

MAKING VIRTUAL THINGS

JOSHUA A.T. FAIRFIELD*

ABSTRACT

People value virtual things—such as NFTs—because such assets trigger and satisfy deep-seated narratives of property and ownership. The cause of the recent series of failures to regulate virtual assets, and the resulting crashes, has been a failure to take seriously the ways people perceive and use the assets. Current legal frameworks fail to support buyers’ and users’ expectations of ownership in virtual things they purchase.

Making virtual things is a matter of social construction of value. Virtual things, like real-world things, have value because a community values them for a purpose. It therefore makes no sense to discount how and why people purchase virtual things in favor of regulation based on the misguided search for the technological essence of something. If a Bitcoin is used as money, it is money. If an NFT is valued, bought, and sold as a thing within a community of collectors, the law ought to and inevitably will support that characterization.

* William Donald Bain Family Professor of Law, Washington & Lee University School of Law.

TABLE OF CONTENTS

INTRODUCTION	1059
I. MAKING VIRTUAL THINGS	1062
A. <i>History</i>	1063
1. <i>Community</i>	1066
2. <i>Technology</i>	1067
B. <i>The Social Construction of Technology</i>	1068
1. <i>The Byzantine Generals Problem</i>	1069
2. <i>Rivalrousness, Excludability, and Uniqueness</i>	1071
3. <i>Other Technological Features of Sociality</i>	1073
a. <i>Graphics</i>	1074
b. <i>Technologically Generated Context</i>	1075
4. <i>The Value of Things</i>	1078
C. <i>Essentialism, Circularity, and Hypocrisy</i>	1081
1. <i>Essentialism</i>	1081
2. <i>Circularity</i>	1083
3. <i>Hypocrisy</i>	1084
II. THE STATE OF THE (VIRTUAL) ART OF MAKING VIRTUAL THINGS	1088
A. <i>Information Theory and Transaction Costs</i>	1089
B. <i>A Social Approach to Virtual Things</i>	1091
CONCLUSION	1096

INTRODUCTION

The recent non-fungible token (NFT) craze (and regularly scheduled high-profile meltdown) is the latest turn in an old discussion.¹ Since the inception of virtualization technologies, people have wanted to own, sell, collect, invest, trade, consume, and sometimes destroy virtual objects²—as academics who study online games, multi-user dungeons (MUDs), multi-user shared hallucinations (MUSHes), virtual worlds, and augmented or virtual reality have long known and written about. The question is not whether people wish to own, buy, sell, trade, or invest in these assets; it is why people cannot own virtual things with confidence that the law acknowledges and protects their ownership interests.³

This Article makes a simple argument: virtual items are made by social narratives of value, and so the legal regulation of virtual things should center on the human social conception and human social use of those things. When humans package and use a virtual thing as if it were a real object, the law should deem it a thing, an object, the same as any other. This approach comports with present and developing law, satisfies human expectations and intentions, and provides a stable basis for understanding virtual assets going forward.

Contrary to this approach, the discussion around the legal regulation of digital assets has long been mired in a discussion of the technological characteristics of virtual things.⁴ Courts and

1. See, e.g., VICKY V. CHOUDHARY, NON-FUNGIBLE TOKEN (NFT): DELVE INTO THE WORLD OF NFTS CRYPTO COLLECTIBLES AND HOW IT MIGHT CHANGE EVERYTHING? 9 (2020).

2. F. Gregory Lastowka & Dan Hunter, *The Laws of the Virtual Worlds*, 92 CALIF. L. REV. 1, 30 (2004) (showcasing that even in entirely virtual spaces, where the idea of private property is not necessary, “the operation of most modern virtual worlds is a property system, with all of the familiar real-world features of exclusive ownership, persistence of rights, transfer under conditions of agreement and duress, and a currency system to support trade”).

3. Primavera De Filippi, Morshed Mannan & Wessel Reijers, *Blockchain as a Confidence Machine: The Problem of Trust & Challenges of Governance*, 62 TECH. SOC’Y 1, 8 (2020); Joshua A.T. Fairfield, *Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property*, 97 IND. L.J. 1261, 1266 (2022) (“Our [legal] rules were intended for an older digital economy focused on licenses rather than sales of digital goods. The struggle of NFTs to find a legal climate conducive to what they offer—full, real, digital ownership—reflects a deeper struggle to shift our legal framework to handle new technological possibilities.”).

4. Juliet M. Moringiello, *False Categories in Commercial Law: The (Ir)relevance of*

academics tend to consider virtual things in light of their technological essence rather than the use to which humans put them. Take an NFT: it is a loosely grouped set of features, including a token recorded in a distributed database (which sometimes rests on other distributed databases) and some kind of asset, which is either recorded with the database entry, linked to it, hashed to it, or somehow otherwise bundled with it by association.⁵ When one looks under the hood to search for the technological essence of a virtual item, there is a temptation to think that we should adopt *sui generis* regulation for digital assets.⁶ Indeed, that process is well underway, with efforts such as the Proposed Article 12 to the Uniform Commercial Code,⁷ which treats digital assets as controllable documents by analogy to security interests in brokerage accounts and equities.⁸

This Article aims to provide a practical take on the characteristics of virtual assets from a *social* rather than technological perspective. Such assets, when characterized by humans as objects to be traded, sold, bought, used, excluded, and so on, should be treated as such. Here we can notice that the process of reification⁹—of making informational objects into legal objects—began long ago.¹⁰ Consider

(*In*)tangibility, 35 FLA. ST. U. L. REV. 119, 146 (2007) (describing a series of cases that culminated in the New York Court of Appeals decision in *Thyroff v. Nationwide Mutual Insurance Co.*, 864 N.E.2d 1272 (N.Y. 2007), *answering certified question* 460 F.3d 400 (2d Cir. 2006), and noting that “[b]ecause the Second Circuit focused on the physical nature of the [digital] asset, it looked to the New York Court of Appeals to clarify the law”).

5. CHOUDHARY, *supra* note 1, at 10-11.

6. Moringiello, *supra* note 4, at 143, 147 (arguing that “overbroad classification of electronic assets is ... evident in case law,” which contributes to a harmful habit among judges and lawmakers to conflate all intangible items even though there are many types of intangible assets).

7. Edwin E. Smith & Steven O. Weise, *The Proposed 2022 Amendments to the Uniform Commercial Code: Digital Assets*, BUS. L. TODAY (Mar. 25, 2022), <https://businesslawtoday.org/2022/03/proposed-2022-amendments-uniform-commercial-code-digital-assets/> [<https://perma.cc/5DYW-N2AJ>].

8. Donna Parisi, Commentary, *Who's in Charge? An Overview of U.S. Digital Asset Regulation*, REUTERS, June 14, 2021, 3:25 PM, <https://www.reuters.com/legal/transactional/whos-charge-an-overview-us-digital-asset-regulation-2021-06-14/> [<https://perma.cc/MPR2-VCMT>] (“The classification of digital assets as securities has wide-ranging implications for the regulatory obligations that flow from the offer, sale, trading and clearing of such assets.”).

9. Douglas Litowitz, *Reification in Law and Legal Theory*, 9 S. CAL. INTERDISC. L.J. 401, 401 (2000) (“In the act of reification, people mistakenly treat a *non-thing*, such as an institution, social role, or relationship, as a *thing*, an immutable part of the natural world.”).

10. *Id.* (“As applied to law, reification represents a kind of infection within legal doctrine and legal theory because it is essentially an error, a delusion, and a mystification that blinds

the deed to a home. It is simply an NFT stored in a centralized and not very accessible database: the county courthouse records.¹¹ The process of projecting a social consensus (“this is my land, that is your land, and we know because of our behavior and an entry into a database”) onto an asset, land for example, is highly developed, so highly developed that we do not see how odd it is to impose property interests over land.¹² Consider property interests in air or in water, or explaining this conception of metes and bounds to a culture that has a different conception of (or lack of) individual land ownership.

The point is, we can find what we need for a successful process of making virtual things from the long history of reifying assets elsewhere in the law.¹³ Doing so requires attention, somewhat ironically, to their informational characteristics.¹⁴ This is because property is the law of who owns what, and the scope of what they own.¹⁵ This information must be written down or otherwise conveyed by the characteristics of the asset itself.¹⁶ These informational characteristics, not information in the sense of information technologies—code—but information in the sense of what information people who wish to buy a digital object know about what they are getting, who owns it, the scope of what they are buying and the rights in it, and so on, are the ones that matter in the formation of stable social narratives of value creating virtual things.

This Article will begin with a brief history of the crying market demand for virtual things, the history of using databases to record property interests in virtual things, and the history of law’s

people to alternative legal arrangements by ‘naturalizing’ the existing legal system as inevitable.”).

11. Joshua Fairfield, *Property as the Law of Virtual Things*, FRONTIERS RSCH. METRICS & ANALYTICS, Aug. 26, 2005, at 9 (stating that NFTs are similar to virtual “deeds” because they can uniquely identify their assets and prove ownership).

12. See Litowitz, *supra* note 9, at 401 (stating that there are “three rather obvious instances of reification: (1) the notion that private ownership of property is natural and inevitable; (2) the notion that labor power is a commodity to be bought and sold; and (3) the notion that gender roles are mandated by nature or God”).

13. *Id.* at 401-02.

14. JOSHUA A.T. FAIRFIELD, OWNED: PROPERTY, PRIVACY, AND THE NEW DIGITAL SERFDOM 135 (2017) (“If traditional property rights are just information, traditional property rules will work just fine in information environments. And if property is just a list of who owns what, we can easily do that with digital and smart property.”).

15. *Property*, BLACK’S LAW DICTIONARY (11th ed. 2019).

16. *See id.*

successes and failures in satisfying the human desire to own, invest in, and trade virtual things. The Article will then proceed to a description of what is most important in the process of reification: a clear understanding of the *conceptualization* of the asset. Or, more simply, the idea that the legal characterization of a virtual thing ought to turn not on what it is in some essentialist sense but on how humans use it. This approach has the signal virtue of being the actual present guiding principle of the law: use a token as currency, and the Bank Secrecy Act applies.¹⁷ Use a token as an equity, and the Securities and Exchange Commission (SEC) has jurisdiction, and so on.¹⁸ Picking out this principle and applying it to emerging areas of digital asset creation will do wonders to simplify a needlessly complex field and support and build the kinds of markets needed to satisfy human preferences.

I. MAKING VIRTUAL THINGS

The signal virtue of property law is that it lets parties know who owns what.¹⁹ This reduces conflict and transaction costs.²⁰ The antithesis of this virtue is purchaser confusion.²¹ When someone considering a transaction does not know what they will receive or whether they truly own it at all, they are less likely to buy or invest.²² If this uncertainty rises far enough, the transaction will not go through, creating deadweight loss.²³ If the uncertainty is

17. See 31 U.S.C. § 5312(a)(3).

18. See 15 U.S.C. § 78d.

19. See BLACK'S LAW DICTIONARY, *supra* note 15.

20. FAIRFIELD, *supra* note 14, at 18 (explaining that clearly defined property rights are helpful because they minimize the amount of research consumers have to do before buying property; additionally, they ensure everyone knows the scope of what they are getting, so everyone's expectations are met).

21. Vincent-Wayne Mitchell & Vassilios Papavassiliou, *Marketing Causes and Implications of Consumer Confusion*, 8 J. PROD. & BRAND MGMT. 319, 320 (1999).

22. Steve Kaczynski & Scott Duke Kominers, *How NFTs Create Value*, HARV. BUS. REV. (Nov. 10, 2021), <https://hbr.org/2021/11/how-nfts-create-value> [<https://perma.cc/FPA4-DXWH>] ("Markets can't operate without clear property rights.").

23. "Deadweight loss" is a term of art used in economics, often in association with monopoly pricing, which may be used to describe any excess burden or deficiency caused by an inefficient allocation of resources. See D. CURTIS & I. IRVINE, *PRINCIPLES OF MICRO-ECONOMICS* 109 (2021) (ebook) ("The excess burden, or deadweight loss, of a tax is the component of consumer and producer surpluses forming a net loss to the whole economy.").

epidemic, no robust market will emerge.²⁴ That, in a nutshell, is the present state of the digital asset market, marked by enormous potential but hamstrung by the itch in the back of every buyer's mind that they do not know whether they truly own anything at all, and if they do, they do not know the scope or extent of what they have bought.²⁵

A. History

The history of making virtual things is not one of technological advancement but of narrative economics²⁶ and community building.²⁷ That is because the value of all things is social and informational²⁸—a social human consensus that the thing has value—and such value is usually generated in a community in which the item or thing is directly valued,²⁹ before value propagates by virtue of the fact that what has stable value in one community has value in general.³⁰ I may not personally value a *World of Warcraft* sword,

24. See Kaczynski & Kominers, *supra* note 22 (describing how clear property rights “make it possible to build markets around new types of transactions—buying and selling products that could never be sold before, or enabling transactions to happen in innovative ways that are more efficient and valuable”).

25. Michael Druckman-Church, Note, *Taxing a Galaxy Far, Far Away: How Virtual Property Challenges International Tax Systems*, 51 COLUM. J. TRANSNAT'L L. 479, 494 (2013).

26. Robert J. Shiller, *Narrative Economics*, 107 AM. ECON. REV. 967, 967 (2017) (“By narrative economics, I mean the study of the spread and dynamics of popular narratives, the stories, particularly those of human interest and emotion, and how these change through time, to understand economic fluctuations.”).

27. See, e.g., Wayne Duggan, *The History of Bitcoin, the First Cryptocurrency*, U.S. NEWS (Aug. 31, 2022, 3:21 PM), <https://money.usnews.com/investing/articles/the-history-of-bitcoin> [<https://perma.cc/NCD6-KXYR>] (explaining that Bitcoin was created for people disenfranchised by traditional financial systems; the coins had no real monetary value at first, but this changed once coders adapted them for a wider base of applications, causing the perceived value to increase).

28. See, e.g., United States v. Petix, No. 15-CR-227A, 2016 WL 7017919, at *5 (W.D.N.Y. Dec. 1, 2016) (“Like marbles, Beanie Babies™, or Pokémon™ trading cards, [B]itcoins have value exclusively to the extent that people at any given time choose privately to assign them value.”).

29. AVNITA LAKHANI, COMMERCIAL TRANSACTIONS IN THE VIRTUAL WORLD: ISSUES AND OPPORTUNITIES 106 (2014) (ebook) (“*World of Warcraft* [operates on] a mission-reward system Since the virtual items enhance character attributes but require time to obtain, they have become objects of value to players.” (footnotes omitted)).

30. Lastowka & Hunter, *supra* note 2, at 29-30 (“[E]very day thousands of pieces of virtual property are transferred in the real world for real dollars.”); see also Chris DiLella & Andrea Day, *Investors Are Paying Millions for Virtual Land in the Metaverse*, CNBC (Jan. 12, 2022,

or a share of Apple, or a ten-pound note from Great Britain, but someone does, and that makes the thing valuable in the general sense.³¹

One error the academic literature often makes in determining the legal treatment of virtual things is to focus on the technology that undergirds a novel application of a thing.³² This Article will touch on these features, with a loose focus on NFTs and similar tokenized digital assets. But this serves merely as an example and not as definitional. For purposes of this Article, a thing is a thing, legally, when a community values it and when it has been legally, technologically, electronically, or even physically packaged in such a way that the community that values it conceives of it as a thing. Social and, particularly, community conception drives legal categorization.³³

This approach is driven by science and technology studies (STS) theory,³⁴ particularly that of Bruno Latour, developer and promoter of actor-network theory,³⁵ who introduces the idea of the “quasi-object.”³⁶ An object is never simply a physical thing; its very thingness, the very concept of it as a unit is socially derived.³⁷ Think of a

7:55 PM), <https://www.cnbc.com/2022/01/12/investors-are-paying-millions-for-virtual-land-in-the-metaverse.html> [<https://perma.cc/RZD7-8KAZ>] (explaining how plots of land in desirable locations in virtual worlds are selling for hundreds of thousands of dollars; “crypto asset manager Grayscale estimates the digital world may grow into a \$1 trillion business in the near future”).

31. *World of Warcraft* players can sell their in-game items on the site PlayerAuctions for real money. *Sell Wow Items*, PLAYERAUCTIONS, <https://www.playerauctions.com/sell-wow-items/> [<https://perma.cc/Y5EN-QASC>].

32. JOSHUA A.T. FAIRFIELD, *RUNAWAY TECHNOLOGY: CAN LAW KEEP UP?* 75 (2021) (explaining that when we regulate technology, we regulate its use by humans, not the physics or electronics behind the technology); *see also* Moringiello, *supra* note 4, at 147-50 (explaining the “tendency to place new intangible rights into the category of intellectual property in case law and scholarship”).

33. *See generally* BRUNO LATOUR, *REASSEMBLING THE SOCIAL: AN INTRODUCTION TO ACTOR-NETWORK-THEORY* 1-2 (2005).

34. *Id.* at 96.

35. *Id.* at 106 (stating that actor-network-theory—that is, “sociology of translation”—is “simply the realization that something unusual had happened in the history and sociology of scientific hard facts, something so unusual that social theory could no more go through it than a camel through the eye of a needle”).

36. BRUNO LATOUR, *WE HAVE NEVER BEEN MODERN* 55 (Catherine Porter trans., Harvard Univ. Press 1993).

37. *Id.* (“Quasi-objects are in between and below the two poles [of nature and society], at the very place around which dualism and dialectics had turned endlessly without being able

brick: clearly comfortably concrete and physical. Yet there can be no explanation of a brick (much less a book) that does not go into the social processes that formed it and the social conceptions for which it is used. It is modular, to be stacked with other bricks. It has characteristics of stability and aesthetics that explain why it is a commonly used building material—its “brick-ness,” its reason for being and its uses. As Latour writes, nothing in the human sphere is purely an object.³⁸ Everything is a quasi-object, imbued with social and informational characteristics by the social processes, functions, and needs that give them birth.³⁹

This is important for our inquiry into the making of virtual things: we cannot purely look to what these things are, technologically. Rather, we are discussing the creation of quasi-objects, nodes of information formed by social consensus within communities that value them. There can be no explanation of virtual things or the processes that form them, much less of the legal (that is, social) structures that do or ought to regulate them, without attending to their social and informational nature. The trick is to realize that this is true of all objects, not merely virtual or informational ones, to realize that an NFT is as real as a brick, and that a brick is comprised as much of information and social process as it is of clay.

With these centering thoughts in mind, the following Subsections will briefly discuss the history of virtual things, from internet domain names to magic swords in virtual worlds to cryptocurrencies to tokenized assets, first with an eye to the communities that initiated and sustained their value to people both inside and outside the community and then with an eye toward some limited technological development that has recently thrust virtual things into the public eye.

to come to terms with them. Quasi-objects are much more social, much more fabricated, much more collective than the ‘hard’ parts of nature, but they are in no way the arbitrary receptacles of a full-fledged society.”).

38. *Id.*

39. *Id.*

1. Community

McDonald's famously did not invest in securing Mcdonalds.com because the internet was a small passing fad among hobbyists.⁴⁰ Twitter handles were not considered property or valuable until OG handle hijacking became prevalent.⁴¹ Virtual world enthusiasts invested tens of thousands of dollars into items in games which, although the practice was mulcted in the media as being a strange gamer behavior at best, in fact revolutionized the video game industry and provided the now-dominant virtual itemization financing model for games.⁴² Cryptocurrencies were born among enthusiasts before taking up a nonnegligible part of mainstream investment portfolios,⁴³ and NFTs are now undergoing the birthing pains of moving from a scarcely comprehended niche product to a highly valued asset, although they are suffering periods of boom⁴⁴ and bust.⁴⁵

The social conception of virtual objects within a community has always been the key to creating informational objects that are collected, bought, and sold as personal property. Understanding the process of making virtual things requires attention to those

40. Joshua Quittner, *Billions Registered*, WIRED (Oct. 1, 1994, 12:00 PM), <https://www.wired.com/1994/10/mcdonalds/> [<https://perma.cc/PW6R-JPEV>].

41. Nicholas Thompson & Brian Barrett, *How Twitter Survived Its Biggest Hack—and Plans to Stop the Next One* (Sept. 24, 2020, 12:00 PM), <https://www.wired.com/story/inside-twitter-hack-election-plan/> [<https://perma.cc/XRS8-7PHT>].

42. Anna Wiener, *Money in the Metaverse*, NEW YORKER (Jan. 4, 2022), <https://www.newyorker.com/news/letter-from-silicon-valley/money-in-the-metaverse> [<https://perma.cc/S3MD-STEJ>] (explaining that in the early 2000s, games were primarily sold as stand-alone products; this model began to change when “[m]assively multiplayer online games, such as World of Warcraft, brought small-scale, in-app purchases—known as microtransactions—into the mainstream”).

43. See Duggan, *supra* note 27.

44. Harrison Seletsky & Ryan Smith, *NFT Market Takes Off with 115% Month over Month Growth*, BEINCRYPTO (Dec. 17, 2020, 7:58 PM), <https://beincrypto.com/nft-market-takes-off-with-115-month-over-month-growth/> [<https://perma.cc/TW5W-A56U>] (describing exceptional growth and record-breaking sales for NFTs).

45. Raphael Minter & Kyle Baird, *NFT Marketplace Volume Crashes \$12 Billion to New 2022 Lows*, BEINCRYPTO (June 22, 2022, 4:00 AM), <https://beincrypto.com/nft-marketplace-volume-12-billion-2022-lows/> [<https://perma.cc/H8X3-D5ZP>]; see also Kevin Collier, *Despite Crypto Crash, NFT Enthusiasts Keep the Party Going*, NBC NEWS (June 22, 2022, 3:11 PM), <https://www.nbcnews.com/tech/crypto/crypto-crash-nft-enthusiasts-keep-party-going-rca34498> [<https://perma.cc/S45Q-QEFX>] (explaining how despite the recent crash, “[m]any still view it as early days for NFTs, ripe for people to experiment with their own projects”).

communities themselves. The easiest such communities to identify were the spate of virtual worlds that caught public attention in the early 2000s.⁴⁶ These were for the most part billed as games (although some, such as *Second Life* and *There* attempted to build nongame spaces that presaged attempts similar to Facebook/Meta's current attempts).⁴⁷ As with NFTs now (and the first cryptocurrencies before them, and virtual worlds before them, and the internet before them) the first question often raised was *why* anything in a video game should have the kind of value we associate with houses and cars, with paintings and collectible books, in short, with personal and real property.

That question largely missed the point. Humans come to value digital objects when, similar to physical objects, they recognize some utility or social differentiation to be had from possessing or controlling a resource. The utility of apples is easily understood, and so is that of Gucci handbags. Both utility and sociality are present in the desire for digital objects, whether a Titan in *EVE Online*, or a Bored Ape NFT. The *why* is less important, and if we can dispense with asking why people value hats in video games or old comic books or *Magic: The Gathering* cards or whatever else the focus of value is, we can use the presence of a community that is coalescing around a conception of value for a given item or object as the starting point for our investigation into how to make good virtual things.

2. Technology

The central theme of this Article is that the social features of virtual things matter as much or more than technology. At the base level, virtual assets are all some combination of technology and

46. See Wiener, *supra* note 42 (noting that in the early 2000s, "as personal computers grew faster and more powerful and the Internet became more reliable and ubiquitous," virtual multiplayer online games, such as *World of Warcraft*, became more popular and entered the mainstream).

47. Daniel Terdimen, *A Brief History of the Virtual World*, CNET (Nov. 10, 2006, 5:52 AM), <https://www.cnet.com/tech/gaming/a-brief-history-of-the-virtual-world/> [<https://perma.cc/S432-A3CY>] ("[Although] often lumped together under the rubric of the massively multiplayer online game, many see a clear difference between goal-oriented online games like *World of Warcraft*, *City of Heroes* and *EverQuest II*, and pure virtual worlds like *Second Life* and *There*.").

game theory.⁴⁸ At what point will a potential bad actor attempt to subvert the system (either by faking a chain of title on the blockchain, or otherwise counterfeiting or stealing a virtual item) rather than cooperating with it (building the social construct of the item's value by legitimately buying or otherwise investing in it)? This Subsection discusses the standout technological features of virtual items, with an eye toward those features that have made the most difference socially. This leads to a somewhat different focus than many treatments of the subject.

One caveat at the outset: in discussing virtual items, there is a tendency among enthusiasts, courts, and practitioners to want to categorize virtual items based purely on their technological characteristics.⁴⁹ This is dangerous: the technology cannot tell us whether a cryptographic token is used as a piece of art, a vote, a medium of exchange, a store of value, a proxy for the right to pick up a newly developed product, or a share in a newly started business, for example.⁵⁰ All use identical technology.⁵¹ In keeping with the theme of this Article, the features that make a virtual item an item, subject to the laws and intuitions of personal property, have a stronger sociotechnological component. The technological feature has a link to the formation of a community that values the assets. These are the features that matter, and when a given technological feature has both hard and social technological components, it is the social that ought to occupy our thinking.

B. The Social Construction of Technology

We look next, therefore, to the socially constructed elements of virtual things, the ways in which the technology is defined by the social needs of the groups who choose to value virtual things. The point is not that technology does not matter. It is that the physical technological features of an asset do not determine its thingness, its

48. Moringiello, *supra* note 4, at 155-56 (explaining that, at their core, virtual assets are all made up of the same type of digital code).

49. *See id.* at 147-50 (explaining the “tendency to place new intangible rights into the category of intellectual property in case law and scholarship”).

50. *See* FAIRFIELD, *supra* note 14, at 156-57 (explaining that the technological characteristics of a digital product matter little to consumers).

51. *See* Moringiello, *supra* note 4, at 155-56.

suitability for use as something prized and collected and exchanged within a community that values it. Those features are determined socially, and the technological features are derivative of social need. This Section therefore analyzes blockchain technology from a *social*, rather than a technological perspective, to determine what elements of the technology undergirding virtual things have social resonance and thus have a part to play in characterizing and structuring a legal framework that supports social expectations.

1. *The Byzantine Generals Problem*

Blockchain is the current technology undergirding both a profound explosion and rapid recession in virtual-item products and their value.⁵² A full discussion of the technology is beyond the scope of this Article, and I have written on its technological and mechanical application elsewhere at greater length.⁵³ The key feature is that a blockchain creates a decentralized and distributed record that is extraordinarily hard to falsify.⁵⁴ It is as if there were an Excel spreadsheet with everyone's baseball cards listed in it, but because that spreadsheet is kept by many different people, one cannot unilaterally list all baseball cards as belonging to oneself.⁵⁵

I recognize that the technology is more complex, but my treatment here is limited because I wish to focus on the fact that blockchain is a social, not a technical solution. The interesting parts

52. See Joshua A.T. Fairfield, *BitProperty*, 88 S. CAL. L. REV. 805, 808 (2015) (stating that blockchain technology facilitates the creation of a public database that tracks “who owns what”).

53. See generally FAIRFIELD, *supra* note 14; Fairfield, *supra* note 52; Fairfield, *supra* note 3; Joshua A.T. Fairfield, *The Human Element: The Under-Theorized and Underutilized Component Vital to Fostering Blockchain Development*, 67 CLEV. ST. L. REV. 31 (2019).

54. See Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 6 (Mar. 10, 2015) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664 [<https://perma.cc/6MQ4-V28X>] (stating that blockchain uses a probabilistic approach which makes it too much work for “potential attackers to corrupt a shared database with false information, unless the attacker owns a majority of the computational power of the entire network”).

55. See Bennett Garner, *Merkle Tree Hashing: How Blockchain Verification Works*, COINCENTRAL (Sept. 3, 2018), <https://coincentral.com/merkle-tree-hashing-blockchain/> [<https://perma.cc/6MUH-ZVEL>] (noting that this process allows multiple computers to keep copies of the same database or ledger to “verify individual records without having to review and compare versions of the entire database”).

of the technology lie in how blockchain supports community formation and the social construction of value. Blockchain is a solution to the Byzantine Generals Problem,⁵⁶ which essentially asks how to form a community of trust when one knows that bad actors will be part of the mix.⁵⁷ If you know that some signals you receive are good ones, and some bad, how can you trust anyone? (Hence the name of the problem—Byzantine generals, historically corrupt, must coordinate to attack a city. Some of them are known to be traitors, but nobody knows which.)⁵⁸

The purpose of blockchain is to work a social change: to convince potential bad actors that it is in their best interest to contribute their efforts toward maintaining the security of the blockchain,⁵⁹ by contributing mining cycles⁶⁰ if the blockchain uses a proof-of-work system,⁶¹ or by voting if it uses a proof-of-stake system,⁶² and so on.⁶³

56. *How Does Blockchain Solve the Byzantine Generals Problem?*, COINTELEGRAPH, <https://cointelegraph.com/blockchain-for-beginners/how-does-blockchain-solve-the-byzantine-generals-problem> [<https://perma.cc/LUR2-MVSX>] (“The Byzantine generals problem is a game theory problem [which only decentralized systems are susceptible to] that describes how difficult it is for dispersed parties to reach a consensus without the help of a trusted central party.” (citation omitted)).

57. *Id.* (“The Byzantine general problem can be solved with the help of a blockchain. It’s all about giving people a way to communicate safely and securely in an unpredictable world. In the actual world, most transactions occur between strangers who do not know or trust one another.”).

58. *Id.* (“A blockchain creates a layer that can be trusted without needing to trust every individual. This is accomplished by a network of nodes coming together to agree on the truth before it is recorded.”).

59. Mike Antolin, *Proof-of-Work vs. Proof-of-Stake: What Is the Difference?*, COINDESK (Aug. 23, 2022, 11:53 AM), <https://www.coindesk.com/learn/proof-of-work-vs-proof-of-stake-what-is-the-difference/> [<https://perma.cc/8J66-CC3G>] (explaining that blockchain uses “consensus mechanisms ... [to] help ensure users are honest with transactions, through incentivizing good actors and making it extremely difficult and expensive for bad actors. This reduces fraud such as double spending”).

60. *What is Mining?*, COINBASE, <https://www.coinbase.com/learn/crypto-basics/what-is-mining> [<https://perma.cc/5GAE-ZMGZ>] (“Mining is the process by which networks of specialized computers generate and release new Bitcoin and verify new transactions.”).

61. Antolin, *supra* note 59 (explaining that in the proof-of-work model, “verifying cryptocurrency transactions is done through mining”; it is a “competition between miners to solve cryptographic puzzles and validate transaction in order to earn block rewards”).

62. *Id.* (explaining that in the proof-of-stake model, validators are randomly chosen to “make sure the transaction is reliable, compensating them in return with crypto... [V]alidators are chosen based on a set of rules depending on the ‘stake’ they have in the blockchain, meaning how much of that token they commit to locking up to have a chance to be chosen as a validator”).

63. *Id.* (“[Both models] are known as consensus mechanisms. Both, in different ways, help

These systems are called “trustless,” but the truth is that they are anything but.⁶⁴ Trust is increased by the incentive structure created by the blockchain, but as will be discussed below, the systems also create and are created by a community, a webwork of trust between social actors in the system that enables the creation of social value. The bottom line: blockchain is a significant advance in creating decentralized virtual items. But it is not itself the special sauce of making virtual things.

2. Rivalrousness, Excludability, and Uniqueness

The most celebrated technological feature of blockchain and other virtual itemization systems (for example, an itemization ledger in a video game that tracks rare or unique items) is that blockchain technology enables rivalrousness, excludability, and uniqueness in virtual items.⁶⁵ Briefly, rivalry of goods means that if I consume it, there is less for you to consume.⁶⁶ So, for example, the process of “burning” a virtual item, such as burning ethereum in exchange for “gas” to run distributed programs on the Ethereum blockchain,⁶⁷ establishes the virtual currency ether as rivalrous.⁶⁸ Excludability

ensure users are honest with transactions, through incentivizing good actors and making it extremely difficult and expensive for bad actors. This reduces fraud such as double spending.”).

64. Fairfield, *supra* note 52, at 820-25 (explaining a core feature of blockchain—its function as a trustless public ledger).

65. Fairfield, *supra* note 11, at 7-8 (“It allows sellers to capture the value associated with ownership, that loosely negotiated but highly prized set of social permissions around the use of scarce resources.”).

66. BRETT M. FRISCHMANN, *INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES* 137 (2012) (“[R]ival resources generally have finite capacity.”); Fairfield, *supra* note 14, at 148 (“Rivalrousness means that if I have a thing, you don’t.”).

67. FINTECHNEWS SING., *What Does It Mean to Burn Ethereum*, FINTECHNEWS (Dec. 14, 2021), <https://fintechnews.sg/57905/sponsoredpost/what-does-it-mean-to-burn-ethereum/> [<https://perma.cc/58A3-ZX7J>] (stating that users have to pay “gas fees” when making transactions on the Ethereum network to “compensate for the computing energy used to process and validate each transaction”); Zhiyuan Sun, *1 Million ETH Has Been Burned Since the Implementation of EIP-1559 in August*, COINTELEGRAPH (Nov. 24, 2021), <https://cointelegraph.com/news/one-million-eth-worth-have-been-burned-since-the-implementation-of-eip-1559-in-august> [<https://perma.cc/TBR5-ZX8F>] (explaining that a portion of one’s gas fee pays “miners” while another portion is “burned,” meaning taken out of circulation permanently).

68. Jagjit Singh, *Buyback-and-Burn: What Does It Mean in Crypto?*, COINTELEGRAPH (Jan. 22, 2022), <https://cointelegraph.com/explained/buyback-and-burn-what-does-it-mean-in-crypto> [<https://perma.cc/PBD2-YNUS>] (explaining that cryptocurrency developers sometimes “burn”

is related: if my possession of something prevents you from having it too, that is, if one person's possession can act as a bar to others, then the asset is excludable.⁶⁹ And finally, rivalry and excludability are distinct from uniqueness.⁷⁰ If I have one dollar bill, it is excludable (my possession of it precludes yours) but not particularly unique.⁷¹ However, if I possess the *Mona Lisa*, the asset is excludable, arguably rival (in that not everyone can enjoy it at the same time, see the lines at the Louvre), and also unique, in that there is only one original copy.

And yet, why do we consider a copy different from the original? Rarity has a peculiar constructed quality. True, being able to assign the equivalent of a specific serial number—a token, an entry in a ledger—to an item makes it unique or rare in a mathematical sense, but why should anyone care? A wide range of attributes serve to make many assets unique in a measurable sense, but only a few in a way that people care about.⁷² To construct uniqueness *socially* means to construct some facet of rareness that serves as a social marker. Consider a Gucci handbag, or Superman's debut in an *Action Comics #1*,⁷³ or a black-border Black Lotus card in *Magic: The Gathering*. These are unique not merely because they possess

a particular quantity of coins to reduce the supply and make them more scarce); see also FINTECHNEWS SING., *supra* note 67 (“Based on the basic principles of supply and demand, assuming demand remains constant while the supply of Ethereum decreases as they are burned, the price would be driven up.”).

69. Daniel Liberto, *What Is a Rival Good vs. a Non-Rival Good with Examples*, INVESTOPEDIA (June 1, 2021), https://www.investopedia.com/terms/r/rival_good.asp [<https://perma.cc/TTW5-CHCV>] (“Excludable goods are private.”).

70. Fairfield, *supra* note 3, at 1263-64 (“Uniqueness is a related and extended version of rivalrousness. If I have a unique object, there is no replacement for it.”).

71. Devin Finzer, *The Non-Fungible Token Bible: Everything You Need to Know About NFTs*, OPENSEA: BLOG (Jan. 10, 2020), <https://opensea.io/blog/guides/non-fungible-tokens/> [<https://perma.cc/H8N5-HEVW>] (describing how currency is inherently interchangeable and replaceable with other currency—that is, a fungible asset).

72. See, e.g., Ender Orçun Çetiner, *The Rarities of Magic: All About Cards from Common to Mythic*, DRAFTSIM (Jan. 18, 2023), <https://draftsim.com/mtg-rarity/> [<https://perma.cc/WVY5-KDR5>] (arguing that “just because a [*Magic: The Gathering*] card is ‘rare’ doesn’t mean that it’s automatically valuable” because sometimes rare cards do not perform well in the game; rarity is “only one factor”).

73. Angela Watercutter, *World’s Most Expensive Superman Comic Just Sold for \$3.2M on eBay*, WIRED (Aug. 25, 2014, 3:46 PM), <https://www.wired.com/2014/08/superman-comic-3-million-ebay/> [<https://perma.cc/A397-QF5D>] (explaining that volume one of the *Action Comics* series is particularly valuable because it is the comic that introduced Superman for the first time in 1938; a pristine copy is worth even more).

unique identifiers.⁷⁴ In fact, many (such as the card, or the comic) originally did not.⁷⁵

However unique a snowflake or a lump of coal, they do not have market value. No group of humans has constructed value around them. In other words, in constructing rarity and uniqueness, the attributes of the community that constructs value are more important than the technological or physical features of the item. The technology matters: blockchain and other databases are used to keep track of who owns what, but human value emerges only as a function of a community. This interrelation of technological function to social convention is what makes a virtual object.

3. Other Technological Features of Sociality

I and others wrote articles on the burgeoning markets for virtual things (virtual worlds, microtransactions, virtual economies) for decades prior to the advent of blockchain.⁷⁶ I have discussed blockchain first because the current Web3 conversation revolves around it.⁷⁷ Yet, as above, we find that blockchain is merely one of a number of technological features that support the social construction of markets and value for virtual items.

74. Mark Rosewater, *Nuts & Bolts: Card Codes*, MAGIC: THE GATHERING (Jan. 12, 2012), <https://magic.wizards.com/en/news/making-magic/nuts-bolts-card-codes-2009-01-12> [<https://perma.cc/4F34-B6NX>] (stating that *Magic: The Gathering* cards are identifiable by a particular code comprised of a series of letters and numbers); see Nicholas Lloyd, *Why Is Black Lotus So Expensive: [Price, Power, History]*, CARDBOARD KEEPER, <https://cardboardkeeper.com/why-is-black-lotus-so-expensive/> [<https://perma.cc/PJN8-X6P7>] (explaining that rarity is only one factor when it comes to the value of *Magic: The Gathering* cards; the rare Black Lotus card is exceptionally valuable because it is one of the most powerful cards you can play).

75. See Çetiner, *supra* note 72 (noting that older cards lack a set code).

76. See generally Joshua A.T. Fairfield, *Virtual Property*, 85 B.U. L. REV. 1047 (2005); Joshua A.T. Fairfield, *Anti-Social Contracts: The Contractual Governance of Virtual Worlds*, 53 MCGILL L.J. 427 (2008); Joshua A.T. Fairfield, *The God Paradox*, 89 B.U. L. REV. 1017 (2009); Joshua Fairfield, *Escape into the Panopticon: Virtual Worlds and the Surveillance Society*, 118 YALE L.J. POCKET PART 131 (2009); Joshua A.T. Fairfield, *The Magic Circle*, 11 VAND. J. ENT. & TECH. L. 823 (2009).

77. Thomas Stackpole, *What Is Web3?*, HARV. BUS. REV. (May 24, 2022), <https://hbsp.harvard.edu/product/BG2202-PDF-ENG?Ntt=> [<https://perma.cc/248M-PLU7>] (“Web3 is being touted as the future of the internet. The vision for this new, blockchain-based web includes cryptocurrencies, NFTs, DAOs, decentralized finance, and more.”).

a. Graphics

Graphics and graphical context play a significant part in convincing humans that what they are looking at is a thing.⁷⁸ Consider the NBA's Top Shot marketplace.⁷⁹ Short video clips of standout basketball plays are put on the market and regularly sell for tens of thousands of dollars.⁸⁰ Yet why would someone pay thousands for a five-second clip of a basketball game? Not solely because the clips are unique and rare: even if one were to assign a unique serial number to each clip, people are unlikely to value and buy it as a digital collectible. Rather, the value emerges because the NFT is graphically packaged and sold in such a way as to augment the construction of value by a community. They are meant to look like objects, be appreciated and displayed as collectibles, and thus generate social (and economic) value.

Top Shots, the digital collectibles themselves, come in the form of a graphically constructed object.⁸¹ Top Shots are presented as three-dimensional-appearing cubes, one side of which reflects the video clip.⁸² The graphical presentation of a virtual thing matters to the community and to the people constructing value narratively and socially. It certainly does not matter technologically. One can hash (run through a mathematical function) any old JPEG or GIF—or any binary for that matter—and get a unique identifying number that then can be recorded in a token as a digital deed, an NFT. The

78. Fairfield, *supra* note 11, at 1 (explaining that although an NFT is technically made up of a combination of parts—similar to code, game theory, and intellectual property—it is perceived as a singular “thing” when attached to a graphic); FAIRFIELD, *supra* note 14, at 156 (“One can think of thing-ness as wrapping up complexity in a neat package, kind of like a holiday present.”).

79. Tommy Beer, *How Did a LeBron James Video Highlight Sell for \$71,455? A Look at a Burgeoning Product Called NBA Top Shot.*, FORBES (Jan. 23, 2021, 5:42 PM), <https://www.forbes.com/sites/tommybeer/2021/01/23/how-did-a-lebron-james-video-highlight-sell-for-71455-a-look-at-a-burgeoning-product-called-nba-top-shot/> [<https://perma.cc/NE4Q-DL5B>] (“NBA Top Shot [is] a blockchain-based platform that allows fans to buy, sell and trade numbered versions of specific video highlights.”).

80. *Id.* (reporting that highlights regularly sell for thousands of dollars each; one video of LeBron James sold for \$71,455 in 2021).

81. Tyler Hayes, *Designing NBA Top Shot Moments: How These 6-Figure NFTs Got Their Look*, PC MAG. (Apr. 7, 2021), <https://www.pcmag.com/news/designing-nba-top-shot-moments-how-these-6-figure-nfts-got-their-look> [<https://perma.cc/AS7N-H7XS>].

82. *Id.*

presentation of the object as a virtually rendered cube has zero technological impact.

The presentation of a virtual object as a virtual object, as taking the form and function, transferability, and separateness of an object from its surroundings, creates the object.⁸³ The graphic presentation invites the conceptualization of the asset as an object; this is the primary generator of virtual objects.⁸⁴ When is a five-second video clip of a baseball game viewed as a distinct entity? When it is sold as a collectible, rendered in the form of a cube.

For all of the hand-wringing about how to legally characterize digital objects—when to treat them as pure intellectual property and when to treat them as personal property (this distinction matters enormously for passing them to someone in a will, for example)—by far, the best rough cut is how the object is presented, not the database on which ownership of the virtual object is recorded.

Objects sold as objects are packaged and intended to trigger intuitions around personal property ownership.⁸⁵ One “buys” them, instead of “rents” them. Their scope and features are defined through a virtual rendition of physical characteristics—size, shape, and so on. They appear, graphically, to be analogous to physical objects. Consumers pay premiums to “buy” a cube of a clip of a basketball game when they would not consider paying thousands of dollars for pay-per-view of the whole game.

b. Technologically Generated Context

Another technological feature that goes undertheorized due to its social ramifications is the technologically generated context, the backdrop, which provides a framework for the value that a community attaches to a virtual object. This is easier to see within earlier iterations of virtual objects, such as online collectible trading cards, virtual worlds, or microtransaction items in games. For each of these the asset is valuable not alone, but within a community and a context. The context of a game gives value to an item used in it,

83. FAIRFIELD, *supra* note 14, at 155-57.

84. *Id.*

85. *Id.*

not merely for its functional purpose but also because a shared context serves to foster community.⁸⁶ A magical sword in *World of Warcraft* was not merely useful in carving through Blackwing Lair; it was also a source of differentiation and awe from others when ostentatiously displayed, the digital equivalent of a luxury good.⁸⁷

Similarly, items in a game, whether online collectible trading cards or hats in *Team Fortress 2*, gain value not merely from their own existence or utility but also from the ability to show them off to friends.⁸⁸ That is, items gain value from context, and a carefully generated context is a key driver of creating a community that values the asset.

Of course, once an asset has value within a context and community, it has value everywhere.⁸⁹ Value metastasizes. I may not be interested in the asset, but as long as there is a stable community somewhere that is interested in it, the asset can be used for any purpose of value exchange.⁹⁰ This was seen decades ago when Chinese merchants began accepting QQ coins (a social media site) in exchange for goods and services—the merchants had no interest in the coins, merely in the low-friction settling of debts.⁹¹ The

86. Fairfield, *supra* note 11, at 4 (focusing on the social aspect of technology).

87. Bailey Fisli, *Classic WoW: 10 Best Items that Drop in Blackwing Lair*, THEGAMER (July 21, 2020), <https://www.thegamer.com/classic-wow-best-items-blackwing-lair/> [<https://perma.cc/N2FB-3YXK>] (stating certain weapons in *World of Warcraft* excite players and are highly sought after because they are powerful, hard-to-obtain objects).

88. *Cosmetic Items*, TEAM FORTRESS 2 OFF. WIKI, https://wiki.teamfortress.com/wiki/Cosmetic_items [<https://perma.cc/DU99-T26N>] (stating some unique hats in *Team Fortress 2* are only awarded to players who complete specific in-game accomplishments; they can be equipped to avatars for other players to see); *Hats: The Ultimate Status Symbol*, TEAMFORTRESS.COM, <https://www.teamfortress.com/classless/day01.php> [<https://perma.cc/VF9K-ND6R>] (“Throughout history, men have worn hats as a way of showing how much better they are than other men.”).

89. See Lastowka & Hunter, *supra* note 2, at 29-30 (explaining that property interests within virtual worlds “bleed over into the real world”); see also DiLella & Day, *supra* note 30 (explaining how plots of land in desirable locations in virtual worlds are selling for hundreds of thousands of dollars).

90. See Lastowka & Hunter, *supra* note 2, at 29-30; see also Fairfield, *supra* note 52, at 836 (“[V]irtual currencies [have begun] to command value outside of their worlds or networks of origin.”).

91. Fairfield, *supra* note 52, at 836 (“Chinese citizens began using Q-coins, a social network currency, to purchase everyday goods and services.”); see also Geoffrey A. Fowler & Juying Qin, *QQ: China’s New Coin of the Realm?*, WALL ST. J. (Mar. 30, 2007, 12:01 AM), <https://www.wsj.com/articles/SB117519670114653518> [<https://perma.cc/5NJV-HAM7>].

merchants knew they could sell the QQ coins to a ready audience for RMB,⁹² and so the coins became their functional equivalent.⁹³

NFTs only appear to break this pattern. Because they reside on distributed databases and not in some single database, NFTs and other cryptographic tokens are transferable outside of their original context.⁹⁴ Or, put more clearly, they have very little in the way of an obvious initial community and context. An NFT is simply an entry on a database, however distributed and decentralized that database may be.⁹⁵ It cannot be removed from that database any more than the existence of a magic sword in a virtual world can be removed from the game creator's database. Presence in the database is the existence of the virtual thing.⁹⁶

But the database is not the context we are talking about here. Consider the communities on which cryptocurrencies and NFTs are founded. Cryptocurrency enthusiasts are as much invested in subreddits and Discords, in a shared language of "HODL,"⁹⁷ and in signaling tribal adherence to a narrative of decentralized finance and the withering away of nation-state involvement in banking as they are invested in the objects themselves.⁹⁸ People get involved with cryptocurrency or NFTs, they do not merely invest.⁹⁹ And most

92. Renminbi (RMB) is the official currency of the People's Republic of China.

93. See Fairfield, *supra* note 52; see also Fowler & Qin, *supra* note 91.

94. Robyn Conti & John Schmidt, *What Is an NFT? Non-Fungible Tokens Explained*, FORBES (Apr. 8, 2022, 8:36 AM), <https://www.forbes.com/advisor/investing/cryptocurrency/nft-non-fungible-token/> [<https://perma.cc/5P5U-K3HU>].

95. *Id.* ("NFTs exist on a blockchain, which is a distributed public ledger that records transactions.")

96. *Id.* ("Essentially, NFTs are like physical collector's items, only digital. So instead of getting an actual oil painting to hang on the wall, the buyer gets a digital file instead.")

97. Ali Montag, *'HODL,' 'Whale' and 5 Other Cryptocurrency Slang Terms Explained*, CNBC (Aug. 28, 2018, 12:30 PM), <https://www.cnbc.com/2018/01/23/what-hodl-whale-and-other-cryptocurrency-slang-terms-mean.html> [<https://perma.cc/5ANH-MT84>] ("In early [B]itcoin forums, someone posted a message that spelled the word 'hold' wrong, and readers interpreted it as an acronym 'hold on for dear life' 'Now, it's become a meme of sorts, so that when the prices are highly volatile, [B]itcoin buyers say "HODL!""").

98. See Duggan, *supra* note 27 (explaining that Bitcoin was created during the 2008 Great Recession for people who had grown to distrust banks and their role in the financial system, and was originally used by only a small community who traded Bitcoin back and forth just for fun); see also Kaczynski & Kominers, *supra* note 22 ("[O]wning an NFT effectively makes you an investor, a member of a club, a brand shareholder, and a participant in a loyalty program all at once.")

99. See Kaczynski & Kominers, *supra* note 22 ("The Bored Ape Yacht Club, for example, comprises a series of NFT ape images conferring membership in an online community. The

NFTs find meaning within a community that generates interest in their value. Basketball enthusiasts might value Top Shots, but they also need other Top Shots enthusiasts to value their purchases, feel envy over their high end purchases, desire to purchase them in turn, and validate their feelings and expressions of value.¹⁰⁰

4. *The Value of Things*

Value is socially constructed.¹⁰¹ The stability of value in virtual things is not a function of stability of the technology: there is no such thing as bug-free code, and every system from The DAO on the Ethereum blockchain to the ICON blockchain has bugs that can compromise the system.¹⁰² Even the fabled security of the Bitcoin blockchain is largely illusory: account hacks, thefts, and similar security breaches are rampant.¹⁰³ Technical perfection, even technical design, does not drive value. Communities with sufficiently strong contexts and social valuation (say, valuation of ships in *EVE Online*) create virtual things that have all the characteristics of valuable property without the decentralization, encryption, and game theory that secures blockchains.¹⁰⁴

All of this to say, stable virtual things are created by stable communities that operate in rich contexts of value. The technological features that matter for the creation of virtual things are those

project started with a series of private chat rooms and a graffiti board, and has grown to include high-end merchandise, social events, and even an actual yacht party.”)

100. *Id.* (“NFTs just need to establish value among a community of potential owners (which can be relatively small), whereas cryptocurrencies need wide acceptance in order to become useful as a store of value and/or medium of exchange.”).

101. Anne Mayhew, *Institutional Economics*, in *THE ELGAR COMPANION TO FEMINIST ECONOMICS* 479, 482-84 (Janice Peterson & Margaret Lewis eds., 1999).

102. Carol R. Goforth, *Using Cybersecurity Failures to Critique the SEC’s Approach to Crypto Regulation*, 65 S.D. L. REV. 433, 442 (2020) (“Aside from losses associated with market volatility and fraudulent offerings, many of the biggest losses associated with [B]itcoin and other cryptoassets have involved failures of cybersecurity including failure to observe reasonable restrictions on access to data and the presence of bugs or errors in the software protocols underlying particular blockchains that have led to hacking or other cyber thefts.”).

103. *Id.* at 443 (“Unfortunately, exchanges appear to be particularly vulnerable to cybersecurity failures.... [T]he rate of major hacking incidents appears to be increasing, and recent security breaches are mainly being seen by large-scale exchanges that should, theoretically, be the most secure.”).

104. *See generally* ROBERT J. SHILLER, *NARRATIVE ECONOMICS: HOW STORIES GO VIRAL AND DRIVE MAJOR ECONOMIC EVENTS* (2019).

that play into the creation of social value. More important than flashy technological features are the social connections and features of a virtual item to its social context of value.

Central to the creation of virtual things is a narrative of value. Here I draw on the work of Nobel Prize-winning economist Robert Shiller, who points out that value is not an essential characteristic of assets but is ascribed by humans.¹⁰⁵ That value is generated by narratives.¹⁰⁶ We notice this most in moments of hype or panicked meltdown, when narratives seem to separate the value of an asset from its underlying context.¹⁰⁷ Housing prices rise beyond anyone's ability to pay or crash beyond any mathematical model of a correction, for example.¹⁰⁸ But the phenomenon goes well beyond extremes: the core of what a virtual thing is, the node that it occupies in a webwork of social meaning, is the story of what it is. The story carries value. The narrative, if successful, generates the meaning of the asset. This is not pure illusion in the form of stories that overwrite the true value or attributes of an asset.¹⁰⁹ Rather, there is no asset without narrative.¹¹⁰ Narrative describes the scope of the asset, its functions, and its features.¹¹¹ In the case of any intangible property interest—an apt example would be the valuation of stocks before and after market crashes, as described by Shiller—the narrative creates the asset.¹¹² Stocks *are* a retirement savings plan, they occupy that legal-social spot within the webwork of social meanings, when we say they are, when the narrative of stock goes from investment to pension. (And to the extent those meanings are elided in some cultures, that, too, is narrative.)¹¹³

This understanding of narrative helps to complicate and explain the proper regulatory response to volatility in narratives. Often

105. *See generally* Robert J. Shiller, Sterling Professor of Econ., Yale Univ., Speculative Asset Prices, Prize Lecture 459 (Dec. 8, 2013) (available at Robert J. Shiller, *Prize Lecture, NOBEL PRIZE* (Feb. 1, 2014), <https://www.nobelprize.org/prizes/economic-sciences/2013/shiller/lecture/> [<https://perma.cc/4EF2-LL33>]).

106. *Id.*

107. *See* SHILLER, *supra* note 104, at 54.

108. Shiller, *supra* note 105, at 463.

109. *Id.* at 491.

110. *See* SHILLER, *supra* note 104, at 58.

111. *Id.* at 30-32, 60.

112. *Id.* at ix-x.

113. Shiller, *supra* note 105, at 462.

unregulated intangible assets follow a boom-and-bust cycle, as hype overwrites panic, and then the cycle begins again.¹¹⁴ There are two dominant stories about how one ought to respond. The first is to ground virtual things back in some form of “real” value by explaining that they are not worth anything after all and that the whole thing is some sort of fraud or scam.¹¹⁵ This is the approach of Bill Gates and Warren Buffett, who have, ironically enough, built enormous wealth out of selling intangibles.¹¹⁶ But because they do not understand the social context in which value for NFTs can be generated and sustained, because they are contemptuous of the values and communities that create and sustain that value, Buffett, Gates, and the like cannot offer more than hypocrisy.

Rather than looking for what is “real” in a stock that is “not real” in an NFT, responsible regulation will look toward validating and enforcing the narratives of thingness and value that arise within various communities. This does not mean propping these narratives up. There is no need to lean into a bubble to protect inflated expectations. But validating the thingness of an item through law, treating a thing as a thing, subject to relevant rules of property ownership and so on, and particularly avoiding the argument that virtual things are in fact “nothing,” a narrative of no value that cuts to the root of the thing valued, will provide a better path forward.¹¹⁷

Thingness is a social construction, of which boundaries and features are determined by a social context, community, and task for which the thing is used.¹¹⁸ The value of the thing is supported by

114. *Id.*

115. See Amanda Marcotte, *NFTs Aren't Art—They're Just the Cult of Crypto's Latest Scam*, SALON (Feb. 16, 2022, 7:00 PM), <https://www.salon.com/2022/02/16/nfts-arent-art--theyre-just-the-of-cryptos-latest-scam/> [<https://perma.cc/LVC9-5NRY>].

116. Billy Bambrough, *Crypto 'The Biggest Ponzi Scheme in Human History'—China Blockchain Execs Back Bill Gates and Warren Buffett After Huge Bitcoin Price Crash*, FORBES (July 4, 2022, 9:15 AM), <https://www.forbes.com/sites/billybambrough/2022/07/04/crypto-the-biggest-ponzi-scheme-in-human-history-china-blockchain-execs-back-bill-gates-and-warren-buffett-after-huge-bitcoin-price-crash/> [<https://perma.cc/6ZCN-Z9S5>] (“[Gates and Buffett] have both been vocal in their opposition to cryptocurrencies ... [Shan Zhiguang and He Yifan] claim that 90 of the world's 100 richest people have come out against [B]itcoin and crypto.”).

117. See Saul Levmore, *Property's Uneasy Path and Expanding Future*, 70 U. CHI. L. REV. 181, 186 (2003) (discussing the “link between interest groups and the apparent expansion of intellectual property rights”).

118. See generally Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691 (2012).

secondary features, including the social use of the thing or its assets of persistence and transferability that can support buying, selling, investment, and the like.

The way to reduce volatility in value, to break the boom-and-bust cycle for NFTs or whatever the next generation of digital deeds and virtual currencies turns out to be, is to expressly turn attention away from the technology and turn towards the ways and reasons that specific communities construct value.¹¹⁹ The key move is to ask how the community values the asset and then validate the structural basis (property rules for property, voting rules for votes, securities rules for securities) that give life to the expectations of the community.¹²⁰ This is the right path. Some misadventures down common problematic paths to the legal governance of virtual things follow.

C. Essentialism, Circularity, and Hypocrisy

This Section picks up some themes with how law has failed to adequately support the community narratives that define, create, and give value to virtual things.

1. Essentialism

The above discussion has surfaced three problems that emerge when policymakers attempt to engage with the process of making virtual things. First, policymakers may be tempted to regulate in terms of what a cryptographic token is in the technological sense—that is, guide regulation by the fact that the physical reality of an NFT is an entry in a distributed database loosely tied to a piece of intellectual property, for example.¹²¹ This I will deem

119. See generally Fairfield, *supra* note 3.

120. See FAIRFIELD, *supra* note 14, at 17 (“It should be no surprise that I think the rules for ordinary property ownership should apply to digital and smart property.”).

121. Moringiello, *supra* note 4, at 132 (“[Grant Gilmore] recognized that perhaps the question ‘what is property?’ was the wrong question and wondered whether we should instead ask ‘what types of claims or choses in action ... can be presently transferred ... with the result that today’s assignee will have priority over interests that attach to the fund after it has indisputably come into existence?’” (quoting Grant Gilmore, *Article 9: What It Does Not Do for the Future*, 26 LA. L. REV. 300, 301 (1966))).

“essentialism”: the mistaken attempt to regulate technology according to some abstract technological essence, rather than the practical path of regulating a virtual thing by looking at the social function it plays within a given community, context, and task.

There are two main difficulties with essentialism. The first is that the desire to drill down to some technological essence deconstructs the virtual thing. Of course, if one looks under the hood for any length of time, any interest in property can be deconstructed. If an NFT is just a cryptographic token loosely associated with a piece of intellectual property, a copy associated with a copyright, then so is a book. If an interest in land is a notation in a database that loosely pertains to land, then a cryptographic token has the same relationship with some other asset.¹²² Drilling down to a technological essence that does not exist (a lower level down is always available—do we go down to individual bits and bytes? Atoms? Electrons?) causes the subtle knot of social expectation and technological features, the narrative of thingness that encapsulates property of any kind, to dissipate.¹²³

The second problem with essentialism is that essentialism about legal categories exacerbates a particular problem with intellectual property.¹²⁴ Offline, the copy-copyright distinction remains robust.¹²⁵ One can buy, own, sell, and even invest and collect copies of rare books despite the fact that an intellectual property interest—the “copyright”—is contained within the physical object—the “copy.”¹²⁶ The interest in the copy, which is, of course, itself an amalgam of social expectation and narrative (what exactly is a “book?”), acts as a vehicle for validating intuitions about everyday personal property

122. See Fairfield, *supra* note 52, at 825-27.

123. See Fairfield, *supra* note 3, at 1310 (“The creator of the system has significant control over the [NFT] because they are able to ban or control access to the service or site in which the asset is used.”).

124. See *id.* at 1287-90.

125. FAIRFIELD, *supra* note 14, at 24 (“A traditional distinction between the thing and the intellectual property rights that attach to it makes a lot of sense. Consider this book: you have the right to read it, take it with you, sell it to someone else, but not the right to make as many copies of it as you want and distribute it to anyone you wish. Ownership of a copy is separate from ownership of the copyright.”).

126. See Fairfield, *supra* note 3, at 1298.

ownership, the ability to own, buy, sell, and trade, to collect, exclude, destroy, or the like.¹²⁷

2. *Circularity*

The second error commonly found in legal attempts to engage with distributed ledger technology is a kind of tautology. Consider the widely cited and influential *Kremen v. Cohen* standard for determining whether a virtual or intangible asset is subject to personal property protection.¹²⁸ The test has three parts: whether an asset is capable of precise definition, whether it is susceptible to exclusive possession, and whether the ostensible owner has a legitimate claim to exclusivity.¹²⁹

The test is by and large useless, although it shares that feature with the large bulk of property tests that rely on legal standards such as exclusion. The problem is that each part of the test is only true if the court says it is. Each is a posthoc feature of the asset once the court has deemed it a property interest. To see the problem in property law at large, let us apply it to the legal interest in real estate: there can be no more archetypal property interest. Is the interest in land capable of precise definition? Of course not, if one is looking for essential features of the land. How high above the land does the interest extend? How far below? What happens when metes and bounds of the land move? When there is an error in geographical definition?

The question of exclusive possession is worse. Land is subject to exclusive possession only if a court says that land is capable of exclusive possession. Land is no more naturally susceptible to exclusive possession than is air or water. Fences, walls, and locks are mere imperfect stopgaps; they suggest a desire to exclude, but

127. Fairfield, *supra* note 11, at 11-12.

128. 337 F.3d 1024, 1030 (9th Cir. 2003) (“Property is a broad concept that includes ‘every intangible benefit and prerogative susceptible of possession or disposition.’” (quoting *Downing v. Mun. Ct.*, 198 P.2d 923, 926 (Cal. Dist. Ct. App. 1948))).

129. *Id.* (“We apply a three-part test to determine whether a property right exists: ‘First, there must be an interest capable of precise definition; second, it must be capable of exclusive possession or control; and third, the putative owner must have established a legitimate claim to exclusivity.’” (quoting *G.S. Rasmussen & Assocs., Inc. v. Kalitta Flying Serv., Inc.*, 958 F.2d 896, 903 (9th Cir. 1992))).

by no means make it a reality. And, of course, the question of a “legitimate claim to exclusivity”¹³⁰ compounds the problem of exclusivity (it is when a court says it is) with legitimacy (again, who legitimates property interests if not courts?).

Tests such as *Kremen* do serve a valuable function of permitting courts to enable treatment of virtual things as things, fully recognized by the law of personal property, when the court’s intuition points in that direction. But these tests do so precisely because they are entirely circular. The court grants its imprimatur not based on the listed criteria but on other features that cause the court to intuit that property treatment is appropriate. This court imprimatur creates the very definition, exclusivity, and legitimacy that are supposed to be the inputs to the system.

So: do NFTs, other artifacts of distributed ledger technology, virtual items in video games, or so on merit treatment as personal property?¹³¹ As the law currently stands, the answer is circular: if the court chooses to grant such status, it can, but there is little enough in the way of a test that responds to predictions.¹³²

In keeping with the rest of the analysis of this Article, a better approach would be to attend in some detail to the social features of the virtual item, to validate its thingness by supporting and focusing on the ways in which the thing is intended to be used and function within a community of value.

3. Hypocrisy

The final wrong turn in the legal regulation of virtual things is the tendency to require elements or attributes of virtual items that one does not require for so-called tangible items.¹³³ An easy example is land. A property interest in land is not marked by characteristics

130. *Id.*

131. Fairfield, *supra* note 3, at 1311 (“The NFT is sold with precisely the rights of ownership—to use, exclude others from using, profit from resale, or even destroy—that come attached to real-world ownership. Those representations to buyers, along with the form of the transaction, the prices paid which reflect an ownership premium, and the behavior of buyers and sellers after the NFT is sold, all point toward personal property as the best legal characterization of NFTs.”).

132. See Moringiello, *supra* note 4, at 151-54.

133. *Id.*

different from a property interest in a virtual item, game economy item, or NFT.¹³⁴ A book and a computer both contain intellectual property interests that have complex relationships with the actual copy.¹³⁵ Our conceptualization of these things, of a plot of land as a thing subject to separate and exclusive ownership, or of a book as an object that can carry and ground a personal property interest that limits and constrains intellectual property interests (through the exhaustion component of the distribution right, for example) is the important part. Conceiving of land as a plot, as a homestead, as a bounded geographical section, or as a lot of space with legal rights attached helps us create a hybrid physical-social-legal thing that can pass freely in the stream of commerce.

Virtual items are not so different as to merit separate legal treatment, and certainly not so different as to merit a complete dearth of legal protection. The current hypocritical state of play requiring virtual property to have certain features strongly set out in order to receive the protection of law and stable markets means that markets in virtual things tend to remain gray, quasi-legal, and tainted with questions of what investors and collectors really own, when those concerns and hesitations are largely unnecessary.¹³⁶ Consider the state of play of legal rights of replevin and conversion in the United States. In many states, digital conversion is not available because the assets are intangible.¹³⁷ The intangibility of the items is utterly irrelevant to any of the players in a conversion scenario. Take the example of a routine theft of a customer list. In many states, that action sounds in conversion if the customer list is physical, but no recovery is available if the same document is in digital format when taken.¹³⁸ This is nonsense, as the Court of Appeals of New York eloquently noted when it remarked that to permit this discrepancy would mean burning down a plaintiff's physical filing system would result in actionable claims of conversion whereas destroying the same plaintiff's digital filing system would not.¹³⁹

134. See generally FAIRFIELD, *supra* note 14.

135. *Id.*

136. See Moringiello, *supra* note 4, at 163.

137. See, e.g., Thyroff v. Nationwide Mut. Ins. Co., 864 N.E.2d 1272, 1276-78 (N.Y. 2007).

138. See, e.g., *id.* at 1276.

139. *Id.* at 1278. Following *Kremen*, the court held that electronic business records could

This discrepancy is doubly problematic for questions of digital replevin. Consider the theft of an NFT. This is a daily occurrence, because NFT collectors use so-called “hot wallets,” in which the cryptographic keys are stored with the platform provider, rather than offline.¹⁴⁰ This means that compromising the platform’s security enables theft of the NFTs.¹⁴¹ The security problem lies in the platform, not the blockchain itself.¹⁴² When an NFT is stolen, the blockchain records the transfer of the NFT from the platform’s wallet (supposedly authorized from the owner’s account) to a blockchain address owned by the thief.¹⁴³

Such thefts are not merely technologically possible, they are common.¹⁴⁴ The surprise comes when plaintiffs seek recovery of the stolen asset.¹⁴⁵ Criminal charges are perhaps a more robust route because the analogy to regular theft is sufficiently strong to encourage prosecutors to bring charges.¹⁴⁶ But for plaintiffs seeking civil replevin, the outlook is grim.¹⁴⁷ Very few states permit digital replevin.¹⁴⁸ Even California, whose *Kremen* standard seems to

be converted: the court recognized that a person can exercise dominion over such a record by pressing the “delete button” but ultimately based its conclusion on the fact that there is no difference between the monetary value of paper records and the monetary value of electronic records. *Id.*

140. Jake Frankenfield, *Hot Wallet: Definition, Types, Examples, and Safety Tips*, INVESTOPEDIA (Jan. 8, 2022), <https://www.investopedia.com/terms/h/hot-wallet.asp> [<https://perma.cc/A3ND-QNS3>] (“A hot wallet is a cryptocurrency wallet that is always connected to the internet and cryptocurrency network. Hot wallets are used to send and receive cryptocurrency, and they allow you to view how many tokens you have available to use.”).

141. Russell Brandom, *\$1.7 Million in NFTs Stolen in Apparent Phishing Attack on OpenSea Users*, THE VERGE (Feb. 20, 2022, 9:37 AM), <https://www.theverge.com/2022/2/20/22943228/opensea-phishing-hack-smart-contract-bug-stolen-nft> [<https://perma.cc/4LGZ-PLYV>] (“Two hundred and fifty-four tokens were stolen over roughly three hours.”).

142. *See id.*

143. *See id.*

144. David Yaffe-Bellany, *Thefts, Fraud and Lawsuits at the World’s Biggest NFT Marketplace*, N.Y. TIMES (June 6, 2022), <https://www.nytimes.com/2022/06/06/technology/nft-open-sea-theft-fraud.html> [<https://perma.cc/VN6U-3T25>].

145. *See id.* (noting that OpenSea only offered an NFT holder roughly \$30,000 as compensation after his NFT, worth at least \$300,000, had been stolen).

146. Fairfield, *supra* note 3, at 1292.

147. *See id.* at 1311 (“[P]ersonal property interests in digital assets remain a theoretical possibility, but never a legally embraced practical reality.”).

148. WILLIAM HOUSTON BROWN & LAWRENCE R. AHERN, III, 1 THE LAW OF DEBTORS AND CREDITORS § 6:32, Westlaw (database updated Sept. 2020); *see also* Moringiello, *supra* note 4, at 128 (“These judicial procedures also developed along lines based on the tangibility or intangibility of the assets involved Replevin, as noted above, allows a secured creditor to

enable recovery (after all, the thief in that case was required to return the stolen domain name) has significant case law stating that replevin of intangible assets is not permitted.¹⁴⁹ Shockingly few states have a clear path.¹⁵⁰

The difficulties in bringing actions for digital conversion or replevin highlight the point about hypocrisy as a destabilizing element for markets and investment in robust virtual things. Theft of NFTs is entirely predictable, explainable, and indeed common.¹⁵¹ The idea that legal rights to recover for the value of the asset (conversion) or indeed to recover the asset (replevin) ought to not be available because of an irrelevant feature (intangibility) demonstrates one of the driving challenges for creating virtual things and, indeed, trustworthy markets in virtual things.

The same goes for questions of intellectual property, particularly doctrines of first sale and exhaustion.¹⁵² Again, there is a premium for the irrelevant characteristic of tangibility. Sale of a tangible book or CD or movie exhausts the seller's distribution right.¹⁵³ Because the distribution right is exhausted and resale of the asset does not make a further copy (that is, the right to make copies is not implicated) it does not matter what license conditions the seller attempts to impose on resale.¹⁵⁴

This stands in marked contrast to the situation with the sale of NFTs or other virtual items.¹⁵⁵ It is not merely the fact that the

gain possession only of tangible personal property.”).

149. See *Kremen v. Cohen*, 337 F.3d 1024, 1030 (9th Cir. 2003); *BROWN & AHERN*, *supra* note 148, § 6:32, n.11.

150. See *BROWN & AHERN*, *supra* note 148, § 6:32; Moringiello, *supra* note 4, at 128.

151. See Yaffe-Bellany, *supra* note 144.

152. U.S. Dep't of Just., Crim. Res. Manual § 1854 (2020) (“The first sale doctrine [also called the “exhaustion doctrine”], codified at 17 U.S.C. § 109, provides that an individual who knowingly purchases a copy of a copyrighted work from the copyright holder receives the right to sell, display or otherwise dispose of *that particular copy*, notwithstanding the interests of the copyright owner.”).

153. See *FAIRFIELD*, *supra* note 14, at 168-71; see also 17 U.S.C. § 109(a) (providing “the owner of a particular copy” of a copyrighted work the right “to sell or otherwise dispose of the possession of that copy”); *Capitol Recs., LLC v. ReDigi Inc.*, 934 F. Supp. 2d 640, 656 (S.D.N.Y. 2013) (noting that the Copyright Act permits “the resale of CDs and cassettes”), *aff'd*, 910 F.3d 649 (2d Cir. 2018).

154. See *Capitol Recs.*, 934 F. Supp. 2d at 656.

155. See, e.g., Michael S. Richardson, Comment, *The Monopoly on Digital Distribution*, 27 PAC. MCGEORGE GLOB. BUS. & DEV. L.J. 153, 167 (2014) (“[T]angible personal property receives first sale protection, whereas intangible digital property receives no protection under

intellectual property interest tends to overshadow the personal property interest in these assets. Rather, the fact that each sale of an NFT involves computers making copies of the intellectual property (even displaying the NFT on one's own computer involves copying the image from a web server or hard drive and replicating in active memory) means that a seller can impose license conditions that follows the item sale after sale and imposes conditions on the subsequent sale.¹⁵⁶ For example, a seller of an NFT might limit the upside gain that an investor might gain from the market rise in value of the virtual item, extracting a cut of the profit on each onward resale.¹⁵⁷

These examples have been discussed in academic literature elsewhere. The point I make here is that, similar to *Thyroff*, the use of irrelevant differentiators, such as tangibility, creates no defensible difference in regulatory climate.¹⁵⁸ As discussed below, when the technological features of a virtual thing feed into social value by way of a community that is eager to create, buy, sell, or trade the asset, the hypocrisy of treating intangible assets as worthy of only second-class legal protection does nothing but contribute to the volatility of the market. Blaming markets and communities that trade in virtual items for the failure to protect the interests that community members value and are eager to engage in is in large part blaming the victim for mistakes in the legal discourse.

II. THE STATE OF THE (VIRTUAL) ART OF MAKING VIRTUAL THINGS

The prior Part defined the problem, some paths not taken, and some paths that should not have been taken. The focus throughout has been on examining the social construction of virtual things and giving that social construction equal billing with the examination of novel technological features. This Part will examine how to emphasize technological and legal features that support the social

the federal court system.”).

156. See FAIRFIELD, *supra* note 14, at 28-30; *Capitol Recs.*, 934 F. Supp. 2d at 660-61 (granting the copyright holder's motion for summary judgment against ReDigi on “direct, contributory, and vicarious infringement of its distribution and reproduction rights”).

157. See Yaffe-Bellany, *supra* note 144 (“OpenSea takes a 2.5 percent cut each time an NFT is sold on its platform.”).

158. See *Thyroff v. Nationwide Mut. Ins. Co.*, 864 N.E.2d 1272, 1278 (N.Y. 2007).

construction of virtual objects in communities. The point is that people value intangible assets all the time and desire to buy, sell, and trade them for sound economic reasons.¹⁵⁹ By focusing on the technological features that support community formation of markets and robust protection of human expectations for the assets, regulators, lawyers, and technologists can create stable and valuable virtual things.

A. Information Theory and Transaction Costs

The first point in finding a good mesh of technological feature, social value, and responsible regulatory framework is to reduce uncertainty by increasing information. I use information here in the social sense, not in the information technology sense. Buyers must know what they are buying and what they can do with it. Sellers must be assured of getting paid and, in many cases, must be constrained from attaching trailing rights that complicate the use of the asset further down the stream of commerce.

Markets in virtual items become volatile as a function of lack of information.¹⁶⁰ Buyers do not know what they are buying. Regulators do not know what parts of the bundle of technological features and social expectations are the center of the communities' valuation of assets. Onlookers simply see much ado about nothing and deem the entire project part of the hype cycle.

The trick is in how to manage the kind of information communities need in order to build robust markets and socially construct stable values of virtual things. Education is a common trap: it is intuitive (but ultimately wrong) to think that what is needed for buyers and sellers of NFTs and cryptocurrency is a thoroughgoing education into the risks, as well as education about the potential for surprising code or intellectual property license provisions. The problem is that such educational impulses are usually designed to

159. Fairfield, *supra* note 3, at 1309-10 (“For many NFTs, the aftermarket is the entire point. A buyer of a piece of art, trading card, or unique digital pet expects to be able to profit from its rise in value.”).

160. See Alexis Rhiannon, *Volatility Measures How Dramatically Stock Prices Change, and It Can Influence When, Where, and How You Invest*, BUS. INSIDER (July 25, 2022, 3:10 PM), <https://www.businessinsider.com/personal-finance/what-is-volatility> [<https://perma.cc/PC5B-8A5V>].

fail and to transfer the burden of information asymmetry onto the party least well suited to bear the risk.¹⁶¹ No one has read an end user license agreement and then made an informed decision based on its contents.¹⁶² Hundreds of millions of citizens have lost their right to go to court, or lost their right at a recovery, because of terms hidden deep in the contract.¹⁶³

The question, then, is how to provide the driving need for buyers to know what they are buying, if education through long license agreements and dense code is not the answer. The answer lies in virtual items themselves. When a community has standardized its expectations, that is, what it means to own a Top Shot or a Bitcoin or an NFT of an artwork, the law surrounding that transaction can become standardized to meet expectations. Buyers can trust that they can buy, use, resell, and exclude others from using assets that they have purchased, not because they have read a paragraph buried deep in a license agreement, read an initial coin offering prospectus, or parsed through lines of smart contract code but because the sale of an item carries a broad set of social expectations as to what it means to own something. Meeting expectations is an act of profound informational significance.

This does not mean there is no flexibility in transactional arrangements in virtual items. Standardization can foster flexibility because once parties know there is a standard deal, they can easily identify when they are entering into a true bespoke arrangement. Consider an analogy to real estate law: the existence of the fee simple absolute, the state of affairs in which a buyer is receiving an unencumbered clear right to the property,¹⁶⁴ helps to center information flows. Telling someone anything other than that they are receiving fee simple absolute raises the need for further investigation and, because investigation is expensive, heavily

161. See generally Comment from Dan Amiram, Balazs Cserna, Alon Kalay & Ariel Levy to the SEC, *The Information Environment, Volatility Structure, and Liquidity* 25-26 (Mar. 2019), <https://www.sec.gov/comments/s7-26-18/s72618-5144730-183368.pdf> [<https://perma.cc/B75N-CKXQ>].

162. See Jamie J. Kayser, *The New New-World: Virtual Property and the End User License Agreement*, 27 LOY. L.A. ENT. L. REV. 59, 63 (2006).

163. See *id.*

164. *Fee Simple Absolute*, BLACK'S LAW DICTIONARY (11th ed. 2019).

advantages sellers who offer fee simple absolute in the market.¹⁶⁵ The same is true of virtual objects. If the background, default rule is that buyers own NFTs free and clear, that they are able to use, exploit, invest in, sell, and exercise the other traditional rights of property ownership, deviations from that standard will be possible but disadvantaged.

Fostering standardized forms of virtual item transactions that map established intuitions around the context for which a virtual item was made helps enshrine low-cost, high-value information transfer. The informational signal that one is receiving the same set of rights with which one has already had life experience is the most powerful, least expensive signal that can undergird the market. Once that signal is in place, other forms can arise. A practical example: once it is established that anyone who is using the term “buy” or “sell” in the context of virtual things in fact is engaged in a transaction that transfers the property interest traditionally associated with that language in common usage, then perhaps it is possible to establish other kinds of transactions. NFT minters who want to retain an interest in property but transfer possession to another might use language such as “rent” to capture the difference. They will be paid lower prices, but that is the point: now the limitation on the recipient’s rights in the assets will result in lower payments, the sign of a functioning market.¹⁶⁶

B. A Social Approach to Virtual Things

The strongest move toward establishing robust markets and stable value for markets in virtual things—aside from supporting the technological features of assets that indeed support the creation of social value rather than undermine it—will be the creation of strong narratives of stability.¹⁶⁷

165. See Gareth R. Jones, *Transaction Costs, Property Rights, and Organizational Culture: An Exchange Perspective*, 28 ADMIN. SCI. Q. 454, 456-57 (1983).

166. See generally FAIRFIELD, *supra* note 14.

167. See Robert M. Cover, *The Supreme Court, 1982 Term—Foreword: Nomos and Narrative*, 97 HARV. L. REV. 4, 11 (1983) (“[T]he creation of legal meaning ... takes place always through an essentially cultural medium.”).

As with all assets, narratives drive value.¹⁶⁸ Even value investors are following a narrative of the conditions under which a stock has value.¹⁶⁹ Assets such as stocks go up and down as news stories and speeches affect investor confidence.¹⁷⁰ Values in every asset from gold to cars to bonds to fishing rights go up and down as a function of the narrative around them.¹⁷¹

Here we must be careful. I do not mean to say that policymakers, journalists, lawyers, entrepreneurs, and so on must blindly parrot the narratives of communities that value virtual assets merely because to do so will keep the asset prices stable. Rather, those constituencies should focus on supporting and validating the structure of narratives of social value, rather than their content. This is the difference between saying “this NFT has value” or “NFTs do not have value because they do not have any substance” and emphasizing that any given asset may or may not have value but that people may engage in transactions in such assets in a way that their expectations of ownership are met.

I have focused largely on narratives of property and ownership because the art NFT market is such a clean example of the oddness that has infected the virtual item space, in which people pay expecting to own and to capture the rise in value of an asset in ways related to the context and narrative of buying, selling, and investment.¹⁷² Technological or legal features that undercut those expectations, of course, introduce volatility and uncertainty in the market, as the high social value that communities place on assets evaporates because it is not supported by law.¹⁷³

But other narratives reflect other social contexts, other ways virtual items are used. Consider a cryptographic token reflecting a vote, either in a corporate governance sense or a local election. The context of the asset determines its value in the political economy just as it does the value of an asset in the financial economy. Values

168. Shiller, *supra* note 26, at 967.

169. *Id.* at 983.

170. *Id.*

171. *See id.*

172. *See* Daniel Kuhn, Opinion, *What You Own When You Own an NFT*, COINDESK (Jan. 18, 2022, 12:04 PM), <https://www.coindesk.com/layer2/2022/01/17/what-you-own-when-you-own-an-nft/> [<https://perma.cc/V4E5-WZ6Z>].

173. *See id.*

such as privacy, recoverability, and verifiability might replace the values of transferability and transactional simplicity. The technological features that matter to the social construction of value (what makes a trustworthy vote or a valuable piece of currency rather than what makes a good *objet d'art*) will best be viewed in light of supporting the narrative that gives the item value. Verification speed matters for currency intended for transactions; it does not for an art NFT, and so on.¹⁷⁴

Beyond addressing the narratives used to create value in virtual items and emphasizing the technological features that support each context and narrative, there is significant value in attending to the health of the communities that generate such values. Here, some of the criticism of virtual items as pure creations of hype is warranted. It is not that all NFTs are garbage, for example, or that stablecoins are a scam, but rather that certain communities (Terra/Luna springs to mind) are grounded on an ethic of unbridled hype, rather than community creation of value.¹⁷⁵ The difference can be hard to detect, but some characteristics come to mind.

Attention to community matters because the community is the entity that will have to course correct or rescue the value of the asset or currency when the unexpected inevitably occurs.¹⁷⁶ I offer two examples here. First, consider The DAO (distinct from its successor entities, called DAOs), a distributed autonomous organization on the Ethereum blockchain.¹⁷⁷ The DAO was intended to

174. See Jaspreet Singh & Prashant Singh, *Distributed Ownership Model for Non-Fungible Tokens*, in SMART AND SUSTAINABLE INTELLIGENT SYSTEMS 309, 317 (Namita Gupta et al. eds., 2021).

175. For examples of the risks of trading NFTs, see Eric Ravenscraft, *NFTs Don't Work the Way You Might Think They Do*, WIRED (Mar. 12, 2022, 8:00 AM), <https://www.wired.com/story/nfts-dont-work-the-way-you-think-they-do/> [<https://perma.cc/H9SC-XZ39>] (reporting on issues such as wash trading in NFT marketplaces); Sam Reynolds, *South Korean Prosecutors Raid Terra Co-Founder Daniel Shin's Home*, COINDESK (July 22, 2022, 2:18 PM), <https://www.coindesk.com/business/2022/07/22/south-korean-prosecutors-raid-terra-co-founder-daniel-shins-home-report/> [<https://perma.cc/6N3R-DZEG>] (reporting on fraud allegations against Terra cofounder).

176. See, e.g., *Hackers Steal \$600m in Major Cryptocurrency Heist*, BBC (Aug. 11, 2021), <https://www.bbc.com/news/business-58163917> [<https://perma.cc/3VBQ-TM4Z>] (stating that the blockchain site, Poly Network, posted a letter on Twitter urging the hackers to return the stolen assets; a couple hours later, the hacker began returning funds "first in small amounts and then in millions").

177. Nathaniel Popper, *A Hacking of More than \$50 Million Dashes Hopes in the World of Virtual Currency*, N.Y. TIMES (June 17, 2016), <https://www.nytimes.com/2016/06/18/busi>

accept investor contributions, invest those funds in blockchain-based projects, and send profits back to the investors.¹⁷⁸ Instead, the funds of The DAO were drawn off through bugs in the Ethereum protocol by a hacker who had figured out how to exploit them.¹⁷⁹ Despite the supposed unhackability of the Ethereum blockchain, the solution to the DAO hack was not technological but social.¹⁸⁰ The community decided to fork the blockchain, creating an alternative record of events in which the transfers made by the hacker had not happened.¹⁸¹

Similarly, the cryptocurrency ICX was targeted by an exploiter who found that a bug in the software in effect permitted him to cause the ICX blockchain to issue him unearned and undeserved currency.¹⁸² The resulting counterfeited currency devalued the holdings of every legitimate holder of ICX.¹⁸³ In response, again, the community acted.¹⁸⁴ Although the counterfeited ICX were indelibly recorded on the ICON blockchain, the community organized a freeze of the exploiter's accounts, functionally burning the currency out of the system by immobilizing it.¹⁸⁵

These examples share a surprising commonality. First, for all of the pontification about the supposed unhackability of blockchain technologies, each problem was caused by a technological hack or exploit. The blockchain or its smart contract functionality or the surrounding apparatus of accounts and platforms certainly was

ness/dealbook/hacker-may-have-removed-more-than-50-million-from-experimental-cybercurrency-project.html [https://perma.cc/6FZU-EZPT] (describing the DAO smart contract hack of June 17, 2016, which siphoned off 3.6 million ether).

178. *Id.*

179. *Id.*

180. *Id.*

181. Shaurya Malwa, *Ethereum Classic's Hashrate, Prices Surge as Miners Prepare for Post-Merge Reality*, COINDESK (Sept. 6, 2022, 2:50 PM), <https://www.coindesk.com/markets/2022/09/06/ethereum-classic-hashrate-prices-surge-as-miners-prepare-for-post-merge-reality/> [https://perma.cc/U6ZR-X57N].

182. David G.W. Birch, *They're Not Smart and They're Not Contracts*, FORBES (Sept. 4, 2021, 6:02 AM), <https://www.forbes.com/sites/davidbirch/2021/09/04/theyre-not-smart-and-theyre-not-contacts/> [https://perma.cc/ZY3N-HABT].

183. See FINTECHNEWS SING., *supra* note 67 (noting that “[b]ased on the basic principles of supply and demand” if the supply of cryptocurrency goes up, the price is driven down).

184. See Birch, *supra* note 182.

185. *Id.* (noting that a California federal judge later determined that ICX “may have acted improperly when it instructed Kraken and Binance to freeze 14 million tokens minted by a crypto ‘hacker’”).

vulnerable to hacks. And in each case the hack, if permitted, would have fundamentally undermined the value of the asset in the community. Consider the ICX exploit: if users were permitted to exploit the blockchain software and functionally counterfeit currency, the value of legitimate tokens would be diluted, in the extreme case to near zero.¹⁸⁶ Similarly, if the theft of NFTs was to go unsanctioned by a court or community, thieves would be able to declare open season on NFTs, again profoundly undermining the stability and value of the asset.¹⁸⁷

To solve these technological failings of virtual items, communities turned to precisely the sort of social technology, trust, and consensus building that blockchain technology was supposed to obviate.¹⁸⁸ When they did so, they shored up and protected the value of the virtual things that the community valued.¹⁸⁹ By sanctioning exploiters, communities protect the value of members' tokens, shoring up the value of the tokens against dilution.¹⁹⁰

The key feature for protecting the integrity and value of the system is the ability of the community to generate key social norms of cooperation and consensus in the face of exploit or attack. This is in fact the defining feature for making virtual items: not the technological or the intellectual property characteristics of the asset but the power of the narrative surrounding the item that makes a community willing to organize and cooperate to defend it. Social agreement and community narrative create virtual items more than technology does. The generative context of virtual items is the community that values them, not the database that such a community uses.

186. See Ryan Haar, *Why Do Bitcoins Have Value?*, TIME (Apr. 19, 2022), <https://time.com/nextadvisor/investing/cryptocurrency/why-do-bitcoins-have-value/> [<https://perma.cc/C7M3-ZURJ>] (explaining that the value of Bitcoin is related to scarcity within a maximum supply of 21 million Bitcoins).

187. See Yaffe-Bellany, *supra* note 144.

188. See *supra* notes 175-84 and accompanying text.

189. See *supra* notes 175-84 and accompanying text.

190. See Birch, *supra* note 182.

CONCLUSION

The process of creating virtual things is as much a social-legal one as a technological one. Virtual things are the core quasi-object, the result of social norms and expectations, combined with technological features that support the social construction of the object. Much of the problem in the legal regulation of virtual things, which indeed has contributed to the present collapse in NFT and cryptocurrency markets, has resulted more from the failure of legal frameworks to offer clear support to buyers' and users' expectations than it has from some fundamental problem with the act of placing value in a virtual thing. This failure has resulted from attending to irrelevant features, such as intangibility, instead of paying attention to the health of the community narrative of value, the use and context for which the digital asset was intended to be used. The result has been a law of making virtual things that is either circular (a right in a virtual thing is exclusive if a court says it is) or off target.

Attention to use, not the search for some technological essence, is the key to making virtual things. The best approach is to track the context and use to which communities put cryptographic tokens and pay attention to the technological features (excludability, rivalrousness, persistence, decentralization) to the extent that these features support the construction of value by the community.

The process of making virtual things is one of social construction, not necessarily technological innovation. This does not make virtual things less real or worthy of legal protection. To the contrary, communities construct value in virtual items the same way that we construct value in land. The clearest way forward from the present cycle of boom and bust in virtual items is to provide legal means of protection for the interests created by these communities.