Open Code and Open Societies

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It has been a decade since the wall fell; a decade since the closed society was declared dead. A decade since the ideals of the open society were said to have prevailed. A decade since the struggle between open and closed was all but at an end.

We stand here in an odd relationship to those who saw that closed society pass. For we celebrate its passing, while a more pervasive closed culture grows up around us. We are confident in our victory, and yet our victory is being undone. If there was an open society, if we have known it, then that open society is dying. In the most significant sense that idea could embrace, it is passing away.

In the United States, we believe we understand the passing of the closed society. We believe we understand its source. That society collapsed because it was weak; it was weak because its economy was dead; its economy was dead because it had no free market, no strong system of property, no support for the exchange and freedom that a property based free market might produce.

We believe we understand property equals progress; and more property equals more progress; and more perfectly protected property equals more perfectly protected progress.

Now in this view, we are not terribly naïve. Property historically has been a key to important progress; it has been an important check on arbitrary state power; it has been a balance to concentrations of power that otherwise pervert. Property is no doubt central and important to free society and free culture. And so to question property, to question my countrymen, is not to doubt its importance.

It is instead to put its importance in context. To let us see something about what the progress that property produces depend upon. To let us understand the mix of resources that produce progress. And to force us to account for that mix.

Now I know you are beginning to wonder, what exactly does this have to do with open source, or free software? How does this topic contribute to the discussion of this conference. Maybe you're

worried I've misunderstood the assignment. Or forgotten what day it is.

But I confess to no such mistakes. I am quite insistent that we begin here. Because it is extremely important to place the issues of open source, and free software, in their full context. It is important, in other words, to understand their significance. For their significance is much more than most allow.

Most think about these issues of free software, or open source software, as if there were simply questions about the efficiency of coding. Most think about them as if the only issue that this code might raise is whether it is faster, or more robust, or more reliable than close code. Most think that this is simply a question of efficiency.

Most think this, and most are wrong. The issues of open source or free software are not simply the issues of efficiency. If that were all this was about, there would be little reason for anyone to pay any more attention to this subject than to the question of whether an upgrade to Office really is faster than the version it replaced.

I think the issues of open source and free software are fundamental in a free society. I think they are at the core of what we mean by an open society. But to see their relation to this core, we must see the context.

Pierre de Fermat was a lawyer, and an amateur mathematician. He published one paper in his life — an anonymous article written as an appendix to a colleague's book. But while he published little, he thought lots about the open questions of mathematics of his time. And in 1630, in the margin of his father's copy of Diophantus' *Arithmetica*, he scribbled next to an obscure theorem ("$X^n + Y^n = Z^n$ has no non-zero integer solutions for N>2") "I have discovered a truly remarkable proof which this margin is too small to contain."

It's not clear that Fermat had a proof at all. Indeed, in all his mathematical papers, there was but one formal proof. But whether a genius mathematician or not, Fermat was clearly a genius self-promoter, for it is this puzzle that has made Fermat famous. For

close to 400 hundred years, the very best mathematicians in the world have tried to pen the proof that Fermat forgot.

In the early 1990s, after puzzling on and off on the problem since he was a child, Andrew Wiles believed that he had solved Fermat's last theorem. He published his results — on the Internet, as well as other places — but very soon afterwards, a glitch was discovered. The proof was flawed. So he withdrew his claim to have solved Fermat's theorem.

But he could not withdraw the proof. It was out there, in the ether of an Internet, and could not be erased. It was in the hands of many people, some of whom continued to work on the proof, even though flawed. And after extensive and engaged exchange on the net, the glitch was undone. The problem in Wiles' proof was fixed. Fermat's last theorem was solved.

Where was Wiles' flawed proof before it was solved?

I take it none of us is homeless; we all have a place where we sleep that is not the street. That place may be a house; it may be an apartment; it may be a dorm; it may be friends. But that place, and the stuff in it, is probably property. The property of someone, giving that someone the right to exclude.

But what about the road leading up to that place. What about the highway leading to that road. To whom does that belong? Who has the right to exclude others from the roads? Or from the sidewalks? Or from the parks? Whose property is the sidewalks or the parks?

There is a concept called copyright. It is species of something called intellectual property. This term, intellectual property, is a recent creation. Before the late nineteenth century in America, the concept did not exist. Before then, copyright was a kind of monopoly. It was a state granted right to control how someone used a particular form of text. But by the late nineteenth century, so familiar was this monopoly that it was common, and unremarkable, to call it property.

In the Anglo-American tradition, the origin of this concept of copyright was contested. At its birth, there were those who said that an author's copyright was his property. His right, perpetually, to control the duplication and use of what he had produced. And there were others who were wildly opposed to such an idea. Who believed any control the author had was simply the bad consequences of a state imposed monopoly.

But the classic style of the English, and in the early style of the Americans, a compromise was chosen. A copyright was a monopoly granted to an author for a limited time, after which, the copyrighted material fell into the public domain. As the American Supreme Court Justice Joseph Story put it,

Copyright on this conception "is beneficial … to authors and inventors, … [and beneficial] to the public, as it will promote the progress of science and the useful arts, and admit the people at large, after a short interval, to the full possession and enjoyment of all writings and inventions without restraint."

Now it is hard to imagine how significant the early decision was to make copyright a limited right in England. When the House of Lords finally decided that copyright was limited by the Statute of Anne, it was in the 1770s. Until that time, publishers claimed a perpetual copyright. But when the right passed to the public, an extraordinary amount of work fell into the public domain. Shakespeare, for example, for the first time was free of the control of monopolistic publishers.

So, where is a copyright protected work once it falls out of copyright protection? What is the place where it sits? What exactly is a copy of *Romeo and Juliet* after the copyright passes?

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Andrew Wiles' flawed proof, the streets, or sidewalks, or parks, *Romeo and Juliet* after the copyright passes: all of these things exist in a place modern political culture has forgotten. All of these things exist in the commons – in the public domain, from which anyone can draw. Anyone can draw from the commons – and here is the crucial idea –without the permission of anyone else. These resources exist in a place where anyone in society is free to draw upon them. Where anyone can take and use without the permission of anyone else.

Now of course, strictly speaking, stuff in the commons is not necessarily free. The streets can be closed; or you might be required to get a permit to hold a protest before city hall. The parks might ban people in the evening. Public beaches get full.

But the critical feature of a resource in the commons is not that the resource is free, in the sense Richard Stallman describes it, of free beer. There may well be restrictions on access to a resource in the commons. But whatever restrictions there are, these restrictions are, as we lawyers say, content neutral. A park might be closed in the evening, but it is not closed to liberals but not open to conservatives. The restrictions that are imposed on a resource in the commons are restrictions that are neutral and general.

Now the first idea to see is how important the commons is – not against property, but with property. How important the commons is to the production and creation of other property. How important it is to the flourishing of other property. The point in emphasizing the importance of a commons is not to deny the significance of property. It is instead to show how property depends upon a rich commons. How creativity depends upon a rich commons. How one feeds on the other. The issue is therefore never *whether* property or a commons, but *how* the two might mix.

We need the streets to move goods to market: the streets, a commons; goods, private property. We need a marketplace within which to sell our goods: a market place, a commons; goods, private property.

Now among commons, among public domains, we might distinguish two categories. We might think about the public domain of real things, and the public domain of intellectual things. The public domain, for example, of streets and parks, and the public domain of ideas, or created works. These commons serve similar functions, but they are importantly different. They are different because while the use of a real thing – like a park, or a road – consumes a park or a road, the use of an idea restricts nothing. If I sing a song that you have written (privately where no one can hear), then you still have as much of the song as you had before. My using your song does not diminish your possession of it.

The realm of ideas, then, in the words of economists, is not rivalrous in the way that the realm of real things is.

This difference is crucial in the digital age. But it is a point that has been understood since the beginning of my country. America's greatest philosopher of freedom, Thomas Jefferson, understood it. And let me read perhaps the most powerful passage from his writing that in my view defines the dilemma of our age.

Here is what Jefferson said:

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possess the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lites his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density at any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement, or exclusive appropriation. Inventions then cannot, in nature, be a subject of property." *IV Jefferson 180–81.*

Notice the crucial steps in Jefferson's story: "Its peculiar character … is that no one possess the less because every other possess the whole."

"e who receives an idea from me receives instruction himself without lessening mine; as he who lites his taper at mine receives light without darkening me."

Ideas function differently. Their *nature* in Jefferson's words, is different. It is in their nature to be inexhaustible; uncontrollable; necessarily free. Nature has made it so; and we can enjoy, as we enjoy the beauty of sunset, this extraordinary value that nature has given us.

Jefferson was brilliant; Jefferson was wrong. He identified a crucial fact about ideas and things intellectual; he defended the world that idea created; he promoted it – the ideal of the enlightenment. But he was wrong to believe that nature would protect it. He was wrong to believe that nature would conspire always to keep ideas free. He was wrong to believe that he knew enough about what nature could do to understand what nature would always defend.

For the critical fact about the world we know – cyberspace—is that cyberspace changes Jefferson's nature. What Jefferson thought couldn't be captured, can in cyberspace be captured. What Jefferson thought could not in nature be controlled, can in cyberspace be controlled. What Jefferson thought essentially and perpetually free is only free if we choose to leave it open; only free if we code the space to keep it free; only free if we make it so. What Jefferson thought Nature guaranteed, turns out to be a good idea that we must defend.

How is this control made possible?

When cyberspace was born, a gaggle of well paid Chicken Littles raced about the legislatures of major world democracies and said copyright would be killed by cyberspace; intellectual property was dead in cyberspace, and they squawked, Congress must do something in response.

Chicken Littles – people convinced the sky was following; well paid Chicken Littles – paid by Hollywood.

At the same time these Chicken Littles were racing about Congresses and Parliaments, they were also racing about the west coast in America, signing up coders – software and hardware producers – to help them build something called "trusted systems" to better protect their content. Trusted systems – code meant to counter a feature of the then dominant code of cyberspace – that content could be copied for free and perfectly; that it could distributed for free and without limit; that content might for once be outside of the control of Hollywood.

These features of the original net Hollywood thought bugs. And so they scampered about trying to find coders who could build a system that would make content safe on the net – which means make it safe to distribute without losing control.

This Chicken Littles then were smart – they turned to code from both coasts in America. From the east coast, they got good east coast code – laws that radically increased the protection content received; from the west coast, they got great west coast code – software and hardware that would make it possible to encrypt and protect content. And these two projects find their ultimate genius in a statute passed by Congress in 1998 – the Digital Millennium Copyright Act, with its anti-circumvention provision.

Now I've made something of a career telling the world that code is law. That rules built into software and hardware functions as a kind of law. That we should understand code as kind of law, because code can restrict or enable freedoms in just the way law should. And that if we are really concerned about liberty first, then we should protect liberty regardless of the threats.

I meant that originally as a metaphor. Code is not literally law; code, I argued, was like law.

But in the anticircumvention provision of the DMCA, Congress has turned my metaphor into reality. For what the anticircumvention provision says is that building software tools to circumvent code that is designed to protect content is a felony. If you build code to crack code then you have violated the US code. Even if the purpose for which you are cracking this code is a completely legitimate use of the underlying content. Even if it would be considered fair use, that doesn't matter. Cracking code is to break the law. Code is law.

Let's take an example. DVD movies are protected by a very poor encryption algorithm called CSS. To play a DVD movie on a computer requires unlocking CSS. Programs for unlocking CSS were licensed to manufacturers of Mac and Windows machines. Owners of those machines could therefore buy DVD movies, and play those movies on their computers.

People running the Linux operating system could not. There was no code to enable CSS to be unlocked under the Linux operating system. The owners of CSS had not licensed it to Linux. So a group of Linux programmers cracked CSS, and built a routine, deCSS, that would enable DVD movies to be played on Linux systems.

Under the anticircumvention provision of the DMCA, that was a crime. They had built code that cracked a technological protection measure; building such code violated the law; even though the only behavior enabled by this code – made more simple by this code than it was before this code – was the playing of a presumptively legally purchased DVD. No pirating was enabled; no illegal copying was made any easier; simply enabling the playing of this movie on a different machine – that's all deCSS did; but cracking CSS to enable that legitimate use was a crime.

Now notice what this represents. Content providers build code that gives them more control than the law of copyright does over their content. Any effect to disable that control is a crime. Thus the law backs up the contents holders' power to control their content more firmly than copyright does. Copyright law gets privatized in code; the law backs this privatized law up; and the result is a radical increase in the control that the content holder has over his content.

Control. For this is the essence of the power that code creates here. The power to control the use of content. The power to control how it is played, where, on what machines, by whom, how often, with what advertising, etc. The power to control all this is given to the content holders by the code that west coast coders build; and that power gets ratified by the product of east coast coders – law.

Now this radical increase in control gets justified in the United States under the label of "property": under the label of protecting property against theft. The idea has emerged that any use of copyrighted material contrary to the will of content controller is now theft. That perfect property is the ideal of intellectual property. That perfect control is its objective.

But that was not Jefferson's conception; that was not the conception of the early founders of the balanced package of intellectual property and an intellectual commons. That was never the idea originally. For the idea about control over content has always been that we give content providers enough control to give them the incentive to produce; but what they produce then falls into the public domain. We given an incentive to produce new

work, but that new work then becomes part of an intellectual commons, for others to draw upon and use *as they wish. Without the permission of anyone else.* Free of the control of an another.

Hollywood has corrupted this vision. It has replaced it with a vision of perfect control. And it has enforced that vision of perfect control on the net, and on laws that regulate the net. And it is slowly turning the net into its space of control.

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Consider an example: You all know the meme about the free nature of the Internet; about how ideas flow freely; about the net as Jefferson's dream. That was its past. Consider a picture of its future:

iCraveTV was a Internet broadcaster in Canada. Under Canadian law, they were permitted to capture the broadcasts from Canadian television, and rebroadcast that in any medium they wanted. iCraveTV decided to rebroadcast that TV across the Internet.

Now free TV is not allowed in the US. Under US law, the rebroadcaster must negotiate with the original broadcaster. So iCraveTV used technologies to block Americans from getting access to iCraveTV. Canadians were to get access to free TV; Americans were not.

But it is in the nature of the existing architecture of the net that it is hard perfectly to control who gets access to what. So there were a number of Americans who were able to get access to iCraveTV, despite the company's efforts to block foreigners.

Hollywood didn't like this much. So as quickly as you could say "cut", it had filed a lawsuit in a Pittsburgh federal court, asking that court to shut down the Canadian site. The argument was this: whether or not free TV is legal in Canada, it is not legal in the United States. And so since some in the United States might, God forbid, get access to free TV, the United States Court should shut down free TV. Copyright laws in the US were being violated; massive and quick response by the federal courts was called for.

Now step back for a moment and think about the equivalent claim being made elsewhere. Imagine, for example, a German court entering a judgment against Amazon.com, ordering Amazon.com to stop selling Mein Kampf *anywhere* because

someone in Germany had succeeded in accessing Mein Kampf from Amazon. Or imagine a court in China ordering an American ISP to shut down its dissidents' site, because the speech at issue was illegal in China. It would take just a second for an American to say that those suits violate the concept of free speech on the net; that they undermine the free flow of information; that they are an improper extension of state power into the world of cyberspace.

But free speech didn't register in this Pittsburgh court. The idea of the rights of Canadians to their free TV didn't matter. The court ordered the site shut down, until the site could prove that it could keep non-Canadians out.

iCraveTV promised to try. And it quickly developed technologies that would succeed in zoning cyberspace based on geography.

Now the pattern here should be clear. Though nations like the US will sing about the importance of free speech in cyberspace, and about keeping cyberspace free, when it comes to issues of national security—as all things copyright are—values fall away. The push will be to zone the space, to allow rules to be imposed that are local. And the technologies for zoning and controlling will quickly develop.

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Technologies of control, justified under the ideal of property, backed up by law. Technologies of perfect control, justified under the ideal of property backed up by law.

This is our future. This is the story of how an open space gets closed. This is the structure under which the closed society reemerges. Where the few control access for the many; where the few control content. Where to use, or play, or criticize, or share content you need the permission of someone else. Where the commons has been shrunk to nothing. Where everything to which you have access, you have access because you have asked permission of someone else.

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Now software is a kind of content. Like stories, or plays, or poems, or film, it is content that others use, and others build upon. It is content that defines the nature of life in cyberspace. It is code that determines how free speech is there; how much privacy is

protected; how fully access is guaranteed. Code legislates all this; code builds this control into its content.

This content, like any content, can exist in the commons, or it can exist privately, as property. It can exist in a form that guarantees that anyone can take and use the resource; or can exist in a form that makes it impossible for others to take and use this resource.

Open source or free software is software that lives in a commons. It is a resource that others can take, and use, without the permission of someone else. That, like the works of Shakespeare, are there for anyone to use as they wish without the permission of an owner. Take, and use, and build upon to make something better, or better fitted to the particular needs of a particular context.

Two things make open code open. First, architecturally, it is open, in the sensed that its source code is available for anyone to take. And second, law makes it open. In its core sense, open code is required to be kept open; closing it, or taking it out of the public hands is a violation of the terms on which it was acquired.

Closed code is different. Closed code – Apple's operating system; Microsoft's applications – this code does not exist in the commons. It is private property. One gets access only as another permits; one is permitted only as another allows.

Here again, closed is defined along two dimensions. First, architecturally – the source is not available; second, legally, one is not permitted to crack and steal the code.

These differences are significant, both for the life of code coded open or closed. But also for the life of life within the open or closed code. If code is law, if it functions as law, if it regulates and controls as law, then a critical difference between open and closed code is the difference of public or secret law. Who knows the control built into a closed system; who knows the data that is collected; who know how technology regulates or interferes; who knows what freedom are preserved?

But open code makes these questions transparent. We know the regulations, because the regulator is open. We know the protections, because coders can see how it works. We know its

security, because we can watch how it protects. We know its trustworthiness, because we can see with whom it talks.

We know all this because this regulation is transparent. Like the requirement of public laws, it assures that the public knows how it is being regulated. Knows, so it can resist; or knows so it can change.

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Now I've built an architecture in this talk that has left room for the place of open and closed code. I have tried to get you to see how our tradition supports balance – a symbiotic balance between property and a commons, and especially between intellectual property and an intellectual property; I've tried to describe how all current trends are counter to this balance; that the push now is to maximize control in the hands of content controlled; perfect control, perpetually assured; and I've tried to suggest that software – code – is content just as music, or Shakespeare is. And that it too needs to live in this balance between open and closed.

Our challenge – those of us who see this importance in balance, and see the importance in maintaining balance – our challenge is to resist this closing of the Internet's mind. To resist this power and control built into content. Our challenge is to find ways to get people to see the value in the commons as well as in property.

And open code is the only strong idealism that will get people to see. Open code is the only place where these ideals live. It is the only place where we can prove that balance and the commons does something good – for innovation, for creativity for growth.

Because here is the central blindspot of my culture, and my country. While we parade around in our certainty that perfect property is perfect progress – while we insist the east died because it didn't protect property – right in our midst is a phenomenon that is inconsistent with this story – the Internet. A space built on a commons, where because most early code governing the net was open code, and where because of the architectural principle of end-to-end, the network owner could not control how the net would be used – the resource of the net was left open for innovation; all could draw upon its riches; no one could close another out.

Upon this architecture of openness; upon this ecology where practically all was within a commons, the greatest innovation and growth we have seen was built.

People will see the importance of the commons when we speak about code. They will see it as we speak about content as code. When we describe the innovation that gets built on top of open systems like Linux; when we point to the past which has proven the value.

But this open content as code will be resisted by those who would close content. Resisted by Hollywood. And the battles that we are just beginning are battles about whether and how content is kept free. For the model for content that captures Hollywood's eye is a model of a closed system. Of closed content. Of maximal control.

An open society must resist this extreme. It must resist a world where to use and build upon resources from our culture you need the permission of Hollywood – of someone else.

History has a way of being ironic. It seems to revel in its irony. But here is the irony of our time. The ideal that seemed so central to killing the closed society of yesterday – property – that ideal is now closing the society of today. The same tool of freedom of yesterday is becoming a tool of control today. Not the same control, or the same control to as evil an end. But nonetheless a control on creativity and innovation; a shifting of that control from individuals to corporations; from anyone to the few.

Only the ideals of the open source and free software movement can resist this change. Only the values expressed here can show something different. Oddly only us – as universities –resist the temptations of large revenues from patents, as science gets corralled by the restrictions of patents, as culture continues to be captured by property that locks it up.

Only this movement will resist this closing. But to resist it, we must speak beyond the efficiencies of software, or beyond the significance of those efficiencies. To resist it, we must show how its values, the values of this movement, are the values of free society generally.