Piracy and Design:
Re-thinking Intellectual
Property in the Third
Industrial Revolution

A Thesis Submitted to
the School of Visual Arts
in Partial Fulfillment of
the Requirements for the
Degree of Master of Fine
Arts in Design Criticism

Design by H55

Alexander the Great:
"What is your idea, in infesting the sea?"

Pirate:
"The same as yours, in infesting the earth!
But because I do it with a tiny craft, I'm called a pirate:
because you have a mighty navy, you're called an emperor."

— Cicero in *De Civitate Dei*

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ABSTRACT

Knockoffs, fakes, and counterfeits are the bane of modern industrial design. They are unauthorized copies of designers' intellectual property. They are the stolen profits of manufacturers. They are the products of piracy: a phenomenon wrecking an industry's will to innovate and create "original" and "authentic" design. But to consumers, piracy offers affordable goods, diversity of options, and sometimes, even better design. Piracy isn't black-and-white like a pirate flag, but a nebulous concept whose edges ebb and flow like the waves of the sea. What's a copy to some is homage to another, what is original today is tomorrow's evolution, what is piracy to the industry is competition to society.

How will we recognize piracy and intellectual property in industrial design with the rise of digital fabrication technologies like 3D printing? By democratizing access to the means of production, it will become easier for users to copy, remix, and self-repair objects in ways that traditionally infringe upon a designer's intellectual property. This calls for a need to redefine what piracy means. In response to the digital revolution, some designers and manufacturers have strengthened protection over their designs via the law and technology, while others are opening up access to them, believing that design is a collaborative process that benefits from a community working on it together. Will the rise of open design see an end to piracy?

This thesis examines more closely the relationships between piracy, intellectual property, and industrial design by studying a variety of case studies and interviews with practitioners. Beyond just a legal and economic issue, piracy is a reflection of society's assumptions about the design process, who a designer is, and what design is for. Piracy is a ghost that will always haunt the world of design.

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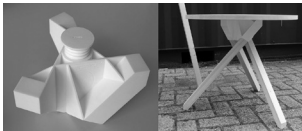
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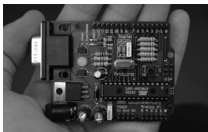
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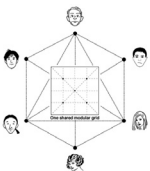
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ACKNOWLEDGEMENTS

The opportunity to write this thesis would have been impossible if I had not enrolled in the D-Crit program, so thanks must go to my sponsors DesignSingapore Council, Hanson Ho, Associate Professor Cherian George, Associate Professor Thomas Kong, Zhuang Xiwen and Chew Kok Soon who got me into New York City.

This thesis could have gone off in so many directions if not for the stewardship of Alice Twemlow and Andrea Codrington-Lippke who kept me focused and on track—thank you for that. I am also grateful to Rob Giampietro, Alexandra Lange, Daniela Fabricus, Matthew Worsnick and Avinash Rajagopal for their insights when I first mapped out this thesis.

I must also thank all my interviewees—a full list is in the Appendix—who spared their time to answer my questions, without which I would not have so rich data to work on. I am also grateful to the entire D-Crit family, from the faculty to my classmates, and also Emily Weiner and Victor de la Cruz, for making possible a program and this thesis.

For making New York City a bit less foreign while I worked on this thesis, I like to thank Sandra Nuut, Jonathan Han, Sherylene Chew, Andrea Lipps, Greg D'Onofrio and Patricia Belen.

My gratitude also goes to those who kept me in their thoughts all the way from Singapore, including Gao Rongjun, Jamie Lee, James Teo, Yin Shanyang, Tay Kay Chin, Lim Wei Yang, Colin Er, Chiam Yee Hong and the class of 4-7.

I must thank my family whom never once complained that I missed out on two years of life with them to embark on this endeavor.

Finally, I must thank Sheere, who nourished my heart, mind and stomach throughout it all.

LIST OF ABBREVIATIONS

3D   3-Dimensional
ACID   Anti-Copying in Design
CAD   Computer-Aided Design
CNC   Computer Numerical Control
DMCA   Digital Millennium Copyright Act
DRM   Digital Rights Management
ISO   International Organization for Standardization

A STATE OF DESIGN PIRACY

A specter is haunting the design world—the specter of piracy.

Across the United States and Europe, industrial designers and manufacturers have called attention to the threat of piracy to their livelihoods. Manufacturing companies are stealing their designs to produce lookalikes, commonly referred to as knockoffs, which are cheaper and more attractive to consumers.

At the 2013 *Salone del Mobile*, a furniture fair in Milan where the industry meets annually to trumpet their latest offerings, British designer Tom Dixon said, "Milan's also become a serious breeding ground for people that copy our products from all over the world."[1] Armed with just cameras, copycats visit the show to photograph the new designs and reproduce them, sometimes even before the original products reach the market, says Casper Vissers, the head of furniture and lighting brand Moooi. "It's very sour if you have presented a product in April and it's in the shops in September, but a bloody copier has it already in August."[2]

In response to this growing threat, many designers and manufacturers have banded together to wage war against such piracy. In 1996, the Anti-Copying in Design organization was formed in the United Kingdom. In 2010, the Authentic Design Alliance came about in Australia. In 2012, the Be Original Americas group was founded in the United States. According to Be Original's president, Jerry Helling, the convergence of globalization and the Internet has

1   Marcus Fairs, ""Milan Is a Breeding Ground for People Who Copy Our Products"," *Dezeen* and MINI World tour, http://www.dezeen.com/2013/04/22/milan-is-a-breeding-ground-for-people-who-copy-our-products/.

2   Ibid.

3   Jerry Helling, e-mail interview with author, October 9, 2014.

4   "What Does Copyright Protect?," United States Copyright Office, http://copyright.gov/help/faq/faq-general.html#protect.

5   "Copyright Law of the United States and Related Laws Contained in Title 17 of the United Sates Code," (2011), http://copyright.gov/title17/circ92.pdf.267.

6   "What Are Patents, Trademarks, Service-marks, and Copyrights?," United States Patent and Trademark Office, http://www.uspto.gov/patents-getting-started/general-information-concerning-patents#heading-2.

7   Ibid.

made industrial design piracy more widespread than ever before. Companies no longer need major investments of inventory and retail space to sell pirated wares and can produce copies just by referencing photographs and drawings of design easily available online, he said, "It is all a perfect storm that supports the ease of copying."[3]

WHAT IS DESIGN PIRACY?

At the heart of the piracy battle is a tussle over intellectual property, a set of legally recognized rights consisting of copyrights, patents and trademarks. While the details of intellectual property systems differ from country to country, they operate on similar principles. Both copyrights and patents set out to encourage innovation and invention by giving producers time-limited protection over the use and distribution of what they create. Copyright in the United States automatically applies to expressions of ideas in tangible mediums, ranging from literary to movies and architecture, but it excludes "facts, ideas, systems, or methods of operation."[4] Particularly for design, copyright only protects what "makes the article attractive or distinctive in appearance to the purchasing or using public" and ignores what is "dictated solely by a utilitarian function."[5] So a chair is not copyrightable, but a pattern on it may be. Generally, designs are protected by utility and design patents. Unlike copyright, patents must be applied for with the United States Patent and Trademark Office, which determines if a work is truly a new invention that deserves protection. While utility patents only protect the functional features of an invention, say a mechanism that allows the chair to swivel, design patents cover an object's appearance.[6] Finally, trademarks, unlike copyrights and patents, were developed with the user rather than the producer in mind. They protect a mark —a logo, a name, a catchphrase—so that consumers have confidence that a product carrying the trademarked symbol is from the designer or manufacturer which owns it.[7]

For this thesis, acts of piracy are defined as the unauthorized reproduction or use of someone else's design, whether it infringes upon any of these rights or is perceived as doing so by others. In industrial design, this ranges from producing lookalike copies to creating components of an object without the approval of its intellectual property owners. From replica furniture to unauthorized inkjet printer cartridges, these are all examples of counterfeit products that "wreak havoc on the economy" according to the International Organization for Standardization (ISO), which promotes a common code for global industrial activities.[8] Calling for an urgent crack down on counterfeiting, the ISO cited an International Chamber of Commerce report which projected that by 2015, the global worth of counterfeit and pirated products will be up to US$1.77 trillion, and cost some 2.5 million jobs. "Here's the bottom line: counterfeiting costs big bucks," stated the ISO report.[9]

THE ORIGINS OF PIRACY

Intellectual piracy is clearly a global phenomenon that has existed across time and industries. In his book *Piracy*, historian Adrian Johns retraces its spread from the world of printing to the pharmaceutical, broadcasting, music, and computer software trade. The phenomenon had its beginnings in London's book publishing trade, some 200 years before the concept of intellectual property came into being during the first Industrial Revolution.[10] Prior to this, copying may have been frowned upon, but it was neither referred to as piracy nor violated any law. But in the seventeenth century, a collective of publishers in London known as The Stationers' Company who protected the trade from copycats were compared to pirates who robbed ships at sea,

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8   Elizabeth Gasiorowski-Denis, "Crackdown on Counterfeiting," *ISOfocus*, http://www.iso.org/iso/news.htm?refid=Ref1809.

9   Ibid.

10 Adrian Johns, *Piracy: The Intellectual Property Wars from Gutenberg to Gates* (Chicago: The University of Chicago Press, 2009).

11 Ibid.283

and accused of using their monopoly over the printing trade to steal profits and power from the government. The Stationers' defended themselves as simply traders who bought the works of authors as "literary property" so as to preserve them in perpetuity. This concept of an author's inherent right to own his or her work enabled the first ever copyright law to be established decades later in 1710. Again, it was the Stationers' who successfully lobbied for this law after their exclusive right from the government to print literary works was not renewed. Copyright restored their incentive to publish books by granting authors a time-limited monopoly over their works, which they then sold to publishers. Over time, it was the publishers who began calling those who challenged their profits and power pirates instead. The history of patents follows a similar path that came about even earlier in thirteenth century Venice. Instead of being awarded for original inventions like they are today, patents at that time were state gifts to individuals or groups in exchange for exclusive access to their work and skills. Over the centuries, patents evolved into a system to encourage and reward invention, particularly as science and industry gained economic importance in the eighteenth century. It was during this period of industrial revolution that debates in Britain on the differences between patents and copyright led to a system where "invention and authorship were tied together as aspects of intellectual property."[11] Our contemporary notion of intellectual property as an internationally agreed upon system of legal rights came into being when countries—spearheaded by the West, specifically the Empire of Austria-Hungary and France—agreed to recognize one another's patents, trademarks and copyrights with the signing of treaties at Paris and Berne in 1883 and 1886 respectively. These remain in force today.

The historical call by industries to defend and strengthen intellectual property to protect their incentive to operate remains. In 2012, the European Union issued a report recommending its

member nations work towards "zero tolerance of infringement" of intellectual property so that design could prosper.[12] While the fashion design industry in the United States has campaigned unsuccessfully for stronger legal protection over the work for several years now,[13] designers and manufacturers in the United Kingdom led by the Anti-Copying in Design (ACID) managed to extend copyright protection on design from 25 years to the length of the author's life plus 70 years—the same terms afforded to artistic works, such as books and music, in the country.

While some celebrated the decision in aiding the war against piracy, others like British designer Sam Jacob questioned its consequences for design culture. "Twenty-five years seems long enough for a company to recoup the costs of design development and it also means that they have to develop new designs of equal merit to replenish their stock of design rights. The extension will mean there is less incentive to invest, to experiment and to develop new designs," he opined on design website *Dezeen*.[14] Noting how the new bill benefitted twentieth-century design in particular, he added, "It essentially fixes the field of design for the foreseeable future and condemns us to mid-century modernism until the middle of the next century."

RE-EXAMINING PIRACY

Jacobs' fear—like the piracy war—may be exaggerated, but there is some truth in it. While researching for this thesis, I chanced upon

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[12] *Design for Growth & Prosperity: Report and Recommendations of the European Design Leadership Board*, (Helsinki, Finland: European Design Innovation Institute, 2012), http://ec.europa.eu/enterprise/policies/innovation/files/design/design-for-growth-and-prosperity-report_en.pdf.10.

[13] "Should Fashion Design Be Given Copyright Protection?," *Michigan Telecommunications and Technology Law Review*, http://www.mttlrblog.org/tag/httpsmallbusiness-jdsupra-compostinnovative-design-protection-act-targets-fashion-knockoffs/.

[14] Sam Jacob, ""Extending Copyright for Design Condemns Us to Mid-Century Modernism"," *Dezeen,* http://www.dezeen.com/2013/04/04/sam-jacob-opinion-copyright-laws/.

a cheap lookalike of an Alvar Aalto Stool E60 in New York City's Chinatown. But then it struck me that a four-legged stool was an archetypal form that surely would have existed even before Aalto created his in 1934. The only reason I identified it as a copy of Aalto's stool was because of my knowledge of design history, which itself is skewed towards major Western manufacturers

and designers. Most consumers would not have thought twice about buying the chair because it works and fits their budget. This gap between how consumers assess design for its function and affordability versus how the industry and the design press advocates for authorship and prizes heritage suggests different understandings over the role design plays in our lives.

This paradox has captivated me as a design writer: by helping to raise design's profile in the public, I have inadvertently put it on a pedestal that makes it more exclusive. Singling out designers and products sometimes raises their commercial value and reinforces design as a professional activity while reducing the role of users to that of mere mindless consumers. But design is what we all carry out to improve everyday life. When organizations like ACID and Be Original call upon consumers to support design by buying original and authentic works, whose future are they fighting for? While we should support designers in making a living, it must not come at the expense of consumers' ability to access design in their lives. Perhaps, this monolithic evil called "piracy" is not entirely what it's been made out to be. No doubt it impacts upon the economic life of designers, but is piracy necessarily only negative? This thesis will examine more closely the legal and economic issues behind this phenomenon, and also look beyond, to map out other relations between piracy, intellectual property and design. As historian Adrian Johns reminds us, piracy isn't just about breaking a law, but a

phenomenon emerging from the nexus of creativity and commerce, and is "deeply enmeshed in the world we inhabit."[15] For instance, to combat digital piracy, record companies have installed digital rights management software to protect their music, but this inadvertently discourages consumers from legitimately sampling music to make their own tunes and limits creative expression. "Its implications begin with intellectual property, but extend far beyond intellectual property alone," writes Johns.[16]

With industrial design undergoing a similar digital revolution today—thanks to digital fabrication technologies such as 3D printing that enables anyone to make and edit their own objects—how will piracy, intellectual property, and design evolve? By examining emerging cases of digital piracy in industrial design and how designers and manufacturers respond to them, this thesis seeks to understand how the world of design is rethinking the role of intellectual property and ushering a new industrial revolution—possibly one without piracy as we know it today.

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15 Johns, *Piracy: The Intellectual Property Wars from Gutenberg to Gates*.14.

16 Ibid.15.

FAKE ORIGINALS & COMPETITIVE PIRATES

It is fabricated in the same way that thousands have been made since 1950. It is produced using the same machines specially built for its assembly. It even matches the drawing on a patent issued when it was first designed. But the fiberglass chair manufactured by furniture company Modernica is not an "authentic" Eames Shell Chair—at least, in the eyes of rival furniture maker Herman Miller.

To Herman Miller, which first mass-produced the chair for the late American designers Charles and Ray Eames, it didn't matter if Modernica made the shell chairs in the same way it did for close to forty years. Nor was it important that Modernica had then bought over the very equipment used by Herman Miller to produce the shell chairs again in 2000.

Provenance—having a clear record of origin—wasn't enough to establish "authenticity."

According to Herman Miller, it was they who brought back the "Authentic Eames Moulded Plastic Chair" when they restarted production after stopping for nearly a decade because the process was deemed environmentally unsound. Never mind that their new version was now made in recyclable polypropylene. In 2013,

the company reverted to offering fiberglass chairs after figuring out a new manufacturing process that was safer for the environment. In each case, the material was changed, the process was tweaked, but somehow, Herman Miller's chair was always the "authentic" version.

Figure 2

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17   "Herman Miller Shell Chair Faqs," (2014), http://www.hermanmiller.com/content/dam/store/documents/herman_miller_shell_chair_faq.pdf.

18   Ibid.

19   Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations: Essays and Reflections*, ed. Hannah Arendt (New York: Schocken Books, 1969).221.

As the company explained in 2014 via a seven-pages long response to frequently asked questions about its shell chair, Herman Miller's version was in accordance with the "vision and standards" of the Eames—even though both had passed long ago.[17] Charles died in 1978, and Ray, a decade later. "Authenticity" in Herman Miller's view came from its history of working with the designers, and now, the Eames Office, an organization the designers' descendants founded to preserve their legacy. This was unlike Modernica, which although using the original machines, had bought them from suppliers that Ray and Herman Miller had broke off from after three decades because of "quality issues"—which also brings to question the "authenticity" of the chairs produced before. "Modernica claims authority based on provenance, however, the detail omitted from its story is that its provenance is one that Ray Eames flatly rejected," stated Herman Miller. "Customers buying an Eames design from Herman Miller can rest assured they are investing in an authentic well-made product."[18] Making clear its disapproval of Modernica's chairs, Herman Miller sued the company for infringing on its intellectual property and false advertising. Modernica was just one of the many "unlicensed knockoffs" the company has been combating for years.

But unlike in art, where authenticity can be traced to a piece of work—think of artist Leonardo da Vinci's portrait of the Mona Lisa in The Louvre versus print-on-demand copies of it sold at the museum shop—the concept of the original in industrial design is a manufactured myth. In his essay "The Work of Art in the Age of Mechanical Reproduction," the late cultural critic Walter Benjamin theorized that the "authenticity" of an object lies in its authority of being actually present in a particular environment and history, and this unique "aura" depreciates as the thing becomes easily reproduced.[19] What are we then to make of mass produced objects, which are essentially identical copies of one another?

Journalist Marcus Boon explains in his book *In Praise of Copying* that such capitalist commodities are presented as "perfect copies"

that are cut off from history and the world, and it is through branding, advertising and marketing that manufacturers transform what is "essentially generic into highly charged objects of desire."[20] This is how Herman Miller and Modernica lay claim to selling "authentic" chairs. By owning the trademark to the word "Eames," only Herman Miller's furniture can be directly identified with the designers. Nowhere on Modernica's website does it attribute what the company calls "[e]asily one of the most important and recognizable designs of the twentieth century" to the Eameses. Instead, the company links its "Case Study Fiberglass Chairs" to how they were originally made: "To ensure authenticity of production, the initial shell chair production was overseen by Sol Fingerhut and Irv Green, the same team employed over sixty years ago to develop the original technology."[21] So while Modernica claims authenticity through how its chairs are manufactured, Herman Miller depends on the endorsement of the Eames Office. Or as Charles Eames himself once said, "The details are not details; they make the product."[22] In this case, the product is authenticity.

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[20] Marcus Boon, *In Praise of Copying* (Cambridge, Massachusetts: Havard University Press, 2010).187.

[21] "Product Details," Modernica, http://modernica.net/rocker-side-shell.html.

[22] "Charles and Ray Eames," Herman Miller, http://www.hermanmiller.com/designers/eames.html.

[23] "Our Manifesto We Believe...", Be Original Americas, http://www.beoriginal americas.com/about-us/.

[24] "Not Original," Be Original Americas, http://www.beoriginalamericas.com/not-original/.

[25] "Useful Articles," U.S. Copyright Office, http://www.copyright.gov/fls/fl103.html.

[26] Johns, *Piracy: The Intellectual Property Wars from Gutenberg to Gates.*271.

PIRACY AND DESIGN

THE GRAY MARKET OF ORIGINALS

Claiming one's work as "authentic" is a growing movement in industrial design as designers and manufacturers battle against piracy and try to distinguish themselves from copycats and their knockoffs. For anti-piracy organization Be Original Americas, "authenticity" encompasses a set of beliefs, such as the idea that designs are the property of a designer, an "original design" is more valuable and durable over time, protecting designs would incentivize the creation of new ones, and that purchasing an "authentic design" is an investment in the future of design.[23] In contrast, copies and knockoffs are "not original" because they "intentionally deceive or confuse the customer regarding design origin."[24] Promoting designs as "original" and "authentic" is a response to existing intellectual property law's lack of protection for design. In the United States, a design such as the Eames shell chair is not copyrightable unlike literature and art, and any patents on this mid-century furniture has already expired—utility patents last 20 years, while design patents protect for just 14 years. Modernica can legally manufacture the shell chairs today, and they are not the only ones. In the eyes of the law, industrial design primarily produces useful works possibly protected by patents rather than creative expressions that automatically deserve copyright protection.[25] This is a historical legacy of nineteenth-century Britain, when crafts and mechanical inventions were regarded as things achievable by anyone who followed a common set of methods, processes and knowledge, writes historian Adrian Johns in *Piracy.* An anti-patent camp even emerged during this period, arguing against the system that "denied the progressive character of industrial society," and added that "[i]nventors were not heroes at all, but everymen."[26] In contrast, literary and art works were expressions of the mind and the property of an individual. Today, this distinction continues in how the law recognizes industrial design objects as containing both

functional (protected by utility patents) and artistic aspects (covered by copyright or design patents). This "conceptual separability" is far from easy to determine, however, particularly when design is increasingly seen as art. In a paper supporting copyright protection for fashion design, attorney Brandon Scruggs points to how architecture works have since received copyright protection in the United States in recognition of their "artistic nature," and he argued that fashion deserves the same because many see it as a form of artistic expression today, and it has become a highly valuable industry as well.[27] The same can be said of all disciplines of design. Like the art world, design has christened its own canon of icons and masters—like the shell chair and the Eameses— and it has become an important sector for countries developing creative economies and districts.

In this context, piracy is a threat to the established design order. To Herman Miller's Director of Communications Mark Schurman, piracy works something like this: "Picture a bunch of rats running around the feet of an elephant, if they feel they can come in and grab one peanut and sell 100 knockoffs, then they'll do it."[28] This view echoes what Ettore Rotelli and Patrizia Scarzella wrote in their book, *In Defence of Design*. Also advocating for

27 Brandon Scruggs, "Should Fashion Design Be Copyrightable?," *Northwestern Journal of Technology and Intellectual Property* 6, no. 122-137 (2007).

28 Linda Geiser, "Be Original with Herman Miller," *Modestics*, http://modestics.com/blog/beoriginal-herman-miller/.

29 Ettore Rotelli and Patrizia Scarzella, *In Defence of Design: The Issue of the Faux in the Industrial Production* (Milan: Edizioni Lybra Immagine, 1991).9.

30 Johns, *Piracy: The Intellectual Property Wars from Gutenberg to Gates*.13.

31 Charles Duhigg and Steve Lohr,

"The Patent, Used as Sword," *The New York Times*, 8 October 2012.

32 Matt Macari, "Apple Finally Gets Its Patent on a Rectangle with Rounded Corners," *The Verge*, http://www.theverge.com/2012/11/7/3614506/apple-patents-rectangle-with-rounded-corners.; Valentina Palladino, "Apple Store Receives Trademark for 'Distinctive Design and Layout'," *Wired*, http://www.wired.com/2013/01/apple-store-trademark/.

33 Anna Winston, "Design Education Is "Tragic" Says Jonathan Ive," *Dezeen,* http://www.dezeen.com/2014/11/13/design-education-tragic-says-jonathan-ive-apple/.

industrial design to receive intellectual property protection, the authors call piracy "detrimental parasiticism" that wastes resources and exploits the work of others. But the duo also acknowledged that a copy belongs on a spectrum of objects, ranging from creations inspired by existing designs to the "slavish reproduction of an original" which they term a counterfeit.[29] They dismissed the entire range of copies all the same, but their definition suggests that piracy isn't black-and-white as anti-piracy organizations frame it to be. What is a knockoff could be a "replica" and a copy of something could be "inspired by"—it is a matter of perception, just as how anti-piracy organizations have tried to build up their works as "authentic" and "original" design. The history of piracy supports this view. In *Piracy*, Johns recounts how in the eighteenth century, it was legitimate for anyone to reprint books somewhere other than where they were initially published, and these same books were only regarded as piratical when they were re-imported to their place of origin. That "piracy was a property not of objects alone, but of objects in space," suggests the phenomenon isn't static, but the product of a changing web of relations.[30]

Consider the case of Apple, the computer company celebrated for its innovative product design and recognized as one of the world's most valuable companies today. It is also well known for aggressively fighting piracy.[31] Not only does Apple try to patent all its designs—from the rounded-edged rectangular shape of its iPads to the transparent interiors of its Apple stores—it also has a history of suing competitors like Samsung and HTC for copying its products.[32] When asked about piracy, Apple's chief designer, Jonathan Ive, once railed, "It's not copying, it's theft. They stole our time, time we could have had with our families. I actually feel quite strongly about it. It's funny—I was talking to somebody and they said do you think when somebody copies what you do it's flattering? No."[33]

But as many have pointed out, Ive's designs for Apple look similar to the work celebrated German industrial designer Dieter Rams did for the appliance company Braun in the 1960s.[34] Compare the all-white rectangular first-generation iPod to Braun's T3 pocket radio. Then there was the first native calculator app for

Figure 4

the iPhone: essentially a digitized Braun ET44 calculator, right down to the orange "=" button. Instead of calling out Apple's designs as copies, others describe them as "homage" or hail the works as "a great evolution," suggesting that copying can be creative too.[35] In their 2014 exhibition at Mexico City's Archivo Diseño y Arquitectura, *Copies: Transformation and Development in Creative Processes*, curators Cecilia León de la Barra and Jorge Gardoni found that copying in design could have a positive influence. "When you copy as a part of a creative process, you understand how things are done, and then you can make a new version and also a new object," wrote the curators in an email.[36] They concluded that it was challenging to identify "real originals"

34 Killian Bell, "The Braun Products That Inspired Apple's Iconic Designs [Gallery]," *Cult of Mac,* http://www.cultofmac.com/188753/the-braun-products-that-inspired-apples-iconic-designs-gallery/.

35 Anthony Wing Kosner, "Jony Ives' (No Longer So) Secret Design Weapon," *Forbes,* http://www.forbes.com/sites/anthonykosner/2013/11/30/jony-ives-no-longer-so-secret-design-weapon/.; Jesus Diaz, "1960s Braun Products Hold the Secrets to Apple's Future," *Gizmodo,* http://gizmodo.com/343641/1960s-braun-products-hold-the-secrets-to-apples-future.

36 Cecilia León de la Barra and Jorge Gardoni, e-mail interview with author, September 8, 2014.

37 Taryn Fiol, "A Side-by-Side Comparison of Apple and Braun Designs," *apartment therapy*, http://www.apartmenttherapy.com/apple-design-doesnt-fall-far-from-brauns-tree-176668.

38 Catherine Bosley, "Swiss Railway Weighs Challenge to Apple over Trademark Clock," *Reuters,* http://www.reuters.com/article/2012/09/21/us-apple-iphone-clock-idUSBRE88K0MK20120921.

39 Edward Said, *Orientalism* (New York: Vintage Books, 1979)

40 Joost Smiers, "Creative Improper Property: Copyright and the Non-Western World," *Third Text* 22, no. 6 (2008).3.

as most objects are evolutions or transformations of one another. What matters for them is the intention of the copier. In the case of Apple, many of its supporters have pointed out the differences in function from Braun products. Ive has also publicly acknowledged Rams as an inspiration, and the latter has reciprocated with admiration for Apple too.[37] Another reason why Apple gets away with copying is evident in a 2012 incident when Swiss railway operator SBB discovered its trademarked station clock design had been copied by Apple for its new iPad. But instead of accusing Apple of stealing its time—like Ive did of piracy—the company said, "SBB isn't hurt, but proud that this icon of watch design is being used by a globally active and successful business."[38]

COPYING AS INNOVATIVE

The politics behind defining an act as piracy is usefully explored through the lens of postcolonial criticism. In his book *Orientalism*, literary theorist Edward Said broke down the Orient as a Western-style construct "for dominating, restructuring, and having authority over,"[39] and the same can be said about contemporary piracy, which has largely been viewed as acts by players outside the West. Against this backdrop of competing geo-political territories, we see how intellectual property and piracy are far from universally understood. Dutch political scientist Joost Smiers has documented how intellectual property is foreign to non-Western communities, as "in most cultures, no justification exists for an individual to exploit a creation or an invention monopolistically for many decades, and it is also not the practice."[40] Traditional Algerian raï music, for instance, has no author as it is created out of different songs and the public spontaneously adding words to it. African music also makes no clear distinction between composer and performer like in the West, which makes it difficult to figure out copyright ownership over a work.

Just as Said observed in *Orientalism* that "European culture

gained in strength and identity by setting itself off against the Orient as a sort of surrogate and even underground self," the concept of the "authentic" and the "original" is being used against piracy and its products.[41] By "stealing/copying" works that are "authentic/original" to create "imitations/knockoffs," piracy is cast as an immoral "Other" that is always inferior and problematic. But as political scientist Andrew Mertha pointed out in *The Politics of Piracy*, China—the country frequently accused as the source of modern piracy—did not have intellectual property laws until the United States pressured it to adopt them in 1990.[42] Outside of such a system, the Chinese have built an industry known as "Shanzhai" (山寨) that has become known for quickly copying successful products from around the world. While

Figure 5

many view this as "shameless counterfeiting" of identical products that has zero value, others like cultural studies professor Josephine Ho argues the opposite.[43] After all, Shanzhai manufacturers and multinational corporations all depend on the same legitimate supply chain that has been set up in China over the decades as globalization has outsourced manufacturing to the East. "[W]hat ensures the distinction of the so-called genuine stuff is less the unique function or nature or quality of the products themselves than their legitimization

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41 Said, *Orientalism*.3.
42 Andrew C. Mertha, *The Politics of Piracy: Intellectual Property in Contemporary China* (Ithaca, New York: Cornell University Press, 2005).
43 Josephine Ho, "Shanzhai: Economic/Cultural Production through the Cracks of Globalization" (paper presented at the 2010 Association for Cultural Studies Crossroads Conference, Lingnan University, Hong Kong, 2010).4.
44 Ibid.4.
45 Rainer Wessler, "Shanzhai's Role in Innovation

Strategy," frog design, http://designmind.frogdesign.com/2013/04/shanzhais-role-innovation-strategy/.
46 "Patent Laws," United States Patent and Trademark Office, http://www.uspto.gov/patents-getting-started/general-information-concerning-patents#heading-3.
47 Megan Anderle, "Brewing a Coffee Monopoly at Keurig, One Single-Serving Cup at a Time," *The Guardian,* http://www.theguardian.com/sustainable-business/2014/oct/02/keurig-k-cup-coffee-monopoly-biodegradable-compost-pods.

and protection by the state and the multinational corporations," she said.[44] Making a case for Shanzhai as not just mindless copying but a form of innovation, multinational design consultancy Frog's executive creative director Rainer Wessler attributed multi-SIM mobile phones to Shanzhai manufacturers who added this feature for customers looking to manage their mobile phone costs. While local and international mobile network operators tried to avoid this out of fear it would reduce phone sales at first, major phone makers like Motorola and Nokia have since copied this feature into their designs. "While their counterparts in the West are busy protecting their ideas and avoiding the reality that common knowledge and capabilities travel, Shanzhai companies embrace this phenomenon as a fact," wrote Wessler.[45]

PIRACY = COMPETITION

Another word to describe piracy is "competition." It is often this reason—more so than a legal determination—that manufacturers and designers have used to decide if an act of piracy is tolerated (or even embraced) or denounced altogether. While intellectual property laws in the United States were originally "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries,"[46] manufacturers and designers are increasingly using them against unwanted competition instead.

We can see this brewing in the single-serve coffee industry, where machines that make the beverage by injecting hot water into prepackaged plastic pods have become popular in recent years. Keurig Green Mountain is a major United States manufacturer of both brewer machines and pods, and sales of the latter account for more than 90 percent of its revenues.[47] In 2011, Keurig sued The Rogers Family Company for infringing on its patents to produce pods that were compatible with its brewers. The courts found

otherwise, and by the time the decision was made in 2013, Keurig's key patents had already expired after twenty years and many other companies could legally offer competing pods without their approval as well. In 2014, the Keurig company unveiled a new brewer, which amongst other features, included a specially designed mechanism—inspired by the United States Mint's counterfeiting technology—to ensure it would work only with the company's new pod designs.[48] This outraged its customers who could no longer use their old pods, and also Keurig's competitors who accused the company of anti-competitive behavior and attempting to monopolize the market. The Rogers Family Company not only sued Keurig, but began freely distributing a "Freedom Clip" they designed to circumvent the company's lockout technology and give consumers the "freedom of choice" to use any pod they wanted.[49] Besides Keurig's official K-Cups, consumers could choose from cheaper options, different coffee blends, and even better designed pods like The Rogers' biodegradable version. This was unlike Keurig's pods, which are largely non-recyclable and contribute significantly to landfills as some 8.3 billion of them were produced in 2013.[50] For the founder of The Rogers Family Company, Jon Rogers, he was not just fighting for consumer choice but the industry's drive to improve.

GET A **FREEDOM CLIP!**

We will throw in a FREE sample pack of our OneCups to the first 10,000 sign ups!!

IT'S FREE!

and brew whatever brand of K-Cup® you want in your Keurig 2.0® Brewer!

Rogers Family Company and its products including its OneCup™ products are neither affiliated with, nor approved by, Keurig, Incorporated®. "Keurig®" and "K-cup®" are registered trademarks of Keurig, Incorporated®.

Figure 6

48 Josh Dzieza, "Keurig's Attempt to 'DRM' Its Coffee Cups Totally Backfired," *The Verge*, http://www.theverge.com/2015/2/5/7986327/keurigs-attempt-to-drm-its-coffee-cups-totally-backfired.

49 "Keurig 2.0 DRM Freedom Clip," The Rogers Family Company, https://www.gourmet-coffee.com/Keurig-DRM-Freedom-Clip.html.

50 Anderle, "Brewing a Coffee Monopoly at Keurig, One Single-Serving Cup at a Time".

51 Ibid.

52 Kal Raustiala and Christopher Sprigman, *The Knockoff Economy: How Imitation Spurs Innovation* (New York: Oxford University Press, 2012).7.

"If they win, it will stamp out innovation," he said. "We do all sorts of things and are always improving, but that's not going to continue if they have a monopoly, which will only hurt the consumer."[51]

It is ironic that Rogers argues for an incentive to innovate as this could very well explain Keurig's attempt to lock out unauthorized pod producers. But the self-interest of Rogers aside, it is also a point made by law professors Kal Raustiala and Christopher Sprigman when they argued for piracy in *The Knockoff Economy*. Contrary to the conventional view that piracy had to be eradicated, the authors found that not only can creativity "co-exist with copying," under certain circumstances, "copying can even be *good* for creativity."[52] For instance, the fashion design industry continues to thrive despite rampant piracy. Raustiala and Springman explain that piracy not only democratizes fashion by offering consumers cheaper alternatives, it helps popularize "original" designs by bringing attention to them. These ultimately aid the trends-driven fashion industry by accelerating the death of styles and encouraging the creation of new ones. Similarly, a diverse offering of pods could make Keurig's machine popular and spur better designs for its pods too.

While *The Knockoff Economy* featured examples—fashion, food recipes, fonts, football tactics, comedy acts—that require less expensive investments in machines and tooling than in traditional industrial design, these conditions are shifting with the onset of what some have dubbed the "Third Industrial Revolution." The first and second industrial revolution in the eighteenth and nineteenth century respectively saw making shift from hand to machine as technology concentrated the means of production to the purview of a few large manufacturers. Today, however, emerging digital fabrication technologies like 3D printing is revolutionizing manufacturing again by enabling anyone to bypass traditional ways

of making, distributing and consuming products. "Digitisation in manufacturing will have a disruptive effect every bit as big as in other industries that have gone digital, such as office equipment, telecoms, photography, music, publishing and films," wrote Paul Markillie in *The Economist*.[53] Digital fabrication technologies will empower everyone to become a factory of the future—and also a pirate too.

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53   Paul Markillie, "A Third Industrial Revolution,"
     The Economist Group, http://www.economist.
     com/node/21552901.

DIGITAL ~~FABRICATION~~
PIRACY COMES TO DESIGN

The cauldron that held the flame for the 2012 Olympic Games, a chain-less bicycle, and a set of industrial chic wireless speakers were just some of the innovative works displayed at London's Design Museum for its 2013 "Designs of the Year" award. But at this annual "Oscars of the design world," it was a mobile cart topped with a yellow-and-white beach umbrella that grabbed the attention of visitors and the headlines.[54]

Displayed on what looked like a food cart that had been wheeled off the streets into the museum's pristine white gallery was a selection of iconic design classics, including vases by canonized designers Alvar Aalto, Hella Jongerius and Marcel Wanders. All were knockoffs of the originals. There was also a pair of vases and a miniature boat that resembled objects in the very same showcase of nominees for the award—copies of Phil Cuttance's "Faceture" vase and PostlerFerguson's "Papa Foxtrot" toy ship.

It turned out that this duckling-shaped cart was also in the

running for the design of the year. "Kiosk" was Belgian design studio Unfold's "hot dog stand"[55] for design piracy, a project intended to demonstrate how digital fabrication technologies like 3D printing enabled anyone to easily make copies of physical objects as never before.

Figure 7

54 Crystal Bennes, "Designs of the Year 2013," *Domus,* http://www.domusweb.it/en/design/2013/04/22/designs_of_the_year_2013.html.; Marcus Fairs, "Design Award Contender Exhibits Copies of Rivals' Objects," *Dezeen,* http://www.dezeen.com/2013/03/20/design-award-contender-exhibits-copies-of-rivals-objects/.

55 "Claire Warnier (Unfold) Talks About Kiosk," in *This happened NL* (2012).

56 Some examples include "Facet Vase" (http://www.shapeways.com/model/1531970/facet-vase.html?li=search-results-3&materialId=6) "Common Random Vase" (http://www.shapeways.com/model/1916434/common-random-vase.html?li=search-results-15&materialId=6) and "PNPPL VASE 1.2" (http://www.shapeways.com/model/1635546/pnppl-vase-1-2.html?li=search-results-17&materialId=6).

57 Dries Verbruggen, Skype interview with author, December 3, 2014.

The project proved its point when the museum requested Unfold to remove their knockoffs of the nominated objects because Cuttance had complained about his vase being copied. Only after Unfold explained their project to Cuttance and assured him the knockoffs were not for sale that the pieces remained. But as Unfold pointed out, similar-looking copies of the New Zealander's handcrafted vases

Figure 8

had long been available online for anyone to 3D print for cheap and even in a variety of materials and colors.[56]

Design piracy as demonstrated by "Kiosk" is a growing issue with the rapid rise of digital fabrication technologies today. When Unfold first launched this project at the 2011 *Salone del Mobile* in Milan, few attendees at this top design trade fair took them or the technology seriously, recalls co-founder Dries Verbruggen.[57] For "Kiosk," they had surveyed designers exhibiting at the fair about 3D printing and copying, and while some were clueless about the technology, everyone claimed to have never encountered a digital copy of their design online. Unfold proved otherwise when "Kiosk" printed for the fair iconic products such as designer Philippe Starck's Juicy Salif lemon squeezer using unauthorized design blueprints that others had replicated and posted on the Internet. That is all it takes to create an object with a 3D printer: a compatible digital file of a design that is scanned or drawn with a computer-aided design (CAD) program, a software widely used by engineers, designers and architects. Today, 3D printing technology has spread beyond the confines of the industry to individuals like Verbruggen and his partner Claire Warner. Anyone in the world can now buy 3D printed physical objects from online marketplaces such as Shapeways, or if you're in the United States, pick up a 3D printer for under US$1,000 from office supply

store Staples and start printing out objects using free design files from online database like Thingiverse. As production goes digital and 3D printers become as ubiquitous as desktop printers are today, people can create physical objects by themselves, and this will pry open the closed world of industrial design.

This democratization of production will also aid the growth of piracy. The music industry experienced this over the last two decades when music became digitized and easily shared over the Internet. As consumers stopped buying music CDs and started downloading pirated copies for free online, music sales in the United States dropped 53 percent from US$14.6 billion in 1999 to US$7.0 billion in 2013.[58] There is a fear that mass adoption of 3D printing will bring about similar consequences. In 2012, *Foreign Policy* magazine declared a coming day when "The Copyright Wars go 3-D," pointing out how even the Swedish file-sharing site Pirate Bay now offered 3D printed designs alongside bootlegged copies of music and film.[59] Warning about impending "Clone Wars," *Popular Science* magazine predicted in 2013 that the previous intellectual property wars in the music and film industry "will seem trivial in comparison to the coming war over, who, in the most literal sense, controls the means of production."[60]

58 "Scope of the Problem," Recording Industry Association of America, http://www.riaa.com/physicalpiracy.php?content_selector=piracy-online-scope-of-the-problem.

59 Joshua Keating, "The Copyright Wars Go 3-D," *Foreign Policy*, December 2012.

60 Luke Mitchell, "Clone Wars," *Popular Science*, January 2013.

61 Rodrigo Caula, "3D Printed Eames Lounge Chair by Kevin Spencer," *designboom* http://www.designboom.com/design/3d-printed-eames-lounge-chair-by-kevin-spencer/.

62 Ian Murchinson, "Ian Murchinson on Twitter," https://twitter.com/ianmurchison/status/347730220121477121.

"IS THIS EVEN LEGAL?"

Industrial designer Kevin Spencer must have missed these warnings when he began experimenting with 3D printing. In 2013, he created a digital miniature of the iconic Eames Lounge chair and Ottoman to upload for sale on Shapeways. Design websites, including Spencer's personal favorite, *designboom*, quickly picked up on this. While most readers of the site praised the project, questions were also raised. One commented, "I wonder how Vitra feels about this one."[61] And in response to Spencer's excited tweet on the feature, a friend replied, "nice! (Is this even legal btw??)."[62]

To some, Spencer had pirated an iconic chair by American modernist designers Charles and Ray Eames. Although his was a miniature, the German furniture manufacturer Vitra also produces and sells similar models, and is authorized to create the life-size chair by the Eames Office. Spencer had not sought permission from anyone, but it wasn't clear if his design had infringed on any intellectual property. The life-size Eames chair is not copyrighted because the law regards it as a functional object, and any patents covering it would have expired since it was released in 1956. Vitra's miniatures, however, are copyrightable works as they are artistic and non-utilitarian.

Figure 9

Compared to Vitra's US$775 version, Spencer's Eames chair was a steal at US$20, or free if you downloaded and produced it with your own 3D printer. The huge price difference is also because Vitra's miniature is about three times larger than Spencer's design, and it is hand-made in leather and wood (like the life-size chair) instead of his machine-printed sandstone or plastic offering. Spencer's design essentially fits the definition of a classic knockoff— similar in look, yet cheaper in production value—and this was the

gray area in which his chair sat.

Pirated or not, such allegations have made Spencer cautious to talk about his work since. When first approached, the industrial designer declared his respect for intellectual property and original ideas. In his view, the 3D printed Eames chair had not violated any laws, nor had any one asked for it to be taken down. "The last thing I want is someone writing that I'm a copyright infringer, because truth be told, I'm not," he replied via e-mail.[63] When we eventually spoke, Spencer said he was unaware of Vitra's miniature designs when he first issued his chairs, and simply wanted to try selling a 3D printed design on Shapeways. Noticing the vast number of miniature furniture available on the site, and how few were well designed, Spencer uploaded his Eames chair. "I was thinking it would be interesting to share the great design of these guys with the community. And it's a small community. It's not being mass produced to like millions of people. It wasn't my intention to profit off someone's designs," said the designer, who later added that his chairs have never reached a high volume of sales either.[64]

THE DIGITIZED DESIGN

To Spencer, his chair is nothing but a "3D photograph" of a design he admires. This analogy suggests how digital fabrication technologies are changing our understanding of physical objects. Indeed, Spencer's Eames chair is only one of many representations that exist online today. Anyone can fire up 3D-modeling software like AutoCAD or Rhinoceros to draw their Eames chair and share it online. This was how Spencer's friend created a digital blueprint

[63] Kevin Spencer, e-mail interview with author, October 15, 2014.

[64] Spencer, Skype interview with author, October 27, 2014.

[65] *Printing Things: Visions and Essentials for* *3D Printing*, ed. Claire Warnier, et al. (Berlin: Gestalten, 2014).

[66] Verbruggen, Skype interview with author, December 3, 2014.

[67] Ibid.

that he then modified to make the 3D printable Eames chair. Using the same digital file, Spencer also easily tweaked the chair to come in different scales and colors after he received feedback from other Shapeways users. But according to the designers at Unfold, even how Spencer copied the Eames chair was laborious as he could have simply downloaded for free the 3D models of the furniture that Vitra has shared online for years.[65] While these digital models have primarily been used by designers in their renderings of interior and architecture plans, the very same files can now just as easily be converted to 3D print the furniture, from a miniature to a life-size version—limited only by cost, materials and quality given the current state of technology.

This ease of translating atoms to bits in a newly digitized world is best exemplified by how Unfold reverse engineered Cuttance's vases, creating copies so similar that Verbruggen was asked how they got hold of the originals to copy in the first place. "[W]e never saw one of his vases for real, never touched one, never seen one. All we did was to look at this movie he made where he documents the whole process," explained Verbruggen.[66] The virtual representations of a work—pictures, process films, 3D models—that designers commonly post online gave Unfold the "entire recipe" to copy the design with digital fabrication tools.[67] It helped that Cuttance's vases were based on a geometric design, which is well suited for the technology to reproduce. While products made from traditional methods like injection molding or carving would be more difficult to create 3D printed copies of, this will change in the coming years as production goes digital, says Verbruggen. "But now we see more and more products being designed for 3D printing. So if you make a copy of that and 3D print it, there is almost zero difference."

Copying isn't the only act of piracy enabled by the digitized product. When father and industrial designer Duann Scott needed to replace the faulty handle lock on the family's Bugaboo stroller,

Figure 10

he was shocked to learn—after several unanswered emails to the service center—that the spare part would cost US$250. Plus, he had to pay to send in his stroller for repair and go without it for a few weeks. In just five minutes, Scott copied the broken part on AutoCAD and 3D printed it instead. To the joy of many parents who shell out over US$1,000 for these designer strollers, Scott then shared step-by-step repair instructions online and even uploaded the design of his part for anyone to 3D print or buy via Shapeways for just US$16.[68] This is just one example of how users are self-repairing products with parts they produce themselves with 3D printing. While many like Scott create one-off fixes, the engineer Stephen Faulkner has built an online community of over 3,000 likes via his "Bugaboo Repair Guy" Facebook page. Faulkner also got into self-repairing his Bugaboo stroller after learning how expensive and inconvenient it was for the Dutch company to do so from New Zealand. At first, he fixed the spoilt brake system using parts anyone could buy at a hardware store, but since discovering 3D printing, Faulkner began offering online replacement parts he designed, which are not only affordable but better engineered in his opinion. As he puts it, "3D Printing! Wow this will make the repairing of items far more affordable and strike a blow against the planned obsolescence on manufacturers like Bugaboo."[69]
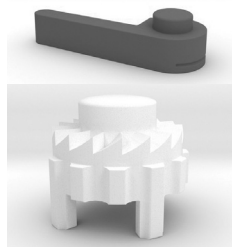
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68 Roy Wood, "DIY Repair of a Baby Stroller... In 3D!," *Wired,* http://archive.wired.com/geek dad/2011/09/diy-repair-of-a-baby-stroller-in-3d/.

69 Stephen Faulkner, Bugaboo Repair Guy, https://www.facebook.com/Bugaboo RepairGuy/posts/200596389998162.

70 Kelsey B. Wilbanks, "The Challenges of

3D Printing to the Repair-Reconstruction Doctrine in Patent Law," *George Mason Law Review* 20, no. 4 (2013).1148.

71 Ibid.

72 Stephen Faulkner, Bugaboo Repair Guy, https://www.facebook.com/Bugaboo RepairGuy/posts/726539834070479.

73 Ibid.

Scott and Faulkner show how digital fabrication technologies are disrupting traditional business models and the roles of manufacturers and users. While self-repair has always existed, users can now replace multiple components and extend the useful life of an object by themselves with increasing ease. It is possible that manufacturers no longer need to stock a huge inventory of physical parts for repair, but can share with users a digital library of parts for them to service products themselves instead. This not only changes "the entire cost calculus for repair," but also challenges the right to repair in existing patent law, wrote law academic Kelsey Wilbanks in her paper on this issue.[70] The unauthorized repairs and parts by Scott and Faulkner are acts of piracy if they were carried out on patented products. Typically, the law requires users to replace a patented object that is broken or no longer usable with a new one instead. While customers have the right to repair a patented product they own, they can only replace parts of it, but not reconstruct the product in its entirety. But as Wilbanks points out, this line is not always clear.[71] Given the many replacement parts Faulkner offers online on Shapeways, how many have to be implemented before his stroller is considered a work of Faulkner's instead of Bugaboo? This is particularly relevant when trying to figure out issues of liability. As Faulkner learnt from an e-mail exchange with a Bugaboo engineer, the company could not always service the stroller or make parts as easily available like he does because they are bounded by "compliance/industry standards/legislation" in the name of safety that differ from country to country.[72] He was also warned that: "Repairing our strollers by you, a non-authorized person, can also bring you in a position that you can be held liable by consumers."[73] Indeed, who should bear responsibility if Faulkner's 3D printed spare part makes the stroller faulty? Bugaboo the manufacturer? Faulkner the designer? Shapeways the printer? Or the user who carried out the repair?

While the law tries to define clear roles for designers,

manufacturers, and users, this is often far from reality. It also closes up design into a finished and closed product, a black box that keeps those outside of it from thinking out-of-the-box and questioning what they use or how it is designed. This may have been justifiable when manufacturing was only viable with mass production, but as users are empowered to become more like Scott and Faulkner, we should question if there is value in opening up design to tinkering too.

THE DIGITAL BRIDGE OR DIVIDE?

The digitization of design has enabled users to interact with objects in ways that have traditionally been protected by intellectual property law, and this poses new questions to the world of physical design. The analogy of digital photography is useful for considering how intellectual property law and physical objects interact in this increasingly digitized world, says attorney Michael Weinberg, who tracks the impact of 3D printing on intellectual property law for Public Knowledge, an organization supporting the freedom of expression in a digital world. While intellectual property law makes no distinction between the actual image and digital file of a copyrighted photograph, this is not necessarily the case with things. "If you are thinking of a physical object, especially one that is not protected by copyright, it is possible to have a digital file that represents that physical object and that digital file is protected by copyright," Weinberg explains. "What kind of control of the physical object, if any, does a copyright of the file give you?"[74]

In his report "What's the deal with copyright and 3D printing?" Weinberg speculated on this issue where "the law is struggling to

[74] Michael Weinberg, phone interview with author, October 22, 2014.

[75] Michael Weinberg, "What's the Deal with Copyright and 3D Printing?," (Public Knowledge, 2013). 14.

[76] Ibid.

[77] Dorona Alberti, "3D Print Mash-up Movie," YouTube, https://www.youtube.com/watch?v=INjUum_oS5w.

catch up."[75] While copyright does not extend to utilitarian physical objects, their design files do fall under the law's protection of maps, diagrams, models, technical drawings and architectural plans. Copyright protection, however, only extends to aspects of a file that goes beyond its function of designing the object—a line not always easy to draw. Can a distinct style of presenting a 3D printable design be copyrighted and hence protect the digital file too? Another consideration is how the design files were created in the first place: 3D scanned objects are regarded differently from those drawn from scratch in CAD software. By gaining intellectual property ownership over a digital design file, says Weinberg, the copyright holder will have "a great deal of control over the distribution and manufacture of the object itself."[76]

But as Dutch designer Diederik Schneemann demonstrated with his Mash-up collection for the 2013 *Salone del Mobile*, it is nearly impossible to control design once it exists digitally. Similar to music sampling where a new tune is composed from portions of different sound recordings, Schneemann 3D-printed several new products simply by cutting and pasting together parts of iconic designs. He combined the backrest of Ross Lovegrove's Orbit, the bulge back of Arne Jacobsen's Grand Prix, the seat of Charles and Ray Eames' LCW, the legs of Gerrit Rietveld's Red Blue, and the arms of Norman Cherner's lounge chair to create his life-size Mash-up chair. While designers have always sought inspiration from others, Schneemann provocatively presented his acts as theft, declaring, "I Steal, Copy, Compose, and Print."[77] In contrast, when designers Philippe Starck and Eugeni Quitllet combined the silhouettes of chairs by Eero Sarinen, the Eameses, and Jacobsen to create their Masters chair in 2009, they called it a tribute to these mid-century masterpieces. But while the duo were commissioned by Italian furniture maker Kartell and the Masters chair was mass produced, Schneemann simply copied parts from digital design files

freely downloaded off the Internet and 3D printed out the Mash-up chair himself.

Examining the nature of these files that Schneemann might have used exposes the fraught lines governing the intellectual property of a digitized design. Assuming no copyright existed on these functional objects, Schneemann would have been free to 3D scan the parts he needed. Anyone could then copy and use his 3D scanned files because copyright currently does not recognize such

Figure 11

scans as "creatively interpreting the object in any way."[78] Things get fuzzy because Schneemann used existing design files, which if first created in a CAD program, may contain copyrightable parts, and make his copying possibly infringing. This challenge in determining intellectual property ownership over a digital design file is

in stark contrast to how Schneemann easily copied, cut, and created his collection. Or as he aptly asked, "Are we moving towards the Napster of Design?"[79]

Just as the file-sharing software Napster became the music industry's symbol for piracy by enabling anyone to easily share digital versions of their music with others, design is set to face a similar future. Traditional designers and manufacturers will face revenue losses and unforeseen ways of interacting with their work, but as Weinberg reminds us, "most (but by no means all) physical objects are not protected by any type of intellectual property right. That means that anyone is free to copy, improve, distribute or incorporate those objects as they see fit."[80] Spencer's miniature homage to the Eameses,

78 Weinberg, "What's the Deal with Copyright and 3D Printing?."15.
79 Alberti, "3D Print Mash-up Movie".
80 Weinberg, "What's the Deal with Copyright and 3D Printing?."1.

81 Renny Ramakers, "New Original," in *Here, There, Everywhere*, ed. Renny Ramakers and Agata Jaworska (Droog, 2014).175.

Scott and Faulkner's fix-it-yourself solutions, and Schneemann's creative remixing all show how the "piracy" that digital fabrication technologies enables in the eyes of intellectual property law today can also be seen as acts that benefit users and the larger public. As the technologies challenge the traditional roles and responsibilities of designers, manufacturers and users, the definition of piracy should evolve. Co-founder of Dutch product design company Droog, Renny Ramakers, has advocated for a new understanding of what an original is today. The technology that now easily allows for new variations and interpretations of a work should be considered as valuable in accelerating the design process and helping us to build upon the works of others, she wrote. "Now that it is becoming easy for everyone to copy, designers could design new models for copying that could improve on the original."[81]

But the fear is that designers and manufacturers will shut down such actions like the music industry when they first tried to protect their position through lawsuits and campaigning against piracy—some of which we are seeing in design today. One outcome of the music industry's piracy war in the United States was the Digital Millennium Copyright Act in 1998, a new law that bolstered the industry's protectionist attitude with legal protection given to digital rights management. This allows creators to lock up access to their digital files, and breaking into it for any reason is a violation of the law, regardless if the protected file is covered by copyright, patents, or not. This discourages fair use of a piece of work, say parodying a music video, and unfairly discourages use of a work in the public domain, which is free for anyone to use. Several companies are already working on technologies to protect intellectual property in 3D printing. Online service Authentise, for instance, streams designs directly to printers instead of allowing the files to be downloaded onto computers. This not only helps designers and manufacturers secure their design files, it also assures

consumers that they are getting a file from the original producer too. This is crucial, for instance, when an airplane needs a virtual file certified to work by the original manufacturer when 3D printing a part. However, the same technology could also easily be used to lock up designs that exist digitally now. The digital fabrication technologies that have opened up design to a wider audience could also be used to lock it up even tighter than before.

The DRM Chair hints at this dystopia. In 2013, a collective of designers led by Thibault Brevet embedded a chair with a digital sensor to track its use so that it would fall apart after being sat on eight times. This design was a metaphor for how companies might apply digital rights management (DRM) to 3D printing technology,

Figure 12

resulting in a world where one does not own physical products but only has access to them. Though the scenario is ominous, Brevet sees the project less as a warning but a conversation-starter on how to implement such technologies. "I could rewrite the system embedded in the DRM chair and give it a practical use with no physical redesign," he said in an interview with *Domus* magazine. "As technologies move forward they effectively have a deeper impact, be it liberating or enslaving, but it is driven by the designers' decisions."[82]

The question is: how will designers react to this new industrial revolution?

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82   Joseph Grima, "Eight Times Only,"
     Domus 2013.

A WORLD OF OPEN DESIGN:
THE END OF PIRACY?

The children's animated television series *My Little Pony* can teach us about a future of piracy and design. In one episode, a dispute arises between a western town's settler-ponies and the native buffalo herd. Upset that the ponies planted apple orchards on their traditional stampeding ground, the buffaloes try to drive them out. An epic battle ensues, and this ends only when the chief buffalo is hit by the ponies' apple pie missiles, and then, the realization that there is a better way out. Only by sharing with the settlers could the buffaloes get to eat such delicious pies made from the apple orchards and reclaim some of their land. As the hero of *My Little Pony*, Twilight Sparkle, reminds audiences at the end: "Friendship is a wondrous and powerful thing. Even the worst of enemies can become friends. You need understanding and compromise. You've got to share. You've got to care."[83]

  In a case of life imitating art, the toy manufacturer Hasbro underwent a similar episode in 2013 when it discovered pirated copies of its *My Little Pony* toys online. Its mass-produced plastic ponies, accessorized for young girls with a mane of hair and a comb, had unexpectedly become popular amongst male adult fans (a.k.a. 'bronies') who were selling their redesigned ponies made of sandstone and metal via 3D printing service Shapeways. The unauthorized ponies more closely resembled the animation series with their stylish freeze-frame manes, and the fans even created figurines of the show's minor characters. At first, Hasbro requested a takedown of such fan art, claiming intellectual property infringement on a burgeoning

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83 Dave Polsky, *Over a Barrel*, vol. 1, *My Little Pony Friendship is Magic* (Hasbro, 2011), 21.

84 "Hasbro Reports Fourth Quarter and Full-Year 2013 Financial Results and Declares an Increase in Quarterly Dividend to $0.43 Per Share," news release, 2014, http://investor.hasbro.com/releasedetail.cfm?releaseid=824366.

85 Todd Blatt, "Cease and Desist," http://toddblatt.blogspot.com/2011/06/cease-and-desist.html.

86 Nick Statt, "Print Chop: How Copyright Killed a 3D-Printed Final Fantasy Fad," *Cnet* http://www.cnet.com/news/print-chop-how-copyright-killed-a-3d-printed-final-fantasy-fad/.

franchise whose television series and toys contributed significantly to the company's earnings of US\$4 billion in 2013.[84] But a year later, the company reversed the takedown when it partnered with Shapeways to allow fans to design and sell their *My Little Pony* figurines again.

This was unprecedented in the short history of interactions between intellectual property law and digital fabrication. Designers and manufacturers have followed in the footsteps of the music and film industry in aggressively protecting themselves against such acts of digital piracy. They were sending out takedown notices backed by the Digital Millennium Copyright Act, requesting online sites to remove infringing content or face legal consequences. Maker Todd Blatt received such a request from Paramount Pictures in 2011 after he created and shared online a 3D printable cube based on the one in their movie *Super 8*.[85] In 2013, digital artist Joaquin Baldwin got a similar notice from video games maker Square Enix for selling 3D printed figurines he had modeled after characters from their popular Final Fantasy VII game.[86] Each time, the individuals complied and piracy was stopped.

Hasbro's embrace of fan art, however, turned it from piracy to a business possibility. For SuperFanArt, Hasbro licenses *My Little Pony* fans to design 3D printable figurines for its brand. Fans have free reign to create whatever pony designs they want—as long as they fall within basic guidelines, such as no ponies with saddles or

in violent poses—and even get to set their own prices. In return, Hasbro gets a cut of sales and the company approves each creation that goes up exclusively on Shapeways. "What's great about the Hasbro deal is that they are opening up the option for a new way for companies to deal with intellectual property and a new way for them to look at it," explains Shapeways' community manager Natalia Kransnodebska who was involved in implementing the original takedown and then the partnership. "What that actually is, is an ability to tap into a huge creative resource that the brand maybe never had access to and never knew about."[87]

SHARING IN THE NEW WORLD OF DESIGN

Opening up intellectual property for others to play with is part of a gathering movement in industrial design. Even as some seek ways to better protect their designs amidst the digital revolution, others embrace the newfound openness by finding ways to share their work meaningfully instead. This mirrors the rise of free and open source movements in response to the war on piracy in the software industry. Unlike closed proprietary software that is tightly protected by its owner, open source developers invite the public to use, study, share and modify their program code because they believe this benefits their work and the larger field of technology. A good example is Linux, an open source operating system launched by Linus Torvalds in 1991. When he shared his code for others to work on, Torvalds attracted a community of volunteers

87   Natalia Kransnodebska, Skype interview with author, December 18, 2014.

88   Clive Thompson, "Build It. Share It. Profit. Can Open Source Hardware Work?," *Wired,* http://archive.wired.com/ techbiz/startups/magazine/16-11/ff_ openmanufacturing?currentPage=all.

89   Marcus Fairs, ""It's More Than a Technological Revolution; It's a Cultural Revolution" - Joseph Grima," *Dezeen,* http://www.dezeen.com/2012/ 10/15/joseph-grima-on-open-design-at- istanbul-design-biennial/.

90   Joseph Grima, "Adhocracy," in Asian Design: *Histories, Collecting, Curating* (Hong Kong: M+ Matters, 2012).10.

who have helped build a free and popular operating system that developers have built commercial and non-commercial software for, from the Android operating system used in smart-phones to the free Apache web-server application that nearly half of all web sites in the world run on today.[88]

Examining the convergence of industrial design, open-source philosophy, and the digital revolution in his exhibition "Adhocracy" at the 2012 Istanbul Design Biennial, the curator Joseph Grima declared that, "It's more than simply a technological revolution; it's a cultural revolution we're undergoing now."[89] His exhibition title appropriated management consultant Robert Waterman Jr.'s term for a flexible organization structure unbound by bureaucracy to describe the new cultural condition of our times—one where designers were defining "new power structures, new economic frameworks, new forms of authority, new modalities of being political."[90] One consequence is a break up of the traditional link between design and authorship—the bedrock of intellectual property—as seen in the exhibition's projects that blurred the line between designer and user. For instance, instead of complete furniture pieces, design studio Minale-Maeda created "Keystone" connectors to be downloaded and 3D printed by users who then connect it to components they fabricate themselves to make tables and chairs. "It ultimately boils down to the emergence of the network as the productive model par excellence of our time," said Grima. "It's a complete shift away from the heroic figure of the designer towards the absence of any single figure as the author; more of a collaborative, networked approach."

Figure 14

A real-life company that embodies Grima's new design code is Arduino, an open source electronics platform started by Massimo Banzi, David Cuartielles and David Mellis in 2005. Instead of

protecting their electronic board design with patents or copyright, the company shares online all their products' schematics, design files

and software for the public to download and use for free. This has allowed users to freely modify this simple computer to build devices ranging from an unmanned model airplane to a monitor that automatically waters the houseplant. Users have even manufactured Arduino boards to sell without paying the creators any royalties. All these are fine by Arduino. Their business revolves around selling the boards, but more significantly, consulting with companies who want to use them in their products. Thus, what may seem like piratical acts to others is to Arduino a trove of community-generated knowledge that has helped it produce better boards and build a profitable consultancy. When a client wanted to control LED arrays with the Arduino board, the team found that one of their users had already published code to do the job, so they just took it to use.[91] In spite of the lack of intellectual property protection, some 1.2 million official Arduinos have been distributed over the last decade, not including counterfeits.[92]
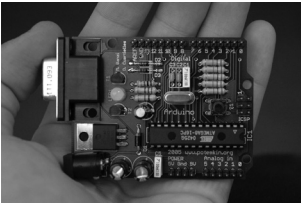
Figure 15

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[91] Thompson, "Build It. Share It. Profit. Can Open Source Hardware Work?".

[92] David Cuartielles, "Arduino Faq - with David Cuartielles," Malmö University, http://medea. mah.se/2013/04/arduino-faq/.

[93] "Creative Commons and Copyright Reform," Creative Commons, http://creativecommons. org/about/reform.

[94] See Appendix

[95] Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to*
Lock Down Culture and Control Creativity, (New York: The Penguin Press, 2004), http:// www.free-culture.cc/freeculture.pdf.Xiv.

[96] "About," Creative Commons, http://creativecommons.org/about.

[97] Weinberg, "What's the Deal with Copyright and 3D Printing?."20.

[98] "State of the Commons," Creative Commons, https://stateof.creativecommons.org/?utm_ campaign=2014fund&utm_source=ca- rousel&utm_medium=web.

A WORLD OF OPEN DESIGN

The myriad ways of sharing an Arduino design is supported by a new breed of licenses that regard intellectual property to be studiously shared instead of preciously protected. The design file of the Arduino is licensed under the Creative Commons Attribution Share-Alike license, which allows for others to create derivative works for personal and commercial use as long as Arduino is credited and the works are also released under the same license. In exchange for letting others freely use their technology, Arduino gains the right to take advantage of user-generated works too. This is how Creative Commons ensures the "maximum benefits to both culture and the economy in this digital age,"[93] by offering a spectrum of licenses[94] that let creators retain their copyright while being explicit on how others can share their work—whether it is copying, distributing, editing, or adapting it. Law academic Lawrence Lessig created the Creative Commons in response to the rise of "a culture in which creators get to create only with the permission of the powerful, or of creators from the past."[95] His licenses modify the existing copyright system's stance of "all rights reserved," to "some rights reserved" instead.[96] Rather than having to actively seek out an owner's permission to use, a Creative Commons work already comes with preset permissions granted by the property owner. While attorney Michael Weinberg of Public Knowledge reminds us that Creative Commons licenses are moot if the work itself is not copyrightable, he says they give others the confidence to build upon the object.[97] Establishing this cultural norm brings out the true nature of the design process: that an object is rarely the work of a singular creative genius as is so often presented, but a collaborative effort that involves sourcing influences from everywhere around us. Since the first Creative Commons licenses were created in 2002, some 882 million works ranging from music to photos and documents have adopted it.[98]

Industrial designers are increasingly contributing their design files into this commons too.

For Israeli designer Ronen Kadushin, the coming together of a more permissive intellectual property infrastructure with the rise of digital fabrication technologies has given birth to what he and many others are calling "open design." Frustrated with manufacturers being the traditional gatekeepers of industrial design, Kadushin wrote a Master thesis that he turned into an online manifesto urging the profession to learn from the open source software movement and use technology to break free from "the dogmas of the Church of Industrial Design."[99] He believed industrial designers needed to adapt to the rise of the Internet and emergence of digital fabrication technologies to become "relevant in a globally networked information society." Only by creating a common pool of digital works that were freely shared and built upon would fresh approaches to design emerge. While acknowledging that this also made designs easier to pirate, Kadushin argued that the existing intellectual property system was far from perfect, often requiring huge resources to defend. "Suppose you have a good bicycle. You like it and you want to keep it, so you buy a really nice lock for it. If a thief truly wants your bicycle, no matter how good your lock is, he will find a way to steal your bicycle. Intellectual property protection is exactly the same," he says.[100]

Instead of trying to protect a design from the openness of the digital age, Kadushin urged designers to take advantage of it. This

99 Ronen Kadushin, "Open Design Manifesto," (2010), http://www.ronen-kadushin.com/files/4613/4530/1263/Open_Design_Manifesto-Ronen_Kadushin_.pdf.

100 Peter Troxler, "The Beginning of a Beginning of the Beginning of a Trend," in *Open Design Now: Why Design Cannot Remain Exclusive*, ed. Bas van Abel, et al. (Netherlands: BIS Publishers, 2011).112.

101 Ibid.114.

102 Jeremy Rifkin, *The Zero Marginal Cost Society* (New York: Palgrave Macmillan, 2014).18.

103 Ibid.21.

104 Ramakers, "Everyone a Designer."200.

way, their work "will be watched, viewed, produced, copied, talked about, blogged about in more places than if it was a closed design."[101] The success of Arduino proves the viability of Kadushin's open design philosophy, and also shows how this has extended beyond digitally fabricated designs into traditional manufactured ones as well. From toy ponies to an electronics board, these open design products demonstrate how the threat of piracy diminishes as designers and manufacturers turn to sharing their works instead of protecting them. They also demonstrate the potential of a new class of products that are tools for creation too.

WILL THE PEOPLE CARE TO SHARE?

The rise of open design is part of the shift towards the "Collaborative Commons," an alternative economy that social theorist Jeremy Rifkin predicts will greatly diminish the market capitalism of today. "While the capitalist market is based on self-interest and driven by material gain, the social Commons is motivated by collaborative interests and driven by a deep desire to connect with others and share. If the former promotes property rights, caveat emptor, and the search for autonomy, the latter advances open source innovation, transparency, and the search for community," he wrote in his book *Zero Marginal Cost Society*.[102] Contrary to the traditional view that intellectual property restraints were necessary to incentivize people to innovate and invent, Rifkin points to the millions of people already freely collaborating using open-source agreements, and notes the "surge in creativity that is at least equal to the great innovative thrusts experienced by the capitalist market economy in the twentieth century."[103]

What this means is that everyone can now be a designer. While mass production churned out design as closed objects of consumption, digital fabrication technologies and open design is freeing objects to become sites for user participation instead. Speculating on this coming future, Droog's co-founder Renny Ramakers noted that

industrial design's traditional creed of "design for all"—as embodied by IKEA's affordable mass produced furniture—has become "all can design" instead. "The new offering is 'design democracy,' in the sense that the user is invited to participate in the design,"[104] she explained. But Ramakers modified her revolutionary statement by adding Droog's poor experience in getting users to participate in their designs and the less than satisfactory results. She also cited information technology professor Burt Mulder's 1 percent law on online communities, which states that only 1 percent of users contribute, while 9 percent post comments, and 90 percent are silent observers. Mulder found that only 0.16 percent of all YouTube users actually contribute content to the video-sharing platform and only 0.12 percent upload images to the photo sharing website Flickr. This is why for Ramakers "the real democratization of design depends not just on ideals, but ultimately on what the masses can and are willing to do."

How will the masses embrace this opening up of design?

One way is via designer Thomas Lommée's project to build a common language for all design. Since 2007, the designer has been developing Open Structures, what he describes as a hybrid of the modular brick toys of Lego and the crowd-sourced encyclopedia Wikipedia.[105] Under Lommée's system, a design is a jigsaw puzzle constructed from a library of parts that can just as easily be reused and adapted to build something else. His 4-by-4 centimeter grid is a standard denominator for anyone to design parts that can assemble an infinite possibilities of objects: from a box to a bicycle, and eventually, even a building. Another important component of

105 Thomas Lommée, "Thomas Lommée, Open Structures," OuiShareTV, https://www.youtube.com/watch?v=Q8eHADkhyoc.

106 Ibid.

107 "ManifesTOG," TOG, http://www.togallcreators together.com/whats-tog-2/whats-tog/.

108 "Open Source Furniture by Philippe Starck for TOG," *designboom,* http://www.designboom.com/design/open-source-furniture-philippe-starck-for-tog-04-08-2014/.

Open Structures is a website where the community shares parts that are digitally fabricated, and also information on how to use them to build different things. Although the project remains in beta mode, Lommée believes that such an open design is both ecological and economical. A system of parts that are compatible with one another means everything around us can be reused, redistributed and rebuilt. "Rather than having one company or one designer designing a complete system, copyrighting it, and selling it out to end users, what we propose is kind of a Lego system where everybody who wants can contribute parts to a shared and common modular database of parts," he explained.[106]

On the other end of the spectrum is TOG: All Creators TOGether, a new furniture company fronted by established designers such as Philippe Starck that also advocates the belief that "anyone can be creative." The company's manifesto (or what it calls Manifes TOG) proudly declares itself as "collaborative," "free," "open source," "interactive," amongst other buzzwords associated with open design.[107] By offering industrially manufactured furniture in a variety of colors and forms, and the option of pairing it with fittings and coverings created by a community of artisans and craftsmen, TOG offers mass customization as its answer to end the cycle of trends in the industry. "TOG is the only company who shows clearly that the only acceptable next trend is the freedom of choice and the freedom to be different," explains Starck, who has built a career around trend-setting proprietary designs.[108]
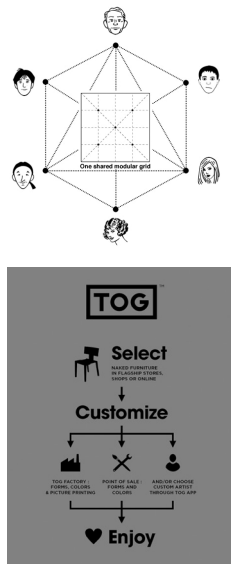
Figure 16

History may point to how users will embrace open design—whether they contribute to a structure of Commons or simply enjoy a world of expanded options. After all, the ideals of open design are a digital update of a recent past. Mass customization? In the pre-

industrial society, craftsmen made objects suited for your needs—tailors still do that today. Self-repair? Washing machines once came with service manuals that guided users how to fix them. Shareable designs? There are libraries of instructional books on how to build your own furniture.
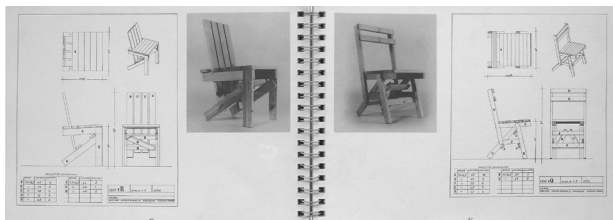
In 1949, Italian designer Mario Dal Fabbro's *Modern Furniture: Its Design and Construction* published drawings detailing the construction of works such as Charles and Ray Eames' Potato Chip Chair and Eero Saarinen's plywood chair to "present to architects, furniture designers, manufacturers, and amateur craftsmen the best work of various designers for their study and interpretation."[109] But close to two decades later, another Italian designer, Enzo Mari, was denounced for encouraging all of the above. He published *Autoprogettazione* in 1974, a free set of detailed instructions that anyone could follow to build and customize nineteen furniture designs using just wood, nails and a hammer. It was a provocation against how industrial manufacturing has alienated consumers from understanding what good design and construction is. Mari hoped people could learn this by building their own furniture, but it never took off. Many users fetishized the furniture's simple aesthetics as perfect for their rural chalets in the Alps, and he even earned the

109 Mario Dal Fabbro, Modern Furniture: *Its Design and Construction* (New York Reinhold, 1949).

110 *Enzo Mari for Artek: Homage to Autoprogettazione* (Artek, 2010).

ire of his peers. "My colleagues, designers and artists almost accused me of being a fascist, because they thought that a designer should create objects which make life easier, while I, according to them, was forcing people to do more work," he said.[110] In 2010, furniture maker Artek began selling an *Autoprogettazione* chair. For US\$320, anyone can buy a set of pre-cut pine boards, nails, and the instructions to assemble such a chair. Design democracy in a package—but without the hammer.

THE GHOST OF PIRACY

As design becomes more open, might the end of piracy be in sight? Instead of closed and completed products, new design approaches could harness user participation. Alternative business models that embrace sharing may offer new incentives for designers and manufacturers to innovate and create. The ease of mass customization with the advancement of technology could diminish the demand for cheap copies. But that is to see design piracy as only an economic issue, a matter of simply reducing its demand and supply. Yet, bundled up within this phenomenon are also questions on how we regard the nature of the design process. Is there ever an "original" or "authentic" design or are they all part of a grand evolution? While we celebrate design as the works of creative geniuses, will we acknowledge that there is a designer in every one of us too? By stripping design away from its commercial context, we see it persists as a means humans undertake to make their everyday lives better. As history has shown, the assumptions we hold of design shape the law and the politics behind how it is valued, and ultimately, what we regard as design piracy. Technology is a catalyst that accelerates the interactions of these different issues and out of it emerges the specter of piracy. It is a nebulous Other that embodies our deepest fears and desires for design. The design pirate is at once the bandit that robs designers and their incentive to create, and also

the unwanted competitor that spurs them to do better. It is the users' champion for better and more affordable design and also the culprit of faulty and sloppy creations. Piracy is the product of our most selfish desires, and our most generous ideals. Like the design of the pirate flag—a skull and cross bone—suggests, piracy is the X-ray of our inner selves. It may ebb and flow with the tides, but piracy will never end.

APPENDIX

Creative Commons: How to License

Open Design Manifesto by Ronen Kadushin

Ronen Kadushin

Open Design Manifesto

In today's market-driven culture, industrial designers commit themselves to producers in order to realize their creativity. Producers, with the power to control all aspects of a product, are the gatekeepers of design creativity, deciding what and how products are available to consumers.
This situation begins in Industrial design education systems that train designers to integrate into an industrial production scenario and accept that producers have the right to regulate design and indoctrinate their set of values and ends. Fresh approaches and radical views are marginalized as they do not conform with the dogmas of the Church of Industrial Design.

But other creative fields that found their products in phase with the realities of the Internet and information technology (fields such as music, communication design, animation photography, text, etc.) are experiencing an unprecedented flood of freely available creative content. Industries that once dominated these fields and have not adapted to this reality are quickly becoming redundant.

Enter the Open Source method, one that revolutionized the software industry, created a viable economy, and gave birth to a flourishing social movement that is community-minded, highly creative and inclusive.

A revolution in product development, production and distribution is imminent due to the Internet's disruptive nature and the easy access to CNC machines. Open Design is a proposal to make this happen. It's aim is to shift Industrial Design to become relevant in a globally networked information society.

***

Open Design method consists of two preconditions:

1. An Open Design is CAD information published online under a Creative Commons license to be downloaded, produced, copied and modified.

2. An Open Design product is produced directly from file by CNC machines and without special tooling.

These preconditions infer that all technically conforming open designs and their derivatives are continuously available for production, in any number, with no tooling investment, anywhere and by anyone.

***

A new product and services market is a natural outcome of a network of designers, manufacturers, consumers and retailers using a common pool of open designs.

The designer should always be acknowledged as the original creator and owner of the design, even in case of a derivative design. If an open design is produced for commercial use, the designer has to agree to such use and get paid.

An open design value is increased with wider modification possibilities and transformation potentials into other products. Designs that typically live only a few years in the marketplace can live on and develop into new shapes and uses.

Ronen Kadushin
September 2010

http://www.ronen-kadushin.com/files/4613/4530/1263/
Open_Design_Manifesto-Ronen_Kadushin_.pdf

Interviewees

Janos Stone	http://janosstone.com/
Cecilia León de la Barra Jorge Gardoni	Curators, *Copies. Transformation and development in creative processes*, exhibition at Archivo Diseño y Arquitectura
Emily Danchuk	Founder, Copyright Collaborative http://www.copyrightcollaborative.com/
Thibault Brevet	http://www.thibault.io/
Jerry Helling	President, Be Original Americas http://beoriginalamericas.com/
Michael Weinberg	Vice President, Public Knowledge https://www.publicknowledge.org/
Kevin Spencer	http://www.shapeways.com/shops/KShop
Jesse Howard	http://www.jessehoward.net/
Dries Verbruggen Claire Warnier	Founders, Unfold http://unfold.be/
Natalia Kransnodebska	Community Manager, Shapeways http://www.shapeways.com/
Bob Copray Niels Wildenberg	Mal Furniture http://www.mal-furniture.com/

Featured Projects

Arduino (2005-)	Massimo Banzi, David Cuartielles, Tom Igoe http://www.arduino.cc/
Eames Molded Fiberglass Chair (2013-)	Charles and Ray Eames, manufactured by Herman Miller http://www.hermanmiller.com/products/seating/multi-use-guest-chairs/eames-molded-fiberglass-chairs.html/
Autoprogettazione (1974)	Enzo Mari
Bugaboo Repair Guy (2011-)	Stephen Faulkner https://www.facebook.com/BugabooRepairGuy/
Case Study Fiberglass Chairs (2000-)	Modernica http://modernica.net/fiberglass-shell-chairs/
DRM Chair (2013)	Thibault Brevet, Gianfranco Baechtold, Laurent Beirnaert, Pierre Bouvier, Raphaël Constantin, Lionel Dalmazzini, Edina Desboeufs, Arthur Desmet and Thomas Grogan https://vimeo.com/60475086/
Keurig 2.0 DRM Freedom Clip (2015)	The Rogers Family Company https://www.gourmet-coffee.com/Keurig-DRM-Freedom-Clip.html/
Keystones (2012)	Minale Maeda http://www.minale-maeda.com/Keystones/page01.html/
Kiosk (2011-)	Unfold http://unfold.be/pages/kiosk
Mash-up (2013)	Diderik Schneemann http://www.studioschneemann.com/projects/?p=3d.printing.vs.copyright/
Open Design Manifesto (2010)	Ronen Kadushin http://www.ronen-kadushin.com/index.php/open-design/
Open Structures (2007-)	Thomas Lommée http://openstructures.net/
SuperFanArt (2014-)	Hasbro and Shapeways http://www.shapeways.com/superfanart/
TOG: All Creators TOGether (2014-)	Grendene http://www.togallcreatorstogether.com/

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