# 1 | The Technological Fix

It seems like ages, although it's been only a few short decades, since Alvin Weinberg posed the question, "In view of the simplicity of technological engineering and the complexity of social engineering, to what extent can social problems be circumvented by reducing them to technological problems? Can we identify Quick Technological Fixes for profound and almost infinitely complicated social problems, 'fixes' that are within the grasp of modern technology, and which would either eliminate the original social problem without requiring a change in the individual's social attitudes, or would so alter the problem as to make its resolution more feasible?"[1] We may be a bit amused, or perhaps a little shocked, by the naïveté of Weinberg's tragically optimistic question—especially when we discover that his answer was a qualified "yes" pointing to, of all things, the hydrogen bomb as a successful technological fix for the social problem of war.

We can only hope we'll never again be so naïve as to think we can somehow simply and justly resolve social problems with technologies, or so oblivious to their own intricate consequences when we try to do so anyway. But it's a surprisingly elusive lesson. We still search for, and long for, such "technological fixes"—even as we give perfunctory lip service to how they are only stopgap measures or technological add-ons to social policies. As Carolyn Marvin wrote, "People often imagine that, like Michelangelo chipping away at the block of marble, new technologies will make the world more nearly what it was meant to be all along."[2] And the social problems we hope to resolve are as intractable as when Weinberg wrote. We hope trigger locks will reduce violent crime, cameras and facial recognition algorithms will ensure privacy and public safety, smart ID cards will squelch terrorism, the V-chip will protect children from images of sex and violence. These technologies hold out the promise of attaining progressive social goals, and of doing so effectively, fairly, and without

discrimination—a promise built upon the persistent sense that technologies exist outside the frailty, inertia, and selfishness of human politics.

This faith in technology as an inherently progressive force is a powerful Western paradigm wrapped tightly into the ethos of American culture. Yet it is an illusion. By itself, technology can never solve the problems its proponents aspire to solve. Imagining that new technology will rescue us from our persistent social ills allows us to momentarily forego the much harder questions: What are the social bases for the problem, how do they work, and why does the problem persist? What forces shaped this technology, what is it supposed to accomplish, and what does it demand of us in order to work? Technological fixes also help abrogate the responsibility of both the people involved in the problem and the designers of the technology themselves. Perhaps this sense of determinism is appealing—don't we want the new dishwasher to scrub our cares away? Rob Kling notes that these "utopian visions" resonate with the public imagination because "their causal simplicity gives them great clarity and makes them easy to grasp, to enjoy or to abhor. They can resonate with our dreams and nightmares."[3] And in a culture bound tightly to an economic and ideological commitment to a never-ending flow of new commodities, planned obsolescence, and the luxurious promises of advertising, the claim that technologies will fix what ails us is an all-too-familiar marketing ploy.

Whenever a new technology arrives, it typically evokes a flurry of questions, hopes, fears, and predictions about what it will do, marked by an underlying faith in social progress through technology. The particular character of the claims about what the technology will accomplish will depend on which of its features are most novel. But, even more, the claims will depend on the particular dilemmas we as a society are facing at that moment. The arrival of a new tool will often get entangled in current tales of social conflict and cultural failings, championed as a long-awaited solution. The printing press would bring forth a new era of learning; electricity would end the tyranny of nighttime over human accomplishment; the radio would unite the nation into a single community; television would bring the world into our living rooms; weapons of mass destruction would banish war.[4] Discourses surrounding new technologies typically "predict a radical discontinuity from history and the present human condition";[5] we expect technologies to intervene in precisely those aspects of society we find most troubling, those we have secretly hoped to finally resolve.

Paul Duguid suggests that these cycles of technological prophecy regularly depend on two principles: supersession, "the idea that each new

technological type vanquishes or subsumes its predecessors," and liberation, "the argument or assumption that the pursuit of new information technologies is simultaneously a righteous pursuit of liberty."[6] These make a kind of logical sense together: An old technology imposes constraints on its users, an improved technology resolves those problems and thus replaces its now worthless predecessor. Social limitations (e.g., the stultifying isolation of life in the vast American wilderness) are tied to established technologies (newspapers, which require human proximity to be distributed); the new technology (radio) will fully replace the old because it removes the barrier it imposed.[7] The "pioneer in the wilderness, the farmer on his isolated acres" will have the news of the nation at their fingertips, will find themselves connected to their fellow man despite the miles, and will be free to exercise their democratic rights as citizens in a way that they could not before.[8]

It is a cohesive vision well suited to an Enlightenment idea that history itself is always a tale of broad social progress. It is also well suited to the interests of capital, which must convince consumers that, despite the quality, durability, and initial appeal of the old commodity, the new product is an urgent improvement rather than a frivolous luxury. Most of all, the broader social structure survives intact; the break is not only resolved, it's welcomed, assured somehow by "the paradoxical prediction that freedom from technology can be achieved through technology."[9]

This requires, of course, that tales of a technology's progressive potential must follow, or be paired with, tales of the previous technologies' limits, failings, and dangers. Dystopic worries about technology are the necessary flipside of the coin; faith in the new technology requires that we perennially forget, or ignore, our faith in each technology that preceded it. This deliberate aphasia allows us to map social ills onto the caricatured evolution of our tools, conjuring a reassuring tale of benevolent and unproblematic progress. Discussing an optimistic faith around the coming of electricity, James Carey notes that "electricity promised, so it seemed, the same freedom, decentralization, ecological harmony, and democratic community that had hitherto been guaranteed but left undelivered by mechanization. But electricity also promised the same power, productivity, and economic expansion previously guaranteed and delivered by mechanical industrialization"[10]—the very ills that critics were looking to electricity to cure.[11] Instead of addressing the complexity and specificity of the interaction between technologies and the sociocultural activities in which they are embedded, critics prefer to embrace this compelling fantasy of waves of technological progress.

**The Internet and the Question of Copyright**

There are certainly better ways to think about the relationship between technological and social change, yet this naïve optimism persists. The Internet brought with it the same rhetoric of supersession and liberation in the whirlwind of hype and hoopla that surrounded its arrival.[12] In a culture fascinated with technological innovation and devoted to the religion of progress, it should come as no surprise that the Internet captured our imagination, spurring the same optimistic predictions as electricity, the automobile, radio, even the hydrogen bomb. According to the Internet's proponents, education would become truly universal as all human knowledge became perfectly and instantly accessible to all. Championed by both the left and the right,[13] the Internet would allow democracy to flourish as citizens went online to debate important issues and politicians spoke directly to the people. Environmentally destructive urban populaces would scatter to the natural idylls once they could work flexible hours from home. The social barriers of race, class, and gender would disintegrate as identity became a virtual plaything, a costume put on with a keystroke. Censorship would fail and wisdom would flourish as those who deserved to be heard could speak freely. Or as *Wired* announced (ironically, in an article about technological disasters), "We think technology is rapidly opening up possibilities and revolutionizing the old order in a way that gives a chance to smaller players. We are unabashed optimists about our collective opportunities as we round the corner into the next century. We are skeptical of anyone's claims (including our own) to know what the future brings, but we look at the glass and see that it is no longer half-full but brimming over."[14]

Yet amid all this promise, the Internet was also being criticized as a grave threat to culture, morality, and society. The earliest legislative attention paid to the new medium concerned the proliferation of pornography online, accessible to anyone in any community at any age. Though these particular worries turned out to be dramatically overstated, we continue to fret about the "promiscuity" of the Internet, facilitating the circulation of not only the loftiest elements of our culture, but also the basest: pornography, hatred, misinformation, unbridled gossip. Concerns also erupted about the "death of privacy" harkened by the Internet: personal information vulnerable to identity thieves, corporate information open to clever hackers, children's personal safety threatened by online stalkers offering virtual candy.[15] Again, the concerns about the Internet's impact on privacy have since shifted. Nevertheless, the fear that the "radical discontinuity"

of the Internet would lead to social ills rather than progress persists. So once again we look to technological solutions to seemingly technological problems, now with the Internet as the problem in need of a technical solution so that its liberatory promise can be fulfilled.

Nowhere has this been more visible than in the recent controversies around copyright law in the digital environment. Once the exclusive domain of corporate lawyers and policymakers, copyright spilled into public awareness with the emergence of the Internet. Designed to regulate the movement of culture by making it a market commodity, copyright now faced a technology that dramatically reimagined how and by whom culture is produced, sold, distributed, and consumed. At the same moment, those industries most invested in copyright found themselves scrambling to keep up with the accelerated stakes of the so-called knowledge economy. The game had changed, not only technologically but economically, politically, and culturally. Would the Internet prompt the renovation of copyright law and the proliferation of new techniques of cultural production that could exceed traditional copyright's limited imagination? Or would it require the imposition of even more stringent versions of the law, to compensate for the absence of those material and economic constraints endemic to physical manufacture and exchange?[16] Many have argued that this battle extends well past the definition of copyright to a clash of paradigms about the control of information: Lawrence Lessig describes it as the choice between "free" versus "permission" culture, Siva Vaidhyanathan calls it a struggle between "anarchy" versus "oligarchy."[17]

The rapid rise of Napster and peer-to-peer file trading offered the flashpoint, provoking the major U.S. entertainment corporations to declare a legal war: against Napster, against proponents of an unregulated Internet, and at times against their own customers. Some foretold the death of copyright; others railed against the sin of piracy and called for new laws to save the endangered species known as artists. Record labels found themselves suing their own consumers; movie studios produced expensive trailers lecturing reluctant audiences, some of whom were, at that moment, automatically downloading Hollywood blockbusters on their computers at home. Digital startups looking to take advantage of the ease of distribution the Internet provides found themselves caught in the crossfire, while the major content providers took flak in the press for not pursuing new business models themselves. Some artists proclaimed their support for their publishers, while others looked the other way as their work appeared online, or even helped it get there; Metallica sued Napster to protect its copyright while Chuck D spoke out in Napster's support. Apple courted

the middle with an industry-friendly plan to sell content through iTunes, only to find itself in competition with a resuscitated Napster providing authorized digital music by subscription.

For the most part, these battles have taken place in the courts and in the court of public opinion; a legal effort to use copyright to stem the tide of "piracy" faces a cultural movement enamored with the appeal of the new technology. But under cover of this noisy debate, content providers and lawmakers have begun to implement significant changes in the way copyright is applied in a digital culture. At the core of these changes is a fundamental shift in strategy, from regulating the use of technology through law to regulating the design of the technology so as to constrain use.

Such strategies aim to take advantage of the fact that, while digital technology may facilitate a dizzying array of choices and opportunities at blistering speed and with total access, it can also be used to keep close tabs on what is being done and by whom. Technical barriers and rules can be incorporated directly into the communication networks that we increasingly use to participate in community, in commercial exchange, in politics, and in the conversation of culture. What we might call "social engineering" has come full circle back to actual engineering, where the tools and the environment are built to assure that the right practices are facilitated, the wrong are inhibited. These technologies are largely being developed and deployed below our cultural radar, enamored as we are with the thrill of the "information revolution," the faith in progress, and the freedom of individual agency.

## Turning to Technology

Consider the court's decision in the lawsuit against the Napster peer-to-peer (p2p) network. While the most important aspect of the decision at the time was the fact that Napster lost the case, it is the particular way in which they lost, at least in the courtroom, that offers an important harbinger of the broader shifts in law, technology, and culture we are now experiencing. Cursory histories of the Napster case may remember only that the courts, finding on behalf of the major record industries, shut down Napster for contributing to massive online copyright infringement. But the Ninth Circuit Court of Appeals actually did no such thing; although it may have been their underlying intention, the court did not mandate that Napster turn off its servers or cease its business operations. Instead, noting that "Napster has both the ability to use its search function to identify infringing musical recordings and the right to bar participation of users

who engage in the transmission of infringing files,"[18] they called for a technological fix, one designed to change Napster so it would systematically discern and filter out the unauthorized music the Recording Industry Association of America (RIAA) had complained about.

Set aside for the moment the legal question of whether the maker of a tool should be held accountable for the uses the tool is put to. This effort to deploy a technological artifact as a legal intervention represents a larger strategy that, even in the short time since the Napster decision, has become a full-fledged project on behalf of the major culture industries.[19] Rather than articulating what can and cannot be done legally with a copyrighted work, this approach favors the design of encryption technologies (once reserved for military secrecy) to build the legal standards of copyright directly into the artifact—such that some uses are possible and others are rendered impossible. While the proponents of this approach (most notably the U.S. music and film industries) have taken great pains to maintain that this is simply a practical improvement required to counter the hazards of the Internet, matching copyright law in terms of the ends it will achieve, this use of encryption represents a dramatic new intervention into communication and culture. Once again, we are putting faith in a technical solution to a social problem.

The film and music industries are in some ways following in the footsteps of the software industry, which in the 1980s had to grapple with the ease of unauthorized reproduction and distribution of their content; indeed, they are expanding on some of the solutions the software industry developed in response. But what was once simple password protection is becoming something much more significant. Current encryption techniques allow content owners to decide who gets access to their work according to much more precise, subtle, and modifiable criteria. Today, digital content can include information indicating how, when, and where that content can be used, rules that will be honored automatically by the devices we use to consume it. With these innovations, film and music distributors are going far beyond what the software industry had once imagined, to govern not only whether we copy their work, but also how we buy, share, experience, and interact with it.

The inflated rhetoric of the copyright wars has provided a compelling cover for a sometimes concerted attempt to develop this technological architecture. This intervention aspires to regulate not only copyright but also nearly every dimension of the distribution and consumption of culture. These control strategies have thus far been of limited effectiveness in the face of persistent hackers, the efforts of commercial bootleggers, the

powerful appeal of free and accessible entertainment for a generation that has known little else, and the ubiquitous cultures of sharing pervasive to the societies and economies of India, China, and elsewhere. However, regardless of (or even in spite of) its likelihood of success, this strategy warrants critical attention, and not only for its possible consequences for copyright. Enlisting technological design as a way to regulate its users will have significant consequences for the trajectory and cultural life of digital technologies, and for how we get to make use of them.

We don't usually think very explicitly about how the construction of walls subtly regulates our activity. Certainly, some of us are aware of this at moments—prisoners know it is the walls and the guards, and particularly their combination, that restrict their freedom so effectively; the residents of what was once East Berlin, or today's inhabitants of the Gaza Strip or Tijuana, are all too cognizant of the unique power of combining political authority, legal force, and technical barriers to intervene in people's lives. Those of us who are relatively untouched by such dramatic impositions of control are afforded the pleasure of seeing the technologies around us as facilitating rather than limiting, offering opportunities to participate in social life as we please. But this invisibility does not mean these arrangements are any less consequential. Technologies choreograph our social activity, often with political consequences, and can be made to do so in increasingly sophisticated ways with digital technology. And when technological design must be directed so that the technologies will enforce laws, the delicate dynamics of technological innovation can be profoundly disturbed.

Building the rules of copyright into the technologies themselves similarly aims to intervene in human activity while disappearing beneath business as usual. Technical copy protection preempts those activities that copyright law has traditionally prohibited, but the translation of legal rules into code may not prove particularly adept at handling copyright's legal subtleties. At the same time, new possibilities for communication and collaboration encouraged by the particular shape of the Internet may find little space to grow inside restrictions based on traditional copyright, especially as it is understood by those whose business models are most powerfully undercut by these new practices.

**Beyond the Technical**

The premise of this book is that in order to understand what is happening to digital copyright, we must broaden the question. While impor-

tant concerns have already been raised about the consequences of these technical control strategies for copyright law,[20] considering these artifacts away from their broader sociopolitical contexts fundamentally misunderstands the kind of controls being developed. We must dare to expand our scrutiny, to see this complex shift in a wider context. The technologies are only the most visible elements of an increasingly cohesive regulatory strategy, sometimes called the "trusted system."

Consider for a moment how most of us are prevented from copying our DVDs. The first line of defense is that the DVD players widely available to consumers do not have a Record button. The act of copying is simply absent from the technological choices offered. This is a powerful barrier, enough to stop most people most of the time from copying the movie they rented. Yet this is only the interface to the underlying system of control, and to stop there begs the question why manufacturers of DVD players, knowing their customers might like to copy their favorite movies, don't design for it.

Manufacturers of DVD players do not offer Record buttons because they are prohibited from doing so by a license arrangement with the movie industry. They assent to this license in order to get the key to unlock the encryption system of DVDs, which is necessary even just to play them; these keys are developed and held by the movie industry and its select technology industry partners. Users simply must abide by the rules built into the technology, even rules that extend well beyond the traditional prohibitions of copyright.

Additionally, any users who might tinker with their DVD players or hack around the protection codes on the DVDs themselves can be criminally prosecuted under new copyright statutes that now strengthen all technical content protection. Such laws are backed by legislators and courts willing to privilege the interests of content providers over the public protections of traditional copyright law, a perspective well fed by the culture industries, which have carefully articulated the problem of Internet piracy as a dire emergency.

An effective version of this system would not be merely a technical achievement. The trusted system relies on more than technology as its primary means of enforcing copyright. It must back that technology with the persuasive force of law and the legitimacy of new political and commercial alignments, and it needs a cultural performance of the risks and rewards sufficient enough to justify it. These elements work in tandem to reshape the movement of culture in ways that cannot be perceived when the elements are considered alone. No one element is sufficient to enforce

the rules being applied, yet in combination they impose a surprisingly strict code of conduct on users and manufacturers.

This is now well beyond a question of how copyright should work, in a digital world; it is the construction and legal authorization of socro-technical systems designed to select out those activities we want to render impossible (and the converse, those we hope to encourage). Critiques that fail to recognize these heterogeneous elements and how they interact not only misunderstand the situation; they inadvertently grant the trusted system greater power by portraying it as merely the sum of its parts. The situation demands the examination of how these legal, political, and cultural elements are produced, and how this complex array of forces is being lashed together in the service of technical content protection. Only that inquiry will effectively demonstrate that these structural alignments are as consequential for the dynamics of digital culture as the technologies they support.

**The Shape of Digital Culture**

Understanding not only the turn to technology as a regulatory strategy, but also the social, legal, political, and cultural mechanisms by which it is possible, is, at one level, crucial to the ongoing disputes about copyright and the Internet; it is a debate that has significant implications for both the production and circulation of culture, for the digital networks upon which that culture will move, and for the practices and institutions that will accommodate decisions made in the courts and in the marketplace.

Copyright is at the heart of cultural policy[21]—those rules that help to govern what is said, by whom, and with what effect. If we are at all concerned about the power of communication, the dynamics of democracy, the politics of culture, or freedom of expression, copyright must be a fundamental part of our inquiry. Shifts in the design and application of copyright law must be recognized as having consequences in all of these domains as they migrate to the digital realm. To the extent that the Internet, among other technologies, is increasingly designed and legislated to be a medium that not only facilitates communication but also imposes tight controls on it, we are very much shaping what the Internet is, will be, and can be. If the personal computer and the Internet are and will continue to be fundamental tools for cultural participation—the "new media"—then the institutional arrangements bent on pressuring hardware manufacturers to embrace restrictive, technoregulatory control systems warrant significant concern.

Moreover, whether or not this is the right strategy for copyright, what is most striking is that this tightly coupled arrangement of institutions, laws, and technologies is being deployed toward ends well beyond that of copyright protection. It is, in many instances, an effort to rename those rules and radically expand the rights traditionally granted to copyright owners. As I began my investigation into these cases, I expected to find a pull back toward the status quo, what Marvin described as "the process of social adjustment around a new technology, which is an occasion for introducing new rules and procedures around unaccustomed artifacts to bring them within the matrix of social knowledge and disposition."[22] It would go roughly like this: the Internet arrives; a number of critics in different domains, especially those shut out of existing arrangements of power, point to it to suggest the possibility of change; those in power turn to the stability and authority of existing law; using the law, they tame the new technology into submission. Instead, what I found was a story of both stasis *and* change. The maneuvers visible in these cases are not only about reaffirming existing arrangements familiar to copyright, but also about extending them, strengthening them, expanding them, reimagining them. Historically, copyright has privileged not the authors of cultural work but its distributors; the modern media industries are dominated by a select few corporations that have consolidated control over the culture market by asserting their intellectual property rights as a way to govern where work comes from and where it goes and to benefit financially from its circulation. While it appears that, as culture shifts into a digital environment, copyright will continue to give them this economic leverage, and that many of the same distributors will be able to retain this control, what is changing is what it will give them the authority to do.

The trusted system as it is being pursued can certainly prevent copying. More than that, it can also enforce complex pricing schemes and undermine the potential for fair use. In fact, these technological restrictions can make access to digital content dependent on users satisfying any number of obligations, well beyond the simple promise to use it within the strictures of copyright law. These constraints, piggybacked along with technical copy protections, will even more dramatically commodify culture, transforming our every encounter with a cultural work into a financial transaction, slicing up the populace into laser-precise market segments at the whim of industry. To the extent that such technological interventions impact some participants more than others, or normalize certain practices and marginalize others, they are likely to shift the structures of participation in culture and society more generally. They are a revised road map for

the movement of information, tightly regimented to ensure that, first and foremost, cultural goods are always and already commodities, and that being commodities trumps all other considerations.

While the debates about copyright law have historically focused on how the law helps or hinders the democratic movement of information, we must recognize that the dynamics of the market can also promote or stifle the production of and access to newsworthy insight, political diatribe, artistic expression, and biting parody. If the trusted system is used to enforce particular market constraints, then the entire arrangement is implicated in this question. The trusted system warrants serious questioning by those interested in the future of digital technology and all the cultural and social interaction that it may or may not host. As Thomas Streeter puts it, "The choices that shape property in media, insofar as they shape what it means to be a speaker and a listener in an electronically mediated environment, and hence subjectivity, may influence the character of social existence. The law of ephemeral property is thus becoming a principal terrain for constructing the contours of contemporary cultures. Ongoing developments in 'information' law and policy will draw boundaries that will undergird the development of social life."[23]

A clearer understanding of not only the relationship between law and technology but also the political and commercial arrangements beneath, will also contribute to the ongoing investigation into the political economy and sociocultural impact of digital cultural institutions. The emerging alignment between the culture industries, hardware and software manufacturers, policymakers, and the courts will have its own consequences. Recognizing this requires moving beyond the overblown hype of "information revolutions," as well as the converse tendency to take such changes for granted. It requires an analysis attuned to the quiet arrangements that are building new patterns and alliances in the industries that produce and distribute culture.[24]

Finally, the implications may extend well beyond the digital circulation of cultural expression. As technology moves from being the object of law to being the means of its implementation, those concerned with the social implications of technologies must prick up their ears. To the extent that we choose to turn to technology to regulate copyright, we are likely to embrace that strategy in other sociopolitical controversies where technology appears to have similarly neutral effects: genetics, nanoscience, public health, education, national security, etc. Be it for the protection of pop music or any other reason, the extent to which lawmakers are willing to regulate and arbitrate over technological design must be made plain,

scrutinized, and judged according to the criteria of political transparency, social equity, and cultural freedom.

## Chapter by Chapter

These questions are at once legal and philosophical, social and cultural, political and economic. As part of its theoretical engagement with these questions, this book aims to move beyond the standard legal critique of copyright by drawing on recent theories of technology, communication, and culture to consider its broader ramifications. Digital copyright is a perfect domain for examining not only the way we structure cultural expression through the mechanisms of law, technology, and the market, but also the way controversies such as these become sites for powerful and consequential debates about the future of culture to be reframed, for participants in that debate to position themselves as powerful agents in that future, and for provocative questions to be closed. With these insights, we can begin to reveal how political efforts, powerful but by no means determining, work to engineer digital culture both through technological design and through the production of laws, institutional arrangements, and cultural discourses to match.

At the same time, while we must address these questions on a theoretical level, the most useful insights come from an interrogation of real world arrangements, of the character of the alliances and compromises that have been constructed to make them possible, and of the disputes that have arisen around them. This book bases its analysis in this on-the-ground interpretive approach by considering three of the most prominent efforts by the U.S. content industries (one a failure, one largely a success, one still being debated) to impose complex control arrangements through the design of technology, and to build the legal and political infrastructure they would need in order to work.

To understand these controversies, it is important to understand the law of copyright and the forces that have shaped it over three centuries. The law represents the slow accumulation of years of disputes and compromises; cutting it open reveals this legacy just as tree rings reveal seasons of growth and tumult. **Chapter 2** introduces the reader to the workings of copyright law and the premises on which it is based. It is written for readers who are largely unfamiliar with copyright law and the recent controversies, but even those well versed in both will find some new approaches for moving beyond the first wave of concerns. Arguments for why copyright exists and how it should be applied are considered in light of its

fundamental contradiction: that it aspires to serve the public good by constructing a property regime premised on private gain. The effort to strike a balance between these often competing interests requires limits and exceptions that are both fundamental to copyright law and, at the same time, revealing of its inherent tensions.

The emergence of new technologies tends to disrupt the balances within this legal regime that manage its structural tensions. Like many technologies before it, the Internet made visible ambiguities that copyright law had not had to deal with before, and afforded an opportunity for those most invested in the workings of copyright law to tip the scales to their benefit. In response, traditional content industries and self-appointed Internet enthusiasts made very different claims for how the distribution of culture would work in a digital age, and how copyright should change to accommodate it. This largely theoretical dispute became all too real with the arrival and astounding popularity of Napster and peer-to-peer file-trading. This chapter offers a quick and dirty history of the music industry's legal attempts to shut down the deluge of unauthorized music sharing, and introduces the technical solutions being proposed: digital rights management (DRM), a means of encrypting digital content in order to limit access to it; and the "trusted system," a scheme whereby hardware and software authorized to access encrypted content will police what can be done with that content. The chapter ends by introducing some of the concerns that have already been raised about this shift to DRM as a copyright solution, particularly around its implications for the fair use doctrine of copyright law.

Using encryption technology to govern cultural distribution is only an example of how we regulate human activity through the built environment. **Chapter 3** attempts to arm the reader for scholarly inquiry into this phenomenon by exploring recent thinking in the fields of communication, science and technology studies, and information studies.[25] Technologies can powerfully shape the social activities in which they intervene, sometimes with significant political consequences; at the same time, technologies are also powerfully shaped by the individuals and institutions that produce them and reshaped in powerful ways by users, suggesting that their impact has a lot to do with the meanings that are negotiated and the cultural contexts in which that negotiation occurs. We can resolve this tension between seeing technology as constructed versus seeing it as consequential by noting that technology is constructed so as to be consequential. In every instance, designing and implementing a technology is an attempt to intervene in social practice. To the extent that designers of

technology can agree about how they would like to choreograph the practices of users, this regulatory role of technology is enhanced; to the extent that designers cannot control what happens to the technology after it leaves their hands and cannot entirely predict its consequences, it is diminished. Understanding the complexity of technology as a political artifact is useful as we begin to consider the implications of deliberately using technologies in place of the law.

However, while technologies can have political consequences, and the move to install DRM encryption systems into digital distribution of culture seems to depend only on technology's ability to do so, an exclusive focus on technology would mask the way it requires much more than mere objects to effectively regulate the movement of culture. To the extent that the actors powerful in this negotiation about the meaning and purpose of a technology are also often powerful in other domains, they can appeal to law, policy, and public discourse to buttress and normalize the authority of the tools they build. Alongside the new technologies come new laws to back them, new institutional and commercial arrangements to produce and align them, and new cultural justifications to convince legislators and users to embrace them. This is not engineering culture through technology, but a more heterogeneous effort to regulate through the alignment of political, technical, legal, economic, and cultural elements that must be held in place for a new paradigm of copyright to take hold.

**Chapter 4** analyzes the construction of the cultural justifications necessary for the trusted system approach to gain any traction at all with manufacturers, artists, legislators, and users. The regulation of the Internet had, before the copyright wars, been largely hands-off; when it first appeared, Napster was wildly popular not only with music fans but with the press as well. To counter these attitudes and to justify a massive change in the character and enforcement of copyright law required a powerful tale of sin and redemption. This narrative not only reframed the debate, it set the stage for the kind of institutional alignments that content providers needed to establish.

In his role as the director of the Motion Picture Association of America (MPAA), the U.S. film industry's powerful lobbying organization, Jack Valenti was the most powerful and articulate of the storytellers, offering up a narrative arc that went something like this: Movie production is an economic boon to the nation; Internet file-trading is a financial danger to that business; content producers, faced with this threat, will withhold valuable content and the medium in question will suffer; however, with stronger copyright protection and technical measures of self-enforcement,

the culture industry will provide a rich consumer experience. The entire chain of assertions was wrapped in a narrative of good beset by evil, coated with dramatic metaphors and salacious scares, and contrasted against a rosy alternative only possible if copyright law were strengthened. Valenti's logic is just one version of the situation, and has been contested on a number of fronts. Nevertheless, it is slowly becoming the standard understanding of how copyright does and should work, and how digital culture depends on the fullest imposition of technical copy protection.

Technologies for the production and distribution of culture have long been designed so as to guide the activity of users, from early printed folios locked to the lecterns on which they sat, to sophisticated password protection systems on consumer software. In order to orchestrate such a system of control, content producers require the cooperation of technology manufacturers, but this turns out to be difficult to achieve: manufacturers are numerous and commercially competitive, and generally see value in offering users as much choice as possible. One attempt to wrangle these interests into agreement, initiated by the record industry, was the Secure Digital Music Initiative (SDMI). The major record labels gathered consumer electronics manufacturers, information technology providers, and fledgling online distributors to produce copy protection for music and the standards for all hardware to honor these protections. **Chapter 5** traces the history of this effort, investigating how the music industry attempted to forge a consensus, and the reasons why it collapsed. SDMI is a reminder that the alignment of technology and content envisioned in such plans cannot be imposed without a matching alignment between the commercial players that produce them, and such an alignment is not so easily achieved.

In stark contrast to the failed SDMI project, the encryption that protects Hollywood DVDs from duplication is a revealing case of how such a trusted system can be produced, and how the necessary institutional alignment can be achieved despite the strategic differences between content and hardware manufacturers. **Chapter 6** reveals how the Content Scramble System (CSS) encryption used to protect DVDs is merely the technical edge of a complex arrangement of content, machines, licenses, and industry partners that together work to contain the activities of users.

In this case, the trusted system also required recourse to the law when that arrangement was breached, as it was when a "crack" called DeCSS was posted online. The industry turned to the Digital Millennium Copyright Act (DMCA), itself a dramatic shift in copyright law produced by the

rethinking of copyright around the Internet and, in particular, the powerful "Valenti logic" offered by the content industries. Prohibiting circumvention of technical protections rather than copying itself, the DMCA embodies this shift toward technical solutions, while also revealing that the technology cannot function without support from the law. Rather than regulating users, the DMCA shores up the arrangements imposed by the content industries on the manufacturers, and forms the fourth side of this heterogeneous square of regulation: technical artifact, commercial agreement, cultural justification, legal authority. And it does so in a way that allows these industries to impose new controls on users that were not available under copyright law before this moment. The trusted system, then, is built on a fundamental mistrust—a mistrust of the technology manufacturers, who must be licensed into submission, and a mistrust of users, who are seen as immoral pirates until they can be technologically compelled to be good consumers.

The record industry tried to organize a voluntary agreement with technology manufacturers, and failed; the movie industry got one by holding their content ransom and forcing technology manufacturers to sign away their interests, but found they were still vulnerable to upstart manufacturers who would not agree to their terms. The next step is to seek the authority of the state to make such systems mandatory. Calling on the state promises to more powerfully bind this trusted system together and impose it on users, but it also brings new forces into play. As **chapter 7** describes, the movie studios hoped to impose similar technical controls onto digital television, and called upon the FCC to give their system legitimacy and assure its imposition. An industry coalition proposed the "broadcast flag," a technical means to mark digital TV content as deserving protection, and to set rules for manufacturers for how to treat that content so as to prevent redistribution over the Internet.

Ideological gaps between these industries, and between these industries and the regulators who have jurisdiction over them, have always been narrow; nevertheless, they have been important in preventing an industry view of copyright law from completely dominating other public interests. Now these gaps are closing around technical copyright protection, thanks in part to the efforts of these industries, the increasing sense of the inevitability of this project (and thus the desire of manufacturers to be on the winning side of its commercial consequences), and the persuasive power of the piracy narrative. This suggests that, whether or not such trusted systems are ever installed and ever succeed, the changes in industry alignment being pursued in order to produce them may themselves

have consequences for culture and technology. This may extend to the increasingly close ideological partnership of the content industries and legislators. However, as the broadcast flag case reveals, the FCC did make significant adjustments to the plans proposed by the movie industry and its consumer electronics partners. Furthermore, the courts subsequently decided that the FCC did not have the authority to install such a technical control regime, revealing further cracks in the political alignments necessary for a comprehensive trusted system to work.

The attempts thus far to impose technical solutions onto the promiscuity of the Internet have all faced intrepid users who refuse these constraints: from the casual users of peer-to-peer networks to the amateur DJs creating innovative forms of digitally reworked music; from the widespread use of "black market" circumvention technologies to the hackers that take on every new system; from academic critics who challenge these strategies to the campus activists who mobilize against them. This kind of agency with culture and with technology has been the biggest hurdle for content owners' attempt to realign digital culture in more commercially viable terms. In some ways, it is this agency that must be curtailed if the broad and heterogeneous strategy of technolegal control is to succeed. **Chapter 8** turns its attention to the robustness requirements that accompany most DRM systems, which require manufacturers of hardware and software not only to limit what users can and cannot do but also to design their tools to fend off the attacks of hackers, the prying eyes of hardware enthusiasts, the curiosity of tinkerers.

Just as digital rights management threatens the agency we have with the culture we encounter, these robustness rules threaten our sense of agency with the technology itself. Critics of the CSS encryption and the broadcast flag made this point by noting that both systems exclude the possibility of open source innovations in the distribution and consumption of film and television. To prevent users from seeing how content is protected and potentially circumvented, robustness rules require technology designers to "weld the hood shut"—something very much at odds not only with open source design, but with the traditions of user appropriation and innovation. What is clear is that these solutions are not just strategic, they are paradigmatic, embodying and imposing a persistent worldview on what is otherwise a much richer set of options for how we interact with culture and technology.

**Chapter 9** attempts to step back from these cases in order to consider the cultural implications of the technology at the heart of these protec-

tion schemes. Once a mechanism for ensuring secret communication between confidantes, encryption is being employed here for a very different purpose: extending control over otherwise public materials. In terms of the distribution of culture over the Internet, encryption is the digital means to assure a subtle, complex, and context-sensitive system of regulation. By encoding a film, the owner of the copyright can dictate to an unprecedented degree what can and cannot be done with it. Most importantly from a philosophical perspective, encryption intervenes before an infringement occurs rather than after. Such a preemptive measure not only treats all users as would-be criminals, it makes the imposition of copyright less open to exceptions like fair use, renders unavailable the ability to challenge a law through civil disobedience, and undercuts the individual's sense of moral agency in a way that can undermine the legitimacy of the rule itself.

While this new application of encryption and licensing is justified in terms of a threat to copyright, the system can accomplish much more. The license that DVD manufacturers must sign requires them not only to honor the restrictions on copying demanded by the movie industry, but also to honor a system called "regional coding." Regional coding stipulates that each disc is numbered according to the continent in which it was produced; DVD players must only play discs from their own region. This is in no way a means of protecting copyright; instead, it gives the movie studios a way to slice up the global market, engage in price discrimination, stagger releases, and even ignore markets they do not see as lucrative. If and when the distribution of culture moves entirely to the Internet, this strategy could be extended in any number of ways, not to protect copyright but to maximize profit.

As copyright was traditionally conceived of as a way to regulate the commercial practices of those who don't own a work (so as to protect the interests of those who do), it has rarely had to consider the way the commercial practices of the owners themselves can have the kind of anti-democratic implications copyright was designed to avoid. Such practices, built directly into the technology and using the threat of piracy as rhetorical cover, are now having those problematic consequences, most powerfully by reifying a clean distinction between producer and consumer in a world where communication is always a recursive and productive process. This precludes the use of new communication technologies in ways that could powerfully shift the roles of such cultural production in a more egalitarian direction.

*Wired Shut* ends there, with a concern well beyond copyright per se, the Internet and its regulation, and the juncture between industry and politics. It reveals a crossroads faced by a society embracing technologies that can both facilitate digital culture and be made to regulate it. The choices we make now will help decide whether we will be active participants in our culture and creative users of our technology, or passive recipients content to quietly embrace what is sold to us and fulfill the roles prescribed for us.