a bicycle is a bicycle, but during the device's early days a number of designs competed for public embrace, and did so not only by being built and sold, but also by being offered up as cultural possibilities: a way to get to work, a means to get exercise, a vehicle for "proper" ladies, an exciting new sport, etc. Not only were different design proposals contesting for dominance; different ideas of what was needed and what problem was to be solved by the bicycle were up for grabs. As these different forms of the bicycle became objects of public consideration, different groups of people characterized bicycles in ways that shaped how they would be received, used, and even rebuilt: the bicycle that is a danger to its rider, the bicycle that is for competition, the bicycle that is disrupting the tranquility of public parks. The bicycle as we know it now did not succeed because it was the obvious or best idea in human transportation, but because enough designers and users were convinced to see it as a viable addition to human society. This consensus overcame the critics, resulting in a coherent set of things and meanings we now label "bicycle."

Constructivists use this insight to revisit the question of users, especially in light of digital technologies. While technologies inscribe subject positions for their users and offer rewards for inhabiting them, these scripts are very much negotiable. Different groups of users choose what tools to use, they reimagine the purpose and function of the tools, they change them materially when they have the skill to do so,[48] and they incorporate the tools into their social experience as meaningful objects in ways unanticipated by designers. As Roger Silverstone and Leslie Haddon noted, the particular process of bringing media and information technologies into the home is a powerful process of interpretation, one in which the technology must be "domesticated" to fit into the dynamics of home and family, while those dynamics must also shift to accommodate and mesh with the technology.[49] And designers in some ways want this process to occur. As Woolgar notes, "The production of all cultural artifacts involves a continual struggle, on the one hand to freeze and embody social relations and, on the other, to render sets of social relations manipulable and manageable."[50]

This attention to the "interpretive flexibility"[51] of a technology does not simply point out the way the initial design of a technology is contested, but recognizes that technologies are always both material and semiotic accomplishments, perpetually being made and remade, named and renamed. Users never encounter a technology apart from the contested cultural meanings that swirl around it; to the extent that they also give it meaning, they too have helped articulate the tool and its political valence. As Streeter put it, "when people describe a distant planet as a wandering god, their guesses about the unknown object do not change the planet itself. But if people describe television alternately as an artwork or a commodity, in the right circumstances their talk can help shape it."[52]

A speed bump is more than just concrete. We treat it with a respect we do not afford to other slabs of concrete, because it speaks its own significance. It is laden with a general sense of authority bestowed upon it by the institutions that put it there. As Keith Grint and Steve Woolgar note, discussing Hiroshima, "What the nuclear bombs did—and what they can do—is not a reflection of the actual technical characteristics of the bombs but the result of various agencies' (scientists, military experts, historians, victims, and so on) constructions . . . Our 'knowledge' of what bombs can do is not based simply on our looking at them or watching them go off. It depends, instead, on a complicated variety of factors, including our reading or listening to the accounts of others, our susceptibility to persuasion by authoritative sources, our willingness to credit claims of expertise, and so on."[53] These meanings often enjoy a kind of stability, not as the inevitable byproducts of the workings of the machinery, but as the result of a set of technical and societal compromises that steer the course, and of the slow sedimentation of time and use.[54]

However, this set of cultural meanings is always in flux, and can be reopened by particular events, political challenges, or shifting attitudes. If we choose to disrespect or ignore the speed bump, we have already changed it. Whatever the consequences of a technology, then, they are as much a result of the social processes by which that technology was named, characterized, justified, and stabilized as by the material design and

political implementation. They cannot exert influence over human activity without being accompanied by a set of meanings that justify and support that influence. Enough disagreement about its purpose and value, and the speed bump loses its political heft, even as it keeps pushing tires up off the ground as they pass over it.

Technology as Mediation

This recognition complicates our original concern, about how technologies regulate human activity, as well as Winner's question of whether technologies have politics. However, social constructivism can easily be overstated, until it appears that there is nothing to technologies but their interpretation, as if one could simply evade the consequences of a technology by characterizing it as something else—that's not a wall, it's a butterfly. The best work on the social construction of technology avoids this pitfall. First, we must remain aware that materials do have "affordances,"[55] things that by its design a tool allows users to do and, by extension, things a user simply cannot materially do with that tool. No matter how imaginative you may be, you will never use a hammer to clean up spilled milk. Still, we never encounter these affordances apart from their meanings; as we choose to pound nails into boards, we are being guided not only by the hammer's firmness and its flat pounding surface, but also by a culture that understands that hammer to be for certain things, builds nails to suit it, and provides training for how to apply the one to the other. Second, interpretation of our tools is primarily a social rather than an individual activity. Not all interpretations of a technology will be embraced by enough people to grant them any real political significance. I can try to interact with the wall as if it were a butterfly, but few are likely to join me, and I risk that others will take my bizarre interpretation as evidence of my deteriorating sanity. However, should enough teenagers or activists successfully enlist enough support for their view, the speed bump will in fact change, at the very least in a cultural way, and possibly in a material one.

How do we discuss the politics of the speed bump when its purposeful design and material longevity do not ensure a consistent meaning? The literature on the social construction of technology does not offer much guidance in this regard. As critics have noted, the constructivist perspective tends to focus on how technologies came to mean something, how they were negotiated and stabilized; it expends less attention on what consequence these contested technologies may then have "for people's sense of self, for the texture of human communities, for qualities of everyday

living, and for the broader distribution of power in society."[56] In other words, one line of inquiry (Winner and Latour) emphasizes the control that technologies can impose; the other (Pinch and Bijker) emphasizes the contingency in the process of their development.

The fact that the speed bump can become a teenager's plaything or a rallying cry for a grassroots organization is the first clue to how we might reconcile these two concerns. The desire on the part of users to rearticulate the technology for their own agendas can powerfully limit how directly a designer's intent can be imposed. After these two challenges, the speed bump is no longer what it once was. But this should remind us that "what it once was" was itself already the result of a process of interpretation and negotiation, rather than some natural fact. Just as the activist couple work hard to represent the speed bump as a menace, the makers of the speed bump worked hard to represent it as a valuable safety measure. Both intended for their speed bump, in material and in meaning, to direct the activity of others. Both attempted to anticipate the social context into which their speed bump would enter and have consequence.

When Winner or Latour asks the question of what happens to people who interact with the low Long Island bridges or the automatic door closers, they ask a question of how human agency exists amidst the constraints of technical structure. When Pinch and Bijker ask how the bicycle came to be what it is, they ask a question of how human agency produces what ends up as technical structure. Putting these two insights together means we can avoid privileging either: The structure we live in is the product of human agency, which itself exists within structures, which were the product of human agency, and so forth.

Perhaps the most useful way to, if not resolve this tension, then at least draw productively from both perspectives, is to think of technologies as not causal at all, but as *mediational*.[57] Technology is a means for someone to intervene in human activity, at a distance, with specific consequence. When social actors, embedded in institutional, political, and ideological contexts, attempt to shape the social practices of others, which are also complexly embedded, they sometimes turn to technological artifacts as a way to insert their interests and subtly organize that activity. In other words, we often talk about "political leverage," but we rarely think about the materiality of that metaphor—in some cases, it is literally a lever that we seek, to move, direct, or prod someone else into action. Rather than focusing on how the technological shapes the social, or the social shapes the technological, we can look at how social actors in one context (designers) aim to shape the social activity in another context (users), using the

technology as a means to do so, and how users then not only work with the tools for their own purposes, but find they must sometimes work against them.

As users, we rarely have reason to think about the designers of our technologies and what they have in mind for us, at least not until they break. In fact, we are discouraged from doing so in many ways. We live in an industrialized consumer economy that puts both geographic and conceptual distance between us and the makers of our things, then offers as a substitute brands and symbols to which we might instead feel connected. Nevertheless, designers do reach out to us through the technologies they make, offering us meaning through the material. The design of a technology is not unlike the act of communication, albeit communication that is asynchronous, remote, one-to-many, and difficult to respond to.

Engineers are not neutral tool-makers, although they may enjoy seeing themselves in this light, and may benefit from appearing so.[58] They're well aware that the tools they design will migrate into a new social context and intervene in human activity there. Knowing this, they design tools to intervene in ways that speak to that context and to particular ends, in ways that also make sense to them. "Every design is a blueprint for human behavior and social structure, as well as a schematic for the 'thing' itself," Gieryn observed.[59] Engineers craft their technology as they might formulate an argument, and they put it into circulation hoping someone will receive it and find it persuasive. We might even think of each technology as a coded claim: "Here's a way to do things," or, more important, "This is the way things are, such that you'd want to do this, so do it this way." As Bryan Pfaffenberger put it, "The technology is designed not only to perform a material function but also to express and coercively reinforce beliefs about the differential allocation of power, prestige, and wealth in society."[60] The material dynamics of the technology will have consequence within this mediation, and were assembled in hopes of having such consequence, but they cannot determine, or be determined, in any direct way.

This coded claim is by no means a designer's individual message, however, just as a story or film is never just its main point. Whatever underlying values shape the social context in which a technology is produced also imprint themselves on that technology—through the choices made by the designers, the dynamics and sources of funding for such projects, and the worldview driving the project. Military research projects embody a militarized worldview not just because of why and by whom they were designed, but because of the principles and priorities, the social hierarchies, and the criteria for success by which they were built. "In this way of thinking," Woolgar argued, "technology can be regarded as 'congealed social relations'—a frozen assemblage of the practices, assumptions, beliefs, language, and other factors involved in its design and manufacture."[61] Pfaffenberger seems to think that the way designers' worldviews get embedded in what they design is precisely what makes technology a political phenomenon: "Technological innovation provides an opportunity to inscribe political values in technological production process and artifacts, which then diffuse throughout society."[62] When that vision of a technology's purpose and use is contested, it is in some way the politics of the artifact and the values it obeys that are at issue.

However, Latour reminds us, "to detect politics in artifacts is always tricky because of the exact opposite of what is implied by Winner's argument: the lack of mastery exerted over [those politics] by engineers."[63] Users, embedded in their own social context, which the designer may or may not have accurately predicted, take this materialized claim just as a listener might take an argument spoken in words. They must somehow comprehend it and, if they choose, incorporate it into their own actions in a meaningful way. Just as with communication, this is a process in which they have some power to interpret, challenge, reject, and modify the claim being made, though it is not unlimited.[64] Of course, the statement made by the designer and built into the technology can be a forceful one. There are powerful rewards for adopting the technology as it was articulated. Use it as intended, and you will enjoy the benefit of the completed task the tool was made to offer; use it in other ways and you risk failing at your task, violating warranties, nullifying offers of technical support, and running up against a pervasive but quiet set of social expectations of "how things are done."

Still, this process is never complete or determining. To overstate the consequences of a technology independent of how users engage with and remake it is to make the same mistake made in the old "hypodermic needle" theory of media effects.[65] Movies don't tell us how to think. Just as the viewer can refuse the implied meanings and implicit worldviews in a film, choosing to see things in a different way, a user may refuse the implied arrangement of their activity the tool proposes. And this cycle continues, just as conversation does: As noted by Gieryn, "We mold buildings, they mold us, we mold them anew."[66] Sometimes an unexpected use can upend what designers intended, but never entirely, since it can no more escape the intended consequences than one can reject a political argument without making reference to it. Every use creates yet another context in which this negotiation will continue.

Technologies, then, are socially constructed, but they are socially constructed so as to have consequences. The fact that technologies are negotiated and renamed and undone does not mean they have no impact. But sometimes they succeed in being consequential in the intended ways, and sometimes they end up having very different results. Users have a great deal to do with this. The construction of a technology, both material and social, is always purposeful, and the contestation around it is a symbolic battle to see whose idea of the proper choreography of user activity will triumph. Understanding this in terms of mediation allows us to see both sides as agents negotiating a contested collaboration, and both efforts as being forceful without being determining—a give-and-take with quite a bit of latitude, but not on a level playing field.

That this mediated "conversation" is never conducted on a level playing field may help explain why some technologies do have consistent politics despite the room for negotiation. The bridge and the speed bump are produced and deployed by institutions that are in a powerful position from which to insist on their proper use. The makers of consumer technologies must convince users to use them, which means the negotiation must be a substantively open one. Things built by the state, on the other hand, though they too have to gain the consensus of citizens to some extent, come with built-in authority and with real consequences for those who contest them. It is difficult for users to negotiate the meaning of state-sanctioned artifacts on a level that could alter their political imposition of control. (DRM, we will see, is both a consumer technology and, at the same time, sanctioned by the state.)

Like an argument, a technology puts its authors/designers and their social context into contact with its listeners/users and their social context, and attempts to convince them of a particular way to understand the world. The technology mediates between these communities by bringing them into meaningful, if coded, conversation, and the political implications of that technology emerge from that conversation—a conversation about possible implications. Of course, as recent communication scholarship reminds us, the act of communication is never only about getting your point across, getting the listener to understand or be persuaded. Communication is simultaneously transmission and ritual.[67] The very act of communicating is a coded claim designed to bring into existence a world as the speaker sees it; the conversation around that act of communication is a negotiation about the world as it stands and as it could become—"not toward the extension of messages in space but toward the maintenance of society in time; not the act of imparting information but the representation of shared beliefs," according to Carey.[68] The point of contact manifest in the act of communication unites people as belonging to and participating in the same project, helping to confirm or occasionally interrogate ways of being, creating a collaborative site for negotiating our shared reality. Using a sophisticated understanding of communication along both of these dimensions, we can bring the same insight to technology. Designing a tool is not only an attempt to facilitate (or inhibit) a behavior in an existing world; it's also an attempt to bring about an imagined world, and align human activity according to its logic. As Silverstone argued, "Technology, in this view, is the site of an (albeit often unequal) struggle for control: for the control of its meanings and for the control of its potency."[69]

But in the end, this comparison between technology and communication breaks down. In the case of communication, encountering the work is the entire interaction. I may read your story, and even be inspired to subsequently write my own, but the negotiation around the meaning of your story has ended. The same may apply to the bridge or the speed bump, in that I encounter the technology, decide in what way I will act within the constraints it imposes, and then move on. But with tools, particularly information technologies, I not only engage with the technology, I also then use it to produce something of my own, which often means bringing it to a second social context and imposing its implicit values on others. I may dislike Microsoft Word; I may cleverly add macros and shortcuts to struggle with the constraints it imposes upon me. But when I produce my manuscript in Word and send it to others in Word format, my renegotiation of its constraints is invisible to the next user. They only see that I have chosen Microsoft Word myself and have made it necessary for them to use it too; my reluctant use nevertheless extends and stabilizes its presence and influence in the world.

By Design

When it comes to law, we have no problem with authorized agents developing and imposing a set of rules, involving themselves in the activities of others, allowing some activities and prohibiting others, and sometimes imposing severe consequences. While we may not always love or admire every detail of that system in every instance, we generally consent to it. As it becomes clear that technology can be a similar means of intervention with similar consequences, it should come as no surprise that those charged with enforcing the law, and those with a legally legitimate

interest in the activities of others, have turned to the power of technology. This puts our question in a slightly different light, because what makes our speed bump different from the Long Island bridges is that it is officially designed and authorized to regulate by government fiat. The fact that an artifact regulates on behalf of the state raises specific questions, which are crucial to our analysis of technical copy protection and digital culture. We must wonder not only whether technologies have political consequences, but also whether they can be made to have them, and whether there are ramifications for using technologies in this way.

It may be somewhat simpler, though I would argue that it is just as important, to explain the political valence of technologies explicitly designed to regulate. A useful philosophical example here is the Panopticon, a prison imagined by philosopher Jeremy Bentham but never built. In a jail built as a cylinder of cells surrounding a central guard tower, with light from outside the jail shining through each cell, many prisoners could be watched by a single jailer. Even more powerfully, the prisoners could not see the jailer in his darkened tower, but would know that he could see them. According to Michel Foucault, this means that prisoners would experience surveillance whether or not anyone was even watching—internalizing the system of control and making it vastly more effective.[70] The particular design of the prison would serve political ends because it would force prisoners' bodies into lines of sight that would effectively discourage misbehavior, and would do so with very little force or ongoing human intervention.

Lessig points to more mundane examples to demonstrate not only that architecture governs behavior, but also that we regularly turn to the design of the material world as a regulatory mechanism, especially when other avenues such as the law are ineffective or prohibitively expensive. We may regulate driving by enforcing speed limits, arresting drunk drivers, and posting traffic cops at busy intersections. But we also install guardrails to orient drivers into lanes and keep them on the road; we put disruptive bumpers between highway lanes to keep them awake; and we lower and raise barriers to ensure that no one drives in front of an oncoming train, or leaves a parking lot without paying. Lessig's concern, as he tracks a shift already underway from "East Coast code" (law, as designed in Washington DC) to "West Coast code" (software and technical protocols, as designed in Silicon Valley), is that the technology of law and the technology of software regulate in different ways and with different implications. And the law will not merely give way to West Coast code; according to Lessig, it increasingly "sees how it might interact with West Coast code to induce it to regulate differently."[71]

The copy protection technologies being used or imagined for digital media are designed to work in similar ways. Certain practices, such as purchasing and playing digital content, will be facilitated and thereby encouraged; these technologies might even benefit users by offering more works in more settings at the touch of a button. But, at the moment of empowerment, the technology will also decisively regulate behavior. The restrictions on copying will be absolute, and blind to intention; this neutrality has distinctly political consequences, in that it blocks uses that have regularly been defended as crucially democratic, but that do not interest the corporate owners of the works being used.

Legal regulation, in both its articulation and its enforcement, is visible. If you want to know the details of a law, you can go to the library, state house, or Internet to read it. It may be in a difficult language for some, but not one so impenetrable as C++ or Javascript source code. The enforcement and adjudication of the law also happens in plain sight: police arrests and judicial decisions are all open to the press and to concerned citizens. These information flows are certainly far from perfect. But the public-ness of these processes is important because they adhere to an underlying democratic principle of transparency: The possibility of public scrutiny helps to ensure accountability. If there is a mistake in the law, someone will spot it. If a law seems unfair, someone will question it. If a law is being abused, those who are wronged can take action against it. Public agents like journalists and legislators are devoted not only to identifying problems and writing laws to solve them, but also to assessing how well a law is working and with what unintended consequences. This is the principle of a court of appeals: While district courts handle questions of fact, a case may be appealed if a participant believes there is a question of law to be resolved. Our legal system admits that rules are imperfect, open to interpretation, and vulnerable to misuse; it demands that the system regularly and skeptically reassess the imposition of control by scrutinizing the laws themselves.

Software code, on the other hand, is much less visible than law. These tools are generally designed in a language that is only comprehensible by a very small community. It is much more difficult for an interested citizen, who does not have the necessary programming expertise, to raise a subtle concern about the way a certain application or protocol organizes activity. Furthermore, most applications do not reveal their code even to those who

might understand it. While Internet protocols are, for the most part, openly shared and publicly available, the protocols built into proprietary intranets are not, especially not to the employees governed by them. The majority of consumer software is "closed," in that you purchase the tool but do not gain access to the underlying code in doing so.[72] A user concerned with the implications of Microsoft's word processor or AOL's browser literally cannot read the code that establishes and enforces those regulations. As Gieryn pointed out, "Once sealed shut, machines are capable of steering social action in ways not always meaningfully apprehended by actors or necessarily congruent with their interests or values."[73] For technical copy protection, this closed design includes the trusted system itself: The security of a trusted system depends on keeping its workings absolutely secret from its users.

While law speaks about what is and is not allowed, and intervenes after activity violates those conditions, technological regulation "allows for automated and self-executing rule enforcement,"[74] exerting control by making certain possibilities unavailable or nonexistent. What is not there cannot be done. After the court ordered Napster to impose a filter on its peer-to-peer network, copyrighted works available on one user's computer simply did not appear on the list when another user searched for them. A search for a particular song would turn up no hits—without explaining whether that was because no one had it, or because it had been filtered out. It was simply rendered invisible, as was any possibility of downloading it.

What we're talking about here is not a concrete speed bump, but a magnetic field that imperceptibly slows the car, and that the government makes both mandatory to obey and impossible to investigate. In fact, one of the purported appeals of a fully instituted trusted system is that the complexity of obeying the assigned digital rights would be buried inside the device. No longer will people have to know, or risk not understanding, the arcane intricacies of copyright law; the rules can be more complex and more sophisticatedly applied, while all users will see will be clean interfaces and gently rebuked requests—the perfect absence of a function, or a civil "Sorry, this file cannot be transferred" message, or, perhaps more likely, "Would you like to initiate the transfer? Only $1.75!"

The contest between law and its subjects, visible and messy but also accountable and improvable, is invisible in technological controls. Enforcement comes in the form of an absence of possibility rather than a prohibition; abuses, flaws, and injustices in the system are themselves encrypted. It is not clear that users will even know exactly what it is they cannot do, which makes it exceedingly difficult to criticize an unfair

system. And much of this technological regulation is an indirect form of government regulation, which means the legal intervention it enacts is also obscured. As Lessig frets, "indirection misdirects responsibility. When a government uses other structures of constraint to effect a constraint it could impose directly, it muddies the responsibility for that constraint and so undermines political accountability. If transparency is a value in constitutional government, indirection is its enemy."[75]

Heterogeneous Engineering

The speed bump, once an unassuming slab of concrete, is revealed to be a complex sociocultural artifact, an object of contestation struggled over by designers, legislators, critics, and users. It regulates, quite effectively, though not with anything like the simplicity we imagined, and it can be unbuilt and rebuilt as users come to it, reconstruct it as meaningful artifact, and convince others to see it as such. It is one element in a complex "sociotechnical ensemble,"[76] as it connects with curbs and bicyclists and shock absorbers and pavers and pedestrians and political slogans. Together all these elements form a relatively stable array that best suits the desired activities of a great many people sharing a single space, and imposes some regulatory consequence on some of them when they drive too fast.

Yet even this complex and interlocking matrix of elements is insufficient to achieve the results necessary. The speed bump cannot work alone. We regularly overlook this; in fact, we may even be impressed that the speed bump seems to function without any help, whereas any alternative would require the messy combination of police officers, speed limits, jurisdictions, exceptions, courts, and prisons. This is a mirage, though not a surprising one in a culture that holds such great faith in the way technologies can cleanly intervene and solve messy social problems. In a way, Winner is seduced by this idea too, marveling at how the bridges, by themselves, discriminate between car and bus passengers with political effect, and do so with such subtlety and apparent disconnection from human politics that they are overlooked by the very people being discriminated against.

Low bridges may regulate the passage of people in buses. But it is easy to overlook, as Winner does, that this is both because it is difficult to get under them *and* because it is illegal for the driver to blow them up. No bridge, low or otherwise, could stop a bus whose driver was equipped with and willing to use a small charge of dynamite. No speed bump can regulate drivers who choose to take a sledgehammer to it. No prison can incarcerate people who have not been shackled and forcibly dragged there and

stripped of the tools necessary to escape. These observations may seem slightly absurd or obvious, but this is only because they are so contrary to our foundational set of laws prohibiting the destruction of public property, because we rarely dare to act outside of those baseline rules.[77]

What Winner's argument overlooks is that, just as technologies are constructed in ways that serve systems of power, systems of power are constructed along with the technology, so as to regulate human activity together. The power of the artifact as an accidental or deliberate constraint depends in part on a set of rules, and on the social and institutional mechanisms behind those rules, guaranteeing that the artifact will remain in place and continue to intervene in human activity as it was designed to, and that trying to avoid or change it will have consequences. These mechanisms also lend the artifact additional authority: As Joerges writes, "The power represented in built and other technical devices is not to be found in *the formal attributes of these things themselves*. Only their *authorization*, their legitimate representation, gives shape to the definitive effects they may have . . . In this view, it is the processes by which authorizations are built, maintained, contested and changed which are at issue in any social study of built spaces and technology."[78]

The permanence of material artifacts, then, is a sociopolitical accomplishment, not a natural fact. We could imagine, though it's not easy, a world in which there were no rule against destroying public property and no compunction not to—where the moment someone built a speed bump, someone else came along and smashed it to bits. As Chandra Mukerji reminds us, New Yorkers experienced this for a cruel moment in September 2001, when terrorists destroyed the World Trade Center. Part of the shock of that act, beyond the criminal and moral violation of mass murder and destruction, was the political violation of bringing down a technological monument that until that moment represented a vision of national and commercial power—that spoke for most Americans of efficiency, progress, and benevolent growth—and bringing it down by violently slamming another legitimate technological system against it.[79] The speed bump cannot have force outside of a legal environment that distinguishes between public and private property and criminalizes the destruction of that which is not your own, and it is that political regime that is reified when we build a speed bump or impose technical copy protections, engineering the material world in order to embody and impose its ideals.

These political frameworks may be in place not just to support the artifact itself, but to pursue the same goal alongside it. Technical design is one, but certainly not the only, avenue for choreographing human activity.

Even when it is relatively unimportant to do so, designers attempt to guide users in ways other than the technical. Stickers warn users away from tampering with certain parts, manuals describe appropriate use, training demonstrates the proper ends to which the technology should be put. When the technology must regulate, especially in an explicitly legal way, it is always, and must be, one piece of a multi-pronged strategy. Though speed bumps need not be accompanied by a reduced speed limit, they almost always are. Curbs and sidewalks are accompanied by community regulations articulating what a sidewalk is for, who is authorized to use it, and under what conditions. What technical regulations do is merely move the point of intervention. This may mask the force of the state in the way Winner suggests, but it certainly does not remove it from the equation altogether.

Thomas Hughes addresses this multipronged approach when he reminds us that all engineers are "system builders,"[80] designing not only material artifacts but also the economic, political, social, and cultural arrangements that will best suit those technologies. Designing the speed bump to the right height such that users tend to slow down to the desired speed is one way to choreograph human activity, but it is not the only way: The same local officials who installed the speed bump may also mandate speed limits, impose financial penalties, shift cultural attitudes about speeding, and tax the sale of fast cars to reinforce the behavior. Furthermore, designers may work to shift material elements of this "seamless web"[81] of things, people, and rules to ensure the speed bump does its job: lobbying for higher curbs, calling for bans on extreme shock absorbers, designing movable speed bumps to encourage their deployment in a context-dependent way, etc.

John Law, discussing the efforts of explorers to develop reliable oceanic trade routes down the coast of Africa, offers us a useful way of thinking even more broadly about this feature of technological regulation. For him, technology is a combination of heterogeneous forces and elements, some material and some not, that is designed to intervene in a social and material environment to some end. "Let me, then, define technology as a family of methods for associating and channeling other entities and forces, both human and nonhuman. It is a method, one method, for the conduct of heterogeneous engineering, for the construction of a relatively stable system of related bits and pieces with emergent properties in a hostile or indifferent environment."[82]

To say that European sailors built stronger ships better suited to the African journey is to overlook the wide variety of other tactics they used

to solve the problems posed by the harsh Atlantic currents. Sturdier ships drew more power from the wind, which meant fewer crew and therefore more room for supplies, which meant the routes could move away from the coast; magnetic compasses meant they could reliably find their way back from the open sea; this made possible new routes that went out into the open ocean and used the strong currents of the Atlantic to return, which proved better than slowly tacking up the coast. The solution was not exclusively technical, although technical innovations were important. The effort of the explorers required lashing together heterogeneous elements (natural, manmade, social, intellectual) into a stable array that together could overcome the forces of a hostile environment determined to pull them apart. This is "the fundamental problem faced by system-builders: how to juxtapose and relate heterogeneous elements together such that they stay in place and are not disassociated by other actors in the environment in the course of the inevitable struggles—whether those are social or physical or some combination of the two."[83]

The speed bump may be the most visible element intervening in the road traffic on our hypothetical street. But if we share Law's commitment to noticing the heterogeneous engineering at work, we can see how city authorities brought together the speed bump and its tendency to not give when vehicles pass over it, the curb and its capacity to keep cars channeled into the roadway, shock absorbers and their tendency to transmit rough terrain to the body of the driver, yellow paint that draws the human eye and has come to signify a warning, speed limits and the mechanisms of law and order to impose consequences for speeders, pervasive cultural attitudes that privilege the safety of pedestrians over the desire to hurry, and the legal and intellectual regime of property that discourages and penalizes the destruction of a public artifact like a speed bump. The laws of physics, the design of automobiles, the rights of ownership, and the cultural mores of human liberties are bound together in a concerted strategy to compel drivers to slow down along that particular stretch of road. The hypothetical challenges faced by our speed bump suggest some of the ways in which forces hostile to this project work to disassociate these elements: The teenagers adamantly embrace the bumpy ride as an entertaining sign of youthful endurance rather than an unpleasant shock worth avoiding, and the young couple works to separate the speed bump from its cultural justification by posing a different right that's potentially worth more protection. We could even imagine the steps that might follow in an effort to maintain the utility of the speed bump: laws outlawing the super shock absorbers, the removal of speed bumps on routes near hospitals, a public campaign heralding the importance of pedestrian safety, and so on.

To understand the regulation of human activity imposed by a bridge, a speed bump, or a DRM encryption system, we need to look not simply at the technological edge of that regulation and what its political consequences may be, but at the heterogeneous network of elements it represents, how they together regulate activity (more than the technology could ever do by itself), and, most important, how these elements are being held together, by whom, and against what challenges. As Law notes, "Successful large-scale heterogeneous engineering is difficult. Elements in the network prove difficult to tame or difficult to hold in place. Vigilance and surveillance have to be maintained, or else the elements will fall out of line and the network will crumble. The network approach stresses this by noting there is almost always some degree of divergence between what the elements of a network would do if left to their own devices and what they are obliged, encouraged, or forced to do when they are enrolled within a network."[84] These efforts are the real force that either successfully regulates users, or fails to do so. The crucial point of analysis is the set of tactics particular individuals or institutions use to assemble this heterogeneous network of elements, justify each of them in isolation and together, and work to vigilantly bind them together against the onslaught of those who remain unconvinced. And, to fully appreciate the power of this heterogeneous approach to regulation, we must also recognize that the heterogeneity itself can help obscure the machinations of power at work here. No one element (technological, legal, economic, political, cultural) by itself could sufficiently regulate the activity in question. As it is only when all elements are deployed in concert that they have the consequences they do, it is much more difficult to identify and assign responsibility for those consequences.

Technological regulation, then, is never merely regulation by technology; it is the prominent inclusion of technical elements into an aligned set of efforts, partnerships, and laws that together arrange people and activities into a coherent system. DRM as a technology draws our attention and criticism, but it is only a part of what is going on in the enforcement of copyright in the digital age. Legal, institutional, and cultural interventions are also being designed to work alongside DRM, and even to make it possible for it to do what it claims to do. These interventions may be of the greatest consequence. If we take Law's perspective, technology has always been a part of the project to regulate users in their copying and

redistribution of culture: For example, music distributors long relied on the fact that cassette tapes lost a generation of quality with every subsequent copy, thus curbing some piracy and requiring somewhat less stringent legal enforcement. What may be new here is only the relative importance of the technical elements, or the fact that the technology is now the first line of defense, or that "technology" as a neutral and comprehensive arbiter is being held up as a new symbol of fairness. Or, perhaps what we're seeing is that digital technology, because it can be designed to intervene in particularly sophisticated ways, is serving two purposes here: as a mechanism for guiding user activity and closing off certain options, but also as the means to hold all the elements of this regulatory regime together.

A Regime of Alignment

In the most recent battles over copyright, content owners have been turning to technological strategies, but the ability to successfully intervene cannot rely on the technologies alone. As Law's analysis suggests, it involves the careful deployment of technological artifacts, social institutions, and discursive justifications, in a sociotechnical arrangement of material and ideological resources that facilitates some behaviors and shuts down alternatives. DRM and the trusted system architecture make this most apparent. What's necessary to make a trusted system work? Certainly the technological apparatus and the necessary protocols must be designed, and this is no small task. Further, the public must be convinced and/or required to adopt it. This technology has not only a number of parts but also a number of supplemental components, each of which has technical and institutional kinks still to be worked out. But the technology itself, robust as it might be, cannot regulate by itself. Complex technological systems require the simultaneous reworking of not only technical artifacts, but also legal, economic, and cultural arrangements to match.

A different way to pose this question is to ask again: Why, unlike your VCR, does your DVD player have no Record button? At one level, it is the simple fact that there is no Record button that prevents you from making unauthorized copies of Hollywood movies. But this speed bump is only the leading edge of a sociotechnical ensemble designed to regulate your consumption and use of your movies. Your DVD player does not have a Record button because the manufacturer signed a license with the major movie studios; this license stipulates a series of technical mandates about the device, the purpose of which is to protect the content of DVDs from being duplicated. These mandates include the absence of a Record button.

The reason you can't easily buy a different DVD player that has a Record button is that all major manufacturers have signed this same license. The reason they all sign and honor this license is that every Hollywood DVD is encrypted, meaning that any DVD player must include one of a set of decryption keys—keys they can only get from the studios upon signing the license. The DVD is encrypted not in order to prevent users from making copies (traditional pirating operations that simply stamp exact copies of the DVD are not frustrated by encryption) but to ensure that DVD manufacturers consent to the terms of these licenses, giving the studios the ability to dictate what DVD players will and will not allow. So while it is the device that specifically prevents copying, and it is the DRM encryption technology that makes the disc unreadable, it is all of these elements working in concert that render some activities possible and others impossible. In fact, the technological innovation is not copy protection, but a more powerful assurance that this complex arrangement will be necessary and enforceable—a trusted system.

The death knell of the trusted system is, of course, the ability to circumvent the built-in rules: As Stefik warns, "The physical integrity, communications integrity, and the behavioral integrity of a repository are the foundations of a trusted system."[85] The system must therefore also be designed to withstand attack, technologically and legally. If the user can break the encryption, or trick the system into dumping unprotected copies onto their computer, or pry open and re-wire the device, or reprogram the system to not charge fees, the system will be leaky. And if a hacker can develop a tool to do these things and pass it around on the Internet, the entire system will disintegrate. So the seamless web of heterogeneous elements must grow. The reason people don't simply build their own DVD players with Record buttons is because they cannot get a decryption key without signing a license; either they would have to sign the license and then violate it, risking a lawsuit, or they would have to devise another way to build that recording DVD player—one that does not need a decryption key because it circumvents the encryption altogether. This is certainly possible, but it is also a violation of the law: The Digital Millennium Copyright Act (DMCA), a law the content industries vigorously lobbied for, prohibits circumvention of copyright encryption schemes.

Using the specter of Internet piracy as a powerful and persuasive scare tactic, the music and movie industries are actually pursuing a four-pronged strategy to control use of their content: legal efforts to prosecute users who share and download, and to also criminalize the production of tools and networks that facilitate these users; technological efforts to make their

content, and the devices used to experience it, more resilient to casual copying; contract arrangements between industries to ensure that the guidelines imposed through law and technology are followed; and political efforts to convince legislators to make such systems mandatory.[86] It is not DRM but the sociotechnical ensemble in its entirety, including the political, institutional, and cultural efforts that ensure its presence and its legitimacy, that has consequences for users' engagement with digital culture.

Mark Rose called modern copyright a shift from a "regime of regulation" to a "regime of property";[87] I'll call this new approach a "regime of alignment": the alignment of distribution systems through material and legal constraints, the alignment of allied institutions through technologically enforced licenses and ideological linkages, and the alignment of access, use, and consumption through a network of restrictions and facilitations. Even if hardware manufacturers, in order to appeal to their consumers, might want to reject the content restrictions preferred by copyright owners, they will find themselves compelled by encryption systems to either accept the terms of the arrangement or get out of the game altogether. This is not a mere imposition of code, not just a speed bump, but the interlocking of the technological, the legal, the institutional, and the discursive to carefully direct user activity according to particular agendas. And more often than not, it is not law designing these regimes. Instead, the legislators and courts assent to play a support role to privately organized arrangements that, while they may pretend to be in the service of public goals, were not designed for those ends.

The way the media industries are intervening into the practices of their consumers, both to regulate copying and to extract payment, requires the careful and systematic alignment of resources around the use of digital content. If the content industries cannot get hardware manufacturers to agree to install the technological limits they desire, or if lawmakers will not use the prohibition of circumvention to stop designers from evading the industry agreements, the entire system collapses. As Joerges observes, "The power of things does not lie in themselves. It lies in their associations; it is the product of the way they are put together and distributed."[88] DRM cannot work without this regime of alignment.

It is this set of associations, this heterogeneous engineering, that we must examine. Looking only at the DRM technologies, or strictly at the law of copyright and its application, or exclusively at the economic dynamics of the entertainment industry, we will always come up short. The efforts to regulate depend on their intersection, on their combination. This complex alignment of technologies, rules, institutions, markets, and people is by no means simple or inevitable, but it thrives in part because our scrutiny so often sees only its components in isolation, like the blind men unable to describe the elephant.

The remainder of the book will consider this particular regime of alignment in terms of four components: (1) the effort to give this strategy cultural legitimacy, (2) the political mobilization necessary to bring into economic and ideological alignment the institutions that could produce the trusted system, (3) the particular effort to grant this arrangement the authority of the state, and (4) attempts to build the system to resist the agency of its own users. By scrutinizing this heterogeneous system of associations, we may not only reveal the more subtle elements of the copyright debates that so often disappear from view. We may also recognize how this process of legitimation and mobilization, regardless of whether the particular implementation succeeds, can have its own consequences for the movement and regulation of digital culture.

> We must begin this analysis by understanding how such a complex set of alignments was invoked and justified. In a world in which doing nothing is easier than doing something, and "staying the course" is a legitimate political position, radically revising copyright law and installing a menagerie of new technologies designed to restrict uses that are becoming massively popular is much harder than not doing so. In order to pull together all of the pieces of this strategy, the proponents of the trusted system would need a provocative call to arms, a compelling rhetorical justification that offered a clear articulation of right and wrong, a dramatic narrative that could persuade a number of reluctant elements to coincide. The first step in producing this regime of alignment is cultural legitimation.