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In *Reno v. ACLU,* the Supreme Court's first opinion to apply the First Amendment to the Internet, Justice Stevens compared the World Wide Web "to both a vast library including millions of readily available and indexed publications, and a sprawling mall offering goods and services."[1] He could not have known in 1997 how sprawling the "mall" would become, with Amazon, eBay, Silk Road, and so on, and we surely cannot imagine the sprawl to come in the future. But the emergence of 3D printing technology nevertheless allows us to see what is coming: a "mall" in which shoppers not only form contracts for goods, but also take possession of the goods themselves after they are, for all intents and purposes, delivered over the wires.[2] If the Internet's "mall" was metaphorical in 1997, that mall will become increasingly literal as home manufacturing becomes more effortless. And at the same time, it will become ever clearer that certain uses of the Internet do not resemble a "library" in any meaningful sense.

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1. Reno v. ACLU, 521 U.S. 844, 853 (1997).

2. After locating an object you wish to 3D print on thingiverse.com, a user takes possession of printing instructions by clicking "Download this thing!" *See generally* THINGIVERSE, http://www.thingiverse.com (last visited Feb. 16, 2016) (offering various files to download for 3D printing purposes).

I. THE MALL AND THE LIBRARY

The mall and the library make a nice metaphor for a fundamental point of constitutional law: namely, that the regulation of commerce—the mall—is presumptively for the legislature rather than the courts, while the regulation of speech—the library—is presumptively off-limits under the First Amendment. That distinction is the product of two familiar constitutional moments.

The mall became regulable without serious judicial oversight in 1937, with the end of what we now describe as the *Lochner* era.[3] During the *Lochner* era, the Supreme Court applied a restrictive reading of the commerce clause[4] together with expansive readings of the Fourteenth Amendment's due process and equal protection clauses to intercept a wide variety of commercial regulations including price, wage, and labor laws.[5] After the Court abandoned those doctrines under extraordinary political pressure, the judiciary effectively left the field.[6] Today, ordinary business regulations receive only a rational basis review, and the standard is very forgiving.[7] In *Williamson v. Lee Optical of Oklahoma, Inc.* and *United States v. Carolene Products Co.,* for instance, the Court upheld laws having no credible purpose but to protect the market share of the industries that had lobbied for them.[8] Those decisions

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3. So-named for a landmark case emblematic of the reigning jurisprudential trend at the time: Lochner v. New York, 198 U.S. 45 (1905) (rejecting an argument that New York State could regulate bakers' work hours under public health-related police powers).

4. U.S. CONST. art I, § 8, cl. 3 (giving Congress the power "to regulate commerce with foreign nations, and among the several states, and with the Indian tribes").

5. *See* Sujit Choudhry, *The* Lochner *Era and Comparative Constitutionalism*, 2 INT'L J. CONST. L. 1, 4–5 (2000).

6. *See* W. Coast Hotel v. Parrish, 300 U.S. 379, 396–97 (1937) (upholding Washington State's minimum wage law against a substantive due process challenge); NLRB v. Jones & Laughlin Steel Corp., 301 U.S. 1, 46–49 (1937) (upholding the National Labor Relations Act over a commerce clause challenge).

7. *See, e.g.*, Williamson v. Lee Optical of Okla., Inc., 348 U.S. 483, 488 (1955) (highlighting the leniency of rational basis review by proclaiming that "[i]t is enough that there is an evil at hand for correction, and that it might be thought that the particular legislative measure was a rational way to correct it").

8. *Id.* at 487–88 (1955) ("The Oklahoma law may exact a needless, wasteful requirement in many cases. But it is for the legislature, not the courts, to balance the advantages and disadvantages of the new requirement. It appears that in many cases the optician can easily supply the new frames or

represent a clear determination by the Court not to sit as a board of review in matters of economic policy.

As for the library, it became nearly unregulable during the Court's dramatic expansion of speech freedoms in the 1950s, 60s, and early 70s. By the end of this period the Court had made it impossible for the government to suppress politically subversive speech or advocacy of violence except for under extremely narrow circumstances.[9] The Court had made clear that the government was not to punish speech because it offended morals, taste, or propriety, except in the narrow category of obscenity.[10] And the Court had also extended speech protections to expressive conduct such as the burning of an American flag.[11] By the early- to mid 1970s, the library was firmly established as the mall's constitutional opposite.

It is therefore important if the Internet contains both libraries and malls to keep the two straight for constitutional purposes. There is considerable overlap, to be sure, as in a market for downloadable music or streaming television; and to the extent that these areas are both library and mall, they

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new lenses without reference to the old written prescription. . . . But the law need not be in every respect logically consistent with its aims to be constitutional."); United States v. Carolene Prods. Co., 304 U.S. 144, 154 (1938) ("[T]he question is at least debatable whether commerce in filled milk should be left unregulated, or in some measure restricted, or wholly prohibited. As that decision was for Congress, neither the finding of a court arrived at by weighing the evidence, nor the verdict of a jury can be substituted for it.").

9. *See* Brandenburg v. Ohio, 395 U.S. 444, 447 (1969) (confining liability for advocacy of violence to cases in which the danger is imminent, probability is high, and incitement is intended). *Cf.* Watts v. United States, 394 U.S. 705, 706–08 (1969) (holding that a draftee saying "[i]f they ever make me carry a rifle the first man I want to get in my sights is L.B.J." was not prosecutable as having made "a true threat" against the life of the President).

10. *See generally* Miller v. California, 413 U.S. 15, 24 (1973) (establishing the contemporary definition for obscenity); Cohen v. California, 403 U.S. 15, 16, 26 (1971) (reversing a breach of peace conviction of a defendant who wore jacket bearing words "fuck the draft" in courthouse hallway); Kingsley Int'l Pictures Corp. v. Regents of Univ. of State of N.Y., 360 U.S. 684, 688 (1959) (reversing the motion picture board's refusal to license "Lady Chatterley's Lover" because the film portrayed "that adultery under certain circumstances may be proper behavior").

11. *See* Texas v. Johnson, 491 U.S. 397, 414 (1989) ("If there is a bedrock principle underlying the First Amendment, it is that the government may not prohibit the expression of an idea simply because society finds the idea itself offensive or disagreeable. . . . We have not recognized an exception to this principle even where our flag has been involved."); *cf.* United States v. O'Brien, 391 U.S. 367, 376 (1968) (assuming without deciding that expressive conduct falls under the First Amendment).

must be treated as libraries that are more or less immune to regulation. But some areas, and certainly markets for 3D-printable goods, deserve to be treated as malls and regulated freely.

Allow me to flesh out the distinction. Most of the contemporary Internet's "content layer" consists of the sort of expression that cannot be regulated without raising First Amendment concerns. This expression includes online news and entertainment as well as most social media and personal communications. All of it is a library, a First Amendment space. But that does not, of course, guarantee that all of it is "protected," i.e., constitutionally unregulable, and it does not mean that it is all on an even keel for First Amendment purposes. But it does mean that these forms of online speech can only be regulated in accordance with the same general framework of First Amendment law that applies in real space.

At least some speech that is connected with online commerce may also belong to the library. Obviously the downloadable music and movies sold on iTunes do not lose their status as speech simply because consideration has been exchanged; the profit motive is as irrelevant to First Amendment analysis online as offline.[12] And there may be other commerce-related "expression" online that implicates the First Amendment—namely, speech in furtherance of marketing. Buy a hammer on Amazon, and you will encounter pictures and descriptions of the hammer on the product page, customer-contributed "reviews" of the hammer, a recommendation that you buy nails as part of the same purchase, and perhaps a banner advertising that other items are on sale.[13] Most of this probably enjoys some sort of protection, just as a rote application of 1970s-vintage commercial speech doctrine would protect the same materials if they were displayed in a physical mall.[14]

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12. *See* Joseph Burstyn, Inc. v. Wilson, 343 U.S. 495, 501–02 (1952) ("That books, newspapers, and magazines are published and sold for profit does not prevent them from being a form of expression whose liberty is safeguarded by the First Amendment. We fail to see why operation for profit should have any different effect in the case of motion pictures.").

13. *See, e.g.*, Stanley 51-616 16 Ounce Hickory Handle Nailing Hammer, AMAZON, http://www.amazon.com/Stanley-51-616-Hickory-Handle-Nailing/dp/B00002X1X5/ref=sr_1_2?s=power-hand-tools&ie=UTF8&qid=1456609564&sr=1-2&keywords=hammer (last visited Mar. 12, 2016).

14. *See Bates v. State Bar of Ariz.*, 433 U.S. 350, 368–80 (1977) (holding that the First Amendment prohibits a blanket ban on all attorney

None of this establishes, though, that the *commerce itself* becomes part of the library simply because it is transacted on the Internet. Amazon, for instance, remains a mall at its core, and as such, it may be regulated without any special scrutiny.[15] For instance, my home state of Michigan imposes a 6% tax on purchases I make on Amazon and other online retailers.[16] As far as I know, no one argues that these taxes implicate the First Amendment. Nor should they, as the creation and performance of contracts is plainly commercial in nature. Purchasing a hammer is expressive behavior only in the most trivial sense, and I would say the same about the subliminal cryptographic handshakes[17] that make the transaction possible. The fact that I and Amazon have communicated with each other is intuitively irrelevant, in spite of the many formulations of free speech that say the First Amendment kicks in whenever one party sends any sort of message to another. Amazon is plainly a mall, and the First Amendment has no general bearing on its business model.

Suppose, then, that instead of buying a physical hammer on Amazon, I purchase access rights to a computer-aided design (CAD) file representing that hammer. (There is not yet any such market on Amazon, but the item can be obtained for $2.99 today on threeding.com.[18]) I then use the CAD file to print a physical hammer in my home using some kind of 3D printer. Am I still in the mall, or am I now in the library? I

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advertising); *Linmark Assocs., Inc. v. Willingboro*, 431 U.S. 85, 92–97 (1977) (holding an ordinance that prohibited most signs advertising the sale of homes in the township unconstitutional under the First Amendment); *Va. Pharmacy Bd. v. Va. Citizens Consumer Council*, 425 U.S. 748, 761–65 (1976) (holding that commercial advertising of prescription drug information falls under the protection of the First Amendment). The protections extended to commercial speech for the first time in the 1970s are consolidated in *Cent. Hudson Gas & Elec. Corp. v. Pub. Serv. Comm'n of N.Y.*, 447 U.S. 557, 561–62 (1980) (holding a regulation that completely banned promotional advertising by electrical utilities unconstitutional under the First Amendment).

15. As a mall offering goods for sale, economic regulations of Amazon would only receive rational basis review by the courts. *See* Williamson v. Lee Optical of Okla., Inc., 348 U.S. 483, 488 (1955).

16. *See* MICH. COMP. LAWS ANN. § 205.52(b)(3) (West 2016).

17. *See generally* Shazia Yasin et al., *Cryptography Based E-Commerce Security: A Review*, 9 INT'L J. COMPUTER SCI. ISSUES 132, 132–37 (2012), http://ijcsi.org/papers/IJCSI-9-2-1-132-137.pdf (discussing various security "communications" used in e-commerce which are argued to constitute expression).

18. *Kitchen Hammer*, THREEDING, https://www.threeding.com/3d-printing-models/kitchen-hammer (last visited Feb. 16, 2016).

think it is obvious that I remain in the mall—that my purchase of a hammer does not become an exercise of free speech simply because Amazon and I have found a newfangled way to get around UPS.

But this seems to be a minority view among twenty-first century lawyers.[19] Since the mid-1990s, courts have subscribed to the position that human-comprehensible computer code, setting aside its functional aspects, can operate as a language for computer programmers to communicate ideas and arguments to each other.[20] For the sake of constitutional analysis, code's linguistic properties are held to raise it to the status of "speech" for First Amendment purposes.[21] That has

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19. *See* Alan Feuer, *Cody Wilson, Who Posted Gun Instructions Online, Sues State Department*, N.Y. TIMES (May 6, 2015), http://www.nytimes.com/2015/05/07/us/cody-wilson-who-posted-gun-instructions-online-sues-state-department.html (quoting renowned First Amendment attorney Floyd Abrams' comments—on Cody Wilson's claim that his 3D-printable gun instructions posted online enjoys First Amendment protection—"[O]n the face of it, it seems to me like a serious claim.").

20. *See, e.g.*, Junger v. Daley, 209 F.3d 481, 485 (6th Cir. 2000) (discussing that speech does not lose First Amendment protection because it is in the form of code); Bernstein v. U.S. Dep't of State, 922 F. Supp. 1426, 1428–30 (N.D. Cal. 1996) (holding that cryptographic computer source code is "speech" protected by First Amendment); *see also* Jorge R. Roig, *Decoding First Amendment Coverage of Computer Source Code in the Age of YouTube, Facebook and the Arab Spring*, 68 N.Y.U. ANN. SURV. AM. L. 319, 322 (2012) ("The question of First Amendment coverage of computer source code was a hot topic in both academic debate and litigation around the turn of the millennium.").

21. There remains some controversy at the edges on the question of whether these properties define "source code" exclusively, or "object code" as well. Source code is defined in most legal discussions as code written in easily human-readable languages such as C or Python. *Source Code*, WIKIPEDIA, https://en.wikipedia.org/wiki/Source_code (last visited Mar. 12, 2016). This source code must then be compiled into a human-inscrutable "object code" before a computer can use it to execute a program. *See* Universal City Studios, Inc. v. Corley, 273 F.3d 429, 445–46 (2d Cir. 2001) ("The 'object code' version would be incomprehensible to readers outside the programming community (and tedious to read even for most within the community), but it would be no more incomprehensible than a work written in Sanskrit for those unversed in that language."). The legal source code/object code dichotomy, though, is really only tenable at the limit; source code can be executed by machines at the expense of efficiency, and object code can be read by human beings at the expense of extreme tedium. At any rate, the distinction is irrelevant to the CAD files that enable 3D printing, as they are not executable files, but Euclidean descriptions of polygons. *See* CAD Video Tutorials, *AutoCAD Tutorial—Using the POLYGON Command*, YOUTUBE (July 26, 2010), https://www.youtube.com/watch?v=1G3xosG_tyM; *Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM)*, INC., http://www.inc.com/encyclopedia/computer-aided-design-cad-and-computer-

been the consistent line in the lower courts, and though the Supreme Court has not weighed in, its recent case law extending First Amendment protections to medical data suggests the Court would take a similar approach.[22] And the argument is now being applied in the 3D printing context. In *Defense Distributed v. United States Department of State,* a case now before the Fifth Circuit, attorneys for the creator of a 3D-printed gun are arguing that the code contained in its predicate CAD file amounts to speech about a constitutional right.[23]

How seriously are we meant to take these arguments? If we carry them through to their logical conclusion, then we should expect strict scrutiny to define essentially all litigation concerning the regulation of 3D-printable products. In last year's *Reed v. Town of Gilbert*, the Supreme Court announced that strict scrutiny is to be applied to any regulation of speech whose application varies based on the content of the *message*—even if it can be shown that the law is not in any way motivated by concerns about the content.[24] Thus in *Reed*, the Court applied strict scrutiny to a local ordinance applying different size and display requirements to "temporary directional signs" and, for instance, signs advertising a business.[25] On these terms, most regulations of CAD files would probably engage strict scrutiny, as well.[26] If CAD files representing Yoda figurines may be freely distributed and CAD files representing guns may not, then the application of the law

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aided-cam.html (last visited Mar. 1, 2016) ("Computer-aided design (CAD) involves creating computer models defined by geometrical parameters.").

22. *See* Sorrell v. IMS Health Inc., 131 S. Ct. 2653, 2667 (2011) ("There is thus a strong argument that prescriber-identifying information is speech for First Amendment purposes.").

23. *See* Complaint at 7, ¶ 26, Def. Distributed v. U.S. Dep't of State, 121 F. Supp. 3d 680 (W.D. Tex. 2015) (No. 1:15-CV-372-RP), 2015 WL 2149795 ("[T]he United States Constitution guarantees a right to share truthful speech—especially speech concerning *fundamental constitutional rights*—in open forums.") (emphasis added).

24. Reed v. Town of Gilbert, 135 S. Ct. 2218, 2228 (2015) ("[A] law that is content-based on its face is subject to strict scrutiny regardless of the government's benign motive, content-neutral justification, or lack of 'animus toward the ideas contained' in the regulated speech.").

25. *Id.* at 2227.

26. *See* Julia Cosans, Note, *Between Firearm Regulation and Information Censorship: Analyzing First Amendment Concerns Facing the World's First 3-D Printed Plastic Guns*, 22 J. GENDER SOC. POL'Y & L. 915, 918 (2014) ("[U]nder a First Amendment analysis, computer files containing the 3-d gun blueprint should be classified as both expressive and functional.").

will turn on the differing contents of those files—contents expressed in the constitutionally-protected "language" of code. If CAD files are considered "speech," then the practical implication is that markets for 3D-printable products can be regulated only under the rarest of circumstances.

II. THE REGULATORY INTEREST IN CAD FILES

American governments have already begun to regulate access to 3D-printable goods. In 2013, the City of Philadelphia adopted an ordinance to ban the manufacture and possession of 3D-printed guns,[27] and in the same year, the State Department ordered Defense Distributed to remove the CAD files for the Department's own firearm components from Defense Distributed's website.[28] Neither of these actions appear to have been very effective, but we should not take them as proof that the regulation of 3D printing is an inherently futile enterprise. Still less should we assume that the government is done attempting to regulate 3D-printable objects.

To the contrary, if we operate on the assumption that 3D printing is an ascendant technology, then it follows that many contemporary retail and delivery markets will eventually become markets for access to 3D-printable designs. One can then assume conservatively that the government will pursue the same regulatory priorities in these new markets as in traditional markets. That will mean continued efforts to regulate the availability of weapons, the withdrawal of hazardous products from the market, and, occasionally, laws limiting access to certain types of products so that others may be protected from competition.

In the age of 3D printing, these kinds of mundane regulatory activities will usually require the government to regulate access to CAD files online. I will discuss the kinds of methods the government might use shortly. But suffice it to say that if we assume CAD files are "speech" for constitutional

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27. *See* PHILA., PA. CODE §§ 10-2001 to -2003 (2013) (originally proposed as Phila. Bill No. 130584, banning manufacture of 3D-printed firearms without a licence); Alexis Kleingman, *Philadelphia Is the First U.S. City to Ban 3d-Printed Guns*, HUFFINGTON POST (Nov. 26, 2013, 2:49 PM), www.huffingtonpost.com/2013/11/26/3d-gun-philadelphia_n_4344733.html ("Not only are you not allowed to create 3D-printed guns, you can't own one or even a piece of one.").

28. Complaint at 7, ¶¶ 25–27, *Def. Distributed*, 121 F. Supp. 3d 680 (No. 1:15-CV-372-RP), 2015 WL 2149795.

purposes, it follows that the government will be engaged in heavy "censorship" by regulating access to them.

You might object at this point that the government could avoid triggering First Amendment scrutiny by regulating the end-product rather than the distribution of its design file. Such is the approach we have traditionally taken with blueprints and recipes—the formula for crystal meth is out there even though it is unlawful to cook it.[29] Likewise with the Anarchist Cookbook, which provides recipes for Molotov cocktails and LSD.[30] You can find instructions to build lawn darts online, in spite of the fact that they have been off the market since 1988.[31] One might be tempted to interpret the right to view the blueprints for all of those illicit devices as a customary First Amendment liberty.

But I am not sure that civil liberties considerations have played much into the government's hands-off treatment of blueprints. It seems more likely that regulators have simply ignored blueprints because policing them would be costly and ineffective. Instead, the time-honored technique for regulating products is to apply pressure to a small number of "choke points" along the chain of commerce through which all goods must pass before reaching the consumer.[32] These include manufacturers, distributors, and retailers.[33] These entities are highly-capitalized and sophisticated within their markets, which give them the financial incentive and the operational capability to comprehend and follow the regulations that govern them. As for enforcement, it is reasonably feasible to enforce a ban on noncompliant products against a small

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29. I leave the Google search to the reader.

30. The original version is available now at Barnes and Noble for about $17.89. *See The Anarchist Cookbook*, BARNES & NOBLE, http://www.barnesandnoble.com (search "The Anarchist Cookbook William Powell") (last visited Mar. 20, 2016). A current version is available at JOLLY ROGER, ANARCHY COOKBOOK VERSION 2000, http://bnrg.cs.berkeley.edu/~randy/Courses/CS39K.S13 /anarchistcookbook2000.pdf (last visited Mar. 13, 2016). The LSD recipe looks a little suspicious, and appears next to a recipe for "Bananadine," an alleged hallucinogen made from banana peels and water. *See id.* at § 158.

31. Jörg Sprave, *BANNED IN USA: How to Make Lawn Darts*, YOUTUBE (June 28, 2015), https://www.youtube.com/watch?v=-GdvIrNl8LY.

32. *See, e.g.*, *Products, Guidance & Regulations*, FDA, http://www.fda.gov/TobaccoProducts/Labeling (last visited Mar. 18, 2016) (providing tobacco products compliance guidance to marketers, manufacturers, and promoters).

33. *Id.*

number of warehouses, factories, and retail outlets.[34] Thus, when the EPA rolls out new fuel efficiency standards for automobiles, the government effectuates those standards by placing a compliance burden on automobile manufacturers.[35] That tends to get the job done, and it is not surprising that the government does not take the additional measure of, for example, ordering all copies of blueprints for noncompliant vehicles to be burned.[36]

In a market for 3D-printable goods, all the traditional choke points disappear.[37] There is no longer any traditional manufacturer sitting at a plant. Manufacturing takes place at the end-point in the consumer's home. There is no physical distribution center.[38] Printing and subsequent possession are the only events in the life of a 3D-printed product to take place in real space.

The absence of real-space choke points in markets for 3D-printable goods dooms any real-space regulatory strategy to fail. Consider Philadelphia's 3D-printed gun ordinance, which bans printing and possession of 3D-printed weapons without attempting to regulate the distribution or possession of the

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34. *See, e.g.*, Claire Reilly, *Australian Police Seize 3D Printed Gun Parts and Knuckle Dusters in Raid*, CNET.COM (Feb. 10, 2015), http://www.cnet.com/news/3d-printed-gun-parts-and-knuckle-dusters-seized-in-australia.

35. *See generally Air Enforcement*, EPA.GOV, http://www.epa.gov/enforcement/air-enforcement#engines (last updated Dec. 1, 2015) ("Motor vehicle engines and off-road vehicles and engines must meet CAA emissions standards . . . . In addition, the composition of fuels used to operate mobile sources, including gasoline, diesel, ethanol, biodiesel and blends of these fuels, are also regulated under the CAA.").

36. *See id.* (noting the many players involved in EPA's CAA compliance regime).

37. *Cf.* Joseph Burton et al., *Panel III: Implications of Enforcing the Digital Millennium Copyright Act: A Case Study, Focusing on* United States v. Sklyarov, 12 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 805, 846 (2002) ("MR. LEHMAN: The problem here is that the person who is actually making the unauthorized copy when something is sent out on the Internet en masse is actually the end-user. I think one of the things about the Copyright Law is it can never work successfully if you are going to go after each individual end-user. That is why, as I said in my earlier remarks, historically you went after the choke points, you went after the people who had the factory that produced the illegal copies.").

38. *See* Claire Chabaud, *3D Printing and the Future Shape of Retail Industry*, SCULPTEO (Dec. 23, 2015), http://www.sculpteo.com/blog/2015/12/23/3d-printing-and-retail-industry ("The distribution step will be fully dematerialized, as 3D files can just be exchanged online.").

CAD files.[39] Such a law might not be completely worthless today, when only a relative few have access to 3D printing resources and it is conceivable that someone might buy a 3D-printed gun in person or by mail.[40] But in the long term, users can be expected to produce such things at home.[41] And in that kind of market, it is unclear how the Philadelphia approach is supposed to work except in isolated cases in which the authorities get extraordinarily lucky.[42]

Whatever we conclude on the question of whether CAD files constitute speech, then, the government will ultimately be forced to choose between regulating the CAD files, on the one hand, and leaving the market for 3D-printable items completely laissez-faire, on the other.

III. RESTRICTING AVAILABILITY OF 3D-PRINTABLE DESIGNS

At this point someone might raise a second objection: even if it is impractical to regulate the end-product because 3D printing eliminates the traditional regulatory choke points, that does not imply that it is even possible to regulate the online distribution of CAD files.[43] There is an old saying that

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39. *See* PHILA., PA. CODE § 10-2002 (2013) ("No person shall use a three-dimensional printer to create any firearm, or any piece or part thereof, unless such person possesses a license to manufacture firearms under Federal law, 18 U.S.C. § 923(a)."). The law does not speak to possession of a "digital model" used in 3D gun printing. *Id.*

40. There are businesses today that 3D-print goods to order in specialized facilities and then deliver them by mail to consumers. From Shapeways, for instance, a user can order fan-designed 3D-printed My Little Pony statuettes. Elizabeth A. Harris, *Hasbro to Collaborate with 3-D Printing Companies to Sell Artwork: Hasbro Selling 'My Little Pony' Fan Art*, N.Y. TIMES (July 20, 2014), http://www.nytimes.com/2014/07/21/business/hasbro-selling-my-little-pony-fan-art.html. If someone set up a similar business around illicit plastic firearms, then those firearms might eventually be traced back to their source.

41. *E.g.*, Reilly, *supra* note 34.

42. The police in Japan, for instance, picked up the hobbyist Yoshimoto Imura for printing 3D-printed guns after he posted a video of himself *in flagrante* on YouTube. Suman Varandani, *Yoshitomo Imura Becomes First Person to Be Jailed for 3D Printing Guns*, INT'L BUS. TIMES (Oct. 25, 2014, 6:34 AM), http://www.ibtimes.com/yoshitomo-imura-becomes-first-person-be-jailed-3d-printing-guns-1713084.

43. *But see* Andy Greenberg, *Feds Tighten Restrictions on 3-D Printed Gun Files Online*, WIRED (June 11, 2015, 11:05 AM), http://www.wired.com/2015/06/feds-restrict-3d-printed-gun-files (confirming the U.S. State Department's intention "to act as gatekeeper for when Americans can legally publish online data that could allow someone to digitally fabricate a gun").

"[t]he Internet interprets censorship as damage and routes around it."[44] If that is the case, then one might say that the First Amendment point is moot.

I find this argument to be badly overstated. Surely 3D-printed guns and other digital things can never be eradicated entirely; determined people with the know-how will always be able to get them. But if that qualifies a regulation as futile then all regulations are futile. Regulations never set up a hermetic seal against violation. Instead, at their best, they contain violation by making it costly. And by that more appropriate measure, some reasonably effective regulation of 3D-printed products must be achievable.

Consider the Napster episode, in which an orgy of online file sharing around the turn of the century nearly cratered the music industry.[45] The disruption that occurred might easily be read as evidence that the Internet is fundamentally wild and unregulable. But it is more accurate to say simply that music distribution is less regulable than it once was. It is possible, of course, to get a pirated copy of whatever you want, and it is not terribly difficult. But for a user of average sophistication, it takes a lot more time and hassle than it once did, and the reason is that intellectual property owners have used legal remedies—most prominently the notice-and-takedown procedures of Digital Millennium Copyright Act (DMCA), discussed below—to drive the exchange of proprietary content underground.[46] Simple inconvenience has driven many would-be "pirates" back to industry-sanctioned markets such as iTunes and Spotify.[47] So while the copyright wars do

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44. The saying is usually attributed to the software engineer John Gilmore. *See* Peter H. Lewis, *Limiting a Medium Without Boundaries; How Do You Let the Good Fish Through the Net While Blocking the Bad?* N.Y. TIMES (Jan. 15, 1996), http://www.nytimes.com/1996/01/15/business/limiting-medium-without-boundaries-you-let-good-fish-through-net-while-blocking.html.

45. *See* Brionna N. Ned, Note, *Unenforceable Copyrights: The Plight of the Music Industry in a P2P File-Sharing World*, 33 REV. LITIG. 397, 402–04 (2014) (describing the rise of peer-to-peer music sharing services in the wake of Napster's demise).

46. *See* Digital Millennium Copyright Act, 17 U.S.C. § 512 (2012).

47. Compliance measures by companies like Google have made it difficult for users to access pirated materials while still maintaining that "[t]he right combination of price, convenience, and inventory will do far more to reduce piracy than enforcement can." GOOGLE, HOW GOOGLE FIGHTS PIRACY 4 (2014), https://drive.google.com/file/d/0BwxyRPFduTN2NmdYdGdJQnFTeTA/view?pref=2&pli=1.

demonstrate the Internet's disruptive power, they hardly demonstrate that the Internet is completely impervious to control. Instead, they demonstrate that mainstream Internet use is meaningfully responsive to regulatory pressures.[48]

Those pressures work because the Internet has regulable choke points of its own. These include search engines, social media platforms, and web space providers.[49] The Digital Millennium Copyright Act operates by pressing the administrators of search engines, social media platforms, and web space providers into the service of copyright owners.[50] If a user posts infringing content to YouTube, for instance, a designated agent at YouTube may receive a takedown letter from the copyright owner. If YouTube complies, then it is guaranteed a safe harbor from litigation by either the copyright owner or the user.[51] YouTube always complies, and that is almost always the end of the story.[52] The system is troublingly open to abuse by overzealous copyright holders who would suppress parody or criticism; but in a dark way, those concerns testify to the system's efficacy.[53] The system accomplishes its objectives; if it didn't, no one would subscribe to Netflix. I think it would be surprising if the government did not use the same techniques to limit access to illicit 3D-printable goods. In fact, the State Department already appears to have groped rather clumsily in that direction in *Defense Distributed*.[54]

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48. *See id.*

49. *See, e.g.*, *id.*

50. *See* Digital Millennium Copyright Act, 17 U.S.C. §§ 501–13 (2012). *See also* Jeffrey Cobia, Note, *The Digital Millennium Copyright Act Takedown Notice Procedure: Misuses, Abuses, and Shortcomings of the Process*, 10 MINN. J.L. SCI. & TECH. 387, 390–94 (2009) (describing the takedown notice and counter-notice procedures under DMCA, and providing an illustrative example).

51. *See* Cobia, *supra* note 50 at 393–94 (illustrating a potentially commonplace usage of the DMCA to take down an infringing YouTube video).

52. *See id.* The statute leaves the user some recourse against the copyright holder at this point, but only if the user gives up their anonymity and effectively submits to being sued. *See* 17 U.S.C. § 512(g)(3).

53. *See generally* Matthew Schonauer, *Let the Babies Dance: Strengthening Fair Use and Stifling Abuse in DMCA Notice and Takedown Procedures*, 7 I/S: J.L. & POL'Y FOR INFO. SOC'Y 135, 152-57 (2011) (describing DMCA abuses).

54. *See* Andy Greenberg, *State Department Demands Takedown of 3D-Printable Gun Files for Possible Export Control Violations*, FORBES (May 9, 2013, 2:36 PM), http://www.forbes.com/sites/andygreenberg/2013/05/09/state-department-demands-takedown-of-3d-printable-gun-for-possible-export-control-violation/#398d24ae3fb7 (highlighting the dilemma faced by regulators

Other kinds of choke points are available as well. In China, a small number of top-level gateway routers run all international traffic into the country.[55] The state runs filtering software on those routers similar to the filters offices in the United States might use to block access to objectionable or time-wasting content.[56] This "Great Firewall" means that users within China cannot access blacklisted foreign materials except through cumbersome proxy software.[57] Domestically, China's "Golden Shield" program requires commercial Internet service providers (ISPs) to run software that scans for and removes objectionable language automatically.[58] Employees of licensed ISPs are required by law to remove any remaining unacceptable materials manually.[59] Between the private and public sector, roughly 100,000 people are thought to be policing the Internet "around the clock."[60] A Reporters Without Borders study in 2003 reported that it was impossible to post messages in online forums that contained blacklisted language.[61] More subtly subversive messages would be deleted within minutes or hours.[62]

Hopefully our own government never uses these tools for the same ideologically-suppressive purposes. But it would hardly be surprising for the government someday to use them to police the distribution of 3D-printable designs, and I expect that in time those measures would strike us as perfectly normal. It is the speech-suppressive ends rather than the means that raise concerns about the Great Firewall, Golden

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when targeting only one of several possible defendants controlling the digital information).

55. James Fallows, *"The Connection Has Been Reset,"* ATLANTIC, http://www.theatlantic.com/magazine/archive/2008/03/the-connection-has-been-reset/306650 (last visited Mar. 13, 2016).

56. JACK GOLDSMITH & TIM WU, WHO CONTROLS THE INTERNET? ILLUSIONS OF A BORDERLESS WORLD 92–95 (Oxford Univ. Press 2006) (providing a rough diagram of Chinese Internet filtering practices).

57. HUMAN RIGHTS WATCH, "RACE TO THE BOTTOM": CORPORATE COMPLICITY IN CHINESE INTERNET CENSORSHIP 15–17 (Aug. 2006), https://www.hrw.org/reports/2006/china0806/china0806webwcover.pdf (last visited Mar. 18, 2016).

58. *See id.* at 11–14.

59. *See id*.

60. *How Does China Censor the Internet?*, ECONOMIST (Apr. 21, 2013, 11:50 PM), http://www.economist.com/blogs/economist-explains/2013/04/economist-explains-how-china-censors-internet.

61. *See* GOLDSMITH & WU, *supra* note 56, at 96.

62. *Id.*

Shield, and to a lesser extent the DMCA. The trouble with China's policy, in other words, is that it regulates the library too closely.

Close regulation of the mall, on the other hand, is not nearly so offensive. Consider the position of a consumer who participates in a market for thousands or millions of products under some byzantine regulatory structure. We do not ordinarily expect the consumer to ascertain a product's compliance with regulations before purchasing it off the shelf. Instead, it is for the manufacturer to prevent noncompliant products from reaching the shelf in the first place. When a noncompliant product causes harm to a consumer, it is generally the manufacturer's fault for making it available, not the consumer's for purchasing it.[63] That approach avoids placing the consumer in an uncertain position relative to the law, it insures that social costs are borne by the party who is in the best position to avoid them, and it avoids setting up senseless deterrents to productive economic transactions.[64] It is intuitive to carry the same approach over to an online mall of 3D-printable goods, where the content provider steps into the shoes of the manufacturer and distributor.

To define such a market as a library would imply that the downloader of a CAD file has not taken a *product* off the shelf, but rather a book of code. As for the merchant selling that product, they become a librarian only tenuously related to the production process going on in the user's 3D printer. And if that merchant is held to account for selling bad wares, then what could have been a simple question about product liability will be overblown into a grand question about democracy and human dignity.

This returns us, then, to the broad question I have posed: does something require us to treat virtually all Internet

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63. RESTATEMENT (SECOND) OF TORTS § 402A(1) (AM. LAW INST. 1965) provides the model of strict liability for unreasonably dangerous materials in tort, and the Uniform Commercial Code's implied warranties of merchantability and fitness for a particular purpose perform the same function in contract. U.C.C. § 2-314 (AM. LAW INST. & UNIF. LAW COMM'N 2002); *see also* RESTATEMENT (THIRD) OF TORTS § 1 (AM. LAW INST. 1998) ("One engaged in the business of selling or otherwise distributing products *who sells or distributes* a defective product is subject to liability for harm to persons or property caused by the defect.") (emphasis added).

64. *See, e.g.*, Jules L. Coleman, *The Morality of Strict Tort Liability*, 18 WM. & MARY L. REV. 259, 262 (1976).

activity as part of the library, or may we admit that online commerce belongs more properly to the mall?

IV. THE UNCERTAIN CONSTITUTIONAL MEANING OF 3D PRINTING

In their most celebrated confrontations with government, computers and the Internet have quintessentially played the role of speech media. *Reno v. ACLU*, in which Congress attempted to impose credit card locks on any Internet media considered inappropriate for children, is obviously a case about free expression.[65] *Brown v. Entertainment Merchants Ass'n*, a case about depictions of violence in video games, also deals with matters that clearly implicate expression.[66] *Bernstein v. United States Department of State* and *Junger v. Daley*, which I discuss below, deal with university professors who wish to use source code as a teaching tool; those cases, too, have expressive connotations because of their connection with the academy.[67] Abroad, it is a speech concern when China and Saudi Arabia filter for unacceptable material, or when in times of political upheaval a strongman such as Hosni Mubarak simply shuts down all Internet access within the territory he governs.[68]

But it is a fallacy to conclude from these confrontations that computers or the Internet or "data" or "information" are always free speech concerns.[69] The First Amendment's salience is not the product of any technological token. Take the law challenged in *Reno v. ACLU* and apply it to magazines and VHS and you will find that the First Amendment analysis does

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65. Reno v. ACLU, 521 U.S. 844 (1997).

66. Brown v. Entm't Merchs. Ass'n, 131 S. Ct. 2729 (2011).

67. Junger v. Daley, 209 F.3d 481 (6th Cir. 2000); Bernstein v. U.S. Dep't of State, 974 F. Supp. 1288 (N.D. Cal. 1997).

68. *See, e.g.*, James Glanz & John Markoff, *Egypt Leaders Found 'Off' Switch for Internet*, N.Y. TIMES (Feb. 15, 2011), http://www.nytimes.com/2011/02/16/technology/16internet.html (noting that Egyptian Internet service providers "are required to [shut down service] by their licensing agreements if the government so decrees").

69. In *United States v. O'Brien*, the Supreme Court assumed without deciding that the burning of a draft card in a public antiwar protest was a kind of expressive conduct. United States v. O'Brien, 391 U.S. 367 (1968). No one reads *O'Brien* as a lesson that all behavior related to draft cards is basically expressive, much less that the "language" printed on draft cards casts a circle of speech protections around all matters having to do with the draft. Yet we have a hard time avoiding those mistaken readings where *information technologies are concerned.*

not change.[70] Or consider *Brown v. Entertainment Merchants,* which extended First Amendment protections to video games.[71] The technology is not the point. Assume, fancifully, that violent video games operated from magic rather than computers, and the expressive stakes would remain exactly the same. In Justice Scalia's words,

> Like the protected books, plays, and movies that preceded them, video games communicate ideas—and even social messages—through many familiar literary devices (such as characters, dialogue, plot, and music) and through features distinctive to the medium (such as the player's interaction with the virtual world). That suffices to confer First Amendment protection.[72]

The technicality that *Grand Theft Auto's* game data was compiled a couple of years ago from source code that several game designers read and discussed with each other is totally irrelevant. As for the international examples of censorship, those ends were speech-suppressive before they were ever adapted to Internet use.

I suspect that we are biased toward a rule that "code is speech" or that CAD files are "only pictures" mostly because of the primitive state of information technologies over most of their brief history. Sharp limitations on bandwidth, processing power, memory, storage, and peripheral devices biased most Internet use until the turn of the century to its most low-power applications—the simplest of which, incidentally, was the transmission of the written word. Thus the Internet in its early ragged glory was overwhelmingly a platform for discussion and expression, and much of that was discussion about the Internet and computing.[73] Legal confrontations involving the Internet tended to raise concerns about the freedom of speech simply because the Internet's non-expressive capabilities had not yet been rolled out.

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70. *See Reno*, 521 U.S. at 893 (O'Connor, J., concurring in part and dissenting in part) ("The [statute at issue] is therefore akin to a law that makes it a crime for a bookstore owner to sell pornographic magazines to anyone once a minor enters his store.").

71. *See Brown*, 131 S. Ct. at 2733.

72. *Id.*

73. For a general discussion on how the Internet was used during its early stages, see Barry M. Leiner et al., *Brief History of the Internet*, INTERNET SOC'Y, http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet#concepts (last visited Feb. 27, 2016) ("Email provided a new model of how people could communicate with each other, and changed the nature of collaboration, first in the building of the Internet itself . . . and later for much of society.").

Over the past twenty years or so, though, the Internet has matured into other uses that are at best tangentially related to speech concerns: online retail, bill payment, home monitoring, Fitbitting, and the distribution of 3D-printable goods. A reasonable person might want to see regulatory shelters for these uses of technology for reasons that have nothing to do with free speech. Consider, for example, the controversy surrounding Uber, the algorithm-driven and mostly unregulated cab service.[74] One might praise Uber as representing innovation and the traditionally regulated cab-drivers' unions represent stagnation and industry capture.[75] Those are legitimate arguments, but they are not First Amendment arguments. Instead, these arguments draw from small-government conservatism, economic libertarianism, Lochnerism, or some similar position.

3D printing presents a similar case, which is to say that arguments for a "freedom to print" would relate more plausibly to a freedom of contract than to the freedom of speech. If the freedom of contract were still viable as a matter of constitutional law,[76] then the debate over 3D printing would be framed in those terms. Instead, parties such as Defense Distributed are left to frame their case in terms of free speech, and so they do. I am concerned, though, that advocates who frame economic liberties as speech liberties risk mooring the prestige of speech freedoms at some middle station between the two.

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74. *See* Matthew Stoller, *Uber's Algorithmic Monopoly: "We Are Not Setting the Price. The Market Is Setting the Price. We Have Algorithms to Determine What that Market Is."*, TUMBLR.COM (Apr. 9, 2014, 6:45 PM), http://mattstoller.tumblr.com/post/82233202309/ubers-algorithmic-monopoly-we-are-not-setting (discussing the many policy debate issues surrounding Uber's ascendancy in the cab market).

75. *See, e.g.*, Larry Downes, *Lessons from Uber: Why Innovation and Regulation Don't Mix*, FORBES (Feb. 6, 2013, 5:00 AM), http://www.forbes.com/sites/larrydownes/2013/02/06/lessons-from-uber-why-innovation-and-regulation-dont-mix/#3b55ad0731fd ("[I]t's no wonder that in the bizarro world of licensed taxicabs and limousines, incumbents faced with the sudden arrival of disruptive technologies that could vastly improve their quality, efficiency and profitability but which also introduce new competitors and new supply chain partners, respond as if their very existence is threatened. It is, of course.").

76. *See* Eugene Volokh, *The Revival of the Contract Clause*, REASON FOUND. (Sept. 25, 2013), http://reason.org/news/show/pensions-contract-clause ("Since the New Deal, the Contract Clause, much like other economic rights, has been afforded a relatively low level of protection.").

Free speech doctrine applied to the letter against regulations of 3D printing would require unrealistic policy outcomes that lawyers have been trained to ridicule since the end of the *Lochner* period.[77] Say, for instance, that in the near future the Consumer Product Safety Commission (CPSC) orders a recall of a 3D-printable pacifier design.[78] The CPSC orders websites that have posted the CAD file, or that sell access to the file to remove it.[79] Let's also say that the recall doesn't make much sense: the evidence of a safety issue is weak. If, at this point, the courts really believe that CAD files "are speech," then they will block the recall order under strict scrutiny. And so it will go for any attempt by the government to restrict the distribution of CAD files: only exceptionally well-justified product regulations in that area will survive. Whether you like that result or not, it amounts to a reinstatement of *Lochner*ism: radical laissez-faire as a constitutional command.[80]

It would come as quite a surprise if the courts were willing to fill such a tall order, whether or not they held to the ostensible position that "code is speech." Talk, after all, is cheap; it is one thing to say that "code is speech," and another altogether to follow those words through to what they imply in the 3D printing context. I am skeptical that there is much appetite at all among judges for strict scrutiny review in the field of product regulation. It seems far more likely that excessively-broad formulations of "information," "data," and "code" as speech will be offset by watered-down First

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77. *See* Choudhry, *supra* note 5, at 4–6 (noting the criticism of *Lochner* from the legal community).

78. Such authority falls under 16 C.F.R. § 1501.5 (2015) (enforcement procedure for toys presenting choking hazards).

79. *See generally* U.S. CONSUMER PROD. SAFETY COMM'N, THE REGULATED PRODUCT HANDBOOK 23–37 (2013), http://www.cpsc.gov//Global/Business-and-Manufacturing/Business-Education/RegulatedProductsHandbook.pdf (prescribing procedures for recalling and destroying regulated products).

80. *See* Choudhry, *supra* note 5, at 4–5 ("During this period, the U.S. Supreme Court struck down close to two hundred state and federal laws regulating a wide variety of market relationships . . . . [T]he *Lochner* era was characterized by a judicial resistance to the regulatory, redistributive, and activist state the likes of which the American constitutional system has not since seen.").

Amendment analyses that allow government the same leeway to regulate that it enjoys in the ordinary course of business.[81]

The existing case law on code and the First Amendment is consistent with this account. There is little evidence that judges' stated commitments to code-as-speech really drive the outcomes. Eight opinions, by my count, hold that the code in dispute is speech for First Amendment purposes.[82] The First Amendment challenger prevails in two of them, and in the remaining six, the court holds that the First Amendment does not confer protection.

The two First Amendment victories come early, in cases involving educational uses of source code. In both *Bernstein v. United States Department of State* and *Junger v. Daley*, university professors sought clearance to post source code for cryptographic algorithms on educational web pages about computer science.[83] The courts upheld their right to do so over objections by the government that cryptographic source code was subject to arms embargoes.[84] These are the seminal cases for the code-is-speech concept, and the ones most frequently cited by advocates for a strong code-is-speech concept. But even in these cases, it is not clear that the code-is-speech concept is really necessary to the outcome. The overall picture of academics who only want to teach their lessons without

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81. Kyle Langvardt, *The Doctrinal Toll of "Information as Speech"*, 47 LOY. UNIV. CHI. L.J. (forthcoming 2016) ("[E]xpanded First Amendment coverage in peripheral areas might lead to a dilution of protection nearer to the core.").

82. *See* Universal City Studios, Inc. v. Corley, 273 F.3d 429, 445–49 (2d Cir. 2001); Junger v. Daley, 209 F.3d 481, 485 (6th Cir. 2000); Def. Distributed v. U.S. Dep't of State, 121 F. Supp. 3d 680, 691–92 (W.D. Tex. 2015); United States v. Alavi, No. CR 07-429-PHX-NVW, 2008 WL 1989773, at *1 (D. Ariz. May 5, 2008); 321 Studios v. Metro Goldwyn Mayer Studios, Inc., 307 F. Supp. 2d 1085, 1099–1101 (N.D. Cal. 2004); United States v. Elcom Ltd., 203 F. Supp. 2d 1111, 1126–27 (N.D. Cal. 2002); Bernstein v. U.S. Dep't of State, 974 F. Supp. 1288, 1293, 1303 (N.D. Cal. 1997); DVD Copy Control Ass'n v. Bunner, 113 Cal. Rptr. 2d 338, 342, 347–50 (Cal. Ct. App. 2001). I do not count *Commodity Futures Trading Comm'n v. Vartuli,* 228 F.3d 94 (2d Cir. 2000) in this group. That case involved software that claimed to give its users sound financial trading advice; the court declined to apply any First Amendment scrutiny, holding that that computer instructions that "induce action without the intercession of the mind or the will of the recipient" are not constitutionally protected speech. *Id.* at 111. Nor do I count *Allied Veterans of the World, Inc.: Affiliate 67 v. Seminole Cty.*, 783 F. Supp. 2d 1197, 1203 (M.D. Fla. 2011), which follows *Vartuli*.

83. *See Junger*, 209 F.3d at 483–84; *Bernstein*, 974 F. Supp. at 1292–93.

84. *Junger*, 209 F.3d at 485; *Bernstein*, 974 F. Supp. at 1310.

censorship has strong traditional First Amendment connotations anyway.

The remaining cases arise under circumstances in which the code-is-speech concept really does seem to be the exclusive basis for the First Amendment challenge. In most of these cases, the First Amendment claimants were parties who developed methods for cracking digital rights management schemes and who then either posted the source code online or sought to sell it as software.[85] The Digital Millennium Copyright Act makes this kind of trafficking in circumvention devices unlawful.[86] In another case, a criminal defendant was indicted for exporting nuclear reactor simulation software to Iran in violation of embargoes.[87] Finally, *Defense Distributed* concerns the application of arms embargoes to 3D-printable weaponry.[88]

The normal run of First Amendment opinions would say that these provisions discriminate on the basis of content, triggering strict scrutiny.[89] But the courts seem to recognize in each of these cases that they are dealing with exotic claims well outside the mainstream of First Amendment litigation.[90] As such, they consistently resort to a doctrine called "secondary effects" that allows them to downgrade to intermediate scrutiny.[91] Under the "secondary effects" doctrine, the anti-circumvention provisions are cast as content-neutral because they do not seem to be motivated by a desire to suppress a

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85. *See Corley*, 273 F.3d at 435–39; *321 Studios*, 307 F. Supp. 2d at 1089–90; *Elcom*, 203 F. Supp. 2d at 1117–19; *DVD Copy Control Ass'n*, 113 Cal. Rptr. 2d at 341.

86. *See* 17 U.S.C. §§ 1201(a)(2), (b)(1) (2012) (proscribing the use and trafficking of circumvention devices).

87. *Alavi*, 2008 WL 1989773, at *1 ("It is true that software source code is speech subject to First Amendment protections. However, BIS and OFAC's control on exporting nuclear reactor simulation software would withstand intermediate scrutiny, which is appropriate for export prohibitions that are based on the function, not the expressive content, of computer source code.").

88. *See* Def. Distributed v. U.S. Dep't of State, 121 F. Supp. 3d 680, 686–87 (W.D. Tex. 2015).

89. *See, e.g.*, *Elcom*, 203 F. Supp. 2d at 1127 (noting defendant Elcom's arguments that strict scrutiny should apply because the restriction is content-based); *Def. Distributed*, 121 F. Supp. 3d at 694 (noting plaintiff's argument that the regulation is content-based and thus invokes strict scrutiny).

90. *See, e.g.*, *Corley*, 273 F.3d at 449–58 (affirming the lower court's characterization of the restrictions in question as content-neutral rather than content-based).

91. *See, e.g.*, *Def. Distributed*, 121 F. Supp. 3d at 693–94 (tracing the history of the "secondary effects" doctrine in the Fifth Circuit).

"message"; instead, they are aimed at the innocuous goal of preventing copyright infringement.[92]

The secondary effects idea is generally regarded as a corner-cutting measure to be applied only in cases involving marginal sexual expression such as nude dancing, and in 2015's *Reed v. Town of Gilbert*, the Supreme Court signaled clearly that it is no longer good law.[93] But just a month later, in the first opinion in *Defense Distributed,* Judge Robert Pitman revived secondary effects to approve the State Department's treatment of 3D-printable firearms.[94] So it is fairly clear where code stands today in the First Amendment order. It is "speech," but of such a disfavored character that judges will strain to water down the analysis in whatever way is necessary to avoid the serious regulatory limits that that premise entails.

I expect that this story will repeat itself as 3D printing technology becomes cheaper and more accessible. If a regulation of 3D printing is ever going to fall in First Amendment litigation, now is the time. The technology today is still mostly identified with a class of artists, tinkerers, and "makers" who use it as a creative medium, and there is not much money on the table.[95] As the technology evolves, though,

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92. *See Elcom*, 203 F. Supp. 2d at 1129–32 (applying intermediate scrutiny to the disputed statute).

93. *See* Reed v. Town of Gilbert, 135 S. Ct. 2218, 2228 (2015) ("A law that is content based on its face is subject to strict scrutiny regardless of the government's benign motive, content-neutral justification, or lack of 'animus toward the ideas contained' in the regulated speech . . . . In other words, an innocuous justification cannot transform a facially content-based law into one that is content neutral."). *See also* Eugene Volokh, *Supreme Court Reaffirms Broad Prohibition on Content-Based Speech Restrictions, in Today's* Reed v. Town of Gilbert *Decision*, WASH. POST (June 18, 2015), https://www.washingtonpost.com/news/volokh-conspiracy/wp/2015/06/18/supreme-court-reaffirms-broad-prohibition-on-content-based-speech-restrictions-in-todays-reed-v-town-of-gilbert-decision ("[T]he majority never mentions 'secondary effects' or cites *Renton* or any of the other secondary effects cases. Presumably it isn't trying to silently overrule those cases, especially since (1) they have been endorsed by some of the Justices in the majority, and (2) there are enough such cases that they can't be lightly dismissed as outliers (though I do think they are inconsistent with the great bulk of free speech doctrine). Yet it's hard to see how those cases could be logically reconciled, on their own terms, with the majority's firm condemnation of facially content-based laws.").

94. *See Def. Distributed*, 121 F. Supp. 3d at 693–96.

95. *See, e.g.*, Evan Chavez Sun, *Maker's Affair Poker Ping Pong Paddles Could Be a Hit*, 3D PRINTING INDUS. (Nov. 30, 2014), http://3dprintingindustry.com/2014/11/30/makers-affair-poker-ping-pong-

we can expect it to follow the same trajectory that other information technologies have: it will reach a much larger class of non-creative consumers who use it exclusively as an appliance for convenient delivery of ready-to-print consumer goods.[96] It will begin to replace certain markets that are today dominated by retail or mail delivery.[97] Physical malls will close down as people migrate to online malls. Once the offbeat ambiance has faded and 3D printing has become the favored method for replacing, say, a toilet paper holder, judges will be less inclined to view CAD files primarily as a means for visionaries to exchange big ideas. The post-*Lochner* instinct will kick in, and even judges who claim to apply First Amendment doctrine in cases on 3D printing will usually dispense with those claims under something that, for practical purposes, approximates the tepid rational basis review that other commercial regulations receive. Whether or not the doctrine recognizes the difference between the library and the mall in theory, markets for 3D-printable goods are sure to be treated as malls in fact.

V. ADMITTING THAT CODE IS RARELY SPEECH

In *Junger v. Daley*, the Sixth Circuit held that "[b]ecause computer source code is an expressive means for the exchange of information and ideas about computer programming, . . . it is protected by the First Amendment."[98] That formulation boils down a set of ideas borrowed from *Bernstein v. United States Department of State*, and sets down two tenets that purport to guide the First Amendment analysis today in cases about code. First, that human-readable code is speech per se, much like

paddles (describing a novel 3D-printed ping pong paddle set, and requesting funding support via Kickstarter).

96. The transition may have already begun. *See, e.g.*, *Automotive*, STRATASYS, http://www.stratasys.com/industries/automotive (last visited Mar. 19, 2016) (operating a marketplace for custom-printed automotive parts).

97. *See generally id.*

98. Junger v. Daley, 209 F.3d 481, 485 (6th Cir. 2000).

plain language.[99] Second, that the "speech" contained in code is "about" whatever function the code performs.[100]

It is time to admit how hard it is to buy into that formula's full implications. The current litigation could not possibly demonstrate the point more vividly. According to the plaintiffs in *Defense Distributed*, CAD files for 3D-printable weaponry are not just speech, but *core political speech*.[101] The long, mind-numbing lists of coordinates contained in those files are not described as mere speech about computer programming, or speech about guns, but "expressive content about the right to keep and bear arms."[102] These pretentious arguments probably play well to certain narrow audiences who are looking for confirmation of their pre-existing libertarian views on gun rights. But for reasons I have outlined above, it is unrealistic to think that courts will buy into them in any meaningful way.

If courts are not going to treat CAD files as speech in practice, then they should abandon the idea in theory. I would say, as I have argued elsewhere,[103] that the courts should abandon the conceit that computer code's linguistic content makes it speech per se. Under such an analysis the First Amendment might still come into play in cases where code is used in the course of expressive conduct. But no expressive intent would be presumed, meaning that mainstream,

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99. *See Junger*, 209 F.3d at 484 (noting that computer code is a mixture of function and expression, and explaining that First Amendment protection is "not reserved for purely expressive communication."). *See also* Bernstein v. U.S. Dep't of State, 922 F. Supp. 1426, 1435 (N.D. Cal. 1996) ("This court can find no meaningful difference between computer language, particularly high-level languages . . . , and German or French.").

100. *See Junger*, 209 F.3d at 484 (contrasting analysis of the functional and expressive elements in decryption software). *Cf. Bernstein*, 922 F. Supp. at 1435 ("The music inscribed in code on the roll of a player piano is no less protected for being wholly functional . . . . Like music and mathematical equations, computer language is just that, language, and it communicates information either to a computer or to those who can read it.").

101. *See* Memo. of Points & Auths. in Support of Plaintiffs' Motion for Preliminary Injunction at 10, 29, Def. Distributed v. U.S. Dep't of State, 121 F. Supp. 3d 680 (W.D. Tex. 2015) (No. 1:15-CV-372-RP) ("Defendants have deprived Plaintiffs' customers, visitors and patrons of access to Plaintiffs' speech; impeded their ability to likewise speak on the same subjects; and infringed their right to keep and bear arms . . . . [N]o constitutional right is so directly linked to one's immediate physical well-being as is the right to keep and bear arms.").

102. Memo. of Points & Auths. in Reply to Defendants' Opposition to Plaintiffs' Motion for Preliminary Injunction at 12, Def. Distributed v. U.S. Dep't of State, 121 F. Supp. 3d 680 (W.D. Tex. 2015) (No. 1:15-CV-372-RP).

103. *See generally* Langvardt, *supra* note 81.

utilitarian uses of computer code would not get any scrutiny beyond rational basis. This approach would do the necessary work of separating the mall from the library in theory, and of allowing courts in practice to avoid First Amendment analysis in cases where it is intuitively inappropriate.

The obvious criticism of this approach is that it would require judges to determine case-by-case who is speaking and who is not. But there is much less to this criticism than meets the eye. The reality is that case-by-case plausibility determinations are already implicit in the law of expressive conduct. They just occur behind the scenes. I could argue that a highway speed limit of 75 miles per hour burdens a patriotic message I intend to communicate by driving 76 miles per hour (as in 1776) on the Fourth of July, but I don't make that argument because I know it's a loser. No judge in the country would take the argument seriously enough to bother walking through an as-applied First Amendment analysis.

It is safe to trust these calls to case-by-case judicial intuition because they are trivially easy. The same is true in regard to 3D printing: do you *really* find it difficult to determine whether a person who downloads and prints a hammer is "speaking?" Formal principles are unnecessary to decide such questions, and as far as formal principles go, "code is speech" only confuses questions that would otherwise be obvious.

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