

The Overlooked French Influence on the Intellectual Property Clause

Sean M. O'Connor[†]

The Intellectual Property Clause (“IP Clause”) of the US Constitution has long been a puzzle for courts and commentators. It authorizes Congress to secure exclusive property rights for authors and inventors, but it does not use the terms “patent” or “copyright,” and its objects of “Science” and “useful Arts” do not cleanly map onto the subject matter of current patent and copyright systems. As the Supreme Court has noted, under popular usage of the terms “arts” and “science,” one would expect patents to promote science and copyrights to promote arts, yet we know from the historical record that exactly the opposite is the case. Other terms, such as “progress” and “discoveries,” remain contested. IP Clause interpretations to date rely exclusively on British legal and intellectual antecedents. I argue that the great French Encyclopédie project—a landmark of the mid-eighteenth-century Enlightenment—provides crucial context to the IP Clause. James Madison, a drafter of the IP Clause, owned and approvingly cited the work. Founding Fathers Thomas Jefferson and Benjamin Franklin were enthusiastic advocates of the Encyclopédie. The Encyclopédie has as its twin goals the promotion of progress in science and in mechanical (useful) arts. I argue that the reliance of early courts and commentators on British antecedents to interpret the federal patent and copyright statutes led to an improperly narrow sense of the context of the IP Clause. Using entries from the Encyclopédie on “art,” “science,” “discoveries,” “inventions,” “writers/authors,” and other relevant topics, I propose a new interpretation of the IP Clause that is more coherent and compelling than existing accounts.

[†] Boeing International Professor of Law and Assistant Dean for Law, Business & Technology Initiatives, University of Washington School of Law. I thank Jane Ginsburg, Daniel Gervais, Barton Beebe, Geoff Turnovsky, Greg Hicks, Hugh Spitzer, Helen Anderson, Theo Myrhe, Zahr Said, Adam Mossoff, participants at faculty colloquiums at Boston College School of Law, Temple University School of Law, and University of Washington School of Law, and H. Tomás Gómez-Arostegui for very helpful eighteenth-century sources on “useful arts.” I especially thank the incredible research librarians at the Gallagher Law Library: Cheryl Nyberg, Mary Whisner, Anna Endter, and Grace Feldman. I am particularly indebted to Professor Dena Goodman, a director of the Encyclopédie of Diderot & d’Alembert Collaborative Translation Project at the University of Michigan, for providing an advance translation of the entry on “Discover, Find” that was not yet available to the public. For comments and assistance, I thank Benjamin Heller, Peter Menell, Rob Merges, and Michael Risch. I would also like to thank Brennen Johnson for excellent research assistance. Generous research funding for this Article was provided by the University of Washington School of Law and a Leonardo da Vinci Fellowship from the Center for Protection of Intellectual Property at George Mason University School of Law. All errors are my own. Comments are welcome at soconnor@uw.edu.

INTRODUCTION	734
I. THE CONVENTIONAL ANGLOCENTRIC ACCOUNT OF THE IP CLAUSE AND INTERPRETATIONS OF ITS KEY TERMS AND STRUCTURE.....	743
A. Nineteenth-Century Antecedents	749
B. The First Wave: Patent-Practitioner IP Histories and the “Standard of Invention”	753
C. The Second Wave: Responses to Legislative Process and Cases Leading to the Copyright Act of 1976	760
D. The Third Wave: Responses to Business-Method Patents, the Copyright Term Extension Act, and Beyond	762
II. THE FRENCH ENLIGHTENMENT AND <i>ENCYCLOPÉDIE</i> AS THE LEADING INTELLECTUAL FRAMEWORK OF THE LATE EIGHTEENTH-CENTURY WEST	773
A. Historical Development of “Science” and “Arts”	773
B. Origins and Scope of the Enlightenment “Progress Project”	785
C. The <i>Encyclopédie</i> as a “Reasoned Dictionary of the Sciences, Arts, and Trades”	787
III. THE FRENCH <i>ENCYCLOPÉDISTES</i> ’ INFLUENCE ON MADISON, JEFFERSON, AND FRANKLIN	803
IV. VIEWING THE IP CLAUSE THROUGH THE LENS OF THE <i>ENCYCLOPÉDIE</i> SOLVES NUMEROUS INTERPRETIVE PUZZLES	809
CONCLUSION	826

INTRODUCTION

Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

US Const Art I, § 8, cl 8

The IP Clause¹ remains a puzzle for courts and commentators.² It authorizes Congress to enact legislation securing exclusive rights for authors and inventors to “promote the Progress of Science and useful Arts” and is invoked to justify passage of

¹ US Const Art I, § 8, cl 8.

² See, for example, Edward C. Walterscheid, *The Nature of the Intellectual Property Clause: A Study in Historical Perspective* 212 (Hein 2002) (“It may well be that [the Framers] perceived no comment to be necessary in that the [IP Clause] was considered on its face to be self-explanatory. If so, this was most unfortunate because of the ambiguity inherent in several of its key terms.”); Edward C. Walterscheid, *Authors and Their Writings*, 48 J Copyright Society USA 729, 773 (2001) (criticizing the Framers for creating “significant interpretational problems” by choosing terms such as “discoveries” and “writings”).

copyright and patent laws.³ But the IP Clause does not specifically refer to copyrights or patents, even though the Framers were well aware of these systems.⁴ Further, terms such as “useful Arts” seem obscure, while others, such as “Science,” appear to have very different meanings from our modern usage, as the Supreme Court recently noted.⁵ Other key terms such as “Progress” remain hotly contested. A troublesome term under all accounts is “Discoveries.”⁶ While generally held by courts to be what inventors produce—because authors must be producing the “writings” named in the Clause⁷—most people tend to think of discoveries as something made by scientists or explorers. But those discoveries—in the form of laws of nature, abstract ideas, naturally occurring phenomena, or other facts about the world—are exactly the sorts of things that have always been *excluded* from patent protection in the United States.⁸ Accordingly, no existing interpretation of the IP Clause is satisfactory.

The problem may be that these interpretations rely exclusively on British legal and intellectual precedents, with some references to contemporaneous American dictionaries. This seems intuitively correct insofar as the new United States was comprised of former British colonies. But after the Revolution, significant parts of British law were rejected by both the federal government and the states. The Constitution was drafted to create

³ US Const Art I, § 8, cl 8.

⁴ See Walterscheid, *The Nature of the Intellectual Property Clause* at 13 (cited in note 2) (“There is little question that the Framers were cognizant of the extant English patent custom and copyright practice.”).

⁵ See *Golan v Holder*, 132 S Ct 873, 888 (2012). The casual modern observer might assume that the objects of copyright protection would be the “useful Arts”—even though objects with practical functions are not copyrightable. See 17 USC § 102 (“In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery.”). One might also assume that “Science” is the object of patent protection—even though laws of nature and naturally occurring phenomena are not patentable. See *Diamond v Diehr*, 450 US 175, 185 (1981). Many legal historians instead correctly hold that “useful Arts” covers inventions (as a variant on the old “mechanical arts”), but these scholars are less persuasive when forced to interpret “Science” as all modern copyrightable content (that is, as an incoherently broad sense of “knowledge”). See Part II.

⁶ See, for example, Walterscheid, 48 J Copyright Society USA at 773 (cited in note 2).

⁷ See, for example, *Bilski v Kappos*, 561 US 593, 621 (2010) (assuming that the IP Clause places the term “inventors” in apposition to the term “discoveries”); *United States v Dubilier Condenser Corp*, 289 US 178, 186 (1933) (same). See also *Feist Publications, Inc v Rural Telephone Service Co*, 499 US 340, 346 (1991) (citing Supreme Court precedent holding that the IP Clause places the term “authors” in apposition to the term “writings”).

⁸ See *Diamond*, 450 US at 185.

a new form of government, not to replicate the British system.

Thus, there is no reason to assume that the IP Clause authorizes Congress to pass laws modeled solely on British antecedents. Nor is there anything in the text of the IP Clause (or the Constitution generally) leading to this Anglocentric approach. Rather, Congress could pass any number of statutes, including British-influenced ones, as well as simply issue direct grants of exclusive rights under private laws to individual authors or inventors.⁹ Further, contrary to what some may believe, Congress is not *required* to grant any exclusive rights: it may refrain from exercising its power under the IP Clause altogether.¹⁰ Accordingly, the IP Clause is a more interesting grant of power than is normally perceived.

So where did the Anglocentric interpretations come from? First, early courts cited British patent and copyright law.¹¹ But they did so only when they were interpreting American patent and copyright *statutes*, which courts understandably believed were modeled after the British patent and copyright laws.¹² When courts discussed the IP Clause, on the other hand, they made no definitive connections to British antecedents. Second, nineteenth-century patent and copyright treatises also cited British cases to illuminate the new US patent and copyright statutes, according to the same logic used by judges.¹³ These texts rarely interpreted the IP Clause directly. Finally, later commentators seemed to assume that references to British law

⁹ See *Eldred v Ashcroft*, 537 US 186, 222 (2003) (“As we read the Framers’ instruction, the Copyright Clause empowers Congress to determine the intellectual property regimes that, overall, in that body’s judgment, will serve the ends of the Clause.”).

¹⁰ See *Goldstein v California*, 412 US 546, 562 (1973) (“While the area in which Congress may act is broad, the enabling provision of Clause 8 does not require that Congress act in regard to all categories of materials which meet the constitutional definitions.”).

¹¹ See, for example, *Clayton v Stone*, 5 F Cases 999, 1001–02 (CC SDNY 1829) (citing British copyright cases); *Ewer v Coxe*, 8 F Cases 917, 919 (CC ED Pa 1824) (same); *Whittemore v Cutter*, 29 F Cases 1120, 1121 (CCD Mass 1813) (citing a British patent case).

¹² See Malla Pollack, *What Is Congress Supposed to Promote? Defining “Progress” in Article I, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause*, 80 Neb L Rev 754, 782–83 (2001) (referring to the English 1624 Statute of Monopolies as the “recognized ancestor” of American utility patents and to the English Statute of Anne as the “acknowledged ancestor” of American copyright statutes).

¹³ See, for example, Thomas G. Fessenden, *An Essay on the Law of Patents for New Inventions* 59 (D Mallory 1810), citing *Boulton and Watt v Bull*, 2 H Bl 463 (1795), and *Hornblower and Maberly v Boulton and Watt*, 8 Term Rep 95 (KB 1799). See also George Ticknor Curtis, *A Treatise on the Law of Copyright* 26, 29 (Little, Brown 1847).

in early American cases and treatises must mean that these sources expressed the view that the IP Clause itself should be interpreted only in light of British antecedents. Thus, as the IP Clause literature developed, it assumed and then entrenched a dogma of exclusively British legal and intellectual antecedents. In the later twentieth century, this dogma blended seamlessly with the emerging orthodoxy of Lockean labor theory as a major justification for property rights, including IP rights.¹⁴ While other justifications for IP rights—such as Hegelian personhood theory¹⁵—should point to Continental influences as well, there has been surprisingly little interest among American IP Clause historians in looking beyond British influences.

Once we remove this artificial impediment of Anglocentric thinking, any number of possible alternative influences can be considered. I do not argue that the French *Encyclopédie* influence is the *sole* influence, nor that this view should completely displace ideas about British influence. But one should not ignore the work that “became almost synonymous with Enlightenment”¹⁶ and “is generally agreed [to be] the most influential work published in the eighteenth century”¹⁷ and described as “the epitome of the [French Enlightenment] *philosophes*’ achievement.”¹⁸ The great French *Encyclopédie* project was a

¹⁴ See Karen I. Vaughn, *John Locke and the Labor Theory of Value*, 2 J Libertarian Stud 311, 312 (1978) (describing Lockean labor theory as a “justification for private ownership of goods and land on the basis of the effort or labor which individuals expend to produce goods or to cause the land to produce goods of value to human beings”).

¹⁵ See Abraham Bell and Gideon Parchomovsky, *A Theory of Property*, 90 Cornell L Rev 531, 542 (2005) (describing Hegelian personhood theory as a justification for property ownership because it “provides the mechanism by which humans achieve self-actualization”); Justin Hughes, *The Philosophy of Intellectual Property*, 77 Georgetown L J 287, 330–65 (1988) (arguing for a Hegelian justification of IP as a powerful alternative to the Lockean justification, given the complexities of modern life).

¹⁶ Richard Yeo, *Encyclopaedic Visions: Scientific Dictionaries and Enlightenment Culture* xii (Cambridge 2001).

¹⁷ Abraham Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* 38–39 (MacMillan 1939). Another commentator states:

The *Encyclopédie* was also an arsenal of philosophic thought in the Age of Reason. This great work, wrote Ira Wade, “organized definitely the knowledge of the eighteenth century; it created a close organization of the more liberal thinkers of the century; and lastly, it welded the political, social and religious doctrines and theories into a compact whole.”

Paul Merrill Spurlin, *The French Enlightenment in America: Essays on the Times of the Founding Fathers* 108 (Georgia 1984), quoting Ira Wade, *Introduction*, in P.A. Chapman, et al, eds, *An Anthology of Eighteenth Century French Literature* i, xlv (Princeton 1930).

¹⁸ James Hannam, *God’s Philosophers: How the Medieval World Laid the Foundations of Modern Science* 3 (Icon 2009).

“Reasoned Dictionary of the Sciences, Arts, and Trades” intended as a comprehensive system to “set forth . . . the order *and connection* of the parts of human knowledge.”¹⁹ As an Enlightenment project, the *Encyclopédie* had a major focus on the sort of codifiable factual knowledge that we think of today as science. But it was equally important to its editors, Jean d’Alembert and Denis Diderot, to follow Francis Bacon’s call for an investigation of the (practical) “arts”—by which they meant the ancient category of mechanical or manual arts (and *not* the fine arts).²⁰ They understood that much of the arts consist of noncodifiable methods²¹ (the kind of trained muscle memory that today we call “procedural knowledge”)²² and called for a new “grammar of the arts” that could provide a system of proxy symbols for these techniques.²³

Thus, the *Encyclopédie* was not what we think of as an encyclopedia today, which focuses on only codifiable knowledge and includes biographical and historical entries.²⁴ While the *Encyclopédie* shares with later encyclopedias an alphabetized organization, it fits each entry into a comprehensive Baconian “system” of human knowledge with complex, cross-referenced interconnections.²⁵

Later encyclopedias generally dropped any similar ambitions.²⁶ Further, d’Alembert and Diderot were quite intent on developing a holistic vision of the phrase “Progress of Science and useful Arts.” Following one of the core insights of the earlier *Querelle des Anciens et Modernes* (Quarrel of the Ancients and Moderns), they considered “progress” to be achievable only in fields whose outputs could be quantitatively measured.²⁷ These included science and practical (or “useful”) arts, such as metalworking, but

¹⁹ Jean Le Rond d’Alembert, *Preliminary Discourse to the Encyclopedia of Diderot* 4 (Chicago 1995) (Richard N. Schwab, trans). See also Jean Le Rond d’Alembert, *Preliminary Discourse (Discourse Préliminaire)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2009) (Richard N. Schwab, trans), archived at <http://perma.cc/948L-FKGL>.

²⁰ See d’Alembert, *Preliminary Discourse* at 24–25 (cited in note 19).

²¹ See id (recognizing the difficulty of “reduc[ing] each particular science or art to a small number of rules or general notions”).

²² Sean M. O’Connor, *The Lost “Art” of the Patent System*, 2015 U Ill L Rev *29 (forthcoming) (on file with author).

²³ Denis Diderot, *Art (Art)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2003) (Nelly S. Hoyt and Thomas Cassirer, trans), archived at <http://perma.cc/W4Q9-WQ7Q>.

²⁴ See Yeo, *Encyclopaedic Visions* at xii–xvi (cited in note 16).

²⁵ See id at 27–29.

²⁶ See id at 191–92.

²⁷ See notes 322–32 and accompanying text.

excluded the fine arts and other fields primarily assessed by qualitative senses of “taste” or “sentiment.” The authors of the *Encyclopédie* ascribed a special and unusual meaning to “discoveries” as the most important inventions, rather than the uncovering of existing facts such as laws of nature²⁸—which I argue explains the vexing use of this term in the IP Clause. They also distinguished between “authors” and “writers.” The former focus on conveying substantive content in their writings, without particular regard for style. The latter focus almost exclusively on style and were also known as belletrists.²⁹ Equally important was the publication of such a work itself, as publication would follow Bacon’s admonition that the sciences and practical arts could not truly advance unless their truths and methods could be subjected to adequate public criticism and confirmation.³⁰

Together with other perspectives from the *Encyclopédie*, the foregoing gives a sense of how my argument will proceed. In the remainder of this Article, I argue for a new interpretation of the IP Clause, especially for the most troubling terms: “useful Arts” and “Discoveries.” In part, the troubling interpretations of these terms are due to the significant changes in key terms such as “science,” “(useful) arts,” and “discoveries” since the constitutional convention. Beginning especially in the late nineteenth century, courts and commentators have at times flipped their interpretations of “Science” and “useful Arts” in the IP Clause, connecting one or the other to “Writings” or “Discoveries.”³¹ A problem with those interpretations is that they still do not cover the fine arts (unless one improperly reads out the word “useful”). Perhaps most importantly, presentist accounts of the IP Clause lead to the most confusion, as neither modern basic science research results nor discoveries (contemporarily thought of as

²⁸ See Jean Le Rond d’Alembert, *Discovery (Découverte)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2012) (Dena Goodman, trans), archived at <http://perma.cc/G4LZ-TY9X> (emphasis added):

In general this name [discovery] can be given to everything that is newly found in the Arts and the Sciences; however, it is scarcely applied, *and ought not to be applied, except to that which is not only new, but also curious, useful, and difficult to find, and which, consequently has a certain degree of importance.* The less important *discoveries* are simply called *inventions*.

²⁹ See Jean Le Rond d’Alembert, *Writer, Author (Ecrivain, Auteur)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2011) (Erik Anspach, trans), archived at <http://perma.cc/T78S-N8C8>.

³⁰ See Yeo, *Encyclopaedic Visions* at xvi (cited in note 16).

³¹ See, for example, *Mazer v Stein*, 347 US 201, 207–09 (1954).

scientific or geographic) are covered by either patents or copyrights.³² Write-ups of results or discoveries can be protected under copyright, of course, which should hint at the connection between the terms “Science,” “Authors,” and “Writings” under the widespread “balanced sentence” interpretation of the IP Clause.³³

James Madison and other Founding Fathers owned and approvingly cited the *Encyclopédie*.³⁴ Madison, in particular, cited the work in an article that he produced in 1787, the year of the convention.³⁵ While some religious men denounced the apparently atheistic and antiestablishment tenor of many *Encyclopédie* entries, they had a grudging respect for the information about arts and sciences contained in others.³⁶ Further, Diderot’s and other *philosophes*’ positions on literary property seemed to be echoed in American state copyright statutes and constitutions adopted before the convention. These scholars’ views on useful arts also matched the emerging focus on useful arts in the states.

The coherent and compelling interpretation that results from using the *Encyclopédie*’s versions of key terms seems to confirm or corroborate that it is, at the very least, a useful addition to the IP Clause literature. I do not claim that the *Encyclopédie* should be seen as the *sole* influence on the Framers—this would make no more sense than an exclusively Anglocentric account. Indeed, the interpretation that I develop can be consistent with different strains of Anglocentric accounts.

My interpretation retains the twin threads of the balanced-sentence (really the parallel-construction) account because of the important distinction between “science” and “(useful) arts” in the *Encyclopédie*. At the same time, my interpretation is consistent with a unitary preamble, as both writings and discoveries can advance both science and useful arts. My interpretation also incorporates the important division between “progress” fields (based on quantifiable advancement) and “nonprogress” fields (based on nonquantifiable taste or sentiment), which originated in the *Querelle*.³⁷ Thus, the scope of Congress’s authority

³² See text accompanying notes 346–48, 471–81.

³³ See Karl B. Lutz, *Patents and Science: A Clarification of the Patent Clause of the US Constitution*, 18 Geo Wash L Rev 50, 51 (1949).

³⁴ See Spurlin, *The French Enlightenment in America* at 45–48, 117 (cited in note 17).

³⁵ See *id.* at 117.

³⁶ See *id.*, citing John Adams, 2 *The Diary and Autobiography of John Adams* 437 (Harvard 1961) (L.H. Butterfield, ed).

³⁷ See notes 322–32 and accompanying text.

under the IP Clause is bounded mainly by fields in which demonstrable progress can be shown. This does not include the fine arts and therefore presents a challenge to modern copyright that seems to cover *primarily* works of subjective, creative expression. At the same time, the *Encyclopédie* definition of “discoveries” as the most important inventions (those that are “curious, useful, and difficult to find”) supports those who have argued for a standard of “invention” higher than mere novelty in the IP Clause. This all indicates a coherent federal “Progress project”³⁸—*if* Congress chooses to exercise its power—that secures existing or newly created rights through federal statutory grants only for demonstrable advances in declarative or procedural knowledge. Because of concern over the reach of this power, especially within the then-untested federal system of government, the Framers restricted such federal grants to limited time periods.³⁹

This coherent-yet-restrictive power under the IP Clause should not be seen as a prohibition on, or an argument against, IP rights for other sorts of things or for longer periods of time. The point at the Framing was simply that the new *federal* government’s powers should be limited, with powers beyond this left to the states. Indeed, the IP Clause has long been interpreted to allow concurrent federal and state patent and copyright systems (provided, of course, that the state systems do not restrict other important federal powers, such as the power to regulate interstate commerce).⁴⁰ While Congress expressly preempted the field for copyright under the Copyright Act of 1976,⁴¹ it could amend the statute to allow concurrent copyrights with the states again. Thus, creative expressive works, which appear to sit outside the “Progress project” and congressional authority, could be protected under state common or positive law. This would match well with the sense of literary property as a common-law right at the time of the Framing (although the actual

³⁸ See Margaret Chon, *Postmodern “Progress”: Reconsidering the Copyright and Patent Power*, 43 DePaul L Rev 97, 102 (1993) (characterizing a “Progress project” as “shorthand [for the] concept of a public trust over a commons of information resources”).

³⁹ See US Const Art I, § 8, cl 8.

⁴⁰ In the early 1970s, a divided Court in *Goldstein* ruled that the states had not relinquished all power to grant exclusive rights to authors under the US Constitution and found no impediment to concurrent state and federal copyrights. *Goldstein*, 412 US at 556–67.

⁴¹ Pub L No 94-553, 90 Stat 2541, codified as amended at 17 USC § 101 et seq.

history of such common-law rights is contested).⁴² It would also match well with an implicit theme that there are common-law privacy, equity, and tort rights that provide remedies if unpublished works or undisclosed inventions are appropriated and used or distributed without permission.⁴³

This is an academic project in the best sense of that term. I do not expect Congress or the courts to dramatically change the scope of copyright or patents on the basis of my progress-project account of the IP Clause. The world has changed much since the convention, and it may not make sense to limit our modern IP systems according to the Framers' vision. If we were to restrict federal copyright and patents to the contours of the IP Clause authority that I argue for here, I would also hope that the states would immediately fill in some of the ceded subject matter, especially for the creative arts. Thus, I am hardly "anti-IP." In fact, I intend in future works to explore the argument—only hinted at here—that robust IP rights can be based on common-law privacy, equity, tort, and property principles. Thus, a roll-back of positive law IP rights should not remove their common-law roots.

This being an academic project, I do expect it to illuminate current practical debates over IP law and the IP Clause. Knowing what congressional power the IP Clause sets out—no matter how antiquated or politically impractical it may be today—allows one to move forward with discussions about what to do with our IP laws. It could be that we actually should amend them to fit within the apparent scope of authority provided by the IP Clause under my interpretation. Or it may be that the IP Clause merits amendment. Again, I do not realistically expect either of these things to happen. But one can craft a coherent and compelling account of the IP Clause so that this important part of the Constitution does not continue to be an enigmatic cipher that can be twisted to fit any pro- or anti-IP argument.

This Article does not seek to be the last word on the matter, but rather the first. If my argument is correct, then the consequences could be far-reaching. For example, we might consider whether our federal copyright system's coverage of "creative

⁴² See H. Tomás Gómez-Arostegui, *Copyright at Common Law in 1774*, 47 Conn L Rev 1, 3–4 (2014).

⁴³ See, for example, *Prince Albert v Strange*, 47 Eng Rep 1302, 1310, 1312 (Ch 1849) (upholding an injunction on the ground that an unauthorized publication and sale of drawings and etchings is an invasion of an author's right to privacy).

expression” (measurable only by qualitative taste or sentiment) is actually constitutional.⁴⁴ The early copyright acts hewed more closely to the “science” sense of the *Encyclopédie* than to either the modern sense of “science” or the sense of “learning in general” that courts, Congress, and commentators have favored. The fact that our current copyrightable subject matter is broader than the *Encyclopédie* sense of “science” does not undercut my argument that the *Encyclopédie* helps contextualize the IP Clause. It instead raises the questions of how and why the copyright system expanded away from its scientific orientation from the mid-nineteenth through the twentieth centuries. I provide some account of this, in line with the scholarship of others, below. Additionally, the *Encyclopédie* sense of “useful arts” can frame debates over the scope of patentable subject matter, especially as a way out of the dead end of “technological arts” tests.

This Article proceeds by laying out the conventional Anglo-centric account of the IP Clause in Part I, and then by showing the development of different interpretations of the terms and structures of the IP Clause. This development is divided into three different historical waves of commentary. Part II details the nature and impact of the *Encyclopédie* generally, as well as background on the historical development of key terms and concepts such as “science” and “(useful) arts.” Part III documents the influence of the *Encyclopédie*, as well as the historical senses of “science” and “(useful) arts,” on Madison and other Founding Fathers. Finally, Part IV shows how the use of *Encyclopédie* definitions of key terms in the IP Clause leads to a much more coherent and compelling understanding of the structures that the Clause empowers Congress to create.

I. THE CONVENTIONAL ANGLOCENTRIC ACCOUNT OF THE IP CLAUSE AND INTERPRETATIONS OF ITS KEY TERMS AND STRUCTURE

The Anglo-centric account of the IP Clause has failed to generate a compelling interpretation. Key terms are still disputed, and there is no consensus on whether the Clause’s structure is unitary or distributive.⁴⁵ Courts and commentators have substituted

⁴⁴ But all is not lost for creative artists. As I argue below, states could protect works of creative expression in a concurrent federal-state regulatory system.

⁴⁵ See notes 103–07 and accompanying text. This Part is summarized from my more detailed intellectual history of the IP Clause literature elsewhere. See generally

alternate terms to make sense of the Clause, on the basis that “what the Framers really meant was *x*.” But many of these alternate terms were well-known to the Framers, so it violates canons of construction to substitute these terms for what the Framers actually wrote.⁴⁶

A major problem is that courts and commentators to date have relied on one kind of dictionary: the ordinary-language dictionary, which was of mixed reputation in the eighteenth century.⁴⁷ Ordinary-language variants had arisen from “hard-word” dictionaries, which sought to define only difficult words, often of Hebrew, Greek, Latin, or French origin.⁴⁸ Professor Richard Yeo presents a critique of these dictionaries in his excellent book on encyclopedias from the Enlightenment.⁴⁹ He quotes Gottfried Leibniz’s observation that “one cannot explain words without making incursions into the sciences themselves, as is evident from dictionaries; and, conversely, one cannot present a science without at the same time defining its terms.”⁵⁰ The Reverend John Harris, author of an early encyclopedia published in 1704,

Sean M. O’Connor, *An Intellectual History of IP Clause Interpretation* (working paper, Sept 2014) (on file with author).

⁴⁶ For example, the claim that “science” really meant “knowledge” is problematic because individuals during the convention period used the term “scientific knowledge.” Similarly, “learning in general” cannot substitute for “science” because the former is undefined and goes beyond any conventional, broad sense of science as “systematic study” at that time. And, again, “learning” was in the Statute of Anne and some state constitutions and copyright statutes. For example, when Parliament enacted the Statute of Anne, “[i]t bore [in part] the title: ‘*An Act for the Encouragement of Learning.*’” *Golan v Holder*, 132 S Ct 873, 901 (2012) (Breyer dissenting). Defining “useful arts” as simply “technology” seems better justified at first blush because the latter term was just coming into use at the time of the convention. See John R. Thomas, *The Patenting of the Liberal Professions*, 40 BC L Rev 1139, 1166–67 (1999). But it is too restrictive to limit “useful arts” to science-based practical applications, which were demonstrably not the sole content of either contemporary patent systems or usages of the term “useful arts.” “Discoveries” seems most challenging for commentators, who at best try to substitute “inventions” for it. See, for example, Dotan Oliar, *The (Constitutional) Convention on IP: A New Reading*, 57 UCLA L Rev 421, 457 & n 139, 458 (2009). But if this was all that the Framers meant, why did they not use this term, with which they were familiar?

⁴⁷ See Yeo, *Encyclopaedic Visions* at 20–21 (cited in note 16) (discussing the reception of general-language dictionaries as they began adopting some characteristics of scientific dictionaries). For a critical guide to Founding-era dictionaries, see generally Gregory E. Maggs, *A Concise Guide to Using Dictionaries from the Founding Era to Determine the Original Meaning of the Constitution*, 82 Geo Wash L Rev 358 (2014).

⁴⁸ See Yeo, *Encyclopaedic Visions* at 18–21 (cited in note 16). Hard-word dictionaries followed from simple bilingual translation guides published in the sixteenth century. See *id.*

⁴⁹ See *id.* at 20–21.

⁵⁰ *Id.* at 20, quoting Gottfried Wilhelm Leibniz, *New Essays on Human Understanding* 522 (Cambridge 1982) (Peter Remnant and Jonathan Bennett, eds and trans).

expressly criticized hard-word dictionaries on two grounds: (1) they were not expansive enough in each entry to give the full sense of the defined term (following Leibniz), and (2) they contained too many common words.⁵¹ But the issue goes even further, because terms are embedded in systems and intellectual frameworks. So even if a short language-dictionary definition offers a reasonable technical definition of a term, the role that the term plays in knowledge systems may be inadequately conveyed. Samuel Johnson's *Dictionary of the English Language*,⁵² cited by courts and commentators interpreting the IP Clause, was a language dictionary and thus was not necessarily seen as authoritative in its time.⁵³

Yeo contrasts language dictionaries with the “historical dictionaries” and “dictionaries of arts and sciences” that arose from a much older “encyclopaedia” tradition dating back to Greco-Roman times.⁵⁴ Originally, this was the “round of learning” or “circle of sciences.”⁵⁵ Marcus Terentius Varro set out an early version of what would become the seven liberal arts in the first century BCE.⁵⁶ In the early fifth century CE, Martianus Capella wrote what became the standard handbook for teaching the liberal arts throughout the Middle Ages.⁵⁷ Up through the early modern period, it was expected that an individual could master not only these liberal arts but also all the important learning of his or her era. From the *Etymologiae*, completed around 636 AD, to the *Speculum maius*, completed around 1250, all worthwhile knowledge could be fit into a few volumes.⁵⁸ This was based on the technical sense of “knowledge” as only that which is divine and unchanging.⁵⁹ Accordingly, these encyclopedias looked

⁵¹ See Yeo, *Encyclopaedic Visions* at 20 (cited in note 16).

⁵² See generally Samuel Johnson, *A Dictionary of the English Language* (Strahan 1755) (2 vols).

⁵³ See Pollack, 80 Neb L Rev at 794–95 (cited in note 12).

⁵⁴ See Yeo, *Encyclopaedic Visions* at xi–xiii, 16 (cited in note 16).

⁵⁵ Id at xi.

⁵⁶ See id at 6 & n 19 (referencing Varro's *Disciplinarum libri novem*).

⁵⁷ See generally Martianus Capella, *The Marriage of Philology and Mercury* (*De nuptiis Philologiae et Mercurii*). See also Henry Osborn Taylor, *The Classical Heritage of the Middle Ages* 49 (Columbia 1901) (describing Capella's text as “[p]erhaps the most widely used school book of the Middle Ages”). Capella's book may have been influenced by Varro's *Disciplinarum libri novem*, which discussed the seven liberal arts—the trivium (grammar, logic, and rhetoric) and the quadrivium (geometry, arithmetic, astronomy, and music). See Yeo, *Encyclopaedic Visions* at 42–43 (cited in note 16).

⁵⁸ See Yeo, *Encyclopaedic Visions* at 5 (cited in note 16).

⁵⁹ See id. See also Sean M. O'Connor, *Method+ology: Art, Science, Technology, Law, and the Means of Innovation* *5, 7–10 (forthcoming Oxford 2015) (on file with author).

backward more than forward, collecting timeless knowledge of the ancients.⁶⁰

Using the term “encyclopaedia” to denote such compendiums of knowledge began only in the sixteenth century.⁶¹ It matched the term “encyclopedia,” which signified the range of subjects that an educated person should know.⁶² The Reverend Johann Heinrich Alsted’s 1620 *Cursus Philosophici Encyclopaedia* may have been the last work purporting to present the “methodological understanding of everything than [sic] man must learn in this life.”⁶³ The flood of new knowledge emerging from the scientific revolution, as well as Bacon’s critiques of scholastic philosophy, challenged the very premise of a stable encyclopedia.⁶⁴

Notwithstanding the challenges to the traditional encyclopedia, the eighteenth-century Enlightenment became the “age of encyclopaedias.”⁶⁵ But now encyclopedias looked forward and represented an effort to record new knowledge.⁶⁶ They also moved from Latin to the vernacular, furthering the Enlightenment efforts to make knowledge accessible to the general public and facilitate dialogue.⁶⁷ New “dictionaries of arts and sciences,” or, as they were sometimes referred to, “scientific dictionaries,” followed.⁶⁸ Distinguishing themselves from hard-word or language dictionaries, these dictionaries of arts and sciences sought to both define terms and explain the arts and sciences.⁶⁹ In particular, dictionaries of arts and sciences aspired to cover not only facts and theories of the physical and natural sciences but also

⁶⁰ See Yeo, *Encyclopaedic Visions* at 6 (cited in note 16) (noting that these encyclopedias were “not intended to report new findings but rather to collect, arrange and transmit old knowledge”).

⁶¹ See *id.*

⁶² See *id.* at 7–9 (noting that, beyond the trivium and quadrivium of the liberal arts, natural and moral philosophy, mechanics and the mechanical arts, theology, law, and medicine were sometimes added). Gregor Reisch’s *Margarita Philosophica* in 1496 was published in twelve books. A course of lectures given at Cambridge in 1707 was published as *Encyclopaedia; Or a Method of Instructing Pupils*. *Id.* at 7.

⁶³ *Id.* at 9 & n 27, quoting Neil Kenny, *The Palace of Secrets: Béroalde de Verville and Renaissance Conceptions of Knowledge* 15 (Clarendon 1991) (quoting from Alsted’s *Encyclopaedia*). Alsted’s work was comprised of seven books.

⁶⁴ See Yeo, *Encyclopaedic Visions* at 9–10 (cited in note 16).

⁶⁵ *Id.* at 11.

⁶⁶ See *id.* at 12.

⁶⁷ See *id.*

⁶⁸ Yeo, *Encyclopaedic Visions* at 12–13 (cited in note 16).

⁶⁹ See *id.* at 15–16. For example, an early leading work by Harris noted on its title page that it was engaged in “[e]xplaining not only the Terms of ART, but the ARTS Themselves.” *Id.* at 14.

explanations of crafts and trades (the “manual” or “mechanical” arts).⁷⁰ Dictionaries of arts and sciences excluded historical and biographical entries. Those subjects were left to another offshoot of the earlier encyclopedia tradition, the historical dictionary.⁷¹ Later, the content of scientific and historical dictionaries would be combined into the modern encyclopedias of the nineteenth and twentieth centuries.⁷²

Thus, the dictionaries of arts and sciences were the locus of credible knowledge about important terms and concepts.⁷³ In fact, they were recommended by early US Patent Office officials for inventors to “ascertain if the invention is new” before applying for a patent.⁷⁴ These dictionaries were to be comprehensive, even if that required going beyond what any one person could ever hope to internalize.⁷⁵ By contrast, language dictionaries were simply used to look up hard or unusual words that one did not know in order to obtain a rough-and-ready understanding of them.⁷⁶ Of the dictionaries of arts and sciences, the French *Encyclopédie* was the most ambitious and well-known. It has been described as “almost synonymous with Enlightenment,”⁷⁷ while another commentator has said that “[i]t is generally agreed that the most influential work published in the eighteenth century was the French *Encyclopédie*.”⁷⁸

Notwithstanding this currently well-documented development and the role of encyclopedias—or dictionaries of arts and sciences—the IP Clause literature has seemed to largely ignore these sources. This is especially odd with regard to the

⁷⁰ Id at 15.

⁷¹ See id at 17 (noting that the first such work was arguably Louis Moreri’s *Grand dictionnaire historique*, published in 1674).

⁷² See Yeo, *Encyclopaedic Visions* at 282 (cited in note 16) (noting that, by the early nineteenth century, encyclopedias no longer classified knowledge and instead attempted to provide total, exhaustive coverage).

⁷³ See id at 280 (noting that dictionaries of arts and sciences were promoted as “reliable summar[ies] of a wider body of knowledge”).

⁷⁴ William Thornton, head of the US Patent Office in the early nineteenth century, admonished applicants to consult “the dictionaries of Arts and Sciences, the Repertory of the Arts, and other publications that treat of the mechanic[al] arts, to endeavor to ascertain if the invention [is] new.” William Thornton, *Patents*, 6 J Patent Office Society 98, 98 (1923).

⁷⁵ But see Yeo, *Encyclopaedic Visions* at 281 (cited in note 16) (noting that earlier dictionaries of arts and sciences “did not seek exhaustive and comprehensive coverage, but rather sought to reduce knowledge to manageable essentials”).

⁷⁶ See id at 18–19.

⁷⁷ Id at xii.

⁷⁸ Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* at 38 (cited in note 17).

Encyclopédie, which looms so large in any intellectual history of the eighteenth century that one may be aware of it without knowing of the relatively obscure current research on dictionaries of arts and science by Yeo and others. I argue that it is a deep-seated Anglocentrism in the IP Clause literature that has caused this glaring oversight of the *Encyclopédie* as an influence on the Framers.

I further contend that this narrow focus stems from two factors. First, the courts interpreting the new federal patent and copyright systems of the early Republic used British cases and principles to illuminate the new American *statutes* because they believed that Congress largely copied American IP statutes from existing British laws.⁷⁹ While this may be true, the courts did *not* claim that these British laws were the primary influence for the IP Clause itself. But the Anglocentric approach of the courts seems to have led commentators and later courts to conflate British influence on the IP statutes with influence on the IP Clause itself. Once the Anglocentric narrative was established early on, no scholar seemed to seriously question it. Second, some commentators—especially in later waves of the IP Clause literature—seriously underestimated the linguistic abilities of the Founders, namely by believing that those educated gentlemen could not read French.⁸⁰ Not only could key Framers such as Madison read French, but other Founding Fathers were fluent enough that they could both converse in it and translate French works into English.⁸¹

This Part summarizes my work elsewhere on the IP Clause literature to show both how the Anglocentric focus developed and how interpretations of key terms changed over time.⁸² This Part separates the literature into three distinct waves. Preceding these were cases and commentary that discussed the IP Clause but did not constitute an organized scholarly dialogue. The First Wave occurred in the early to mid-twentieth century.⁸³ It established the balanced-sentence interpretation, which found two similar but separate powers in the Clause—one for patents and one

⁷⁹ See note 11.

⁸⁰ See, for example, Pollack, 80 Neb L Rev at 790–803 (cited in note 12).

⁸¹ See Spurlin, *The French Enlightenment in America* at 45–48 (cited in note 17).

⁸² See generally O'Connor, *An Intellectual History of IP Clause Interpretation* (cited in note 45).

⁸³ See, for example, Lutz, 18 Geo Wash L Rev at 51 (cited in note 33); Richard C. De Wolf, *An Outline of Copyright Law* 15 (Luce 1925).

for copyright.⁸⁴ The Second Wave began in the mid-twentieth century, largely with copyright scholars engaging the protracted legislative process culminating in the Copyright Act of 1976.⁸⁵ The Third Wave emerged at the end of the twentieth century, as IP became a mainstream policy issue, and technology-driven issues such as IP protection for software, databases, and business methods, as well as concerns over copyright-term extension, made scholars look back to how these subject matters might fit, if at all, under the powers granted to Congress under the IP Clause.⁸⁶

A. Nineteenth-Century Antecedents

Madison's discussion of the IP Clause in *Federalist 43* as part of the effort to secure ratification of the Constitution was the first major interpretation of the IP Clause. Madison provided that:

The utility of this power will scarcely be questioned. The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals. The States cannot separately make effectual provision for either of the cases, and most of them have anticipated the decision of this point, by laws passed at the instance of Congress.⁸⁷

⁸⁴ Invoking the standard eighteenth-century linguistic device of the "balanced sentence," this interpretation sets forth two powers granted to Congress. Congress shall have, first, the "power . . . to promote the Progress of Science . . . by securing . . . to Authors . . . the exclusive Right to their [] Writings;" and second, the "power . . . to promote the Progress of . . . useful Arts, . . . by securing [to] Inventors . . . the exclusive Right to their . . . Discoveries." US Const Art I, § 8, cl 8. Thus, copyright-type systems are authorized to promote the progress of science, while patent-type systems are authorized to promote the progress of the useful arts.

⁸⁵ See, for example, Lyman Ray Patterson, *Copyright in Historical Perspective* 200–01 (Vanderbilt 1968) (detailing the evolution of the copyright statute).

⁸⁶ See, for example, Malla Pollack, *The Multiple Unconstitutionality of Business Method Patents: Common Sense, Congressional Consideration, and Constitutional History*, 28 Rutgers Computer & Tech L J 61, 62 (2002) (arguing that business-method patents do not promote progress, which is a limit on Congress's patent power under the IP Clause).

⁸⁷ *Federalist 43* (Madison), in *The Federalist* 288, 288 (Wesleyan 1961) (Jacob E. Cooke, ed). Madison was a member of the Confederation Congress committee that had recommended that states pass IP laws. See Karl Fenning, *The Origin of the Patent and Copyright Clause of the Constitution*, 17 Georgetown L J 109, 114–15 (1929).

Madison had in fact submitted the proposed powers that formed the basis of the final IP Clause, ultimately considered by the drafting committee along with both of Charles Pinckney's proposals.⁸⁸ Thus, Madison's views have significant weight. But in the passage above, he seems to simply use copyright law in Great Britain as an example of *why* the IP Clause is justified. He is not suggesting that the IP Clause is derived from, or limited by, British law.

Early American patent law treatises did not directly address the IP Clause.⁸⁹ Rather, they used British cases solely to illuminate American *statutory* patent law. But these secondary sources also discuss the French patent system.⁹⁰ Justice Joseph Story discussed the IP Clause in his *Commentaries on the Constitution*, but he largely tracked *Federalist 43* and made no claim that the IP Clause was derived from British law.⁹¹

Early US patent cases cited British cases for common-law patent principles,⁹² even while evincing conflict over the preamble of the IP Clause. Thus, *Pennock v Dialogue*⁹³ referenced the IP Clause to imply that "science and useful arts" acted as a unitary object that Congress was to promote.⁹⁴ But *McClurg v*

⁸⁸ See Fenning, 17 Georgetown L J at 112 (cited in note 87).

⁸⁹ Thomas Fessenden published the first such treatise in 1810. See Fessenden, *An Essay on the Law of Patents for New Inventions* at 59 (cited in note 13). Fessenden's use of relevant terms illustrates their contemporaneous meaning. He referred to "authors" of discoveries, inventions, and improvements in the arts in the older sense of the authority under which a project is undertaken. See, for example, *id* at ix-x. "Reflection" and "philosophical study" meant scientific inquiry. See *id* at xxix. "Useful arts," "arts," and "mechanical arts" were used interchangeably but excluded the fine arts. See generally *id*. He may have set the roots of the technological-arts test when he suggested that patent-eligible inventions be restricted to practical application of scientific principles. Willard Phillips published the second treatise in 1837. See generally Willard Phillips, *The Law of Patents for Inventions* (American Stationers' 1837).

⁹⁰ See Fessenden, *An Essay on the Law of Patents for New Inventions* at 207-13 (cited in note 13). Fessenden mentioned the French Patent Act of 1791. See *id* at 214. Phillips cited a French treatise for the principle that inventors have a *right* to the property in their invention even if it is not an inherent, natural, and exclusive right. See Phillips, *The Laws of Patents for Invention* at 4 (cited in note 89), citing Augustin-Charles Renouard, *Traité des Brevets d'Invention, de Perfectionnement et d'Importation* (A.A. Renouard 1825).

⁹¹ See Joseph Story, 3 *Commentaries on the Constitution of the United States* 48-51 (Rothman 2d reprint ed 1999).

⁹² See, for example, *Whittemore v Cutter*, 29 F Cases 1120, 1121 (CCD Mass 1813), citing *Boulton and Watt v Bull*, 2 H Bl 463 (1795).

⁹³ 27 US 1 (1829).

⁹⁴ *Id* at 19 (noting that the main object of the IP Clause was to promote the progress of science and useful arts, which "could be done best[] by giving the public at large a right to make, construct, use, and vend the thing invented . . . having a due regard to rights of the inventor"). However, when deciding circuit cases, the Supreme Court justices

*Kingsland*⁹⁵ held that Congress's power was plenary and unrestrained by the IP Clause.⁹⁶ Meanwhile, the *Pennock* Court's references to British patent practices were limited to a discussion of those practices' influence on the American patent *statute* at issue, not on the IP Clause itself.⁹⁷

Early US copyright cases followed a similar path. Courts cited British cases for interpretations of the Statute of Anne and common-law copyright doctrines in construing the US Copyright Act.⁹⁸ *Wheaton v Peters*,⁹⁹ for example, cited British cases for both purposes.¹⁰⁰ But it did not interpret the IP Clause by reference to such cases. Dissenting in *Wheaton*, Justice Smith Thompson gave what appears to be the first articulation of the IP Clause as comprised of two separate powers.¹⁰¹

Later IP treatises deepened the Anglocentric account of American IP generally,¹⁰² while also exploring key terms used in the IP

were not consistent on this point. Compare *Whitney v Emmett*, 29 F Cases 1074, 1082 (CC ED Pa 1831) (Baldwin) (declaring that Congress intended the law "to promote the progress of useful arts" by the benefits granted to inventors, not by those benefits accruing to the public after the patent had expired), with *Ames v Howard*, 1 F Cases 755, 756 (CCD Mass 1833) (Story) (using the phrase "to promote the progress of science and useful arts"); *Blanchard v Sprague*, 3 F Cases 648, 650 (CCD Mass 1839) (Story) (same).

⁹⁵ 42 US 202 (1843).

⁹⁶ *Id* at 206. This further distanced analysis of the patent statutes from analysis of the IP Clause, as the Clause was simply a broad enabling grant authorizing Congress to implement any number of exclusive-rights systems.

⁹⁷ *Pennock*, 27 US at 12–13.

⁹⁸ See, for example, *Ewer v Cox*, 8 F Cases 917, 919 (CC ED Pa 1824); *Clayton v Stone*, 5 F Cases 999, 1001–02 (CC SDNY 1829).

⁹⁹ 33 US 591 (1834).

¹⁰⁰ See *id* at 596. The original question was whether *Wheaton* had complied with the technical requirements of the federal Copyright Act. See *id* at 592–93. A secondary question was whether, even if he could not claim a federal copyright, he could enforce a common-law copyright. See *id*. Thus, the Court needed to address questions of American statutory and common-law copyright law. See *id* at 597–98.

¹⁰¹ See *id* at 684–85 (Thompson dissenting) (arguing that Congress's power under the IP Clause was not unitary just because both science and the useful arts are contained within the same provision, but rather that the "article is to be construed distributively," and that this interpretation was borne out when Congress passed separate statutes for useful arts (patents) and science (copyright)).

¹⁰² See Curtis, *A Treatise on the Law of Copyright* at 4 n 1, 16 n 1 (cited in note 13) (citing Grotius and Puffendorf); George Ticknor Curtis, *A Treatise on the Law of Patents for Useful Inventions in the United States of America* xxiii (Little & Brown 1849) (characterizing both English and American patent law as being mutually grounded in "a bargain . . . between the public and the patentee"); Eaton S. Drone, *A Treatise on the Law of Property in Intellectual Productions in Great Britain and the United States* 3–5 (Little & Brown 1879) (citing Grotius, Puffendorf, Barbeyrac, and Titius); Albert H. Walker, *Text-Book of the Patent Laws of the United States of America* 100–01 (Strouse 1883) (discussing the contrasting bases of patent law in the United States and the British common law); Henry Childs Merwin, *The Patentability of Inventions* 4 & n 3 (Little & Brown

Clause. For example, the attorney Albert Walker distinguished the “useful arts” from *both* “science” and “fine arts.”¹⁰³ The term “discoveries” was simply synonymous with “inventions.”¹⁰⁴ Henry Merwin suggested that “discoveries” were either practical applications of newly discovered scientific principles or “great advance[s] in the arts.”¹⁰⁵ Professor William Robinson used “art” and “arts” only for the useful arts (or, as he called them, the “industrial” arts), not the “fine” arts.¹⁰⁶ Authors varied as to whether the Clause was unitary or distributive.¹⁰⁷ At the same time, Robinson rejected both the IP Clause and the Patent Act¹⁰⁸ as the original or exclusive sources of patent law, favoring an elaborate “legal science” of fundamental axioms, principles, and deducible theorems rooted in the English monopoly-patent/privilege system.¹⁰⁹

Late nineteenth-century cases expanded discussion of the IP Clause and generally advanced the Anglocentric narrative.

1883) (discussing the use of the terms “invention” and “discovery” in the IP Clause). See also generally William C. Robinson, 1 *The Law of Patents for Useful Inventions* (Little & Brown 1890). While George Ticknor Curtis and Eaton Drone cited Continental thinkers such as Grotius, Puffendorf, Barbeyrac, and Titius for property-law theories, they made no claim that these writers influenced the Framers.

¹⁰³ In line with centuries of use, Walker used “art” to mean any practical application of natural materials or forces for human benefit. See Walker, *Textbook of the Patent Laws of the United States of America* at 2–4 (cited in note 102).

¹⁰⁴ *Id.* at 2–3.

¹⁰⁵ Merwin, *The Patentability of Inventions* at 8 (cited in note 102). Merwin further stated, “Sometimes it is said that the difference between discovery and invention is one of degree simply; that a discovery is a great advance in the arts, an invention, a slight advance; and therefore, it is said, the patent for a discovery includes a great deal, but that for an invention very little.” *Id.* The latter seems to echo the *Encyclopédie* definition (the “most important inventions”), even as Merwin seemed unaware of this origin. See *id.* Ultimately, Merwin did not put much stock in the Framers’ choice of words and disregarded the “impossible proposition that inventions and discoveries are the same.” *Id.* at 4 n 3.

¹⁰⁶ See Robinson, *The Law of Patents for Useful Inventions* at 43–44 & n 1 (cited in note 102).

¹⁰⁷ Walker was ambiguous on whether the IP Clause preamble was unitary or distributive. Compare Walker, *Text-Book of the Patent Laws of the United States of America* at 1 (cited in note 102) (“Congress has power to promote the progress of science and useful arts, by securing for limited times to inventors, the exclusive right to their respective discoveries.”); *id.* at 184 (citing the IP Clause and stating that its purpose is to “promote the progress of science and useful arts”), with *id.* at 52 (“It is the useful arts that Congress is authorized by the Constitution to promote.”). Robinson adopted a unitary approach. See, for example, Robinson, *The Law of Patents for Useful Inventions* at 35 (cited in note 102) (“[T]he progress of science and art is promoted by securing to inventors these exclusive privileges.”). He also believed Congress’s power under the IP Clause to be plenary, in line with *McClurg*. See *id.* at 70. See also *McClurg*, 42 US at 206.

¹⁰⁸ Patent Act of 1836, 5 Stat 117.

¹⁰⁹ See Robinson, *The Law of Patents for Useful Inventions* at v–vi, 15 n 8 (cited in note 102). Robinson believed that the United States should adopt a common-law patent regime. See *id.* at 15 n 8.

*McKeever v United States*¹¹⁰ suggested a strong British influence on the Framers, even though there were important differences between the British and American systems.¹¹¹ *Baker v Selden*¹¹² distinguished between useful arts and sciences: the former are methods to be practiced, while the latter are contemplative truths about the world.¹¹³ The *Baker* Court also expressly adopted Thompson’s distributive interpretation of the IP Clause.¹¹⁴ *Burrow-Giles Lithographic Co v Sarony*¹¹⁵ marked a key transition point for the terms “author,” “science,” and “arts” in the way that both courts and the public used them.¹¹⁶ Finally, *United States v Perry*¹¹⁷ undertook a much-criticized effort to define “fine art.”¹¹⁸

B. The First Wave: Patent-Practitioner IP Histories and the “Standard of Invention”

What I call the First Wave of IP Clause scholarship ran from the late 1910s to the early 1960s.¹¹⁹ Similar to the

¹¹⁰ 14 Cl Ct 396 (1878).

¹¹¹ See id at 421. For example, in the United States, patents were granted as of right, not by the “grace and favor” of the Crown, as in England. Moreover, the United States had no “Crown Rights” such as those that allowed the British sovereign to practice patented inventions without permission from, or payments to, the patent holders. See id at 420–21.

¹¹² 101 US 99 (1879).

¹¹³ See id at 100–05. The Court also distinguished the useful arts from taste-based arts, implicitly referencing the old Aristotelian category of arts of pleasure: “[T]hese observations [that copyrighted matter cannot preclude practice of the underlying system] are not intended to apply to ornamental designs, or pictorial illustrations addressed to the taste. Of these it may be said, that their form is their essence, and their object, the production of pleasure in their contemplation.” Id at 103–04.

¹¹⁴ Id at 105–06, quoting *Clayton*, 5 F Cases at 1003 (Thompson). The *Baker* Court also cited British cases—not as influences on the IP Clause but to craft the standard that it sought in the case—which likely further entrenched the Anglocentric narrative. *Baker*, 101 US at 106–07.

¹¹⁵ 111 US 53 (1884).

¹¹⁶ Id at 56–58, 60–61. “Art” was used for both mechanical arts and fine arts. See id at 60–61. “Author” was used in both its Romantic sense of creative self-expression (“genius”) and the older *Worcester*’s sense of “authority.” See id. While the Court recognized “authors” and “inventors” as distinct classes under the IP Clause, it frequently used the term “invention” in its older, broader sense to mean any creation, including utilitarian inventions and fine art. For example, the *Burrow-Giles* Court referred to authors and their “inventions.” Id at 56, 60.

¹¹⁷ 146 US 71 (1892).

¹¹⁸ Id at 74. However, the Court was compelled to do this because, at the time, the Copyright Act distinguished between fine art and commercial art for tariff purposes. See *Mazer v Stein*, 347 US 201, 211–13 (1954).

¹¹⁹ Two important cases and the 1909 Copyright Act set the stage for the First Wave. *Bleistein v Donaldson Lithographing Co*, 188 US 239 (1903), held that litho-

nineteenth-century commentary, the First Wave of scholarship was written largely by judges and practitioners. Using nineteenth-century treatises and cases as starting points, few questioned the Anglocentric narrative, but these scholars also implicitly expanded it to cover the IP Clause.

The first twenty years of the First Wave established the major foundations of the IP Clause literature. Some scholars introduced the argument that constitutional convention delegate Charles Pinckney deserved equal credit with Madison for the various proposals that led to the IP Clause.¹²⁰ The balanced-sentence grammatical justification was introduced for a distributive interpretation of the Clause.¹²¹ “Science” meant “learning in general,” while the dual senses of “art” as the mechanical arts and the fine arts led to some confusion.¹²²

graphed circus-advertisement posters were works of (fine) art within the subject matter of the pre-1909 Copyright Act, even as the Court evinced confusion caused by the changing sense of “art” and expanded copyrightable subject matter to include the “useful arts.” Id at 249–51. *Continental Paper Bag Co v Eastern Paper Bag Co*, 210 US 405 (1908), considered whether the intentional nonuse of a patent promoted the progress of science and useful arts. See id at 422–25. The Court seemed undecided as to whether the IP Clause preamble was unitary or distributive. Compare id at 422–23 (noting that it executes “the purpose of the [IP Clause] to promote the progress of *science and useful arts* by securing for limited times to inventors the exclusive right to their respective discoveries”) (emphasis added), with id at 423 (stating that “it is urged that non-use of an invention . . . is not to promote the progress of *the useful arts*”) (emphasis added); id at 424 (mentioning “a number of cases which bring out clearly the services rendered by an inventor to *the arts and sciences*”) (emphasis added). The House report on the 1909 Copyright Act treated the IP Clause preamble as unitary—even as the subject matter of copyright was much of the fine arts, with no mention of “science”—and thus as limiting Congress’s power to enact legislation that promotes both the progress of science and useful arts. See HR Rep No 2222, 60th Cong, 2d Sess 6–7, 14 (1909). The Court used the same definitions of “writings” and “authors” as in *Burrow-Giles*. See id at 2–3.

¹²⁰ See, for example, George Ramsey, *Scope of United States Patent Protection*, 1 J Patent Office Society 373, 375–76 (1919). It is not clear whether Ramsey was familiar with Judge Charles Nott’s obscure book from a decade earlier, which alleged a conspiracy whereby Madison and his supporters actively suppressed Pinckney’s contribution. See Charles C. Nott, *The Mystery of the Pinckney Draught* 4–5, 12 (Century 1908). See also Fenning, 17 Georgetown L J at 112 (cited in note 87) (discussing the relative statutory contributions of Pinckney and Madison).

¹²¹ Richard De Wolf explained it as a form of grammatical parallel construction “so much used in the days of the colonial worthies,” which led to the two intertwined grants—copyright and patent rights—that we think of today. De Wolf, *Outline of Copyright Law* at 15 (cited in note 83). But he provided no support for his claim of its popularity in colonial times.

¹²² De Wolf described the problem nicely:

Lawyers, textbook writers and even judges sometimes seem to have the impression that the proposition is the other way about—that science is to be promoted through patent protection and useful arts through copyright. But when the Constitution was adopted, the word science did not have the specific meaning

But Anglocentrism still dominated. Richard De Wolf introduced the Venetian origins of copyright to the IP Clause literature but otherwise maintained the Anglocentric narrative.¹²³ P.J. Federico acknowledged Continental precedents for patents generally but focused on the British system as the only formal antecedent for the American system.¹²⁴ The attorney Frank Prager introduced details on Italian and French IP precedents and described French *philosophe* and *Encyclopédie* editor Denis Diderot as a staunch supporter of publishers' property rights.¹²⁵ However, Prager still viewed British antecedents as central to the American system.¹²⁶

In the midcentury, the term "technology" began entering the IP Clause literature as courts and commentators grappled with the debate over a constitutional "standard of invention" (higher than mere novelty) and the changed senses of "art" and "science."¹²⁷ "Technology" began to be substituted for "art," both to provide a new term for the mechanical (useful) arts, now that "art" had become restricted in common use to the fine arts, and in order to underscore a growing belief that patent-eligible inventions should be based on scientific principles or

which it has today—that of natural science. It meant learning in general. And on the other hand, the word art was not so closely associated as it now is with the fine arts. One occasionally finds references to the useful arts as being within the scope of copyright protection on account of their having been mentioned in the Constitutional provision referred to. It is doubtful, however, whether the framers of the Constitution had any such idea.

Id at 15–16.

¹²³ See id at 2 (citing the development of printers' privileges in Renaissance Venice).

¹²⁴ See P.J. Federico, *Origin and Early History of Patents*, 11 J Patent Office Society 292, 295 (1929) (discussing the practice of granting patents in certain Continental countries).

¹²⁵ See Frank D. Prager, *A History of Intellectual Property from 1545 to 1787*, 26 J Patent Office Society 711, 733–34, 736 (1944). Reprinting a translation of Diderot's *Letter on the Publishing Trade*, Prager praised it as a key turning point in IP history. See id at 733, 754. He linked it to the preambles of four of the pre-Constitution state copyright acts. See id at 738–39. However, the language in those preambles seemed to flow more directly from the *Encyclopédie* entry for "copyright." See generally Michel-Antoine David, *Copyright (Droit de copie)*, The Encyclopedia of Diderot & d'Alembert Collaborative Translation Project (Michigan, 2010) (IML Donaldson, trans), archived at <http://perma.cc/Y7M4-FJKZ>. Diderot's success, according to Prager, was establishing IP rights within the other Enlightenment human rights necessary for a free and just society. See Prager, 26 J Patent Office Society at 732 (opining that Diderot's famous Great Encyclopedia "takes for granted the justice of religious tolerance and speculative freedom[;] [i]t asserts . . . the democratic doctrine"). He further cited Quesnay, Turgot, and the Physiocrats as friends of IP because they were also attacking mercantilism. See id at 732–33.

¹²⁶ See Prager, 26 J Patent Office Society at 711 (cited in note 125).

¹²⁷ See, for example, *Cuno Engineering Corp v Automatic Devices Corp*, 314 US 84, 90–91 (1941) (instituting the "flash of [] genius" test).

laws.¹²⁸ An extreme view of the latter was given by Justices William Douglas and Hugo Black in their concurrence in *Great Atlantic & Pacific Tea Co v Supermarket Equipment Corp.*¹²⁹ patents should be granted only for inventions that “push back the frontiers of chemistry, physics, and the like” and that make “a distinctive contribution to scientific knowledge.”¹³⁰ Many commentators resisted this contention, arguing that, while great inventions *applied* scientific advances, they did not need to *themselves* represent a major scientific advance.¹³¹

Also during the midcentury, courts continued to grapple with the copyright subject matter challenge raised by mass-produced

¹²⁸ Prager displayed the perhaps initially unconscious transition from “art” to “technology” in the patent literature, as he used the terms interchangeably without explicating either. See, for example, Prager, 26 J Patent Office Society at 713–20 (cited in note 125) (using “art” for mechanical arts in the first two cited pages but using “technology” in the latter two). For more on this transition, see generally O’Connor, 2015 U Ill L Rev (cited in note 22). The attorney Karl Lutz then expressly defined “useful arts” as “technology.” Lutz, 18 Geo Wash L Rev at 54 (cited in note 33). But he did not explain why the “useful arts” were simply “technology.” Lutz also cemented the “balanced-sentence” and “science . . . [as] learning in general” interpretations in the modern patent literature. *Id.* at 51. The attorney Robert Coulter also expounded the useful-arts-as-technological-arts position in a three-part article. See Robert I. Coulter, *The Field of the Statutory Useful Arts, Part I*, 34 J Patent Office Society 417, 417–18 (1952) (“The technological arts—the ‘useful’ arts—are clearly distinguishable from the cultural arts and from other disparate arts, such as those of business, teaching, politics, etc.”); Robert I. Coulter, *The Field of the Statutory Useful Arts, Part II*, 34 J Patent Office Society 487, 498 (1952) (stating that the “technological arts are the ‘useful arts’”) (emphasis omitted); Robert I. Coulter, *The Field of the Statutory Useful Arts, Part III*, 34 J Patent Office Society 718, 734 (1952). While trying to cabin “science” to copyrights and “useful arts” (“technological arts”) to patents, he acknowledged blurred boundaries: books and illustrations could advance the useful arts by providing instructive material; similarly, patented inventions could advance science (even in its narrow sense) by providing instruments for experimentation and observation. See *id.* at Part II at 492–94, 498. He also seemed aware of the challenges of copyright promoting “science” when it also covered entertainment and fine arts. See *id.* at Part II at 492. Likewise, the modern sense of “art” contained more than the mechanical or practical or useful arts. *Id.* at Part I at 417, 428–29; *id.* at Part II at 494, 498–500.

¹²⁹ 340 US 147 (1950).

¹³⁰ *Id.* at 154 (Douglas concurring). Douglas and Black also admonished that the IP Clause never sanctioned the patenting of mere “gadgets.” *Id.* at 155 (Douglas concurring). The majority did not mention the IP Clause in rejecting the combination patent at issue for failing to meet the invention standard. See *id.* at 151–53 (majority).

¹³¹ See, for example, Lutz, 18 Geo Wash L Rev at 55 (cited in note 33) (arguing that this heightened patentability standard would “result[] in the rejection of practically every patent that has been presented to the court, and, if strictly adhered to, will completely emasculate the patent system”); Coulter, 34 J Patent Office Society at Part II at 493 (cited in note 128); Arthur H. Seidel, *The Constitution and a Standard of Patentability*, 48 J Patent Office Society 5, 5 (1966) (arguing that, to “[s]uppress protection of creative efforts, by imposing a high standard few inventions attain . . . [, would lead to] a deprivation of ownership inimical to free individuals working competitively with one another”).

decorative objects. *Mazer v Stein*¹³² abandoned the balanced-sentence interpretation in order to allow such works under some penumbral reading of “science and useful arts.”¹³³ The Court effectively initiated the practice of reading the word “useful” out of “useful arts” and then flipping the objects of patents and copyrights such that “science” went with patents and “(useful) arts” went with copyright.¹³⁴ Douglas and Black dissented on constitutional grounds because these objects did not seem to be “writings.”¹³⁵

The standard-of-invention question was addressed when Congress added § 103 to the Patent Act as part of its major 1952 revision.¹³⁶ This revision also replaced “art” with “process” in § 101.¹³⁷ The House and Senate reports on the bill both expressly adopted the balanced-sentence interpretation and understood the object of patents as promoting the progress of the useful

¹³² 347 US 201 (1954).

¹³³ *Id.* at 217–19.

¹³⁴ While ostensibly denying the need to review the constitutional power for Congress to create copyright statutes under the IP Clause, the Court gave an extended review of just this kind in a footnote. See *id.* at 206 n 5, 218.

¹³⁵ Echoing their clear disdain for “gadgets” in *Great Atlantic & Pacific Tea Co.*, 340 US at 155 (Douglas concurring), Douglas and Black derided the idea of viewing commercial or popular art as “writings” under the IP Clause:

The Copyright Office has supplied us with a long list of [works of art] which have been copyrighted—statuettes, book ends, clocks, lamps, door knockers, candlesticks, inkstands, chandeliers, piggy banks, sundials, salt and pepper shakers, fish bowls, casseroles, and ash trays. Perhaps these are all “writings” in the constitutional sense. But to me, at least, they are not obviously so.

Mazer, 347 US at 220–21 (Douglas dissenting).

¹³⁶ 35 USC § 103.

¹³⁷ 35 USC § 101. The change was curious, though, as it attributed different meanings to “art” in different parts of the statute. As explained in the House and Senate reports:

“Art” in [§ 101] has a different meaning than the words “useful art” in the Constitution, and a different meaning than the use of the word “art” in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process or method. The word “process” has been used to avoid the necessity of explanation that the word “art” as used in this place means “process or method,” and that it does not mean the same thing as the word “art” in other places.

HR Rep No 1923, 82nd Cong, 2d Sess 6 (1952); S Rep No 1979, 82nd Cong, 2d Sess 5 (1952). This is fine as far as it goes—Congress has the right to be its own lexicographer—but then what does “useful arts” mean in the Constitution? And what about “art” in different parts of the statute?

arts.¹³⁸ “Science” was learning in general, and its promotion was the object of copyrights.¹³⁹

Despite enactment of the new § 103, some commentators were concerned that courts were still using a heightened standard of invention. Judge Giles Rich sought to define “science,” “discoveries,” and “inventions” to show that “science” was not the object of the patent system.¹⁴⁰ Oddly, he did not explore the term “useful arts” but simply used it as if readers knew what it meant.¹⁴¹ He also adopted the balanced-sentence interpretation—criticizing those who took the unitary approach—and implicitly accepted the Anglocentric account.¹⁴² The attorney Arthur Seidel likewise sought to analyze all IP Clause terms in order to argue against a heightened standard of invention.¹⁴³

¹³⁸ HR Rep No 1923 at 4 (cited in note 137); S Rep No 1979 at 3 (cited in note 137).

¹³⁹ See De Wolf, *An Outline of Copyright Law* at 13 (cited in note 84) (“If it can be demonstrated that any particular copyright statute does not, in fact, promote the progress of science . . . such statute is invalid.”). See also *id.* at 15.

¹⁴⁰ Rich adopted the “learning in general” definition of “science” from Johnson’s *Dictionary*. See Giles S. Rich, *Principles of Patentability*, 28 *Geo Wash L Rev* 393, 396–97 (1960). Rich claimed that the natural sciences that we think of as “science” today were instead part of natural philosophy at the time of the Framing. See *id.* “Invention” and “discovery” were used interchangeably, Rich claimed (without any support), but he then proceeded to read “discovery” out of the Constitution altogether. See *id.* at 403–05.

¹⁴¹ Rich used the term “technology” only once in the article, using “art” or “useful art” everywhere else. *Id.* at 402. Yet he also used the term “art” in its fine-art sense, without appearing to notice its ambiguity. See *id.* at 401.

¹⁴² Oddly, Rich stated, “If the promotion of both ‘Science and useful Arts’ be ascribed as the object of the patent system, then the copyright system would have no stated object.” *Id.* at 397. But no one was suggesting that. Rather, under the unitary-preamble view, both patents and copyrights had as their object the promotion of science and the useful arts. See note 94 and accompanying text.

¹⁴³ See Seidel, 48 *J Patent Office Society* at 9–17 (cited in note 131). There was also a concern that the Supreme Court might hold that the heightened invention standard was a *constitutional* requirement, thus reinstating it in addition to, or in place of, § 103’s nonobviousness requirement. See *id.* at 5–8. Seidel adopted the balanced-sentence interpretation but conceived of the preamble as simply the “overall objective” of the power, not a limit on that power. See *id.* at 9–10. He did not directly define “useful arts” but rather juxtaposed Johnson’s *Dictionary* definitions for “useful” and “art.” See *id.* at 10 n 11. This suggested that “useful arts” was not a unitary categorical term but rather a term that encompassed any arts that happened to have practical uses. He also subscribed to the “learning-in-general” definition of “science.” See *id.* at 11–12. In an interesting twist, he used Johnson’s definition of “inventors” as the basis for the novelty-only patentability standard that he advocated: “inventors” create something new, but not necessarily something important or genius. See *id.* at 13–14 & n 17, 16. Inventors can also make “discoveries” as a subclass of the new things that they create. See *id.* at 15. But following Johnson’s definition of “discover”—“[t]he act of finding anything hidden” or “[t]he act of revealing or disclosing any secret”—Seidel had to engage in some semantic contortions to argue that it *also* meant creating new things. See *id.* at 13, 15 n 19.

The Supreme Court's 1966 decision in *Graham v John Deere Co*¹⁴⁴ likely explains the downturn in IP Clause scholarship in the mid-1960s, which I mark as the end of the First Wave. The Court decisively adopted the balanced-sentence structure (with “useful arts” as the subject matter of the patent system) and declared that § 103's nonobviousness standard is the constitutional standard of invention.¹⁴⁵ This comported with what most First Wave scholars had advocated, so there was limited immediate criticism.¹⁴⁶ However, the Court did not define “useful arts.” Enshrining Thomas Jefferson, the Court spent more than two pages endorsing his ideas—even as it made clear that Jefferson had no direct hand in the IP Clause.¹⁴⁷

¹⁴⁴ 383 US 1 (1966).

¹⁴⁵ Id at 6, 17–19. The Court salvaged part of *Great Atlantic & Pacific Tea Co*—even as it effectively rejected most of its troubling language—by saying that “it is in this light that patent validity ‘requires reference to a standard written into the Constitution.’” Id at 6, quoting *Great Atlantic & Pacific Tea Co*, 340 US at 154 (Douglas concurring). At the same time, the Court asserted that it had never changed the standard of patentability—explaining *Cuno Engineering Corp* as a misinterpreted decision. See *Graham*, 383 US at 15–17.

¹⁴⁶ There were, unsurprisingly, at least a few critiques. See, for example, Note, *The 1966 Patent Cases: Creation of a Constitutional Standard*, 54 *Georgetown L J* 1320, 1331–33 (1966) (criticizing the Court for using Jefferson's views on the patent system with regard to the IP Clause when Jefferson had no direct role in drafting the IP Clause); Albert B. Kimball Jr, Note, *An Analysis of Recent Supreme Court Assertions Regarding a Constitutional Standard of Invention*, 1 *APLA Q J* 204, 206 (1973) (criticizing the Court for confusing a “statement of purpose” with a “restraint” in construing the IP Clause preamble). Some commentators were generally favorable to *Graham*. See, for example, Giles S. Rich, *Laying the Ghost of the “Invention” Requirement*, 1 *APLA Q J* 26, 26, 37–38 (1972) (favoring *Graham*'s interpretation of § 103 and that case's assessment that the constitutional standard of invention was coextensive with that interpretation); Joel Rosenblatt, *The Constitutional Standard for “Ordinary Skill in the Art”*, 54 *J Patent Office Society* 435, 439 (1972) (mistakenly implying that *Graham* adopted Douglas's concurrence in *Great Atlantic & Pacific Tea Co* as “the” constitutional standard of invention). Edward Irons and Mary Helen Sears's article supporting *Graham*'s affirmance of a constitutional standard of invention represents an indeterminate middle ground: it criticizes the Court's adoption of the balanced-sentence interpretation and supports Douglas's and others' high standard of patentability. See Edward S. Irons and Mary Helen Sears, *The Constitutional Standard of Invention—The Touchstone for Patent Reform*, 1973 *Utah L Rev* 653, 656, 678–79. Notably, Irons and Sears refer to traditional mechanical arts from the Middle Ages as “technology,” showing the continuing displacement of “arts.” Id at 659–60.

¹⁴⁷ See *Graham*, 383 US at 7–11. In fact, the Court unintentionally revealed at least one reason why Jefferson's views should *not* hold too much weight: He wanted a complete ban on monopolies and continued to push for this when the Bill of Rights was being debated in 1788. But his views were rejected by the convention, both in 1787 when the body of the Constitution was adopted, and in 1788 when the Bill of Rights was adopted. See id at 7–8. This misplaced reliance on Jefferson would prompt a few authors to seek to correct the historical record. See generally, for example, Adam Mossoff, *Who Cares What Thomas Jefferson Thought about Patents? Reevaluating the Patent “Privilege” in*

C. The Second Wave: Responses to Legislative Process and Cases Leading to the Copyright Act of 1976

Even as the debates over the standard of invention wound down in the aftermath of *Graham*, Congress was gearing up for the first major overhaul of the Copyright Act since 1909. Academics as well as practitioners were keenly interested, and thus what I call the Second Wave of scholarship began among a different set of commentators. Two major IP history books in the late 1960s formed the locus of this next wave.¹⁴⁸ Both gave highly Anglocentric accounts of IP in America.¹⁴⁹

In the early 1970s, a divided Court in *Goldstein v California*¹⁵⁰ ruled that states had not relinquished all power to grant exclusive rights to authors under the Constitution, stating that it could ascertain no impediment to concurrent state and federal copyrights.¹⁵¹ The Court asserted a unitary reading of the IP Clause preamble that underscored the changed popular sense of “art” and the reversed roles of “science” and “useful arts.”¹⁵² The Court also adopted *Burrow-Giles*’s definitions of “author” and “writings.”¹⁵³

The Copyright Act of 1976 expressly preempted the field for state copyright statutes, effectively mooted *Goldstein*’s central holding.¹⁵⁴ Nevertheless, the House and Senate reports noted

Historical Context, 92 Cornell L Rev 953 (2007). See also Kenneth J. Burchfiel, *Revising the “Original” Patent Clause: Pseudohistory in Constitutional Construction*, 2 Harv J L & Tech 155, 209–17 (1989).

¹⁴⁸ See generally Bruce W. Bugbee, *Genesis of American Patent and Copyright Law* (Public Affairs 1967); Patterson, *Copyright in Historical Perspective* (cited in note 85). Professor Lyman Patterson’s book argued that copyright’s origins as a limited economic right for *publishers* in Britain made it ill-suited as a vehicle for the full range of *authors*’ rights. See Patterson, *Copyright in Historical Perspective* 8 (cited in note 85).

¹⁴⁹ See Bugbee, *Genesis of American Patent and Copyright Law* at 56 (cited in note 148) (“English precedent, far more than that of any other European state, [left] its mark upon the law of intellectual property in early America.”); Patterson, *Copyright in Historical Perspective* at 180 (cited in note 85) (“[A]ll of the ideas [of American copyright] originated in the English history of copyright.”).

¹⁵⁰ 412 US 546 (1973).

¹⁵¹ *Id.* at 556–67.

¹⁵² See *id.* at 555 (“The objective is to promote the progress of science and *the arts*.”) (emphasis added).

¹⁵³ See *id.* at 561–62.

¹⁵⁴ See HR Rep No 94-1476, 94th Cong, 2d Sess 129–33 (1976). However, the question whether the text of § 301 truly did preempt all state common law with regard to literary, musical, or creative property remains open. See Melville B. Nimmer, *Nimmer on Copyright* § 1.01(B) at 1-9 (Bender 1978) (stating that “it may [] be doubted whether Congress achieved its professed objectives of using ‘the clearest and most unequivocal language possible, so as to foreclose any conceivable misinterpretation . . . and to avoid

that Congress did *not* intend for the scope of statutory subject matter to be coextensive with the IP Clause's grant of power.¹⁵⁵ Congress also invoked the IP Clause's restriction to "limited times" to set term limits for even unpublished works, which were now brought into the federal copyright system.¹⁵⁶ Beyond this, neither the Act nor its accompanying House and Senate reports discussed the meaning of the IP Clause to any great extent.

The remaining Second Wave articles exhibited no unifying theme, other than possibly the expanding interest in IP. The attorney Gary Kauffmann argued for copyright as property instead of monopoly by explaining that the modern sense of the public's primacy in copyright policy is based on five historical accidents, including a misreading of the IP Clause.¹⁵⁷ Professor Robert Hauhart briefly reviewed the historical literature on IP to argue for unifying principles for patent and copyright law.¹⁵⁸ Professor Morgan Sherwood discussed the origins of the American patent system in the context of how well it has served democracy.¹⁵⁹ Finally, the attorney Donald Banner synthesized now-conventional readings of the IP Clause to praise the genius of the American patent system that the IP Clause enables.¹⁶⁰

Rounding out the 1980s, the Supreme Court continued to focus on copyright, deciding two major cases. In *Sony Corp of America v Universal City Studios, Inc.*,¹⁶¹ the Court considered the IP Clause in the context of a contributory infringement claim based on the sale of home video recorders that facilitated

the development of any vague borderline areas between State and Federal protection"). Similarly, the attempt to expressly preempt indicates that Congress accepted *Goldstein's* interpretation of the IP Clause on this point.

¹⁵⁵ This comment was directed at a change in § 4's text from "all the writings of an author" to "original works of authorship." See HR Rep No 94-1476 at 51 (cited in note 154). The Senate report is essentially the same. See S Rep No 94-473, 9th Cong, 1st Sess 116 (1975).

¹⁵⁶ HR Rep No 94-1476 at 24 (cited in note 154).

¹⁵⁷ See Gary Kauffmann, *Exposing the Suspicious Foundation of Society's Primacy in Copyright Law: Five Accidents*, 10 Colum J L & Arts 381, 386-87 (1986).

¹⁵⁸ See generally Robert C. Hauhart, *The Origin and Development of the British and American Patent and Copyright Laws*, 5 Whittier L Rev 539 (1983).

¹⁵⁹ See generally Morgan Sherwood, *The Origins and Development of the American Patent System*, 71 Am Sci 500 (1983).

¹⁶⁰ See generally Donald W. Banner, *An Unanticipated, Nonobvious, Enabling Portion of the Constitution: The Patent Provision—The Best Mode*, 69 J Patent & Trademark Office Society 631 (1987).

¹⁶¹ 464 US 417 (1984).

unauthorized recordings of copyrighted broadcasts.¹⁶² Limiting its interpretation to the IP Clause's grant of power, the Court determined that Congress could create "monopoly privileges" only for general public benefit, and not for the private benefit of authors or publishers.¹⁶³ *Harper & Row Publishers, Inc v Nation Enterprises*¹⁶⁴ acknowledged *Sony's* "public purpose" interpretation of the IP Clause but reemphasized the critical role that the "monopoly" grant to authors served in generating the material in the first place.¹⁶⁵

D. The Third Wave: Responses to Business-Method Patents, the Copyright Term Extension Act, and Beyond

Important precursors to what I call the Third Wave occurred in the late 1980s and early 1990s. While they did not form a coherent trend themselves, they each had a strong impact on later scholars and themes. The attorney Kenneth Burchfiel published a belated yet scathing critique of the Supreme Court's "revisionist history" that served as the impetus for major Third Wave scholar Edward Walterscheid's work.¹⁶⁶ Professor Jane Ginsburg raised the possibility of French influence on the Framers.¹⁶⁷ While not citing the *encyclopédistes'* roles in literary-property debates, she did discuss the marquis de Condorcet's views.¹⁶⁸ Amid growing concerns over the protection of databases, the Supreme Court decided that there is a constitutional requirement of originality for copyrightable works under the IP

¹⁶² Id at 417–18.

¹⁶³ Id at 429.

¹⁶⁴ 471 US 539 (1985).

¹⁶⁵ Id at 546, quoting *Sony*, 464 US at 429. Notably, the dissent seemed to reveal the near invisibility of the qualifier "useful" in the IP Clause by this time. In one place, Justice William Brennan stated, "[t]he 'promotion of science and the useful arts,'" while in another he said, "[t]o ensure the progress of arts and sciences." Id at 582, 589 (Brennan dissenting). When Brennan actually quoted the IP Clause, he did of course include the term "useful," but when he *paraphrased* it, he dropped the term. This suggests that Brennan effectively read it out of the IP Clause.

¹⁶⁶ Burchfiel, 2 Harv J L & Tech at 209–17 (cited in note 147).

¹⁶⁷ See Jane C. Ginsburg, *A Tale of Two Copyrights: Literary Property in Revolutionary France and America*, 64 Tulane L Rev 991, 1012 (1990). Ginsburg was engaged in a comparative study, however, that was not directly aimed at arguing for such an influence. The main theme of her article is that the conventional views of French copyright law (as based on authors' rights) and Anglo-American copyright law (as focused on utilitarian public goods) are not so stark in reality. She shows that the practical focus of both early French and American copyright systems was on works of public instruction (whether styled as "knowledge" or "science"). See id at 991–96.

¹⁶⁸ See id at 1013–14.

Clause.¹⁶⁹ And finally, Professor Margaret Chon gave a postmodernist critique of standard accounts of the IP Clause, advocating a public domain-oriented “progress project” on behalf of Madison and Jefferson.¹⁷⁰ The *encyclopédistes* get mentioned in a footnote that correctly emphasizes their interest in practical arts over purely speculative, theoretical knowledge, but Chon makes no explicit reference to their possible influence on the Framers.¹⁷¹

Walterscheid began the Third Wave in earnest during the mid-1990s.¹⁷² Expanding on Burchfiel’s positions, he was also sympathetic to Prager’s quest to open up American IP history beyond England.¹⁷³ But, aside from a limited exception for French patent practice, Walterscheid felt that the British focus was proper.¹⁷⁴ “Useful arts” were entire industries, not specific processes within an industry.¹⁷⁵ “Invention” originally meant

¹⁶⁹ *Feist Publications, Inc v Rural Telephone Service Co*, 499 US 340, 347 (1991).

¹⁷⁰ See Chon, 43 DePaul L Rev at 134–44 (cited in note 38). Arguing that the fine arts had effectively been folded into the useful arts (even based on an “applied-science-or-technology” interpretation), Chon adopted a unitary reading of the IP Clause preamble that sought solely to promote the progress of knowledge. See *id.* at 115 & n 92, citing *Bleistein*, 188 US at 249. She also cited *Twentieth Century Music Corp v Aiken*, 422 US 151, 156 (1975), and *Feist*, 499 US at 346–47, to show that the Supreme Court was by then interpreting “science” and “(useful) arts” in their modern, popular senses. See Chon, 43 DePaul L Rev at 115 n 92 (cited in note 38).

¹⁷¹ See Chon, 43 DePaul L Rev at 121 n 113 (cited in note 38), quoting Donald H. Meyer, *The Democratic Enlightenment* 109 (Putnam 1976).

¹⁷² See generally Edward C. Walterscheid, *To Promote the Progress of Useful Arts: American Patent Law and Administration, 1787–1836* (Rothman 1998); Edward C. Walterscheid, *Inherent or Created Rights: Early Views on the Intellectual Property Clause*, 19 Hamline L Rev 81 (1995).

¹⁷³ See Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 1)*, 76 J Patent & Trademark Office Society 697, 698 n 9 (1994).

¹⁷⁴ See *id.* at 698 n 9 (“[E]ssentially no other European patent practices or law were known to those responsible for creating the first patent law in the United States.”). Walterscheid acknowledged arguments for the Dutch system as a major precursor to the British system, as well as a possible influence on the Anglo-American tradition. See, for example, Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 2)*, 76 J Patent & Trademark Office Society 849, 854 n 15 (1994), citing William Searle Holdsworth 4 *A History of English Law* 345 (Sweet & Maxwell 1936). While arguing that the specification requirement came directly from English law, he allowed that French and Dutch specification requirements may have antedated the British one. See Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 3)*, 77 J Patent & Trademark Office Society 771, 777 (1995). He cited the faster development of patent case law in Britain as another reason that American courts looked to Britain. See Walterscheid, *To Promote the Progress of Useful Arts* at 4–5 (cited in note 172).

¹⁷⁵ See Walterscheid, 76 J Patent & Trademark Office Society at Part 1 at 706 & n 30 (cited in note 173).

“importation” and was used interchangeably with “discovery.”¹⁷⁶ However, by 1615, “discovery” came to mean the modern notion of “invention.”¹⁷⁷ Awkwardly, Walterscheid claimed that the constitutional convention committee substituted “science” for “knowledge” in the IP Clause proposals because the former was both “shorter” (and works better with “useful arts”) and more “aesthetically pleasing” for the balanced sentence structure.¹⁷⁸

Professor Malla Pollack made a major contribution in arguing across numerous articles for a new sense of “progress” and for congressional limits on interpreting “limited times.”¹⁷⁹ According to Pollack, “progress” meant dissemination or diffusion of knowledge, rather than advances or increases in it.¹⁸⁰ She also looked at the

¹⁷⁶ See *id.* at Part 2 at 856 & n 25 (cited in note 174). See also Rich, 28 Geo Wash L Rev at 403 (cited in note 140).

¹⁷⁷ See Walterscheid, 76 J Patent & Trademark Office Society at Part 2 at 870 (cited in note 174) (noting that “invention” came to mean *both* “importation” and the “establishment of a new trade or industry . . . through actual discovery of new technology”). This was because “to invent” meant “to originate, to bring into use formally or by authority, to found, establish or appoint.” *Id.* at Part 2 at 870, quoting E. Wyndham Hulme, *On the History of the Patent Law in the Seventeenth and Eighteenth Centuries*, 18 L Q Rev 280, 280–81 (1902). Walterscheid also unearthed an intriguing alternate use of “discovery” from the proceedings of the first Congress as “to disclose to another”:

[I]f an Inventor discovers [i.e., discloses] his Secret to any second Person, it is the power of him [i.e., the second person] to prevent a Patent issuing by entering a Caveat in the Attorney General’s Office, when if two Persons appear to have discovered the same thing, it is held not to be *new* within the meaning of the Statute.

Edward C. Walterscheid, *Novelty in Historical Perspective (Part 1)*, 75 J Patent & Trademark Office Society 689, 703 n 67 (1993), quoting Senate Report of Mar 29, 1790, reprinted in *Proceedings in Congress during the Years 1789 and 1790 Relating to the First Patent and Copyright Laws*, 22 J Patent Office Society 352, 363 (1940). However, he did not suggest this as the meaning of “discover” in the IP Clause. Instead, he asserted that it was part of the old caveat practice, and the quote itself uses the term in two different ways.

¹⁷⁸ See Walterscheid, *To Promote the Progress of Useful Arts* at 50–51 (cited in note 172). But “science” is only two letters shorter than “knowledge.” And “useful arts” is already longer than “knowledge.” So the substitution of “science” for “knowledge” actually puts the two terms used in the final IP Clause at greater odds with each other. As to “aesthetically pleasing,” who knows what to make of that?

¹⁷⁹ See generally, for example, Pollack, 80 Neb L Rev 754 (cited in note 12); Malla Pollack, *Unconstitutional Incontestability? The Intersection of the Intellectual Property and Commerce Clauses of the Constitution: Beyond a Critique of Shakespeare Co. v. Silstar Corp.*, 18 Seattle U L Rev 259 (1995).

¹⁸⁰ See Pollack, 80 Neb L Rev at 758 (cited in note 12). She relied on contemporaneous newspapers and dictionaries to support this usage with examples, including “the progress of a fire.” *Id.* at 799.

“Idea of Progress” literature but somehow missed the *Encyclopédie* as the major intellectual event of the Enlightenment.¹⁸¹

Professor I. Bernard Cohen offered an alternative reading of the IP Clause, in which the Framers authorized Congress to promote the progress of “science” as “those theoretical or general principles of practice that are associated directly with useful inventions or that lead to economic benefits or financial rewards.”¹⁸² He was baffled by what copyright has to do with either science or the useful arts, which is surprising given the importance of publications in science. Cohen equated “discoveries” with patentable inventions, but he cited Chambers’s *Encyclopedia* and Johnson’s *Dictionary*, not Diderot’s *Encyclopédie*.¹⁸³ He collapsed “discoveries” into “inventions” based on Latin roots, showing that both authors and inventors produce the former, but his interpretation left no role for “writings.”¹⁸⁴ Disappointingly, he was skeptical of fixing a meaning of “arts.”¹⁸⁵ Yet he did a nice job (re)establishing the broader, older senses of “science” and “art.”¹⁸⁶ He astutely pointed out that the Framers “introduced

¹⁸¹ See *id.* at 803–09. She cited Turgot and Condorcet but implied that they could not have been influences because English translations were not available until 1787. See *id.* at 803–05 & n 237. This is irrelevant, however, as Madison, Jefferson, Franklin, and others were conversant in French and owned copies of French works. See Spurlin, *The French Enlightenment in America* at 45–48 (cited in note 17).

¹⁸² I. Bernard Cohen, *Science and the Founding Fathers* 308 (Norton 1995). Note that this summary of the IP Clause’s purpose actually appears in Supplement 11 of the book. Cohen found two powers in the IP Clause, but they are not the standard ones. Rather, he disaggregated the preamble from the rest of the Clause: Congress has the powers (1) to promote the progress of science and useful arts, and (2) to secure for limited times to authors and inventors the exclusive right to their respective writings and discoveries. See *id.* at 241. While intriguing, and later echoed to some degree by Walterscheid, this reading makes no sense grammatically, as it ignores the connecting term “by.”

¹⁸³ *Id.* at 306. Cohen claimed that Chambers’s *Encyclopedia* was “the foremost scientific dictionary in English at the time of the Constitution,” which may be technically true, but only based on the qualifier “in English.” *Id.* It was also a missed opportunity for Cohen, as the *Encyclopédie* entry on “discovery” supports an argument that he made: namely, that “discoveries” (really, the principles of practice associated with an invention) are a class of particularly important inventions. See text accompanying notes 346–48.

¹⁸⁴ *Inventor* is itself a Latin term meaning “one who finds out, a contriver, author, discoverer.” The Latin noun *inventor* is derived from the Latin verb *invenio*, which means, in its strictest sense, “I come upon, ‘I find,’ ‘I discover.’” Cohen, *Science and the Founding Fathers* at 241 (cited in note 182).

¹⁸⁵ *Id.* at 306–07. Again, he ignored the dominant French *Encyclopédie*—with its extensive, highly influential, and separately published entry on “art”—in favor of Chamber’s anemic discussion in the English *Encyclopedia*: “[A]n ‘art and a science . . . only seem to differ as less and more pure.” *Id.* at 306.

¹⁸⁶ “Science” could include any systematic treatment of the knowledge or skills related to a field of human endeavor. “Art” could include the ability to do any task requiring skill and, perhaps, training.

‘practical [useful] arts’ rather than simply ‘arts’” so as to stress the practical (versus theoretical) nature of what they contemplated.¹⁸⁷

In 1998, in *State Street Bank & Trust Co v Signature Financial Group, Inc.*,¹⁸⁸ the Federal Circuit rejected the claim that there is a business-method exception to patent eligibility,¹⁸⁹ eliciting strong critiques from the academy. Professor John Thomas obliquely referenced the IP Clause by seeking to limit patentable subject matter to the “useful arts.”¹⁹⁰ Pollack also responded to *State Street* with a multipronged approach against business-method patents based both on her notion of “progress” as well as claims that they were historically disfavored.¹⁹¹ At the same time, her definition of “useful arts” was helpful in resurrecting the notion of *art* as skills or rules to manipulate physical materials.¹⁹²

That same year, Congress passed the Copyright Term Extension Act of 1998¹⁹³ (CTEA), which extended the term of copyright by twenty years.¹⁹⁴ Public domain advocates decried it as the “Mickey Mouse Protection Act” and sought relief under the IP Clause.¹⁹⁵ CTEA backlash also brought to the fore a simmering debate over whether the Uruguay Round Agreements Act¹⁹⁶ (URAA), which restored copyright protection for certain foreign works, was constitutional.¹⁹⁷ Both Cardozo Law School and Loyola

¹⁸⁷ Cohen, *Science and the Founding Fathers* at 308 (cited in note 182).

¹⁸⁸ 149 F3d 1368 (Fed Cir 1998).

¹⁸⁹ *Id.* at 1375–76. The business-method exception is the notion that business methods are categorically excluded from patentable subject matter.

¹⁹⁰ See Thomas, 40 BC L Rev at 1142 (cited in note 46) (arguing that “the constitutional directive that patents apply to the ‘useful Arts’ . . . cabin[s] the extent of patentable subject matter”). But other than equating the “useful arts” with the “technological arts,” as others had done, Thomas could not really give a working definition that included “technology” and excluded aesthetic creations. See *id.* at 1140 nn 11–12, 1163–75.

¹⁹¹ See Pollack, 28 Rutgers Computer & Tech L J at 66–69 (cited in note 86). In part, she argued that the “useful arts” did not include “commerce,” and thus business methods were not patent-eligible subject matter. See *id.* at 119.

¹⁹² See *id.* at 86–87.

¹⁹³ Pub L No 105-298, 112 Stat 2827.

¹⁹⁴ See CTEA § 102, 112 Stat at 2827 (changing the statutory copyright term from fifty to seventy years).

¹⁹⁵ Critics claimed that Congress extended the term in great part due to lobbying by the Disney Company, which wanted to protect its foundational Mickey Mouse (Steamboat Willie) character, whose copyright term was coming to an end. See, for example, Paul M. Schwartz and William Michael Treanor, *Eldred and Lochner: Copyright Term Extension and Intellectual Property as Constitutional Property*, 112 Yale L J 2331, 2333 (2003).

¹⁹⁶ Pub L No 103-465, 108 Stat 4809 (1994).

¹⁹⁷ Others countered that the two acts were simply necessary to bring the United States into compliance with the Berne Convention. See, for example, Shira Perlmutter,

Los Angeles Law School each published a symposium on these constitutional questions.¹⁹⁸

In 2003, the Supreme Court upheld the CTEA,¹⁹⁹ prompting another set of scholarly responses.²⁰⁰ Staying within the Anglo-centric narrative, the Court seemed careful to cite British antecedents only for congressional acts and not for the IP Clause itself. In dissent, Justice John Paul Stevens reversed the progress goals, using “promote the useful arts” for copyright,

Participation in the International Copyright System as a Means to Promote the Progress of Science and Useful Art, 36 Loyola LA L Rev 323, 333 & n 33 (2002).

¹⁹⁸ See generally, for example, Jane C. Ginsburg, et al, *The Constitutionality of Copyright Term Extension: How Long Is Too Long?*, 18 Cardozo Arts & Enter L J 651 (2000); Symposium, *Eldred v. Ashcroft: Intellectual Property, Congressional Power, and the Constitution*, 36 Loyola LA L Rev 1 (2002). Notably, Professor Lawrence Solum analyzed the IP Clause afresh in the Loyola symposium. See Lawrence B. Solum, *Congress's Power to Promote the Progress of Science: Eldred v. Ashcroft*, 36 Loyola LA L Rev 1, 12 & n 59, 37 & n 112 (2002). Oddly, he seemed unaware of the details of the extensive IP Clause literature even though he mentioned reviewing it. While not citing Walterscheid, he followed the latter by arguing that “progress” applies only to “science.” See *id* at 11–14. Employing what he called a “parallel construction” structure (really just the balanced-sentence interpretation), Solum posited that “science” is “systematic or grounded knowledge of enduring value,” *id* at 51, while “writings” includes the information-based objects covered by the 1790, 1802, and 1831 Acts. See *id* at 43. Separately, a strand of literature developed around whether the IP Clause—and perhaps other parts of the Constitution—were expressly designed as antimonopoly protections. Compare Tyler T. Ochoa & Mark Rose, *The Anti-monopoly Origins of the Patent and Copyright Clause*, 49 J Copyright Society 675, 694–95 (2002), with Thomas B. Nachbar, *Intellectual Property and Constitutional Norms*, 104 Colum L Rev 272, 328–49 (2004).

¹⁹⁹ *Eldred v Ashcroft*, 537 US 186, 221–22 (2003).

²⁰⁰ See, for example, Edward C. Walterscheid, *Musings on the Copyright Power: A Critique of Eldred v. Ashcroft*, 14 Albany L J Sci & Tech 309, 326 (2004) (arguing that the IP Clause preamble was both its own grant of power and a device that limited the exclusive rights that Congress could grant under the body of the Clause); Edward C. Walterscheid, *The Preambular Argument: The Dubious Premise of Eldred v. Ashcroft*, 44 IDEA 331, 379 (2004) (same); Malla Pollack, *The Democratic Public Domain: Reconnecting the Modern First Amendment and the Original Progress Clause (a.k.a. Copyright and Patent Clause)*, 45 Jurimetrics J 23, 28–30 (2004) (arguing again that “progress” meant only “diffusion” and that the IP Clause must be read in conjunction with the First Amendment). Pollack again mentioned the French *philosophes* Turgot and Condorcet to claim that their view of “progress” was in this knowledge-diffusion sense. See *id* at 30–31. She then improperly applied this view to Enlightenment thinkers generally. See *id* at 29–31. Some commentators supported the Supreme Court’s position. See, for example, Schwartz and Treanor, 112 Yale L J at 2414 (cited in note 195) (arguing that *Eldred* was properly decided on a rational-basis review). Schwartz and Treanor provided their own historical account of the IP Clause, rejecting the monolithic approach of some commentators, especially those advancing the antimonopoly argument. See *id* at 2378 n 271. They also underscored the gap between the concerns over copyright in Britain with the very different economic environment in America, which they argued likely led to the Framers having very different motivations and goals than Parliament. See *id* at 2332 n 3.

while attributing this result to the government as respondent.²⁰¹ Justice Breyer, dissenting on the ground that the term extensions were tantamount to creating “perpetual” copyrights, engaged in some dubious historicizing to support what was essentially a policy argument.²⁰²

In the wake of *Eldred v Ashcroft*,²⁰³ IP Clause scholarship seemed to give accounts of the Clause independent of any single contemporary hot topic. Professor Dotan Oliar has recently provided persuasive arguments supporting the idea that the IP Clause preamble limits the remainder of the Clause.²⁰⁴ But he makes the presentist error of relying on a modern definition of “discoveries.”²⁰⁵ He accepts a modified version of the “science as

²⁰¹ *Eldred*, 537 US at 228 (Stevens dissenting). However, the government’s brief showed no such reversal or confusion. See generally Brief for Respondent, *Eldred v Ashcroft*, Docket No 01-618 (US filed Aug 5, 2002) (available on Westlaw at 2002 WL 1836720).

²⁰² *Eldred*, 537 US at 243 (Breyer dissenting). For example, he misleadingly juxtaposed a British citation and the IP Clause’s purpose: “The Clause authorizes a ‘tax on readers for the purpose of giving a bounty to writers.’” Id., quoting 56 Parl Deb (3d Ser) 341, 350 (1841) (Lord Macaulay). But read in the original source, Lord Macaulay’s quote concerns British copyright law in 1841, not the American IP Clause. See Copyright Bill, 56 Parl Deb (3d Ser) 341; A Speech Delivered on Serjeant Talfourd’s Copyright Bill, 56 Parl Deb (3d Ser) 341, 344–57 (1841) (speech of Lord Macaulay). Breyer appears to have been fixated on this quote and its implied perspective on copyright ever since he made it the first sentence of his famous 1970 law review article. See Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 Harv L Rev 281, 281 (1970).

²⁰³ 537 US 186 (2003).

²⁰⁴ See Dotan Oliar, *Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress’s Intellectual Property Power*, 94 Georgetown L J 1771, 1771 (2006) (refuting the widely held belief that the Framers intended the preamble to be nonbinding); Oliar, 57 UCLA L Rev at 445 (cited in note 46). Oddly, Oliar bluntly rejects the balanced-sentence interpretation as “doubtful” and regards the disjunctive-preamble version of it as “[e]specially indefensible,” all without any compelling new evidence against it. Oliar, 94 Georgetown L J at 1823.

²⁰⁵ See Oliar, 94 Georgetown L J at 1798 (cited in note 204) (distinguishing “discoveries” from “inventions”). Thus, Oliar claims that “discoveries” cannot be synonymous with “useful arts,” as Walterscheid asserted. Id. at 1809. But Oliar does not link “discoveries” to “authors” and “writings” either. So there are no protectable things linked to the useful arts, and inventors have no output except for writings and (scientific) discoveries. At the same time, he argues that, once the Framers decided not to authorize payments from the government (by rejecting the encouragements proposals), “useful arts” became something that could have market value to make the exclusive-rights approach work. See id. at 1777, 1809. This hopelessly mixes up terms in the preamble and the body and, at any rate, means that “discoveries” should have appeared nowhere in the IP Clause (or, perhaps, should have been placed in the preamble). Further, he implies that the terms “science” and “arts” (without the qualifier “useful”) come from Pinckney’s education proposal. See id. at 1794. But Pinckney’s “arts and sciences” in the education context is really not the same as “science and useful arts” as used in the exclusive-rights context of the IP Clause. Further, Oliar takes the sometimes-blurred boundaries between “sciences”

learning/knowledge” thesis that “lean[s] more towards ‘useful’ knowledge and away from more abstract types of knowledge.”²⁰⁶ Professors Craig Nard and Andrew Morriss consider the IP Clause in their historical look at “constitutionalizing patents” as a public-choice story.²⁰⁷ But while they canvass a number of Continental systems for influences, Nard and Morriss unfortunately rely on secondary sources that do not evince such connections.²⁰⁸

Other recent articles do not expressly address the IP Clause, but they do show important historical connections between American and French patent law from the time of the Framing through the first American patent and copyright statutes. For example, Professor Mario Biagioli argues that the introduction of a formal enabling specification in American and French patent law at around the same time helped citizens of each country to reframe their relationship with their governments.²⁰⁹ Similarly, Professor John Duffy wrote an intriguing

and “art” to claim that “there was no dichotomous distinction between ‘science’ and ‘useful arts’ in 1787, just as there is none today.” Oliar, 57 *UCLA L Rev* at 466 (cited in note 204). But this is a common misunderstanding of the reasonably clear historical relationship between “science” and “art” that is outlined in Part II of this Article.

²⁰⁶ Oliar, 94 *Georgetown L J* at 1809 (cited in note 204). This leads to another odd error. Oliar states that: “The Copyright Act of 1790 . . . listed maps as copyrightable subject matter, although to the extent that they are factual works they would not be protected today.” *Id.* at 1809 n 188. This is an incorrect statement of current copyright law. But it is driven by Oliar’s other perplexing comment that “useful knowledge at the time of the Framing does not seem to have been limited to what is currently engulfed by copyrightable expression.” *Id.* at 1809. He gives examples of the term “author” being used for “inventor,” but it is unclear how this helps his arguments. See Oliar, 57 *UCLA L Rev* at 469 (cited in note 204). Arguably, this actually undercuts his position: if “author” included “inventor” (which was in fact a historical use of “author”), then why were both terms used? The IP Clause could simply read, “To promote the progress of science and useful arts, by securing for limited times to authors the exclusive right to their writings and discoveries.”

²⁰⁷ Craig Allen Nard and Andrew P. Morriss, *Constitutionalizing Patents: From Venice to Philadelphia*, 2 *Rev L & Econ* 223, 312 (2006). Nard and Morriss use the term “constitutionalizing patents” to signify codification and bureaucratization of a patent system. *Id.* at 224.

²⁰⁸ The authors appear to have considered the French, Dutch, German, and even later Italian experiences with patents and privileges, but the authors simply dismiss these experiences in the secondary sources that they rely on. See *id.* at 260 n 147, citing Harold G. Fox, *Monopolies and Patents: A Study of the History and Future of the Patent Monopoly* 28 (Toronto 1947), William Hyde Price, *The English Patents of Monopoly* 4 (Houghton Mifflin 1906).

²⁰⁹ See Mario Biagioli, *Patent Republic: Representing Inventions, Constructing Rights and Authors*, 73 *Soc Rsrch* 1129, 1132 (2006). In essence, Biagioli links a move to textual representation of patented inventions in patent disclosure to the move to representative government. He also emphasizes the temporary unity of France and America—and disconnect from Britain—that resulted when France and America radically altered

history of the “invention” doctrine that traces part of the 1793 amendments to the Patent Act to a provision of the French Patent Act of 1791.²¹⁰

A recent book with a promising title presents a confused take on the IP Clause.²¹¹ *Copyright Law and the Progress of Science and the Useful Arts* uses the IP Clause as a springboard to create a socially just cultural-production theory of copyright.²¹² But its interpretation of the IP Clause does not actually support its themes.²¹³ Ultimately, the book simply does what many modern courts and commentators do: it ignores the word “useful” in order to reverse the original referents of the terms so that the preamble simply matches today’s senses of “science and the arts.”²¹⁴

their governments and patent systems. See *id.* at 1137–38. But he does not make the connection to the *Encyclopédie* as a key impetus for codification of the arts and sciences.

²¹⁰ *Décret relatif aux brevets à accorder aux auteurs des découvertes (Decree concerning Patents to be Granted to the Authors of Discoveries)*, in *Collection générale des décrets rendus par l'Assemblée Nationale (General Collection of Decrees Rendered by the National Assembly)* 1464 (Baudoin 1791). See also generally John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 *Tex L Rev* 1 (2007). The French provision was an exception to patentability for purported inventions that simply changed the form or proportions of an existing machine or manufacture. See *id.* at 36. Duffy notes that, while French commentators have long been aware of this American derivation of their law, American commentators have “remained oblivious.” *Id.*

²¹¹ See generally Alina Ng, *Copyright Law and the Progress of Science and the Useful Arts* (Elgar 2011).

²¹² See *id.* at 32.

²¹³ Starting from the dubious premise that “[t]he terms ‘science’ and ‘the useful arts’ in the clause have fairly settled meanings in the literature,” Ng explains that:

While the colonial usage of the term “useful arts” referred to scientific inventions that were to be protected by patent laws requiring proof of novelty, the word “science” was taken to mean an organised system of knowledge that was the product of authorship and was to be protected by copyright laws.

Id. at 24–25. To the extent that there is a majority position on these terms in the IP Clause literature, it does not match her definitions. “Useful arts” are most commonly equated with “technological arts,” not “scientific inventions” (whatever those are). *Id.* at 25 (introducing the term “scientific inventions”). See also Coulter, 34 *J Patent Office Society* at Part II at 498 (cited in note 128) (“The technological arts are the ‘useful arts.’”). “Science” is most commonly defined as “learning in general,” not Ng’s narrower authorship in “an organised system of knowledge.” Ng, *Copyright Law and the Progress of Science and the Useful Arts* at 25 (cited in note 211). See also De Wolf, *An Outline of Copyright Law* at 15 (cited in note 84) (“[N]atural science [means] learning in general.”). Ng’s definition of “science” is better than that of “learning in general,” but it is not the majority position, let alone the consensus. Both of these terms, then, point away from the aesthetic sociocultural productions in the (fine) arts that she sought to advance through copyright law.

²¹⁴ See, for example, Ng, *Copyright Law and the Progress of Science and the Useful Arts* at 38 (cited in note 211) (“In general terms, *the progress of science and the arts* can be taken to mean the advancement of culture and society.”) (emphasis added). It is true

In 2013, the Supreme Court again rejected an argument for a limitation on Congress's IP Clause power in *Golan v Holder*.²¹⁵ Culminating litigation over the URAA, the Court upheld the Act and its restoration of copyright for foreign authors.²¹⁶ The Court implicitly reaffirmed the full balanced-sentence interpretation, stating that, “[p]erhaps counter-intuitively for the contemporary reader, Congress’ copyright authority is tied to the progress of science; its patent authority, to the progress of the useful arts.”²¹⁷ Justices Stephen Breyer and Samuel Alito dissented on the ground that the IP Clause focuses *only* on incentives to create, and the URAA would not lead to the creation of even one new work.²¹⁸ However, they agreed with the majority’s embrace of the balanced-sentence interpretation, which aligns copyright with “science.”²¹⁹

Since 2013, two scholars have offered interesting new interpretations of “science” and “useful arts.” Professor Ned Snow introduces a more historically accurate sense of “science” than the modern “knowledge in general” interpretation, but he still views the historical evidence through a largely modern perspective on “science.”²²⁰ In particular, he seems to fall prey to the popular misconception that “science” can be defined as any activity that follows “the” scientific method (in Snow’s case, this appears to be an undefined combination of “reason and experience”).²²¹ Interpreting the IP Clause, he also puts too much weight on the singular “science”—which he contrasts with the plural “useful arts”—to argue that the Framers must have meant “science” as

that Ng sometimes toggles back to “science and useful arts,” but it is contextually clear that she still means “science and the arts.” See, for example, *id* at 55 (arguing that “whether [] property rights take the form of private or common property is not important as long as literary and artistic works are produced for society for the purposes of advancing science and the useful arts”). This allowed her to construe “progress” as “social and cultural progress.” *Id.* But this is likely not the “progress” that the Framers envisioned. Instead, Enlightenment “progress” was largely in the sense of objective, often quantifiable, progress in a particular field. See Part III.

²¹⁵ 132 S Ct 873, 894 (2012) (determining that the matter should be resolved by Congress, not the Court).

²¹⁶ *Id.* at 878.

²¹⁷ *Id.* at 888.

²¹⁸ *Id.* at 902–03 (Breyer dissenting).

²¹⁹ See *Golan*, 132 S Ct at 899 (Breyer dissenting).

²²⁰ See generally Ned Snow, *The Meaning of Science in the Copyright Clause*, 2013 BYU L Rev 259.

²²¹ See *id.* at 278. Modern history and philosophy of science have long since dispensed with any notion of a singular “Scientific Method.”

a comprehensive system that includes all branches of learning.²²² While he is careful to make this broader than the modern natural or physical sciences—and thus includes the possibility of things such as a science of government or of morality²²³—he nonetheless seems to require these to be formal branches of study. In the end, he approaches but ultimately misses the more straightforward, long-standing meaning of “science” as external, systematic study of an activity or phenomenon.²²⁴ He also misses the fundamental roots of “to know” and “knowledge” as encompassing only statements that are certain or objectively true, as opposed to statements of mere belief or opinion.²²⁵ While Snow admirably seeks to inject some much-needed contextual intellectual history into these debates, the only contemporary source other than dictionaries that he cites is Ephraim Chambers’s English-language *Encyclopaedia*;²²⁶ Snow fails to mention Diderot and d’Alembert’s *Encyclopédie*, which had eclipsed Chambers’s work by the time of the Framing. Curiously, Snow’s real mission is to argue that obscene and other writings that do not merit First Amendment protection may not fall within the subject matter set forth in the IP Clause.²²⁷ But his arguments, like mine, have much larger implications and challenge all manner of creative works as IP Clause “writings.”²²⁸

Professor Emily Michiko Morris does not seek to directly interpret “useful arts” in the IP Clause, but rather she provides an interesting angle on the term in the course of defining “technology.”²²⁹ Although she uncritically accepts the twentieth-century

²²² See id at 296–300.

²²³ See id at 278.

²²⁴ Snow cites Solum for the idea of science as systematic study but minimizes Solum’s contribution because it was focused on a different end point. See Snow, 2013 BYU L Rev at 271 n 45 (cited in note 220).

²²⁵ Snow is in good company, as the many champions of “science” as “knowledge in general” implicitly rely on this definition to justify the inclusion of pretty much any expression as “science” and hence as copyrightable subject matter. See, for example, Oliar, 94 Georgetown L J at 1809 (cited in note 204). But the classical origins of the term “knowledge” are best summarized by the long-standing—yet contested—construct of “justified true belief.” See Part III.A. See also Matthias Steup, *Epistemology* (Stanford Encyclopedia of Philosophy, Dec 14, 2005), archived at <http://perma.cc/S4JB-H7E4>.

²²⁶ See Snow, 2013 BYU L Rev at 295 n 132 (cited in note 220).

²²⁷ See id at 259.

²²⁸ Snow pushes this theme further in Ned Snow, *The Regressing Progress Clause: Rethinking Constitutional Indifference to Harmful Content in Copyright*, 47 UC Davis L Rev 1 (2013).

²²⁹ See generally Emily Michiko Morris, *What is “Technology”?*, 20 BU J Sci & Tech L 24 (2014).

convention of equating “useful arts” with “technology” or “technological arts,” Morris nonetheless implicitly reconnects “technology” with the older sense of “art” when she defines the former as “artifice plus action.”²³⁰ The problem with her definition, however, is that it provides no real boundary between what she seeks to capture—the modern popular sense of “technology” as engineered gadgets or science-based practical methods or products—and works of modern art that use electronic or other active components in such a way that “new operation[s] or activity[ies]” result.²³¹ Further, Morris’s definition is intentionally modern, and she makes no real effort to ground it in history or an originalist interpretation of the IP Clause. Instead, she is content to assume that “technology” is what the Framers meant by “useful arts,” and thus we need only to define “technology” (in the present day).

II. THE FRENCH ENLIGHTENMENT AND THE *ENCYCLOPÉDIE* AS THE LEADING INTELLECTUAL FRAMEWORK OF THE LATE EIGHTEENTH-CENTURY WEST

This Part²³² first briefly overviews the historical development of the terms and concepts “science” and “arts.” It then reviews the origins and scope of the Enlightenment’s “progress project.” Finally, it examines the *Encyclopédie* and its treatment of key terms that appear in the IP Clause.

A. Historical Development of “Science” and “Arts”

While the roots for “art” are the Latin *arti* and *ars*,²³³ the latter were translations of the Greek *techné*.²³⁴ The meaning of

²³⁰ See *id.* at 24.

²³¹ See *id.* at 25. For an example of modern art fitting this definition, see James Coupe and Juan Pampin, *Sanctum* (Henry Art Gallery), archived at <http://perma.cc/6H9C-DNVW>.

²³² Parts II.A through II.C are summarized from my discussions of “art” and “science” elsewhere. See generally O’Connor, *Method+ology* (cited in note 59).

²³³ *Webster’s New International Dictionary of the English Language* 155 (Merriam 2d ed unabridged 1956).

²³⁴ Cicero is credited with translating *techné* as *ars* as part of his quest to introduce classic Greek philosophy to his fellow Romans by translating it into Latin. See John Dugan, *Cicero’s Rhetorical Theory*, in Catherine Steel, ed, *The Cambridge Companion to Cicero* 27, 27 (Cambridge 2013) (“Cicero emphasizes in *De inventione* that he is composing an *ars*, meaning both ‘art’ and ‘handbook’, . . . where *ars* is a Latin calque for the Greek *techné*.”). *Techné*, in turn, descended from the Indo-European root *tek*, meaning “to fit together the woodwork of . . . a house.” David Roochnik, *Of Art and Wisdom: Plato’s Understanding of Techné* 19 (Penn State 1996).

techné was established by the time of the pre-Socratics (circa 500 BCE).²³⁵ Each field of *techné* comprised a determinate area of expertise and *telos* (goal) at which it aimed. *Techné* was closely associated with man's control over his environment, playing a central role in Greek stories such as *Prometheus Bound*.²³⁶ The five criteria required of a *techné* emphasized its objective, rational, rule-based orientation: exactitude, control, reliability, teachability, and certifiability.²³⁷ While artisans were valued for their control of natural elements and "practical wisdom" (*sophos*), they were often low in the social order—in many cases even slaves.²³⁸

Plato contrasted *techné* with the fuzzy, intuition-based activities that we think of as the fine arts today.²³⁹ Such activities are the antithesis of *techné*: the inspired poet succumbs to "divine madness" and "goes out of his mind and his intellect is no longer in him" as he channels spirits or muses.²⁴⁰ At the same time, Plato occasionally seemed to conflate *techné*, as practical methods or "know-how," with *epistemé*, as theoretical knowledge about the world or "knowledge that."²⁴¹

Aristotle clarified the *telos* that a *techné* must have by distinguishing those arts for which the means itself is the end (for example, flute playing) from "productive" arts in which the means produce something else (for example, brickmaking).²⁴² Almost anything, including the practice of economics, could be a *techné*.²⁴³ He was less concerned than Plato with the role of

²³⁵ See G.E.R. Lloyd, *The Definition, Status and Methods of the Medical Τεχνη in the Fifth and Fourth Centuries*, in A.C. Bowen, ed, *Science and Philosophy in Classical Greece* 249, 256 (Garland 1991).

²³⁶ See Roochnik, *Of Art and Wisdom* at 4 (cited in note 234).

²³⁷ See id at 5.

²³⁸ See Paul Oskar Kristeller, *The Modern System of the Arts: A Study in the History of Aesthetics Part I*, 12 *J Hist Ideas* 496, 502–03 (1951). For example, Plutarch states that Archimedes would not write about his significant mechanical inventions because he regarded the "work of an engineer and every art that ministers to the needs of life as ignoble or vulgar." Plutarch, *Plutarch's Lives* 479 (Cambridge 1917) (Bernadotte Perrin, trans). Additionally, many textile weavers were slaves. See Wesley Thompson, *Weaving: A Man's Work*, 75 *Classical World* 217, 221 & n 13 (1982).

²³⁹ See Tom Angier, *Techné in Aristotle's Ethics: Crafting the Moral Life* 13–19 (Continuum 2010).

²⁴⁰ Id at 16–17. The masterful orator likewise is not a *technité*: "That's not a *techné* you've mastered—speaking well about Homer; it's a divine power that moves you." Id.

²⁴¹ See id at 17–18.

²⁴² Aristotle, *Nicomachean Ethics* book I.i.1–3 at 3 (Harvard 1926) (H. Rackham, trans).

²⁴³ For example, Aristotle stated that, "as there are many . . . *technai*,] . . . their ends are also many; the end of the medical art is health, that of shipbuilding a vessel,

divine madness and more concerned with that of chance.²⁴⁴ Aristotle distinguished “practical wisdom” (*phronésis*), which was directed to *techné* and all contingent and changeable things in the world, from “theoretical wisdom” (*sophia*), which was directed to *epistémé* and the strictly necessary and unchanging aspects of the world.²⁴⁵ Aristotle believed the contemplative life seeking *sophia* to be the highest calling and accordingly privileged “liberal arts” (activities of the mind fit for free [*liberalis*], high-status men) over “mechanical arts” (or “visceral arts”).²⁴⁶ Aristotle also developed his doctrine of “habituation” for training ethical individuals through a “learn by doing” approach by reference to artisan apprenticeships.²⁴⁷

Sometimes, Plato and Aristotle appear to have conflated *techné* and *epistémé*. But this is because they likely were speaking of two kinds of “knowledge.” Later philosophers would distinguish these as “knowledge how” or “know-how” (*techné*) and

that of strategy victory, that of economics wealth.” Angier, *Techné in Aristotle’s Ethics* at 37 (cited in note 239).

²⁴⁴ It is chance that undermines the claims of medicine as a *techné*. There are too many intervening contingencies to allow the physician to have the kind of determinate success in healing that a master carpenter would have in creating furniture. See Angier, *Techné in Aristotle’s Ethics* at 38 (cited in note 239) (“[I]nsofar as *techné* is genuinely present, it . . . exclude[s] chance, along with the unreliability and unpredictability associated with the latter.”). Aristotle’s solution was that a field is still a *techné* so long as the application of its systematic, rational rules allows the artisan to “aim at” (*stochastiké*) the desired result with a greater probability of success than the amateur (who relies solely on chance).

²⁴⁵ Because only contingent things can be changed, one must know what is contingent and what is necessary. Thus, all should seek *sophia* so as to avoid vainly trying to change the unchangeable. See Aristotle, *Nicomachean Ethics* book VI.v.3–4 at 337 (cited in note 242). In modern times, this is captured in Reinhold Niebuhr’s *Serenity Prayer*: “God grant me the serenity to accept the things I cannot change, / Courage to change the things I can change, / And the wisdom to know the difference.” Kent S., *Darkest before the Dawn*, 16 Utah Bar J 2d 16, 18 n 4 (2003) (attributing the prayer to Niebuhr but noting that Niebuhr may have attributed it to Friedrich Oetinger).

²⁴⁶ See Angier, *Techné in Aristotle’s Ethics* at 66–78 (cited in note 239). While happiness (*eudaimonia*) results from individuals performing their appointed function (*ergon*), Aristotle may have been speaking only of *technités* qua *technités*, not as fully flourishing humans. Notwithstanding, this sense of satisfaction in fulfilling one’s function was given a modern gloss in the concept of “flow.” See generally Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience* (Harper & Row 1990). The debate over the relative values of *sophia* and *phronésis* arguably continues in the tension between “pure” and “applied” science from the nineteenth century to the present. See Peter Dear, *What Is the History of Science the History Of? Early Modern Roots of the Ideology of Modern Science*, 96 *Isis* 390, 401–02 (2005).

²⁴⁷ See Angier, *Techné in Aristotle’s Ethics* at 106 (cited in note 239) (“[V]irtues we get by first exercising them . . . for the things we have to learn before we can do, we learn by doing.”).

“knowledge that” (*epistémê*).²⁴⁸ The distinction is critical for understanding the difference between “art” and “science” as well as for grasping how Francis Bacon and then the *encyclopédistes* sought to distinguish the kind of muscle memory that we can develop as we train our bodies to perform tasks from the kind of cognitive memory that we develop through purely reflective or mental activities.

The distinction between and interaction of these two things may be explained by modern research on the relationship between “declarative” and “procedural” knowledge in neuroscience and experimental psychology. While philosophers have long tried to reduce knowledge-how to knowledge-that (and vice versa), the two may in fact be separate, but interacting, processes. Thus, philosopher Marcus Adams persuasively argues that the cognitive science functions of declarative knowledge and procedural knowledge map onto knowledge-that and knowledge-how, respectively.²⁴⁹ Declarative knowledge and procedural knowledge arise in different parts of the brain, come about through different processes, and are double dissociated.²⁵⁰ The former consists of abstract mental constructs that are plastic, can be generalized and combined, and can be conveyed entirely through language. The latter consists of “muscle memory” (such as the physical ability to ride a bicycle) that is rigid, cannot be generalized, and is impossible to convey through language alone—dependent instead on demonstration and practice. Citing research on “representational redescription”—which suggests that much declarative knowledge starts as procedural knowledge—Adams argues

²⁴⁸ See, for example, Gilbert Ryle, *Knowing How and Knowing That: The Presidential Address*, 46 *Proceedings of the Aristotelian Society* 1, 4–5 (1946); Ephraim Glick, *Two Methodologies for Evaluating Intellectualism*, 83 *Phil & Phenomenological Rsrch* 398, 407–11 (2011).

²⁴⁹ See Marcus P. Adams, *Empirical Evidence and the Knowledge-That/Knowledge-How Distinction*, 170 *Synthese* 97, 111–12 (2009).

²⁵⁰ See *id.* at 104–05. Declarative knowledge is stored in the hippocampus and related structures in the medial temporal lobe. See *id.* at 107. Procedural knowledge is distributed throughout other parts of the brain. See *id.* Evidence that these two types of knowledge are double dissociated comes from observations that individuals with impairment in one type of knowledge can still fully engage in the other. See *id.* For example, amnesiacs with damage to the hippocampus and related structures (which store declarative knowledge) can still act on and improve their procedural knowledge. See *id.* Likewise, individuals with Parkinson’s or Huntington’s disease have difficulty acquiring or performing procedural knowledge, even as they are still fully able to acquire or recall declarative knowledge. See *id.* at 108.

that the two memory systems work together.²⁵¹ Rigid, particular procedural knowledge can be abstracted into declarative knowledge.

It should be clear that “art” in antiquity bore little resemblance to how we use that term today.²⁵² What we consider the five fine arts today—music, poetry, painting, sculpture, and architecture—were not linked in antiquity.²⁵³ Rather, music and poetry were part of the liberal arts, while painting, sculpture, and architecture constituted the “visual arts” subset of the “mechanical arts.”²⁵⁴ Some ancients classified painting and sculpture within the “imitative arts” (except architecture).²⁵⁵ But this category also contained sophistry, use of the mirror, magic tricks, and the imitation of animal voices.²⁵⁶ Parts of poetry, music, and dance shared the mysterious inspiration of Muses.²⁵⁷ However, much poetry was more closely associated with rhetoric and logic.²⁵⁸ Music theory, in its Pythagorean mathematical aspect, was considered *epistemé*. Aristotle distinguished the “arts of necessity” and the “arts of pleasure,” but the latter do not map onto the modern fine arts.²⁵⁹ Some modern writers have committed the presentist error of imposing current definitions of “art” and

²⁵¹ See *id.* at 110, citing Annette Karmiloff-Smith, *Beyond Modularity: A Developmental Perspective on Cognitive Science* 694 (MIT 1992), Annette Karmiloff-Smith, *Précis of Beyond Modularity: A Developmental Perspective on Cognitive Science*, 17 *Behavioral & Brain Sci* 693, 693 (1994) (describing “representational redescription”).

²⁵² Today it means the fine arts, minor or decorative arts, and other forms of creative expression.

²⁵³ See Kristeller, 12 *J Hist Ideas* at 506 (cited in note 238).

²⁵⁴ See *id.* at 502, 505.

²⁵⁵ See *id.* at 511 n 92.

²⁵⁶ See *id.* at 504.

²⁵⁷ See Kristeller, 12 *J Hist Ideas* at 501 (cited in note 238). This included the improvisational or purely creative composition functions. “Music” is actually originally derived from the Greek *μουσική* and the Muses, and it was originally a much broader term encompassing poetry and dance as well. Interestingly, there were no Muses for the visual arts in ancient times. See *id.* at 506. The now-familiar-visual-arts Muses were created by the allegorists of the early modern period. See *id.*

²⁵⁸ *Id.* at 508. “Poetry,” as a variant on the Greek *poiésis*, was not limited to rhyming or other verse as it is today. *Poiésis* was the much broader concept of “producing” any entirely new thing in the world, closer to the broad definition of “invention” that includes the creation of new devices in language, logic, or mathematics (as well as the creation of new machines or objects). See *id.* at 504 (noting that music and dance were treated as “parts of poetry” and not as “separate arts”).

²⁵⁹ *Id.* at 504, citing Aristotle, *Metaphysics*, in 8 *The Works of Aristotle* 981b(17) (Oxford 1908) (J.A. Smith and W.D. Ross, trans).

“beauty” on ancient writings in order to make it appear that the aesthetics-based fine arts concept existed in classical times.²⁶⁰

“Science” likewise has origins in antiquity. *Scientia* was the nominal form of *scire* (“to know”).²⁶¹ While modern English translations of ancient Greek writings often translate *epistemé* to “science,” this can be misleading.²⁶² *Scientia* is not synonymous with the modern sense of “science”; rather, it simply meant “knowledge,” as opposed to “belief” or “opinion.” Similar to *ars*, *scientia* was a Latin translation of a Greek term—in this case, *epistemé*.²⁶³ This may be part of the origin of the “learning in general” sense of “science” used in some of the IP Clause literature. However, the use of *scientia* changed significantly over the centuries.

By late antiquity, the notion of seven definitive liberal arts was established, including grammar, rhetoric, dialectic, arithmetic, geometry, astronomy, and music.²⁶⁴ Medicine and architecture were sometimes mentioned, but they were too close to the mechanical arts and were often practiced by slaves or low-status men. Sometimes the liberal arts were referred to as sciences.²⁶⁵ But this distinction simply signified the role of the field as “subject” or “object” for a given purpose. When practiced to

²⁶⁰ The term “beauty” centered on moral good for the ancients, as in “beautiful habits of the soul and [] beautiful cognitions.” Kristeller, 12 J Hist Ideas at 499 (cited in note 238). Think of terms like “beatify” and “beatific,” related to saintly behavior. See id.

²⁶¹ *Scire* arose from the much earlier Proto-Indo-European root *skei* (“to cut, divide, or otherwise separate or distinguish”). See *The American Heritage Dictionary of the English Language*, archived at <http://perma.cc/3C9S-MXZA>.

²⁶² See Stephen F. Brown, *Theology and Philosophy*, in F.A.C. Mantello and A.G. Riggs, eds, *Medieval Latin: An Introduction and Bibliographical Guide* 267, 280 (Catholic 1996) (referring to “*scientia*” as “Aristotle’s *episteme*”).

²⁶³ See id. at 280. *Epistemé* had a strong version and a weaker version in Greek philosophy. The strong version included only statements that could be demonstrated to be necessarily true (such as logical or mathematical propositions deducible from axioms) or that were believed to be invariably true (such as “laws of nature”). See Richard Parry, *Episteme and Techné* (Stanford Encyclopedia of Philosophy, Oct 28, 2007), archived at <http://perma.cc/L9C8-NCKB>. The weaker version could include contingently true statements based on inductive probabilities. See id.

²⁶⁴ See Kristeller, 12 J Hist Ideas at 505 (cited in note 238). Originally preliminary studies, the liberal arts became the sole curriculum for monastic and cathedral schools in the tumultuous times after the fall of Rome. See id. at 507. Capella’s *On the Marriage of Philology and Mercury* became the standard text for teaching the liberal arts through the Middle Ages. See William Harris Stahl, 1 *Martianus Capella and the Seven Liberal Arts* 22 (Columbia 1971) (referring to Capella’s text as “perhaps the most widely used schoolbook of the Middle Ages”).

²⁶⁵ See Kristeller, 12 J Hist Ideas at 514 (cited in note 238) (noting that, even in Renaissance Italy, “it was still apparent that the liberal arts were primarily sciences or teachable knowledge”).

achieve practical ends, the liberal arts were a subject and an “art.” When contemplated as part of systematic study, the liberal arts were an object and a “science.”²⁶⁶

In the Carolingian period, relative order and stability were restored, learning increased, and the liberal arts were split into the trivium (grammar, rhetoric, and dialectic) and the quadrivium (arithmetic, geometry, astronomy, and music).²⁶⁷ The reintroduction of Aristotle’s writings from the Islamic world in the twelfth and thirteenth centuries led scholars to revise the liberal arts to accommodate both philosophy (logic, ethics, and physics) and Aristotle’s divisions of knowledge.²⁶⁸ The new universities introduced medicine, jurisprudence, and theology as subjects outside the liberal arts.²⁶⁹ Hugo of St. Victor introduced a scheme of seven mechanical arts to correspond to the seven liberal arts.²⁷⁰ These subjects, however, were not taught within the universities.²⁷¹

Artisans who had traditionally been illiterate began receiving basic education and could now write descriptive accounts of their art.²⁷² For example, the twelfth-century Benedictine monk Theophilus gave a comprehensive treatment of the manner of preparing materials and working them into various artifacts in

²⁶⁶ This mapped onto the pre-scientific-revolution sense of science as any kind of systematic study of human activity or natural phenomena. See note 277 and accompanying text.

²⁶⁷ See Kristeller, 12 *J Hist Ideas* at 507–10 (cited in note 238); Edward Grant, *The Foundations of Modern Science in the Middle Ages: Their Religious, Institutional, and Intellectual Contexts* 33–43 (Cambridge 1996).

²⁶⁸ See Grant, *Foundations of Modern Science in the Middle Ages* at 43 (cited in note 267).

²⁶⁹ See *id.* at 35–37; Hannam, *God’s Philosophers* at 75 (cited in note 18). In fact, the first university, in Bologna, Italy, was exclusively a school of law. See *id.* at 74–75.

²⁷⁰ These consisted of *lanificium* (the working and weaving of wool), *armatura* (the making of arms and armor), *navigatio* (navigation), *agricultura* (agriculture), *venatio* (hunting), *medicina* (medicine), and *theatrica* (theater or drama). Architecture, sculpture, and painting were listed as subdivisions, or *lesser arts* (alternately, *minor arts*), within the mechanical art of *armatura*. See Kristeller, 12 *J Hist Ideas* at 520 & nn 126–29 (cited in note 238). The visual arts remained in the artisans’ guilds. See *id.* at 508. Painters were often associated with the druggists who prepared the paints, sculptors with goldsmiths, and architects with masons and carpenters. See *id.* at 507–08.

²⁷¹ This is curious, because the origin of the universities was as the *universitas* (the “whole” or “entirety”), denoting the collection of all artisans practicing a certain art or trade within a free city. See Grant, *Foundations of Modern Science in the Middle Ages* at 34–36 (cited in note 267).

²⁷² The rise of the monastic traditions and their emphasis on artisanal activities provided another source of literate artisans. See Pamela O. Long, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance* 78–88 (Johns Hopkins 2001).

On Divers Arts.²⁷³ But rather than provide principles that treated these techniques as *techné*, he described only their practical application.²⁷⁴ His work is translated as referring to these mechanical arts as “useful arts.”²⁷⁵ These developments coincided with the first “scientific revolution,” in which a kind of observational “experimentation” on natural phenomena was explored by Roger Bacon and others.²⁷⁶

Throughout the Middle Ages, “art” retained the broad meaning of any human activity.²⁷⁷ But it lost its *techné* sense and denoted *any* skills or techniques (procedural knowledge) used to manipulate mental or physical objects. The term *artista* emerged, but it meant simply the craftsman or the student of liberal arts.²⁷⁸ The notion of aesthetics had still not developed; *beauty* continued to be a measure only of moral goodness.

Also throughout the Middle Ages, “science” effectively reverted to its older Proto-Indo-European root’s meaning of “to cut/divide/distinguish” (*skei*).²⁷⁹ It became a general term meaning the knowledge that came from studying, observing, and analyzing—defined as dividing into constituent parts—a phenomenon or activity.²⁸⁰ “Science” was a reflective enterprise in which the inquirer sought to understand the phenomenon through analysis, without seeking to change or manipulate it. One could “make a science of” anything, including human activity.²⁸¹

²⁷³ See generally Theophilus, *On Divers Arts: The Treatise of Theophilus* (Chicago 1963) (John G. Hawthorne and Cyril Stanley Smith, trans).

²⁷⁴ Twentieth-century translators and editors of the *Treatise* interchangeably refer to the work as describing “art” and “technology.” See *id.* at xxvii–xxviii. But neither the term “technology” nor the concept existed during the period in which Theophilus wrote. See Long, *Openness, Secrecy, Authorship* at 2 (cited in note 272).

²⁷⁵ It is rewarding “to expend your efforts on the practice of divers useful arts.” Theophilus, *On Divers Arts* at 47 (cited in note 273). See also Long, *Openness, Secrecy, Authorship* at 86 (cited in note 272).

²⁷⁶ See Hannam, *God’s Philosophers* at 148–51 (cited in note 18).

²⁷⁷ See Kristeller, 12 *J Hist Ideas* at 508 (cited in note 238).

²⁷⁸ See *id.*

²⁷⁹ See note 247.

²⁸⁰ See Aristotle, *The Great Ethics of Aristotle* 119 n 1 (Transaction 2014) (Peter L.P. Simpson, trans). This could be a taxonomic enterprise that involved demarcation decisions about what the phenomenon was and how it could be distinguished from other phenomena.

²⁸¹ See Kristeller, 12 *J Hist Ideas* at 508–09 (cited in note 238) (describing Thomas Aquinas’s belief that “shoemaking, cooking, and juggling, grammar and arithmetic” are no less *artes* than the visual arts). For example, one could make a science of an art by reflectively studying the art and its practice in a manner that generated contemplative knowledge (*scientia*) of the art. This would also lead to a notion of the social sciences as reflective, systematic studies of human activity.

Scientia relied on the application of one or more Aristotelian “phases” of inquiry: resolute,²⁸² compositive,²⁸³ divisional,²⁸⁴ and definitional.²⁸⁵ The goal was to bring order to the various bits of knowledge and methods known or practiced by those in the field, not to inquire deeply into root causes. The result was generally a treatise. This was also the origin of the various “-ologies” that would emerge.²⁸⁶

By the Renaissance and early modern period, many arts returned to *techné* status.²⁸⁷ These periods also produced a new kind of “architect-engineer”: the literate *ingeniator* who used “genius” (an increasingly secularized version of divine madness)²⁸⁸ to

²⁸² The resolute phase traces observed phenomena back through their causes to the first principles of the subject matter being studied (similar to analysis and a posteriori reasoning). See Sean Martin O'Connor, *Regressus and the Scientific Revolution: A Defense of Zabarella's Contribution to Scientific Methodology* *4, 9–10 (unpublished MA thesis, Arizona State University, 1995) (on file with author).

²⁸³ The compositive phase begins with first principles and then deduces effects, including observed phenomena, from those principles (similar to synthesis and a priori reasoning). See *id.* at *9–10, 12.

²⁸⁴ The divisional phase uses dichotomous distinctions, such as “living/non-living,” to ascertain the status of the object under inquiry. See *id.* at *9.

²⁸⁵ The definitional phase explicates the definition of an object in order to get at its essential properties. See *id.*

²⁸⁶ An “x-ology” is the objective, contemplative, and systematic study of a phenomenon or activity. When it studies a human activity, the activity has a different name that signifies the practice of the activity or the “art” of doing the activity. For example, “theology” is the study of gods, divinity, and religion, while “religion” is the practice of a faith’s directives.

²⁸⁷ See Pamela O. Long, *Invention, Authorship, “Intellectual Property,” and the Origin of Patents: Notes toward a Conceptual History*, 32 *Tech & Culture* 846, 870–75 (1991). For example, Venetian glassmakers possessed multiple types of valuable information that contributed to the production of what was considered to be the finest glass in Europe. These included: recipes and ingredient lists that could be written down; know-how that consisted of processes, observations, and handling of materials that might be beyond codification; and plans and know-how for constructing important related devices such as furnaces. See *id.* at 872–73. Thus, the master glassmakers possessed systematic and rigorous declarative and procedural knowledge that elevated their craft to *techné* art. See *id.*

²⁸⁸ During the secularizing Italian Renaissance, the term “divine madness” lost most of its supernatural aspect. Professor Martha Woodmansee makes this point for authors, but not explicitly for inventors. See Martha Woodmansee, *The Genius and the Copyright: Economic and Legal Conditions of the Emergence of the ‘Author’*, 17 *Eighteenth-Century Stud* 425, 426–27 (1984). This legitimized “genius” beyond earlier suspect linkages with those possessed by demons or otherwise insane. “Genius” became the mysterious—but not necessarily supernatural—font of creative imagination. “Genius” seemed to be a native talent, and thus unteachable, which put it at odds with the traditional model of the *techné* artisan. Yet its value for innovation in all manner of arts was clear. See Long, 32 *Tech & Culture* at 881–83 (cited in note 287). See also Françoise Meltzer, *Hot Property: The Stakes and Claims of Literary Originality* 12 (Chicago 1994) (distinguishing historical understandings of “genius” as attributable to demons, muses,

invent and reduce to practice new buildings, machines, and public works projects.²⁸⁹ The *ingeniator* promoted his works through writings and direct conversations with powerful patrons.²⁹⁰ But even as the *techné* sense of “art” reemerged, it was modified by allowing “irrational” genius into the otherwise-rule-based design-and-production process.²⁹¹

The reintroduction of Plato’s writings to the West in the second half of the fifteenth century (and the humanism that followed) elevated the visual arts.²⁹² Platonic mysticism further emphasized the role of “genius.”²⁹³ Humanism helped secularize the role of “genius,” while also promoting a new individualism.²⁹⁴ Arts in which individual “genius” was expressed gained favor. Poetry, long in the shadow of grammar and rhetoric as a liberal art, became privileged because of this new perspective.²⁹⁵ By the

and other supernatural forces from the more modern characterization of “genius” as an internal capacity to be fostered).

²⁸⁹ See Sunny Y. Auyang, *Engineering—An Endless Frontier* 14–15 (Harvard 2004); Long, 32 *Tech and Culture* at 881–83 (cited in note 287). See also generally Bertrand Gille, *Engineers of the Renaissance* (MIT 1966) (tracing trends in engineering and its application from the pre-Renaissance through the end of the Renaissance, particularly through the study of Leonardo da Vinci’s contributions to the field). This was a form of Aristotelian *poiésis* that was foreign to the traditional notion of purely rational *techné*. The terms used—*ingeniator*, *ingénieurs*, *ingegnere*, and “genius”—all derived from the root *geni*, which also gives us *genie*. Plato’s divine madness and the term “inspiration” (literally “taking in spirits”) are variants on this. See Lannom Smith, *Howells and the Battle of Words over “Genius”*, 13 *Am Literary Realism, 1870–1910* 101, 101–03 (1980). The *ingeniator* could be “inspired” with ideas of entirely new things. The term *ingenium* was in use at least since Vitruvius’s *De architectura* in Ancient Rome and was applied as *ingeniator* to the new architect-engineers as early as the twelfth century. See Auyang, *Engineering* at 14 (identifying Ailnoth, who worked on the Tower of London in the twelfth century, as one of the first to be called an *ingeniator*). Later, in seventeenth-century France, *ingeniator* would become *ingénieur* and signify educated technical officers. It was ultimately adopted as “engineer” in English. See *id.* at 14–15. The related term “engine” originally meant “genius and ingenuity” before becoming confused as the name for certain products or processes of ingenuity, such as the external and internal combustion “engines.” *Id.* at 14. This is a bit like the term “Frankenstein” becoming used for Dr. Frankenstein’s creation during the twentieth century.

²⁹⁰ See, for example, Gille, *Engineers of the Renaissance* at 124–26 (cited in note 289) (detailing the professional networking activities of Leonardo da Vinci with Duke Ludovico Sforza). This powerful patronage permitted Leonardo da Vinci to adopt the titles of *ingeniarius ducalis* and *Ingenere Generale*. See *id.* at 126. See also Auyang, *Engineering* at 14 (cited in note 289).

²⁹¹ See Woodmansee, *The Genius and the Copyright* at 426–27 (cited in note 288).

²⁹² See Kristeller, 12 *J Hist Ideas* at 510–11 (cited in note 238). While excluding logic, the new “humanities” system added history, Greek, and moral philosophy to the established trivium. See *id.* at 510.

²⁹³ See *id.* at 511.

²⁹⁴ See *id.* at 510–11.

²⁹⁵ See *id.* at 510.

sixteenth century, numerous Italian “academies” had opened their doors to the study of contemporary vernacular poetry, which had become as prestigious as classical Latin literature.²⁹⁶ The expressive “genius” in the visual arts of painting, sculpture, and architecture distinguished these forms of creation from the other mechanical arts. While still not as prestigious as the liberal arts, the visual and literary arts occupied a new space between the liberal and mechanical arts.²⁹⁷

In the late sixteenth century, the notions of “imitative arts” and “arts of pleasure” were revived.²⁹⁸ Music and poetry were united as the new art of opera.²⁹⁹ Dance was considered by some to be part of music (and hence a liberal art).³⁰⁰ The “amateur tradition” expanded the role of the liberal arts from basic education to something that developed refined tastes and pursuits for courtiers, gentlemen, and princes.³⁰¹ In turn, “taste” and “sentiment” emerged as things not strictly rational, yet not entirely arbitrary.³⁰² One could have good or bad taste, and it could be improved through training.³⁰³ A new class of journalists argued for including the visual arts in the liberal arts.³⁰⁴ Giorgio Vasari coined the phrase *Arti del disegno*, likely leading to the term “beaux arts.”³⁰⁵ Visual artists left their craft guilds in Italy to join new academies of design and drawing.³⁰⁶

The shifting importance of visual arts and the relatively high status of *ingeniators* fueled the debates over what constituted “art” versus “science.”³⁰⁷ Heikki Mikkeli has summarized

²⁹⁶ Kristeller, 12 *J Hist Ideas* at 511 (cited in note 238).

²⁹⁷ See *id.* at 513. This new understanding was memorialized in fresco on the Campanile of Florence, where painting, sculpture, and architecture are grouped by themselves between representations of liberal arts, on the one hand, and mechanical arts, on the other. See *id.*

²⁹⁸ See *id.* at 504.

²⁹⁹ See *id.* at 512–13.

³⁰⁰ See Kristeller, 12 *J Hist Ideas* at 511 (cited in note 238).

³⁰¹ *Id.* at 517.

³⁰² See *id.* at 496–97.

³⁰³ See, for example, Dabney Townsend, *Hume’s Aesthetic Theory* 52–57 (Routledge 2001).

³⁰⁴ See Kristeller, 12 *J Hist Ideas* at 514 (cited in note 238).

³⁰⁵ See *id.*

³⁰⁶ See *id.* (observing that the Academy curriculum replaced the guild-workshop tradition with a more systematic, *epistémé*-based education that included geometry and anatomy).

³⁰⁷ The perceived prestige of a field was as important as how it was classified, resulting in numerous conflicting classification systems. See *id.* at 519–21 & nn 123–30. A fascinating project would be to collect these systems into one resource for reference and comparison. Theology was the “Queen of the Sciences,” but natural philosophy was her

the typical view of the time, held by Paduan professor Jacopo Zabarella (an instructor of Galileo):³⁰⁸

Science deals with what already exists, but art is concerned with creation. The subject-matter of a science is immutable, but the subject-matter of an art is the formation of things as yet non-existent, but which can be made by man. The contemplative philosopher is not interested in initiating anything, but rather wants to comprehend and arrange the forms of existing, eternal things. Moreover, the ultimate purpose of the contemplative sciences is the pursuit of knowledge for its own sake, but in the productive arts the end-result is an actual product.³⁰⁹

Thus, by the beginning of the seventeenth century, the basic ideas of “art” and “science” were entrenched. “Science” meant the “systematic study” of anything.³¹⁰ “Art” meant the manipulation of changeable aspects of the world.³¹¹ Sometimes art produced something other than itself, such as bricks, boats, or buildings; other times its “doing” was the end itself, such as a musical or dance performance.³¹² The belief that a field had to be one or the other complicated classification. No one seemed to acknowledge that fields could have both art and science components. For example, one could “make a science” of mathematics by studying it as an object of contemplation, or one could use

handmaiden. Math and other liberal arts were often classified as sciences. The mechanical arts sat at the bottom. See Jetze Touber, *Law, Medicine, and Engineering in the Cult of the Saints in Counter-reformation Rome: The Hagiographical Works of Antonio Galonio, 1556–1605* 23 (Brill 2014) (Peter Longbottom, trans). Medicine and jurisprudence occupied widely varying positions. See George W. McClure, *The Culture of Profession in Late Renaissance Italy* 15–20 (Toronto 2004); Coulter, 34 J Patent Office Society at Part III at 734–35 (cited in note 128).

³⁰⁸ Some scholars attribute the initial development of the hypothetico-deductive “scientific method” to Zabarella. See, for example, O’Connor, *Regressus and the Scientific Revolution* at *10, 15–17 (cited in note 282).

³⁰⁹ Heikki Mikkeli, *The Foundation of an Autonomous Natural Philosophy: Zabarella on the Classification of Arts and Sciences*, in Daniel A. Di Liscia, Eckhard Kessler, and Charlotte Methuen, eds, *Method and Order in Renaissance Philosophy of Nature: The Aristotle Commentary Tradition* 211, 213 (Ashgate 1997).

³¹⁰ The Greek sense of *epistemé* as the inquiry into necessary and unchanging truths about the cosmos was considered part of natural philosophy (*philosophia*). See Brown, *Theology and Philosophy* at 279–80 (cited in note 262).

³¹¹ See *id.*

³¹² “Art” also included the manipulation of mental concepts, such as numbers, for practical ends. See Kristeller, 12 J Hist Ideas at 504–05 (cited in note 238).

mathematics to perform the calculations needed to design and build a house.³¹³

B. Origins and Scope of the Enlightenment “Progress Project”

In the seventeenth century, “the cultural leadership of Europe passed from Italy to France.”³¹⁴ The changes occurring in France during this period largely mirrored those of the Italian Renaissance.³¹⁵ The term “beaux arts” came into use, first for the visual arts alone, but then for poetry and music as well.³¹⁶ Still, there was no unifying theme for the fine arts, and as such there was still no clear sense that they constituted a special group.³¹⁷

The rest of the mechanical arts and the sciences were undergoing equally momentous changes. Francis Bacon in England, Galileo Galilei in Italy, and René Descartes in France were creating the intellectual framework for the “new sciences” that revived the rigor of the ancient *techné* arts.³¹⁸ While Bacon and Galileo clothed their new enterprise in the mantle of natural philosophy—likely for the prestige that this brought—they sought a new hybrid between arts and sciences.³¹⁹ Inspired by the successes of the *ingeniators*, the new scientists used innovative instruments—such as the telescope and microscope—to discover and explain the workings of nature with mathematical precision through carefully designed experimental inquiry.³²⁰ But the new sciences diverged from traditional natural philosophy in that *epistemé* was not the sole end of their endeavors. Rather, they sought to create practical-art applications both for the betterment of the human condition and, ostensibly, to demonstrate the correctness of the principles that they discovered.³²¹

³¹³ Coulter, 34 J Patent Office Society at Part III at 735 (cited in note 128).

³¹⁴ Kristeller, 12 J Hist Ideas at 521 (cited in note 238).

³¹⁵ See *id.*

³¹⁶ *Id.* at 524.

³¹⁷ See *id.* at 526.

³¹⁸ See Kristeller, 12 J Hist Ideas at 516, 520, 525 & n 161 (cited in note 238). Underscoring the robust dialogue and crossover between “science” and “art,” Galileo participated in the debates over the nature and relative status of painting and poetry. *Id.* at 516. Bacon contemplated the role of imagination in poetry. *Id.* at 520.

³¹⁹ See Dear, 96 *Isis* at 394–95 (cited in note 246) (“Bacon [] attempted to represent natural philosophy . . . as necessarily having a practical or utilitarian dimension.”).

³²⁰ See O’Connor, *Method+ology* at *21–22 (cited in note 58); Yeo, *Encyclopaedic Visions* at 146–48, 166 (cited in note 16). For an overview of scientific development in the seventeenth century, see Dear, 96 *Isis* at 393–95 (cited in note 246).

³²¹ See Peter Dear, *Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500–1700* 55–60, 66–72 (Princeton 2001); Dear, 96 *Isis* at 394–96 (cited in note 246); d’Alembert, *Preliminary Discourse* (cited in note 19). This conflation of contemplation

The success of the new sciences led to a critical turning point for “art” and “science” in the form of the *Querelle des Anciens et Modernes*.³²² Taking place in England and France during the last quarter of the seventeenth century, the *Querelle* pitted those advocating a new notion of “progress” (in which contemporary Europeans had advanced, and would continue advancing, beyond the knowledge and authority of classical antiquity) against those arguing that the intellectual and artistic heritage of antiquity was still supreme.³²³ While starting as a literary controversy, the *Querelle* became a “systematic comparison between the achievements of antiquity and of modern times.”³²⁴ This led to novel systems of classifying knowledge, arts, sciences, and culture that transcended those of medieval academics or Italian Renaissance commentators.³²⁵ A key insight was that, in fields using mathematical calculation and accumulated knowledge, the progress of the moderns could be clearly demonstrated.³²⁶ Fields relying on individual talent, genius, and the “taste” or “sentiment” of the critic and the public, by contrast, could not be shown to have progressed.³²⁷

A secondary insight arises from the *Querelle*’s attempted distinction between quantitative and qualitative fields. While present-day scholars may be tempted to classify “science” as quantitative and “art” as qualitative, most disciplines have both quantitative and qualitative aspects. This was especially true for the arts as traditionally understood. Fields in the mechanical arts that had quantitative “progress” components also had significant qualitative aspects.³²⁸

Following the *Querelle*, notions of taste, sentiment, and aesthetics took center stage in the discourse of educated persons in

and production is the root of the current lack of clarity as to where science ends and technology (as the successor to *techné* arts) begins.

³²² See Kristeller, 12 J Hist Ideas at 525–26 (cited in note 238).

³²³ See id.

³²⁴ Id at 525.

³²⁵ See id.

³²⁶ See Kristeller, 12 J Hist Ideas at 525 (cited in note 238). In other words, in fields in which the artifacts or performances could be measurably shown to be better—that is, faster, stronger, and so on—or in which specific problems could be shown to have been solved, quantifiable progress could be held to occur. See id. See also Yeo, *Encyclopaedic Visions* at 148 (cited in note 16).

³²⁷ Kristeller, 12 J Hist Ideas at 526–27 (cited in note 238).

³²⁸ See id at 507–08 (listing seven mechanical arts that demanded both qualitative and quantitative skill).

London and Paris.³²⁹ This led to the creation of aesthetics, value theory, and the final separation of the fine arts from the other arts and sciences. The first codification of the fine arts as a unified field developed in the eighteenth century through the work of Abbé Charles Batteux.³³⁰ But while the *Querelle* had liberated quantitative fields from this requirement of grounding in the thinking of the ancients and allowed those fields to “progress,” it had not done the same for purely qualitative fields.³³¹ Thus, the fine arts, based on taste and sentiment, could not be said to “progress.” Some might prefer the work of the ancients; some might prefer the work of the moderns. Neither could be proved “better,” and thus there could be no arrow of progress.³³²

C. The *Encyclopédie* as a “Reasoned Dictionary of the Sciences, Arts, and Trades”

The Enlightenment as the “Age of Reason” emerged from humanism, the new sciences, and the *Querelle’s* notion of progress. The British may have taken the early lead through the writings of Isaac Newton and John Locke, but by the mid-eighteenth century, the epicenter of the Enlightenment was France.³³³ In particular, the *Encyclopédie* was “almost synonymous with Enlightenment.”³³⁴ Its editors—Diderot and d’Alembert—and their contributors created the “most influential

³²⁹ See Paul Oskar Kristeller, *The Modern System of the Arts: A Study in the History of Aesthetics Part II*, 13 *J Hist Ideas* 17, 17 (1952).

³³⁰ See *id.* at 21–22. Batteux relied on the poetic theories of Aristotle and Horace to update ancient notions of imitative arts and arts of pleasure. Thus, Batteux asserted that music, poetry, painting, sculpture, and dance were all arts that attempted to imitate beautiful aspects of nature, with pleasure as their end. See *id.* By contrast, the mechanical arts were practical applications that had function and utility, with the satisfaction of human necessities as their end. Interestingly, he also created a third major division of arts that combined pleasure and usefulness as ends, placing eloquence and architecture in this category. See *id.* at 21. He also specially mentioned theater as a combination of all the other beaux arts. Batteux’s system was highly influential in France, England, Germany, and beyond. See *id.* at 20–21. While it was criticized for its reliance on the notion of imitative arts—which really did not seem to capture everything that the fine arts cover—this reliance was likely necessary, as it was the only principled means to ground the system in the still-authoritative writers of classical antiquity. See *id.* at 21.

³³¹ See Kristeller, 12 *J Hist Ideas* at 525 (cited in note 238).

³³² See *id.*

³³³ Spurlin, *The French Enlightenment in America* at 6–7 (cited in note 17).

³³⁴ See text accompanying note 77. Another commentator notes, “With all its imperfections, the *Encyclopédie* was the greatest achievement of its kind, and the most potent influence on the Age of Enlightenment.” Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* at 39 (cited in note 17).

work published in the eighteenth century,”³³⁵ which represented an intellectual achievement beyond even the dictionaries of arts and sciences that had come into vogue.³³⁶ These *philosophes* created an integrated intellectual worldview that became the handbook for the Enlightenment.³³⁷ While arranged alphabetically, the *Encyclopédie* used a clever system of cross-references—described as a print version of hypertext—that allowed readers to find unexpected linkages among entries.³³⁸ Many of these linkages suggested provocative views on important issues of the day.³³⁹ With a print distribution of over twenty thousand copies, half of which were outside France,³⁴⁰ the *Encyclopédie* was not only an intellectual milestone among elites, but also a broadly impactful work even to ordinary, literate, middle-class individuals.³⁴¹

In the *Preliminary Discourse*, which served as an introduction to the work, d’Alembert set out the ambitious scope of the *Encyclopédie* as a comprehensive system to “set forth . . . the order and connection of the parts of human knowledge.”³⁴²

³³⁵ Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* at 38 (cited in note 17).

³³⁶ See text accompanying notes 67–73. Preceding the *Encyclopédie* were John Harris’s *Lexicon Technicum* (1704) and Ephraim Chambers’s *Encyclopaedia* (1728). The French *Encyclopédie* project expressly started out as an effort to make a French version of the *Encyclopaedia* but quickly outstripped Chambers’s work in scope, ambition, and quality of contributors. See Yeo, *Encyclopaedic Visions* at 125 (cited in note 16); Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* at 38 (cited in note 17).

³³⁷ See Yeo, *Encyclopaedic Visions* at 126–27 (cited in note 16).

³³⁸ See Christopher Werth, *At 300, Encyclopedia Pioneer May Yet Get a Hero’s Burial*, Weekend Edition Saturday (NPR, Oct 5, 2013), transcript archived at <http://perma.cc/W9TS-YPLK>.

³³⁹ See *id.* (quoting Caroline Warman’s account of how the entry for “apricot” leads one to an apricot-jam recipe by Diderot himself, then to the entry on *sucrierie*—which includes instructions on how to set up a sugar plantation and manage slaves—and then to an entry on slavery that contains “the most impassioned diatribe against the use of slaves”). Diderot and d’Alembert may have been indebted to Chambers for an earlier version of the cross-reference system. See Yeo, *Encyclopaedic Visions* at 126–27 (cited in note 16).

³⁴⁰ See John Lough, *The Encyclopédie* 38 (McKay 1989).

³⁴¹ See Werth, *At 300, Encyclopedia Pioneer May Yet Get a Hero’s Burial* (cited in note 338) (citing Professor Andrew Curran, an expert on Diderot at Wesleyan University, and Philippe Marcereou, the director of the Sorbonne Library, on the *Encyclopédie*’s status as one of the most widely distributed and influential books of the era).

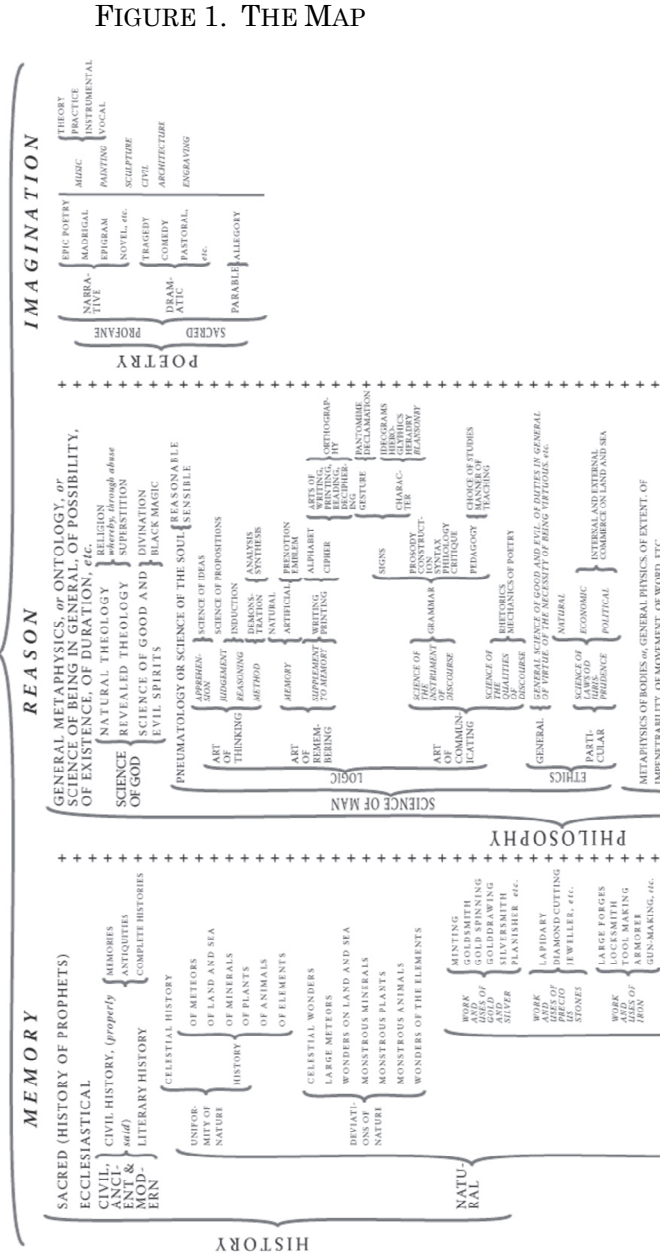
³⁴² D’Alembert, *Preliminary Discourse* at 4 (cited in note 19) (emphasis added). This distinguishes it from modern encyclopedias, which are usually just alphabetical sequences of entries on various topics of declarative knowledge. D’Alembert authored the first two sections of the *Preliminary Discourse*; the third section was an updated version of Diderot’s *Prospectus*, used to solicit interest in the project.

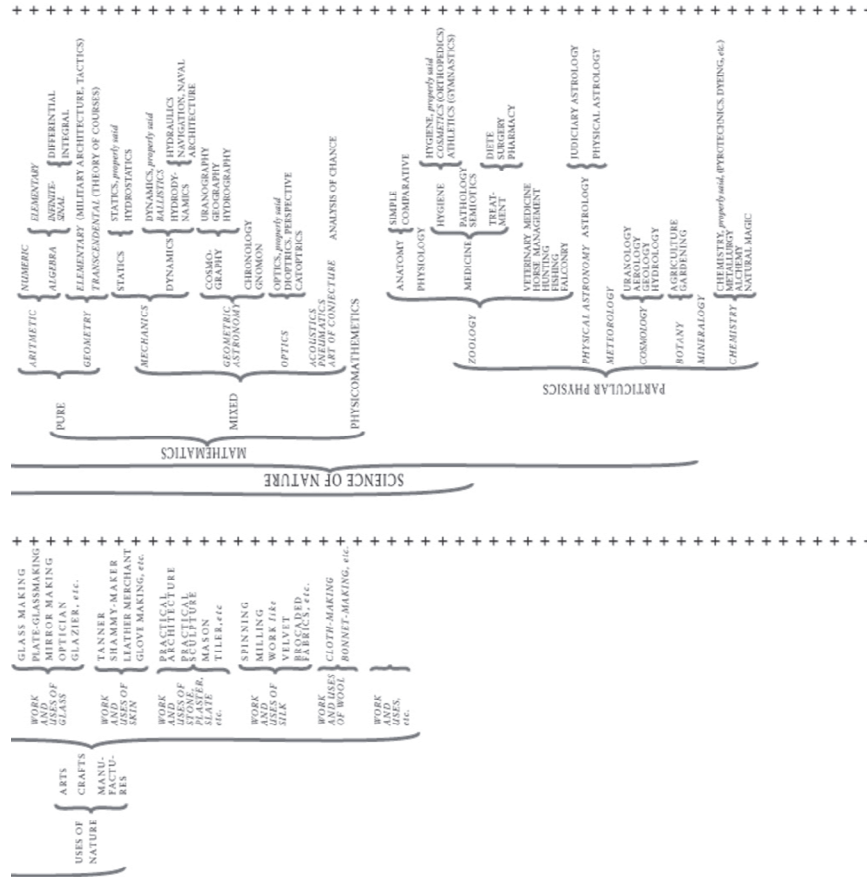
Accompanying the *Encyclopédie* was a “Map of the System of Human Knowledge” (the “Map”), reproduced below.³⁴³

³⁴³ Jean Le Rond d’Alembert, *Map of the System of Human Knowledge (Système Figurè des Connoissances Humaines)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan) (Benjamin Heller, trans), archived at <http://perma.cc/6YBB-B26N>. This figure was graciously provided by Benjamin Heller.

MAP of the SYSTEM of HUMAN KNOWLEDGE

UNDERSTANDING





Following Bacon, the *Encyclopédie* separated all human “knowledge” into three major divisions: memory, reason, and imagination.³⁴⁴ But the *Encyclopédie* sought to create “a grammar of the arts” that would effectively convey procedural knowledge of the arts as well as codifiable declarative knowledge of arts and sciences. It was a “*Reasoned Dictionary of the Sciences, Arts, and Trades . . .* to contain the general principles that form the basis of each science and each art, liberal or mechanical, and the most essential facts that make up the body and substance of each.”³⁴⁵

For d’Alembert, the arts and sciences were connected and focused on “discoveries.”³⁴⁶ But this was not just “discovery” in the modern sense of “uncovering” something already existing—for example, “discover a new land” or “discover a law of nature.” Instead, “discoveries” were a kind of invention. In particular, they were the most important inventions, distinguishable from ordinary inventions by being “curious, useful, and difficult to find, [] which, consequently[,] ha[ve] a certain degree of importance.”³⁴⁷ “Discoveries” could be any newly created physical

³⁴⁴ D’Alembert, *Preliminary Discourse* at 50–52 (cited in note 19). However, while Bacon put “imagination” as the first type of mental activity that humans undertake, the *encyclopédistes* placed “memory” first. See *id.* at 25 n 34, 50–52. This may be due to their Lockean view of human nature as proceeding from direct sense impressions to reflective manipulations of the resulting mental ideas. See *id.* at 7–8 nn 10–12. The *encyclopédistes* rejected Descartes’s rationalist account that we begin from innate ideas and move outward to the world. See *id.* See also *id.* at 79–82.

³⁴⁵ *Id.* at 4. By “*Reasoned Dictionary*,” d’Alembert meant a “[s]ystematic” dictionary—that is, one based on a rational system and not simply an alphabetized sequence of definitions. *Id.* at 4 n 6.

³⁴⁶ *Id.* at 5 (“If one reflects somewhat upon the connection that discoveries have with one another, it is readily apparent that the sciences and the arts are mutually supporting, and that consequently there is a chain that binds them together.”).

³⁴⁷ D’Alembert, *Discovery* (cited in note 28):

In general this name [discovery] can be given to everything that is newly found in the Arts and the Sciences; however, it is scarcely applied, and ought not to be applied, except to that which is not only new, but also curious, useful, and difficult to find, and which, consequently has a certain degree of importance. The less important *discoveries* are simply called *inventions*.

D’Alembert distinguished this sense of “discovery” (used as a noun) from what we might think of as an early version of our modern sense by providing a separate entry for “discover, find” (used as a verb). Jean Le Rond d’Alembert, *Discover, Find (Decouvrir, Trouver)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2013) (Dena Goodman, trans), archived at <http://perma.cc/8VVG-EPYY>. I am deeply indebted to Professor Dena Goodman, a director of the *Translation Project* and professor at the University of Michigan, for providing me with an advance translation of this entry that was not yet available to the public at the time of this writing.

artifacts or processes, as well as newly invented mental processes or objects such as calculus or a mathematical concept.³⁴⁸

D’Alembert speculated that “arts”—as the manipulation of naturally occurring materials to satisfy human needs or wants—developed before other kinds of knowledge because such skills were necessary for human survival (for example, healing and agriculture).³⁴⁹ Equally important was the social capacity of humans to learn artisanal skills from one another.³⁵⁰ While such skills may have originally developed on a trial and error basis, over time they became rooted in systems of rigorous and principled rules—essentially *techné*.³⁵¹

Once humans had mastered their environment enough to allow for more leisure time, d’Alembert further hypothesized, they could engage in “idle speculations” in order to better understand the “less evident properties” of the world around them.³⁵² This matured into the broad, early sense of “science” as any activity in which “the object of a discipline is only *contemplated* from different approaches, the technical collection and disposition of observations relative to that object are called ‘science.’”³⁵³

³⁴⁸ See Louis de Jaucourt, *Invention (Invention)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2003) (Nelly S. Hoyt and Thomas Cassirer, trans), archived at <http://perma.cc/W7RW-U2CR>. D’Alembert praised Descartes’s “inventive genius” and referred to Newton as having “invent[ed] calculus,” in the same way as d’Alembert referred to the inventions of the wristwatch and the telescope. D’Alembert, *Preliminary Discourse* at 32, 51–52 (cited in note 19) (“Imagination acts no less in a geometer who creates than in a poet who invents.”).

³⁴⁹ D’Alembert, *Preliminary Discourse* at 14 (cited in note 19).

³⁵⁰ See id.

[From the beginning, man had to preserve his physical body by] . . . preventing the evils that threaten it or . . . remedying those that have attacked it. We try to satisfy these needs by two means: by our own discoveries and by the investigations of other men, which our social intercourse puts us in a position to enjoy. Whence must have come the birth of agriculture and medicine first, and then all the most absolutely necessary arts.

³⁵¹ See id at 40–41:

In general the name *Art* may be given to any system of knowledge which can be reduced to positive and invariable rules independent of caprice or opinion. . . . But just as there are rules for the operations of the mind or soul, there are also rules for those of the body: that is, for those operations which, applying exclusively to external bodies, can be executed by hand alone.

³⁵² Id at 14–15. This is similar to Condorcet’s “first combining” approach to how practical or useful arts developed first. Id at 15 n 23, citing Marie Jean-Antoine-Nicolas de Caritat, marquis de Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind* 15–16 (Weidenfeld and Nicolson 1955) (June Barraclough, trans).

³⁵³ D’Alembert, *Preliminary Discourse* at 4 n 5, 40 (cited in note 19) (noting that sciences are activities “of a purely speculative nature” that “are limited to the examination of their object and the contemplation of its properties”). D’Alembert’s sense of “science”

D'Alembert also acknowledged a new set of inventions that “derive practical use from the speculative study of their object.”³⁵⁴ In other words, such inventions (or “discoveries,” if they were important enough) applied insights obtained from systematic, contemplative study of certain phenomena (“science”) to solve practical problems (“art”). This suggests the then-emerging concept of “technology,” but the term “technology” was not yet widely used, and d'Alembert neither used its French cognate nor further explored the concept.

The arts were not a unitary field, however, and d'Alembert classified them into categories, each of which was placed within one of the major divisions of human knowledge—memory, reason, and imagination. The mechanical arts minus the emerging fine arts became the “useful arts,” classified within memory as procedural knowledge handed down from artisan to artisan.³⁵⁵ In the Map, the useful arts can be found within the division of memory, underneath the subdivision of “Natural History,” in the section “Uses of Nature.” The new class of fine arts was placed under imagination—the reflective capacity by which existing ideas are combined into new ones.³⁵⁶ The arts of “thinking,” “remembering,” and “communicating” were classified within the division of reason, under the “Science of Man” subdivision in the Map.

conforms to the broader sense that originated in late antiquity. See text accompanying note 353. An artisan could “make a science” of his or her art by stepping outside its practice to contemplate it as *object* rather than as *subject*. D'Alembert arguably anticipated Auguste Comte's assertion that every science is born from an art. See D'Alembert, *Preliminary Discourse* at 8 n 23 (cited in note 19). For more on Comte's views in this regard, see L. Levy-Bruhl, *The Philosophy of Auguste Comte* 62 (G.P. Putnam 1903) (Kathleen de Beaumont-Klein, trans). Like earlier thinkers, d'Alembert was confounded by disciplines that seemed to be both an “art” and a “science.” He suggested that these disciplines could be “simultaneously” an “art” and a “science,” even though it would be more precise to identify different *aspects* of a field as “art” or “science.” D'Alembert, *Preliminary Discourse* at 40 & n 49 (cited in note 19) (“[We could say] that several of our sciences are arts when they are viewed from their practical side.”). Thus, the use of logic in reasoning is logic as art; the study of logic as an object is logic as science. See *id.* at 19. But it would be a mistake to equate “art” with “practice,” and “science” with “theory.” There are theoretical and practical elements of each “art” and each “science.” Peter Dear explicates this nicely when discussing the *theorica* and *practica* of any given field. *Theorica* was the apparatus of a field—such as tools and methods—and the study of them; *practica* was the actual use of these tools to achieve a specific goal. See Dear, 96 *Isis* at 393 (cited in note 246).

³⁵⁴ D'Alembert, *Preliminary Discourse* at 40 (cited in note 19).

³⁵⁵ See *id.* at 50–52.

³⁵⁶ See *id.* at 37 (claiming that imagination “consists of the ideas which we create for ourselves by imagining and putting together beings similar to those which are the object of our direct ideas”).

“Genius” was a key part of imagination for the *philosophes*, and it signified a capacity to respond immediately and intuitively to one’s environment.³⁵⁷ The “genius” was a deeply sensitive individual inclined to flights of fancy that generated more sublime truths than those produced by careful, rational thinkers (albeit with many more errors). In this way, the modern popular sense of “genius” as someone of high intelligence is tangential, at best, to the *philosophes*’ usage. While the Enlightenment is sometimes referred to as the “age of reason,” it would be a mistake to infer that imagination and intuition were disfavored. Like the *philosophes*’ reverence for uncodifiable artisanal skill, their respect for the irrational “genius” was obvious in their writings.³⁵⁸ Each aptitude had its place in a well-functioning society.³⁵⁹

This sense of “genius” may have led to the later Romantic notion of the author as a passionate seer guided by inspiration and intuition to find greater truths than is possible through incremental, rational analysis.³⁶⁰ The “genius” artist must also possess skills allowing implementation of his or her vision, and these were a teachable part of the overall art. But “genius” was not teachable, and thus it was at odds with the traditional *techné*

³⁵⁷ See Jean-François de Saint-Lambert, *Genius (Génie)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2007) (John S.D. Glaus, trans), archived at <http://perma.cc/5LDP-D89N>. D’Alembert occasionally used an older sense of “genius” in his entries that signified an “excellent quality” as well as a sense that “genius” is a “feeling that creates.” D’Alembert, *Preliminary Discourse* at 31 n 39 (cited in note 19).

³⁵⁸ See, for example, de Saint-Lambert, *Genius* (cited in note 357) (“There are few errors in Locke and too few truths in Shaftsbury; the former however has nothing but expansive intellect, penetrating and correct; but the latter is a *genius* of the first order. Locke has seen; Shaftsbury has created, constructed, strengthened.”).

³⁵⁹ For example, the “genius” was great at pioneering bold new ideas and acting on the fly but was accordingly prone to error and poor at managing projects already underway, especially those with many detailed moving parts. “Men of *genius* . . . [are] better made to overthrow and establish states and to maintain or re-establish order than to follow it.” Id. In this way, “geniuses” resemble the modern notion of the entrepreneur. They were also better suited for philosophy and the fine arts than for government, as errors in the latter could directly harm others. See id.

³⁶⁰ This is likely no accident, because Rousseau was originally a contributor to the *Encyclopédie* before breaking off from the *philosophes* due to ideological disagreement over this very point. See d’Alembert, *Preliminary Discourse* at 103 n 61 (cited in note 19). See also Robert Nisbet, *Genius*, 6 *Wilson Q* 98, 98–99 (1982) (noting that the German Romantics were involved, along with the French *philosophes*, in transforming the meaning of “genius” from “special talent” to “a person of greatness who achieves solely through the ‘genius’ that is endowed in him by God or by nature”).

sense of art.³⁶¹ The Romantic prioritization of “genius” in the fine arts, however, may have led to the modern sense that such arts are unteachable and purely intuitive.

Similarly, works of fine art were assessed qualitatively through taste, sentiment, and the emerging field of aesthetics, and thus the *philosophes* could not place them into a “progress” narrative.³⁶² Epitomized by the fashion saying “hemlines go up; hemlines go down,” there was no arrow of progress for taste-based fields. Or, as economists often say: there is no accounting for taste—it is simply an inherent starting point for personal preferences. This taste-or-sentiment basis for the fine arts seemed to lead d’Alembert to avoid merging them into the liberal arts, the other established category of arts distinguished from the mechanical arts. For d’Alembert, the liberal arts were as rule based and practical for mental operations (such as logic and mathematics) as the mechanical arts were for physical operations. The fine arts thus needed their own category—they were for pleasure only and centered on “genius” and taste.

Diderot matched and extended d’Alembert’s views on the arts, especially the useful arts. Diderot’s entry on “art” was considered so important that it was also published in a separate monograph. At the same time, the fine arts were not even addressed in the original entry, but a paragraph was appended in the second edition to briefly overview them. Diderot also discussed

³⁶¹ The eighteenth-century poet Edward Young summarized this contrast: “[A]n original may be said to be of a vegetable nature, it rises spontaneously from the vital root of genius; it grows, it is not made: imitations are often a sort of manufacture wrought up by those mechanics, art and labour, out of pre-existent materials not their own.” Edward Young, *Conjecture on Original Composition*, in *The Complete Works, Poetry and Prose, of the Rev. Edward Young* 549, 552 (Tegg 1854).

³⁶² D’Alembert follows J.P. de Crousaz, who is considered to have written the first French treatise on aesthetics, *Beauty*, in 1714. See Kristeller, 13 *J Hist Ideas* at 17 (cited in note 329). Professor Barton Beebe has argued for a notion of “aesthetic progress” in the eighteenth century that influenced the Framers as well as early statutes and case law. Barton Beebe, *Design Protection and the Problem of Aesthetic Progress in Intellectual Property Law* (unpublished presentation, IPR University Center, Helsinki, Finland, May 23, 2013) (on file with author). I disagree. While the *Encyclopédie* entry on “taste,” for example, argues that taste can be refined in persons, this is a matter of established “high” versus “low” taste, not a matter of limitless measurable potential in the way that “progress” in quantifiable fields was described. See Jean le Rond d’Alembert, et al, *Taste (Goût)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2003) (Nelly S. Hoyt and Thomas Cassirer, trans), archived at <http://perma.cc/JHP4-PLSU>.

the useful arts at length in his section of the *Prospectus*.³⁶³ While some artisans were mere craftsmen who did not understand why their craft worked, others were masters who knew both the principles and practice of their art.³⁶⁴ Diderot criticized earlier authors for not actually observing or experiencing artisanal practices; by contrast, he and other *Encyclopédie* authors not only visited the shops but also tried the various arts and crafts with their own hands.³⁶⁵ He also explored the shorthand language that experienced artisans used to communicate with one another, but it is important to understand that such shorthand codified tacit knowledge, or “know-how,” in that it did not enable those completely unskilled in the art to understand or learn the described technique.³⁶⁶

Diderot’s “art” also mapped onto the traditional notion of *techné*.³⁶⁷ He distinguished “art” from “science” by asking whether there was a subject of action or an object of contemplation.³⁶⁸ A useful art was that which transformed a natural material by hand or by machine into something satisfying a practical human need.³⁶⁹ For each art to be covered by an entry in the *Encyclopédie*,

³⁶³ The *Prospectus* reviewed here is the amended version appearing as Part III of the *Preliminary Discourse*. See generally Denis Diderot, *Prospectus*, in d’Alembert, *Preliminary Discourse* at 106 (cited in note 19).

³⁶⁴ See *id.* at 106, 122–23. This distinction echoed Aristotle’s separation of *chierotechnité* from *technité*. See Angier, *Techné in Aristotle’s Ethics* at 38 (cited in note 239). Further, Diderot was the son of an artisan and was fascinated with craft operations. See *id.* at 123 n 26. An unattributed *Encyclopédie* entry on “craft” likewise seeks to dignify the craftsman above the lowly position that society had placed him in. See *Craft [abridged] (Metier [abridged])*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2009) (Stephen J. Gendzier, trans), archived at <http://perma.cc/22PG-W4KS>.

³⁶⁵ Diderot particularly criticized Ephraim Chambers and the English *Encyclopedia*. See Diderot, *Prospectus* at 109–12 (cited in note 364); Yeo, *Encyclopaedic Visions* at 126–27 (cited in note 16).

³⁶⁶ See Diderot, *Prospectus* at 123–24 (cited in note 19).

³⁶⁷ See Diderot, *Art* (cited in note 23) (noting that “art” is the name given to the “center or focal point to which [people] linked the observations they had made, in order to create a system of instruments, or of rules which were all directed toward the same object”). The entry was classified as “Applied Natural History,” linking it to the useful-arts section of the Map.

³⁶⁸ *Id.* (“If the object leads to action, we give the name of ‘art’ to the compendium of the rules governing its use and to their technical order. If the object is merely contemplated under different aspects, the compendium and technical order of the observations concerning this object are called ‘science.’”). This also maps onto Dear’s exposition of both arts and sciences as having *theorica* and *practica* components. See Dear, 96 *Isis* at 393 (cited in note 246).

³⁶⁹ See Diderot, *Prospectus* at 124 (cited in note 364). This suggests an early root for the “machine or transformation” test that the Federal Circuit relied on in *In re Bilski*, 545 F3d 943, 961 (Fed Cir 2008). While the Supreme Court rejected this test as the *sole*

the author would document in text and illustrations: (1) the details of the material to be worked and the processes to transform it; (2) the principal things to be made from it, and the manner of making them; (3) the details of the tools and machines used; (4) the steps of workmanship; and (5) the terms of the art.³⁷⁰ While Diderot's discussion and the various entries seem to focus on the manipulation of natural materials, his favorable reference to Captain Thomas Savery's patented steam engine as an "art" (without tying it to the manipulation of natural materials) suggests that Diderot also viewed manipulations of natural forces as "arts."³⁷¹

Unlike d'Alembert's apparent view that each activity must be either "art" or "science," Diderot articulated the subtlety that each art included *theorica* and *practica* elements.³⁷² The former elements are the contemplative set of principles for the field, while the latter are the application of those principles by the artisan in the practice of his or her craft.³⁷³ Both must interact for progress to occur in an art.³⁷⁴

Like d'Alembert, Diderot elevated the useful arts by calling for a new kind of artisan-scientist who could use scientific insights to develop entirely new arts, rather than just incremental

test for patent eligibility, *Bilski v Kappos*, 561 US 593, 602–05 (2010), the test captured a long-standing attribute of useful arts (and hence patent-eligible inventions).

³⁷⁰ See Diderot, *Prospectus* at 124 (cited in note 364).

³⁷¹ See Diderot, *Art* (cited in note 23) (referring to the steam engine as "raising water by fire"). Savery developed a steam pump that could raise water vertically. It had no pistons and could move only the water that it was connected to. But Savery was able to obtain a fourteen-year British patent on it in 1698, which was extended for twenty-one additional years under Parliament's Fire Engine Act in 1699. See generally Captain Thomas Savery, *The Miner's Friend; Or, an Engine to Raise Water by Fire, Described* (Clowes 1702). See also *An Act for the Encouragement of a New Invention by Thomas Savery, for Raising Water, and Occasioning Motion to All Sorts of Mill-Work, by the Impellent Force of Fire*, 10 & 11 Will 3, ch 31 (1698).

³⁷² See Diderot, *Art* (cited in note 23) ("[I]t is evident that every art has its speculative and its practical aspect: the former consists in knowing the principles of an art, without their being applied, the latter in their habitual and unthinking application."). See also Denis Diderot, *Encyclopedia (Encyclopédie)*, The Encyclopedia of Diderot & d'Alembert Collaborative Translation Project (Michigan, 2002) (Philip Stewart, trans), archived at <http://perma.cc/SBJ3-ZN8L> ("[E]ach art has its metaphysics. This aspect is always abstract, lofty, and difficult.").

³⁷³ See Diderot, *Art* (cited in note 23) ("In every art there are many particulars concerning its material, its instruments, and its application which can only be learned through practice.").

³⁷⁴ See *id.* ("It is difficult if not impossible to go far in the practice of an art without speculation, and, conversely, to have a thorough knowledge of the speculative aspects of an art without being versed in its practice.").

improvements in existing ones.³⁷⁵ In some ways, this was just an update of the Renaissance *ingeniator*. But one can also perceive an anticipation of the nineteenth-century conceptualization of “technology” in the work of both Diderot and d’Alembert.

Notwithstanding the *encyclopédistes*’ primary interest in the useful and liberal arts, they also ushered in the modern fine arts system by amending Batteux’s system to replace dance with architecture and by moving the conceptual framework away from the troubled imitative arts to the emerging fields of aesthetics and value theory.³⁷⁶ This group—painting, architecture, sculpture, music, and poetry—has constituted the core of the fine arts ever since.³⁷⁷ Professor Paul Kristeller argues that the *encyclopédistes* solidified the modern system of the arts because they identified this group as those arts that are informed mainly by “genius,” “taste,” and “sentiment,” rather than by the five measures of the traditional *techné* arts (teachability, certifiability, exactitude, control, and reliability).³⁷⁸ In the eighteenth

³⁷⁵ See *id* (explaining how those familiar with wheels, pulleys, levers, counterweights, and so forth could scarcely predict or comprehend the destructive potential of gunpowder, because its effects were not incremental to catapults and the like, but orders of magnitude greater). He admonished “learned men” to not so quickly dismiss bold new experimental avenues just because the earliest demonstrations were less than impressive. For example, the essayist Michel de Montaigne prematurely wrote off firearms because the early incarnations were so ineffective. See Michel de Montaigne, *On War Horses*, in *Michel de Montaigne: The Complete Essays* 314, 325 (Penguin 2003) (M.A. Screech, trans).

³⁷⁶ See Kristeller, 13 *J Hist Ideas* at 22–23 (cited in note 329). The *Encyclopédie* entry on “taste,” for example, seems to take the notion of the fine arts for granted, while the entry on “beautiful” discusses the fine arts and explicitly references Batteux. The entry on “taste” consists of three separate parts written by three different authors: Voltaire, Montesquieu, and Diderot. See generally d’Alembert, et al, *Taste* (cited in note 362). In the entry on “beautiful,” Diderot criticizes Batteux for failing to define “beautiful nature” clearly and explicitly enough. Denis Diderot, *Beautiful (Beau)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2006) (Philippe Bonin, trans), archived at <http://perma.cc/6NWQ-LEZE>. At the same time, there is a discrepancy between d’Alembert’s listing of the fine arts (the modern five) and those listed on the Map. See Figure 1. The latter adds engraving and elevates poetry to the overarching subdivision of imagination, within which all the other fine arts are subordinated. See Figure 1.

³⁷⁷ See Kristeller, 12 *J Hist Ideas* at 497 (cited in note 238).

³⁷⁸ For a historical overview of how this system formed, see Kristeller, 13 *J Hist Ideas* at 17–23 (cited in note 329); Kristeller, 12 *J Hist Ideas* at 496–98 (cited in note 238). D’Alembert, for example, described eloquence as an art governed by taste or sentiment—which cannot be taught—rather than skill or art. See D’Alembert, *Preliminary Discourse* at 33–34 (cited in note 19). Thus, eloquent speakers are born, not made, and those who aspire to eloquence can only emulate those who have it.

century, the term “aesthetics” would come into currency as the name for this essential attribute of the fine arts.³⁷⁹

The *Encyclopédie* was also “the greatest publishing venture” of the eighteenth century and an ambitious undertaking in the relatively new world of print capitalism.³⁸⁰ The sheer number of volumes and the costly illustration plates required significant financing to produce.³⁸¹ Partly because it was a work that would be produced over time, the publishers initiated a subscription system for its volumes as they were released. This was also designed to create a sense of community among subscribers in the emerging “Republic of Letters.”³⁸² Reportedly, the publishers made substantial profits despite initial censorship and the other challenges of publication and distribution.³⁸³

Likely in tandem with the rise of readership, as relative prosperity, urbanity, and education became common among the cosmopolitan middle class, the debates over literary property heated up. Diderot was an active participant in these debates. In his *Letter on the Book Trade*, he succinctly set out a natural-rights position for literary property that predates and sounds suspiciously like the preambles to some of the American state copyright statutes and constitutions:

Indeed, what can a man possess, if a product of the mind, the unique fruit of his education, his study, his efforts, his time, his research, his observation; if the finest hours, the finest moments of his life; if his own thoughts, the feelings of his heart, the most precious part of himself, that part which does not perish, that which immortalises him, cannot be said to belong to him? What comparison can there be between a man, the very substance of a man, his soul, and a field, a meadow, a tree or a vine which, at the beginning of time, nature offered equally to all men, and which the individual claimed for himself only by cultivation, the first legitimate means of possession? Who has more right than the author to use his goods by giving or selling them? . . .

³⁷⁹ See Kristeller, 12 *J Hist Ideas* at 496–97 (cited in note 238).

³⁸⁰ See Yeo, *Encyclopaedic Visions* at 20–21 (cited in note 16); Spurlin, *The French Enlightenment in America* at 116–18 (cited in note 17).

³⁸¹ See John Lough, *The Encyclopédie* 34 (McKay 1989).

³⁸² Spurlin, *The French Enlightenment in America* at 46–58 (cited in note 17).

³⁸³ See Robert Darnton, *The Encyclopédie Wars of Prerevolutionary France*, 78 *Am Hist Rev* 1331, 1332 (1973).

[T]he author is the master of his work, or nobody in society is the master of his possessions.³⁸⁴

Similarly, Michel-Antoine David's *Encyclopédie* entry on "copyright" gives a natural-rights argument for copyright and literary property: "If there is on earth any state of freedom it is assuredly that of men of letters: if Nature contains anything whose ownership cannot be disputed with those who possess it, it must be these products of the mind."³⁸⁵

This also sounds suspiciously like Lockean labor theory. In fact, Locke may have advocated for literary property outside his major writings.³⁸⁶ In any event, even if an eighteenth-century American knew only of Locke's physical-property labor theory, and not of his comments arguably advocating literary property, there was no necessary inference from Locke's actual theory to a labor theory of intangibles such as literature. By contrast, Diderot's *Letter on the Book Trade* and David's "copyright" entry explicitly tied Locke's labor theory for tangibles to intangible writings.

An open question, however, is what Diderot and the *encyclopédistes* thought about patents and other exclusive rights for inventors in the mechanical arts. While the *encyclopédistes* seemed to suggest that sovereigns should grant some sort of pay or exclusive rights to inventors of valuable discoveries,³⁸⁷ the *encyclopédistes* also seemed to indicate that honor and attribution—formal or informal—could be sufficient.³⁸⁸ At the same

³⁸⁴ Frédéric Rideau, *Commentary on Diderot's Letter on the Book Trade (1763)* (Copyright History, 2008) (L. Bently and M. Kretschmer, eds), archived at <http://perma.cc/97FD-QWCD>.

³⁸⁵ David, *Copyright* (cited in note 125). David was equally concerned with *publishers'* rights, so he also gave a labor-theory account of those rights:

[The printing privilege granted by the sovereign] is no doubt an act of grace from the prince but it changes nothing about the nature of ownership: on the contrary it is founded on the justice of putting the . . . proprietor in a position to reap the fruits of his labour and his outlay.

Id.

³⁸⁶ See Justin Hughes, *The Philosophy of Intellectual Property*, 77 *Georgetown L J* 287, 300–02 (1988).

³⁸⁷ See Diderot, *Art* (cited in note 23) ("The liberal arts must free the mechanical arts from the degradation in which these have so long been held by prejudice, *while royal protection must save them from the indigent state in which they still languish.*") (emphasis added).

³⁸⁸ See d'Alembert, *Preliminary Discourse* at 101–02 (cited in note 19):

Witness England, a country to which the sciences owe so much, although their government does nothing for them. It is true that the English nation is not neglectful of the sciences, that it even respects them, and this kind of reward, superior to all others, is doubtless the surest means of making the sciences and

time, Diderot had harsh words for those artisan-inventors who would keep their discoveries secret.³⁸⁹ Diderot was clearly focused on secrecy, so one might infer that he would find the “open-letters” disclosure system of patent rights acceptable. He also had interesting thoughts on the incremental nature of innovation and the phenomenon of parallel innovators essentially inventing contemporaneously.³⁹⁰ At the same time, the *encyclopédistes*

arts flourish; because while the government distributes offices, it is the public which bestows esteem.

This seems to ignore the patent system, however. More directly:

After this we need not be astonished that inventors are sensitive to the honor of being discoverers. It is the last thing of which a man would want to divest himself. After Thales discovered the relationship between the sun’s diameter and the circle this star describes around the earth, he communicated this discovery to someone who offered him anything he would desire for it. Thales asked only to be allowed to keep the honor of the discovery. This wise man of Greece, poor and old, was left untouched by the thought of money or profit or any kind of advantage, but he feared the injustice that might deprive him of his deserved glory.

Jaucourt, *Invention* (cited in note 348).

³⁸⁹ In his entry on “art,” Diderot describes the social cost of secrecy:

[W]e invite the artists to take counsel with learned men and not to allow their discoveries to perish with them. The artists should know that to lock up a useful secret is to render oneself guilty of theft from society. It is just as despicable to prefer the interest of one individual to the common welfare in this case as in a hundred others where the artists themselves would not hesitate to decide for the common good. If they communicate their discoveries they will be freed of several preconceptions and especially of the illusion, which almost all of them hold, that their art has reached its ultimate perfection. Because they have so little learning they are often inclined to blame the nature of things for a defect that exists only in themselves. Obstacles seem insuperable to them whenever they do not know the means of overcoming them. Let them carry out experiments and let everyone make his contribution to these experiments: the artist should contribute his work, the academician his knowledge and advice, the rich man the cost of materials, labor, and time; soon our arts and our manufactures will be as superior as we could wish to those of other countries.

Diderot, *Art* (cited in note 23). See also Diderot, *Encyclopedia* (cited in note 372):

But the origin and progress of an art are not like the origin and progress of a science. Scientists converse; they write; they put forward their discoveries; they refute; they are refuted. Such contestations manifest the facts and fix the dates. Artists on the contrary live unknown, hidden, isolated; they do everything for their interests, and almost nothing for their glory. There are inventions that are kept within a family for centuries: they pass from fathers to sons, are improved or atrophy, without anyone knowing either by whom or when the discovery can be said to have been made. . . .

The government ought to allow entry to its manufactures to watch the men work, ask them questions, make drawings of their instruments, machines, and even the premises.

³⁹⁰ See Diderot, *Encyclopedia* (cited in note 372):

reverence for Bacon could possibly have influenced their view of patents—Bacon was a strong advocate of both Elizabeth’s and James’s prerogative power in their official positions in the British government.³⁹¹

III. THE FRENCH *ENCYCLOPÉDISTES*’ INFLUENCE ON MADISON, JEFFERSON, AND FRANKLIN

While it is well established that the *Encyclopédie* was the “greatest achievement” and the “most influential work”³⁹² of the Enlightenment, this in itself does not prove that it influenced the Framers. Books and ideas traveled slowly to the colonies and early states. In fact, in his 1976 book *The Enlightenment in America*, Professor Henry May was quite skeptical about the availability of, and readership for, the *Encyclopédie*.³⁹³ He and others also focused on the declining popularity of the *philosophes* and French thought generally in the early nineteenth century.³⁹⁴ But more-recent scholarship has shown specific links between the *Encyclopédie* and individual Framers and other key Founding Fathers, as well as evidence that the *Encyclopédie* was more widely available than May believed. Further, the evidence of the declining influence of the *philosophes* in early nineteenth-century America may actually help explain why early IP Clause interpretations—which did not even begin until this period—ignored what should have been an obvious part of the Framers’ intellectual worldview. This Part argues that key Framers

Chance commonly suggests the first attempts; they bear no fruit and remain buried; another tries again: he has a partial success, but not the kind people talk about; a third walks in the second’s footsteps; a fourth in the third’s; and so on, until the end product of these experiments is excellent: and this product is the only one that creates a sensation. It also occurs that an idea has barely blossomed in a workshop before it gets out and about. Work goes on in several places at once: each man operates separately; and the same invention, claimed at the same time by several, properly belongs to none of them, or is only attributed to the one it makes rich. If the invention has come from abroad, national jealousy mutes the inventor’s name, and it remains unknown.

³⁹¹ See Federico, 11 J Patent Office Society at 298, 300 (cited in note 124).

³⁹² Wolf, *A History of Science, Technology, and Philosophy in the Eighteenth Century* at 38–39 (cited in note 17).

³⁹³ See Henry F. May, *The Enlightenment in America* 114 (Oxford 1976). See also Yeo, *Encyclopaedic Visions* at 112 (cited in note 16) (noting that the *Encyclopédie* was not widely disseminated in the colonies).

³⁹⁴ See, for example, May, *The Enlightenment in America* at 358–62 (cited in note 393).

owned and endorsed the *Encyclopédie*—suggesting that it strongly influenced the IP Clause.

Most directly relevant, Madison owned a copy of the *Encyclopédie* that he received from Thomas Jefferson in 1785, while Jefferson was minister to France.³⁹⁵ It appears that Madison asked Jefferson to purchase and ship the *Encyclopédie*, along with a number of other books.³⁹⁶ Madison had no difficulty reading French, as underscored by his request of over forty French titles from Jefferson (multiplied by the various volumes in many titles, such as the *Encyclopédie*). Among the requested titles was a collection of other works by Diderot.³⁹⁷ Beyond this, one commentator has also asserted that “[t]here is evidence that [Madison] was thoroughly familiar with the works of . . . Diderot.”³⁹⁸ Evidence that the *Encyclopédie* was no mere trophy addition to his library are Madison’s multiple citations to it for historical points in his memorandum “Of Ancient & Modern Confederacies,” written around 1787.³⁹⁹ Thus, Madison was actively using the *Encyclopédie* the same year that he was working on the IP Clause.⁴⁰⁰ Madison was also a supporter of the publisher

³⁹⁵ See *Letter from Thomas Jefferson to James Madison, with a List of Books* (Sept 1, 1785), in Douglas L. Wilson and Lucia Stanton, eds, *Jefferson Abroad* 24, 27 (Random House 1999). See also Spurlin, *The French Enlightenment in America* at 117 (cited in note 17).

³⁹⁶ See *Letter from Thomas Jefferson to James Madison* at 25 (cited in note 395):

I have at length made up the purchase of books for you, as far as it can be done for the present. The objects which I have not yet been able to get, I shall continue to seek for. Those purchased, are packed this morning in two trunks, and you have the catalogue and prices herein inclosed.

The *Encyclopédie* is included in the list attached to the letter as “13. first livraisons of the Encyclopedie 47. vols. 4to. (being 48f less than subscription).” *Id.* at 27.

³⁹⁷ It was listed as “Diderot sur les sourds and muets [On the Deaf and Dumb] 12mo. 3f2. sur les aveugles [On the Blind] 3f. sur la nature [On Nature] 3f. sur la morale [On Morals] 3f5.” *Id.* at 29.

³⁹⁸ Spurlin, *The French Enlightenment in America* at 111 (cited in note 17), quoting Edward MacNall Burns, *James Madison, Philosopher of the Constitution* 187 (Rutgers 1938).

³⁹⁹ While some “*Id.*” citations in this memorandum have unclear prior referents, the *Encyclopédie* is directly cited five times. If some or all of the “*Id.*” citations do indeed refer to the *Encyclopédie*, then this increases the total number of citations to up to nine. See generally James Madison, *Of Ancient & Modern Confederacies*, in Galliard Hunt, ed, 2 *The Writings of James Madison (1783–1787)* 369 (Putnam 1900). Others concur with the assessment of five citations. See, for example, Spurlin, *The French Enlightenment in America* at 117 (cited in note 17), citing George R. Havens, *James Madison et la Pensée Française*, 3 *Revue de littérature compare* 604, 610–11 (1923).

⁴⁰⁰ I could not find an exact date for “Of Ancient & Modern Confederacies.” It is possible that Madison read and cited the *Encyclopédie* later in 1787, after the convention. However, as he had received the *Encyclopédie* in 1785 and may well have been preparing

Charles-Joseph Panckoucke's rearrangement and reworking of the *Encyclopédie* in the *Encyclopédie méthodique, ou par ordre de matières*, which was similarly published and distributed under a subscription plan beginning in 1782.⁴⁰¹ Madison called it "a compleat scientific Library."⁴⁰² Moreover, Madison, together with Hugh Williamson and Thomas Mifflin, listed *Encyclopédie méthodique* first on a list of books recommended for a congressional library they proposed to the Continental Congress in 1783.⁴⁰³

Many other Founding Fathers and Framers owned or had access to copies of the *Encyclopédie*. Jefferson, a noted Francophile, not only sent a set of *Encyclopédie* volumes to Madison (as mentioned above) but also bought a set for public use in 1781 while he was governor of Virginia.⁴⁰⁴ Benjamin Franklin also owned a copy.⁴⁰⁵ John Adams, who actually had animus toward the *philosophes* because of their perceived atheism and radicalism, nonetheless paid 360 livres to a Parisian bookseller for a thirty-nine-volume edition.⁴⁰⁶ John Quincy Adams translated or paraphrased the first twenty pages of the *Preliminary Discourse*

the memorandum for the convention, it seems far more likely that he had at least looked at the *Encyclopédie* before the convention. It is reasonable to speculate that the *Encyclopédie* was in fact fresh in his mind while he participated in the convention.

⁴⁰¹ See Spurlin, *The French Enlightenment in America* at 109, 119 (cited in note 17), citing George B. Watts, *The "Encyclopédie Méthodique"*, 73 *Pubs Mod Lang Assn* 348 (1958); Robert Darnton, *The Business of Enlightenment: A Publishing History of the Encyclopédie, 1775–1800* (Harvard 1979); Letter from Thomas Jefferson to James Madison (Nov 11, 1784), in Julian P. Boyd, ed, 7 *The Papers of Thomas Jefferson* 503, 507 (Princeton 1953); Letter from James Madison to Thomas Jefferson (Mar 27, 1786), in Julian P. Boyd, ed, 9 *The Papers of Thomas Jefferson* 355, 357 (Princeton 1954); Letter from Francis Hopkinson to Thomas Jefferson (May 1, 1786), in Boyd, ed, 9 *The Papers of Thomas Jefferson* 439, 439; Letter from Thomas Jefferson to Francis Hopkinson (May 9, 1786), in Boyd, ed, 9 *The Papers of Thomas Jefferson* 482, 482.

⁴⁰² Letter from James Madison (Apr 15, 1783), in William T. Hutchinson and William M.E. Rachal, eds, 6 *The Papers of James Madison* 463, 464 (Chicago 1969).

⁴⁰³ See Loren Eugene Smith, *The Library List of 1783* 121 (unpublished PhD dissertation, Claremont Graduate School, 1969), archived at <http://perma.cc/2K9B-7UMU>.

⁴⁰⁴ See Spurlin, *The French Enlightenment in America* at 117 (cited in note 17). Jefferson apparently paid for the volumes with tobacco notes. See Letter from Thomas Jefferson to John Fitzgerald (Feb 27, 1781), in Julian P. Boyd, ed, 5 *The Papers of Thomas Jefferson* 15, 15 (Princeton 1952).

⁴⁰⁵ See Spurlin, *The French Enlightenment in America* at 117 (cited in note 17), citing Letter from Benjamin Franklin to Benjamin Chambers, and the Other Gentlemen of Chambersburgh (Sept 20, 1788), in Albert Henry Smyth, ed, 9 *The Writings of Benjamin Franklin* 664, 664 (Macmillan 1906).

⁴⁰⁶ Spurlin, *The French Enlightenment in America* at 117 (cited in note 17), citing John Adams, *Mar 20, 1780*, in L.H. Butterfield, ed, 2 *Diary and Autobiography of John Adams* 436, 437 (Belknap 1961).

in the margins of one set.⁴⁰⁷ Alexander Hamilton quoted from the *Encyclopédie*'s entry on "empire" in *Federalist 22*.⁴⁰⁸

Other notable Americans of the time were familiar with the *Encyclopédie*. Copies were held in the libraries of William Short and John Randolph.⁴⁰⁹ Joel Barlow was acquainted with it.⁴¹⁰ Charles Brockden Brown had read it.⁴¹¹ And Benjamin Rush, a signer of the Declaration of Independence, had actually met Diderot in person.⁴¹²

The *Encyclopédie* was also in major institutional libraries. Harvard's library held it, and its librarian—Thaddeus Mason Harris—adopted the principles of classification set out "by the immortal Bacon and since illustrated and enlarged by the learned D'Alembert" in his own book *A Selected Catalogue of Some of the Most Esteemed Publications in the English Language, Proper to Form a Social Library, with an Introduction upon the Choice of Books*.⁴¹³ The Charleston Library Society ordered the *Encyclopédie* in 1773.⁴¹⁴ A set was also held by the New York Society Library.⁴¹⁵ This evidence supports my contention that educated persons in America during the Founding era viewed British scientific and Enlightenment thought through the lens of the more current *philosophes* and the *Encyclopédie*.

Accordingly, the *Encyclopédie* was available to many of the American leaders and intellectuals at the time of the Founding. Particularly relevant is Madison, because of his role in drafting the IP Clause. At the same time, some American conservatives were alarmed by the antireligious views (and possibly all-out atheism) contained in the *Encyclopédie*, while others held a dim view of French culture as decadent. This was especially true, for

⁴⁰⁷ Spurlin, *The French Enlightenment in America* at 117 (cited in note 17).

⁴⁰⁸ Id. See also *Federalist 22* (Hamilton), in *The Federalist* 135, 137 (cited in note 87).

⁴⁰⁹ Spurlin, *The French Enlightenment in America* at 117 (cited in note 17).

⁴¹⁰ Id.

⁴¹¹ Id. at 117–18, citing David Lee Clark, *Introduction*, in Charles Brockden Brown, ed., *Edgar Huntly or Memoirs of a Sleep-Walker* v, viii (MacMillan 1928) (originally published in 1799).

⁴¹² Benjamin Rush, *Travels through Life: An Account of Sundry Incidents & Events in the Life of Benjamin Rush*, in George W. Corner, ed., *The Autobiography of Benjamin Rush* 69, 69 (Greenwood 1970).

⁴¹³ Spurlin, *The French Enlightenment in America* at 118 (cited in note 17), citing Jesse H. Shera, *Foundations of the Public Library: The Origins of the Public Library Movement in New England 1629–1855* 112–13 (Chicago 1949).

⁴¹⁴ Spurlin, *The French Enlightenment in America* at 118 (cited in note 17).

⁴¹⁵ Id., citing *A Catalogue of the Books Belonging to the New-York Society Library, Together with the Charter and By-laws of the Same* 137 (Van Winkle 1813).

example, of President Timothy Dwight IV of Yale College and the Reverend Samuel Miller.⁴¹⁶ However, even those opposed to the atheistic and radical tendencies of the *Encyclopédie* may still have appreciated its many other entries. Further, some who opposed the religious and social aspects of the *Encyclopédie* may have been more open to the reworked *Encyclopédie méthodique*, which focused on the scientific method aspects of the *Encyclopédie*.⁴¹⁷ Beyond Madison and Franklin, Francis Hopkinson, James Monroe, and the College of William and Mary were subscribers.⁴¹⁸ And again, despite religious and conservative opposition, the *Encyclopédie* has been claimed as an influence on Revolutionary War-era views on the rights of man and on the Declaration of Independence.⁴¹⁹

Having established the *Encyclopédie's* general influence on key Founding Fathers, the question remains as to why this has not been raised before in the IP Clause literature. I provided one answer in Part I: The early cases and commentaries on patent and copyright law were fixated on interpreting the *statutes* passed by Congress and not the IP Clause itself. This set a context and tone for later cases and commentary, which then assumed that the Anglocentric approach of earlier documents was relevant to interpreting the IP Clause itself. In the alternative, the early Anglocentric accounts simply limited the thinking of later writers who might have considered other influences if presented with a truly blank interpretive slate.

But accounts of the *philosophes'* waxing and waning reputation in this Part suggest an additional cause. At its peak in the 1780s, a number of key Founders fully embraced the *Encyclopédie* and the *philosophes'* worldviews. But the controversial aftermath of the French Revolution turned many against not only those Frenchmen who committed various atrocities but also the *philosophes* whose radical thinking seemed to have empowered the

⁴¹⁶ See Spurlin, *The French Enlightenment in America* at 118–19 (cited in note 17).

⁴¹⁷ See, for example, Samuel Miller, 2 *A Brief Retrospect of the Eighteenth Century* 268 (John Swords 1803):

It is scarcely necessary to say that [the *Encyclopédie méthodique*], executed by many of the persons who were engaged in the [*Encyclopédie*], bears, like that, an anti-religious complexion; and that, while it displays much genius, learning, industry, and perseverance, its general tendency is highly unfavourable to the interests of virtue and piety.

⁴¹⁸ Spurlin, *The French Enlightenment in America* at 119 (cited in note 17).

⁴¹⁹ I am grateful to Professor Geoff Turnovsky for reminding me of this connection.

darker sides of the Revolution.⁴²⁰ Thus, by the time that the first IP cases and treatises emerged under the new US federal system, not only were the *philosophes* out of vogue, but their views were also considered downright dangerous and possibly seditious. As English author Frances Trollope stated in her 1832 book *Domestic Manners of the Americans*, Diderot, Rousseau, and Voltaire “were read by the old federalists; but now they seem known more as naughty words than as great names.”⁴²¹

This intellectual retrenchment could also have been concomitant with the changing political and social attitudes toward both England and France. Whereas the Americans were at war with the British in the 1770s and 1780s due to the policies and perceived oppression of the British government, they were grateful for the crucial military and other support of the French.⁴²² Naturally, one would expect favorable inclinations toward the French and unfavorable ones toward the British during this time period. But after the Revolutionary War, debates arose as to how closely to maintain connections with the French.⁴²³ Further, the more natural cultural affinity to all things British would reasonably exert a gravitational tug once direct hostilities ceased. This is supported by statements made as early as the 1790s that demonstrated concern over French culture and increasingly favorable attitudes toward the British. The early nineteenth century reinforced this cultural shift back toward Britain as the Napoleonic Empire seemed to be anathema to the liberal democratic ideals shared by the Americans and the British.⁴²⁴ Even the War of 1812 did not fully reverse this trend. Thus, when the IP Clause was beginning to be considered in cases and commentaries, the Founding generation’s close connection to French culture and thought—at least among a significant contingent—was likely a distant memory.

⁴²⁰ See Donald H. Meyer, *The Democratic Enlightenment 177–79* (Putnam 1976).

⁴²¹ Frances Trollope, *Domestic Manners of the Americans* 254 (Bentley 5th ed 1839).

⁴²² See Noam Chomsky, Book Review, *The Rule of Force in International Affairs*, 80 *Yale L J* 1456, 1488–89 (1971).

⁴²³ See generally Lawrence S. Kaplan, Book Review, *The Diplomacy of the American Revolution: The Perspective from France*, 4 *Rev Am Hist* 385 (1976).

⁴²⁴ See Bradford Perkins, 1 *The Cambridge History of American Foreign Relations: The Creation of a Republican Empire, 1776–1865* 84–85 (Cambridge 1993) (contrasting increasingly positive American views of Great Britain with anti-French sentiment engendered by the French Revolution and Napoleon’s “tyranny”).

IV. VIEWING THE IP CLAUSE THROUGH THE LENS OF THE
ENCYCLOPÉDIE SOLVES NUMEROUS INTERPRETIVE PUZZLES

It is fascinating how many puzzles raised by the IP Clause literature can be solved by using the *Encyclopédie* to decipher the Clause's key terms. The Clause shifts from a cryptic sphinx that requires sleight of hand substitution of alternate terms to understand, to a coherent and sensible limited grant of power that can be interpreted via its own terms. This outcome alone suggests that the *Encyclopédie* influenced the Framers—especially those drafting the IP Clause. But combined with the *Encyclopédie's* demonstrable prestige and influence on Enlightenment thinkers generally—and Madison and other Founders in particular—the situation shifts from possibly coincidental to quite possible.

Further, as a groundbreaking new kind of dictionary of arts and sciences, the *Encyclopédie* would almost certainly have been considered more reliable and authoritative on fundamental terms and concepts than Johnson's hard-word language dictionary. Thus, it actually makes *more* sense to use the *Encyclopédie* to understand the contemporaneous meaning of terms in the Constitution—especially for the educated Enlightenment Framers—than to look to Johnson's *Dictionary*. It is true that the *Encyclopédie* was in French, but terms were routinely shifted between English and French at this time—the important point was the concept underlying the language variants.⁴²⁵ This Part applies *Encyclopédie* meanings to key terms in the IP Clause to demonstrate that it can be interpreted as a compelling, limited grant of power that allows the federal government to grant additional, temporary protections for the sake of advancing important substantive knowledge that might also be protected at the state level.

Looking at the IP Clause's structure, it is important to note the *Encyclopédie's* fundamental distinction between “art” and “science.” Even more critical is the fact that the emerging fine arts were cabined off into a separate place within imagination.⁴²⁶ By contrast, other arts and sciences were spread across the

⁴²⁵ For example, *entrepreneur*, a French term, was translated literally as “undertaker” (as in engaging in an undertaking, not the American sense of a funeral director). Both the English and French terms were used interchangeably in English writings, such as Cantillon's seminal works on entrepreneurship. See generally, for example, Richard Cantillon, *Essai sur la nature du commerce en général* (Gyles 1755).

⁴²⁶ See d'Alembert, *Preliminary Discourse* at 37–39, 51 (cited in note 19).

three “knowledge” categories of memory, reason, and imagination.⁴²⁷ Combined with the clear distinction made by the *philosophes*, and seemingly also by Madison in *Federalist 43*—between literary property and rights in artisanal inventions—this points to the balanced-sentence interpretation of the IP Clause.⁴²⁸ Like Professor Solum, though, I wonder whether it is better called “parallel construction.”⁴²⁹ A “balanced sentence” is one that has two roughly equal parts *on either side* of punctuation, such as a comma or a semicolon.⁴³⁰ The IP Clause is better described as having a parallel construction that threads throughout the whole text.⁴³¹

Turning to the Clause’s first term, “promote,” I adopt *Goldstein’s* account that “to promote” was “synonymous with the words ‘to stimulate,’ ‘to encourage,’ or ‘to induce.’”⁴³² While this does not come from the *Encyclopédie* per se, it is entirely consistent with the *Encyclopédie’s* usage, especially with regard to “progress.” While Professor Pollack claims that “promote” means “advance,” this is to support her argument that “progress” must mean *only* dissemination or diffusion. It allows her to argue that, if “progress” means “advance,” then the preamble is redundant, as it essentially says “to advance the advance of . . .”⁴³³ No one other than Pollack has adopted this reading.

“Progress,” as used in the *Encyclopédie*, seems to denote not just a vague sense of “advancement” or “improvement,” but rather the sense that originated in the *Querelle*. Progress could be shown only in those fields that could be assessed quantitatively. Fields based on taste or sentiment could not be shown to “progress.”⁴³⁴ This was not a negative indictment of these latter fields. It just put them outside the progress narrative. An ancient taste- or sentiment-based work could be as valuable as the most modern work in that field. By contrast, for example, an older machine made of wood was simply not as valuable as a

⁴²⁷ See id at 60 n 1.

⁴²⁸ See Lutz, 18 Geo Wash L Rev at 51 (cited in note 33); *Federalist 43* (Madison) at 288 (cited in note 87).

⁴²⁹ Solum, 36 Loyola LA L Rev at 11 (cited in note 198).

⁴³⁰ One example is the old ad slogan, “If you’ve got the time, we’ve got the beer.”

⁴³¹ More research needs to be done to determine from where, if anywhere, De Wolf obtained his information that this structure was popular among the “colonial worthies” of the time and to evaluate how valid this point is. See De Wolf, *An Outline of Copyright Law* at 15 (cited in note 121).

⁴³² *Goldstein*, 412 US at 555.

⁴³³ Pollack, 80 Neb L Rev at 788–89 (cited in note 12).

⁴³⁴ See text accompanying notes 326–28.

newer one made of iron—other than perhaps for historical or aesthetic purposes. But for a machine qua machine, one can generally be objectively assessed as measurably better than the other. Thus, fields within both science and the useful arts were “progress” fields, while those in the fine arts were not. This has important implications for the likely intended scope of Congress’s power under the IP Clause.

“Science” meant the systematic study or contemplation of a field. It did not mean “knowledge in general” or “learning in general.” Professors Ng and Snow are some of the few IP Clause scholars to pick up on this well-established historical meaning. “Science” certainly would not have included works of pure entertainment or creative expression.⁴³⁵ One could “make a science” of those things by studying them and perhaps writing a treatise on the subject. But the works of entertainment themselves would be the *object* of the study. An important concomitant is that the output of “science” was written works—not machines, processes, or any other operational object or method. Prime examples were Newton’s *Principia* and Locke’s *Two Treatises*, as well as other information-based works. Creative works could possibly have been part of “science” for the *encyclopédistes*, such as when literary fiction or dramatic works were written as a kind of allegorical study of politics, society, or similarly weighty topics. Voltaire’s *Candide* comes to mind.⁴³⁶ The issue then becomes one of line drawing. Who is to decide what fiction or dramatic work conveys a substantial message or is instead stylized “fluff”?

“Useful arts” does not directly appear in the *Encyclopédie*. But in some ways, it did not need to. The original entry on “art” was about *only* the useful or mechanical arts.⁴³⁷ It was not until the second edition that an addendum to the entry on “art” briefly discussed the fine arts.⁴³⁸ This perspective was not limited to the *Encyclopédie*. The other contemporaneous dictionaries of arts and sciences covered primarily the “sciences” and mechanical or artisanal practices.⁴³⁹ In part, this was because of the very liberation of the fine arts that had begun a century earlier. They were being discussed in their own circles and publications.

⁴³⁵ See Ng, *Copyright Law and the Progress of Science and the Useful Arts* at 24–25 (cited in note 211).

⁴³⁶ At the same time, d’Alembert referred to Voltaire as a *belletrist* and not a substantive “author.” See text accompanying notes 458–61.

⁴³⁷ See Diderot, *Art* (cited in note 23).

⁴³⁸ See Kristeller, 13 *J Hist Ideas* at 24 (cited in note 329).

⁴³⁹ See Yeo, *Encyclopaedic Visions* at 20–21 (cited in note 16).

But by the end of the eighteenth century, those practicing the beaux arts were beginning to refer to them simply as the “arts.”⁴⁴⁰ In a way this was accurate, as at least the visual arts had always been part of the “arts” construed broadly. The problem was that this created an ambiguity: Did “art” mean all arts, or just the beaux arts? As documented in Part II, this question would create much confusion among nineteenth- and twentieth-century courts and commentators. The problem was only partly resolved by substituting “technology” for the mechanical/useful arts.⁴⁴¹ But, in the meantime, the mechanical/useful arts had no generally accepted term to differentiate them from the beaux arts, because traditionally one had not been needed.

My theory is that “useful arts” was a neologism created in the seventeenth century and increasingly adopted throughout the eighteenth century to address this exact lacuna in the language. First, the term’s actual usage at the time captured exactly this set of mechanical-minus-fine arts.⁴⁴² Second, the term

⁴⁴⁰ See Kristeller, 12 *J Hist Ideas* at 497–98 (cited in note 238) (noting a convergence of “art,” in the modern sense, and “fine arts” or “beaux arts” in the eighteenth century).

⁴⁴¹ The problem was only partly resolved because “technology” omits many important artisanal practices and implies only those arts that are based in scientific knowledge. See notes 128–30 and accompanying text.

⁴⁴² One contemporary example of this usage was the Pennsylvania Society for the Encouragement of Manufactures and the Useful Arts. The Society’s purpose was to promote manufacturing in Pennsylvania. In discussing this aim, the Society cited the fact that the people of Pennsylvania “possess[ed] within [them]selves the materials of the useful arts, and articles of consumption and commerce.” *The Plan of the Pennsylvania Society for the Encouragement of Manufactures and the Useful Arts* 4 (Aitken & Son 1787). See also Tench Coxe, *An Address to an Assembly of the Friends of American Manufacturers* 7 (Aitken & Son 1787) (referring to “citizens, who are expert at manufactures and the useful arts”). Also in 1787, E.A.W. Zimmerman helped introduce one of the early senses of “technology” as the study of “useful arts and manufactures.” E.A.W. Zimmerman, *A Political Survey of the Present State of Europe* iii (London 1787). Zimmerman’s linguistically appropriate implication that this was the “study of” (“ology”) useful arts and manufactures did not become the dominant meaning of “technology” from the late nineteenth century on, when the term became more closely associated with the processes and objects created through the practical application of insights and knowledge developed in the new sciences. Earlier appearances of “useful arts” going all the way back to 1627 tend to support my theory as well. However, as with the emergence of the modern system of fine arts, an emerging sense of “useful arts” went through many permutations before apparently settling on the mechanical arts minus the fine arts. See generally Batty Langley, *Practical Geometry: Applied to the Useful ARTS of Building, Surveying, Gardening and Mensuration* (London 2d ed 1726); Daniel Defoe, *A General History of Discoveries and Improvements, in Useful ARTS, Particularly in the Great Branches of COMMERCE, NAVIGATION, and PLANTATION, in All Parts of the Known WORLD* (London 1725); Publius Vergilius Virgil, *The Works of Virgil: Containing His Pastorals, Georgics and Aeneis* (London 1697) (John Dryden, trans). See also Samuel Sewall, *Some Few Lines towards a Description of the New Heaven as It Makes to Those Who Stand*

perfectly described its contents, especially in light of the *Encyclopédie* worldview. “Useful” meant “practical,” and that is exactly what distinguished these arts from those created (solely) for aesthetic purposes.⁴⁴³ This could not be clearer in the Map, in which the useful arts are grouped under memory as the nonexclusive list of techniques for manipulating natural materials designated as “uses of *x*,” and the beaux arts are grouped under imagination.⁴⁴⁴ An open question, discussed in Part III, is whether manipulation of natural *forces* would be included in the useful arts. I think that they would be—again based on Diderot’s approving discussion of Savery’s steam engine, which was as much about harnessing steam as it was about the particular mechanical objects used to do so.⁴⁴⁵

The Clause’s next term is “securing.” I will not rehash all the literary-property debates over common-law copyright and “securing.”⁴⁴⁶ And there is nothing directly on point in the *Encyclopédie*. But at least Diderot and David clearly supported natural rights to one’s literary productions.⁴⁴⁷ Further, Madison claimed in *Federalist 43* that common-law copyright was “solemnly adjudged” to exist.⁴⁴⁸ He implicitly acknowledged that there may be no legally cognizable cognate for inventions.⁴⁴⁹ A number of state copyright laws also supported a natural right to one’s literary productions.⁴⁵⁰

upon New Earth 5 (Boston 1697) (“They who remove from one Land to another, there to dwell; that settlement of theirs is call’d a Plantation. Especially, when a land, before rude and unfurnish’d, is by the New-comers replenish’d with usefull Arts, Vegetables, Animals.”).

⁴⁴³ This tidy distinction would become blurred in the late nineteenth century with the advent of mass-produced commercial art and useful products designed with aesthetic, ornamental flourishes, such as those that the Supreme Court grappled with in *Perry*. See *Perry*, 146 US at 74.

⁴⁴⁴ This raises the question of how innovation could occur in processes cabined under memory. My only suggestion is that the *encyclopédistes* may have had some kind of Socratic “remembering” of things that one does not currently know (for example, the process of anamnesis discussed in the *Meno* and *Phaedo* dialogues). Or perhaps they envisioned some other hybrid process of memory and imagination—possibly mediated by reason.

⁴⁴⁵ See Diderot, *Art* (cited in note 23).

⁴⁴⁶ See, for example, Patterson, *Copyright in Historical Perspective* at 194–95 (cited in note 85); Walterscheid, 48 J Copyright Society USA at 781 n 277 (cited in note 2).

⁴⁴⁷ See Prager, 26 J Patent Office Society at 733–34, 736 (cited in note 125).

⁴⁴⁸ *Federalist 43* (Madison) at 288 (cited in note 87).

⁴⁴⁹ See *id.*

⁴⁵⁰ The Massachusetts, New Hampshire, and Rhode Island 1783 literary-property/copyright statutes all contained identical preambles echoing the *encyclopédistes*’ natural law justifications for copyright. See Thorvald Solberg, *Copyright Enactments of the United States, 1783–1906* 14 (Government Printing Office 1906):

I suggest a new theory: the genius of the Framers's use of "securing" is that it covers both preexisting rights and newly created ones. On the one hand, "securing" is used in other parts of the Constitution and core documents—such as the Declaration of Independence—to mean "securing" existing rights. And the normal term for creating new rights would have been "grant" or "issue." On the other hand, I think that those who argue that "securing" can also mean "to secure" newly created rights have a point.⁴⁵¹ At the same time, it is hard to believe that the Framers would have used "securing" if they *only* meant newly created rights. In that case, "grant" or "issue" would have been the much more obvious and correct choice. But what if the Framers knew that the question of preexisting or natural rights was unsettled? Again, even Madison could not claim that it was settled for inventions, and he argued only that these rights *should* be treated similarly.⁴⁵² Thus, in the face of uncertainty, why not use the term that covers both scenarios? Let the courts hash out the underlying rights questions—whichever way they

Whereas the improvement of knowledge, the progress of civilization, the public weal of the community, and the advancement of human happiness, greatly depend on the efforts of learned and ingenious persons in the various arts and sciences: As the principal encouragement such persons can have to make great and beneficial exertions of this nature, must exist in the legal security of the fruits of their study and industry to themselves; and as such security is one of the natural rights of all men, there being no property more peculiarly a man's own than that which is produced by the labour of his mind.

North Carolina's 1785 statute contained the same sentiment:

Whereas nothing is more strictly a man's own than the fruit of his study, and it is proper that men should be encouraged to pursue useful knowledge by the hope of reward; and as the security of literary property must greatly tend to encourage genius, to promote useful discoveries, and to the general extension of arts and commerce.

Id at 25. New York's 1786 statute referenced "natural justice" as the basis for copyright:

Whereas it is perfectly agreeable to the principles of natural equity and justice, that every author should be secured in receiving the profits that may arise from the sale of his works, and such security may encourage men of learning and genius to publish their writings; which may do honor to their country, and service to mankind.

Id at 11.

⁴⁵¹ See, for example, Walterscheid, 19 *Hamline L Rev* at 94–95 (cited in note 172) (discussing the meaning of the word "secure" and concluding that "all that [the IP Clause] does is authorize the Congress to create and protect an exclusive right for authors and inventors . . . in their writings and discoveries for a limited time"); *Wheaton*, 33 *US* at 661 (stating that the word "secure" in the IP Clause is used not in reference to "the protection of an acknowledged legal right" but rather to "a future right").

⁴⁵² See *Federalist* 43 (Madison) at 288 (cited in note 87).

decide, the IP Clause will still work. In other words, “securing” should be read as follows: To the extent that there are preexisting rights, Congress can secure them by providing extra protections. If there are none, then Congress can “secure” the rights that it creates.

Notwithstanding the plaintiffs’ concerns in *Eldred v Ashcroft*⁴⁵³ and *Golan v Holder*,⁴⁵⁴ “limited Times” seems fairly straightforward, at least in terms of the *encyclopédistes*’ and the Framers’ thinking. The question is, assuming that Madison and others believed in common-law copyright—which was usually held to be perpetual—why allow Congress to secure exclusive rights for only limited times? Those who oppose arguments that the Framers supported perpetual common-law copyrights sometimes use the “limited Times” provision as evidence.⁴⁵⁵ But the Framers could have both believed in perpetual common-law copyrights—which would be enforced under *state* common law—and felt that the federal government should be authorized to create only an enhanced national system for enforcing these rights for limited times. This would make sense, especially in the face of concerns over the balance of federal and state power. Certainly some cross-state rights system was needed—as Madison acknowledged in *Federalist 43*, “[t]he States cannot separately make effectual provision” for copyrights (or patents, for that matter).⁴⁵⁶ But it might have been too risky to allow the untested federal government to enforce or create exclusive, perpetual IP rights. This point is underscored by Madison’s statement that perhaps the government should be given a power to buy the rights back even during the limited term.⁴⁵⁷

For courts and commentators that have argued for limits on IP subject matter based on the terms “authors,” “writings,” or “discoveries,” the *Encyclopédie* provides some interesting support. In the entry “writer, author” (*crivain, auteur*), d’Alembert distinguished between the two.⁴⁵⁸ “Writers” were belletrists

⁴⁵³ 537 US 186, 208–12 (2003).

⁴⁵⁴ 132 S Ct 873, 885 (2012).

⁴⁵⁵ See, for example, De Wolf, *An Outline of Copyright Law* at 14 (cited in note 84).

⁴⁵⁶ *Federalist 43* (Madison) at 288 (cited in note 87).

⁴⁵⁷ Madison, in discussing how the negative consequences of monopolies might be limited in the IP context, suggested that it might “suffice to reserve in all cases a right to the public to abolish the privilege [of monopoly] at a price to be specified in the grant of it.” Walterscheid, 19 *Hamline L Rev* at 90 (cited in note 172), quoting *Letter from James Madison to Thomas Jefferson (Oct 17, 1788)*, in Julian P. Boyd, ed, 14 *The Papers of Thomas Jefferson* 21, 21 (Princeton 1958).

⁴⁵⁸ See d’Alembert, *Writer, Author* (cited in note 29).

concerned primarily with producing aesthetically appealing verse or text—they wrote as craft and focused on style, not substance.⁴⁵⁹ By contrast, “authors” wrote to convey substantive—usually scientific—content and wrote mechanically, without undue concern for style. “Racine and Voltaire are excellent *writers* whereas Corneille is an excellent *author*. Descartes and Newton are *famous authors*.”⁴⁶⁰ While this makes sense, one wonders whether d’Alembert was dealing backhanded compliments to these various individuals: Did Racine and Voltaire have nothing serious to say? Were Descartes and Newton clumsy in the presentation of their ideas? This concern is underscored by one person who apparently rated both terms: “The *author* of ‘La Recherche de la vérité’ is a first-class *writer*.”⁴⁶¹

Because the IP Clause authorizes Congress to grant exclusive rights to “authors” for their “writings,” the latter term might be limited to substantive or information-based works. Ideally, these would be obviously scientific works such as treatises and other scholarship. But, just as in the subject matter of the 1790 Copyright Act, other works of systematic study (“science”) such as maps and charts could be protected as well. This substantive, information-based scope accords well with Professor Ginsburg’s research on the nature of copyrighted materials in the first decades of the federal copyright system.⁴⁶² But, as she shows, copyright was not limited exclusively to what might be considered purely informational or scientific works.⁴⁶³ Some literary fiction and dramatic works may have been protected as well. As mentioned above, however, there is evidence that the *philosophes* supported the use of fiction, dramatic works, and even music as ways of conveying substantive concepts.⁴⁶⁴ This was even truer for the generation of intellectuals that supported

⁴⁵⁹ Oddly, this distinction echoed all the way into the twentieth century. Pulp detective novelist Mickey Spillane always took pride in saying that he was a “writer,” not an “author.” And he distinguished the terms by saying that writers are paid for basically churning out product, not highbrow ideas. See Michael Carlson, *Interview with Mickey Spillane*, CrimeTime (Oldcastle Books), archived at <http://perma.cc/Q52K-VMJN>.

⁴⁶⁰ D’Alembert, *Writer, Author* (cited in note 29).

⁴⁶¹ Nicolas Malebranche is the individual in question. See *id.*

⁴⁶² See, for example, Ginsburg, 64 Tulane L Rev at 1015 (cited in note 167). Professor Snow also notes that some well-known magazine stories on seduction were not registered for copyright in the aftermath of the 1790 Copyright Act, suggesting a sense among authors and publishers that such nonsubstantive works were not copyrightable. See Snow, 2013 BYU L Rev at 264 n 18 (cited in note 220).

⁴⁶³ See Ginsburg, 64 Tulane L Rev at 1016 (cited in note 167).

⁴⁶⁴ See text accompanying notes 435–36.

the French Revolution.⁴⁶⁵ But while a work such as *Candide* might seem to be just such a work of fiction, d'Alembert actually used its author, Voltaire, as an example of a “writer” or belletrist, as contrasted with an “author.” Of course, one cannot expect uniform thought and statements from all the *philosophes*. Thus, while some line drawing may have to be done, one can say that “writings” should be works conveying substance, not merely expressing style. At the same time, because they are “writings,” they must be fixed expressions (as opposed to ideas).

“Inventors” are not accorded an entry in the *Encyclopédie*, but they are discussed. As some recent scholars have noted, in American and British writings of the late eighteenth century, the terms “inventor” and “author” are sometimes used interchangeably.⁴⁶⁶ This is because “inventions” could include anything newly created, including a book. Similarly, the *Encyclopédie* describes Leibniz “inventing” calculus.⁴⁶⁷ Likewise, someone could “author” an invention, because the term could be used in the broad sense, adopted later by *Burrow-Giles*, of the originator of anything, or the authority under which something was done.⁴⁶⁸ The *Encyclopédie* entries sometimes used this broad sense of “author” too. Given the potential interchangeability of these terms, as well as their distinct meanings (especially “author”), the Framers may well have included both terms in the parallel structure of the IP Clause to signal their narrower meanings. One could surmise the opposite as well: the Framers used both *because* the terms were overlapping and the Framers did not want to potentially limit the IP Clause to the narrower version of the one used. But if this were the case, one would expect them to use the disjunctive form: “to authors *or* inventors.” And if the Framers believed that the terms were completely interchangeable, then they would have used only one.⁴⁶⁹

⁴⁶⁵ For example, works such as Voltaire’s *Candide* were used to enlighten readers about serious social and political issues through a fictional vehicle that might not present as much political risk to the author in tumultuous times. Likewise, Romantic composers such as Wagner were seen by some as engaged in a kind of cultural education of the public.

⁴⁶⁶ See, for example, Oliar, 57 UCLA L Rev at 469 (cited in note 46).

⁴⁶⁷ See Jean Le Rond d’Alembert, *Differential Equation (Equation différentielle)*, The Encyclopedia of Diderot & d’Alembert Collaborative Translation Project (Michigan, 2012) (Gregory Bringman, trans), archived at <http://perma.cc/ABQ4-YWMD>.

⁴⁶⁸ See *Burrow-Giles*, 111 US at 57–58.

⁴⁶⁹ It seems too much of a stretch to assume that not only did the Framers want to preserve parallel construction in the IP Clause and so needed two terms at this point in

Finally, “discoveries” in the *Encyclopédie* solves the biggest puzzle in the IP Clause. Courts and commentators have traditionally tried to substitute in “inventions,” even as they find a primary sense of “uncovering” for “discoveries” (especially scientific or geographic ones).⁴⁷⁰ An attempt to explain the term “discover” as meaning to “uncover” the principle of a new invention does not really work either, as the French, British, and American systems would not allow patenting of a principle.⁴⁷¹ Walterscheid found an intriguing use of “discover” with regard to disclosing (“discovering”) one’s invention to the patent office to seek a patent, in a passage from a 1790 Senate report.⁴⁷² However, the context of the passage dissuaded him from claiming it as a possible meaning of the IP Clause.⁴⁷³ In contrast to these strained meanings, the *Encyclopédie* definition as “not only new, but also curious, useful, and difficult to find” perfectly and naturally fits the context of the IP Clause, as well as the early development of the American patent system.⁴⁷⁴ It also is consistent with Jefferson’s views, even though those were not directly relevant in drafting the IP Clause and early IP statutes.⁴⁷⁵

Plugging these definitions into the IP Clause results in a coherent and unstrained interpretation that is indeed a kind of

the text, but they also did not want to repeat the same term (first in the science power, then in the useful-arts power).

⁴⁷⁰ See, for example, *Eldred*, 537 US at 223–24 (assuming that the term “discoveries” in the IP Clause refers to inventions); Walker, *Text-Book of the Patent Laws of the United States of America* at 2 (cited in note 102) (“The word discovery does not have, either in the Constitution or the statute, its broadest signification. It means invention, in those documents, and in them it means nothing else.”).

⁴⁷¹ At the same time, the notion of a “principle”—especially as used by nineteenth-century patent courts and commentators—is complicated. It might have included: (1) a “scientific” principle akin to a law of nature, for example, $E = mc^2$ (not patentable); (2) a practical or “technological” principle, for example, properly controlled and channeled, steam can push a piston, which can be used to power mechanical operations (generally not patentable, as it is either too broad or has no practical application); (3) a legal principle (not even considered for patentability in the cases, but courts were sometimes unclear when using the term “principle” about whether they were referring to a legal principle or one of the science/art/technology principles under consideration); or (4) the “principle of the machine” or “principle of the invention,” for example, a description of how the invention operates or generates utility (patentable if limited to an enabled practical application). See Merwin, *The Patentability of Inventions* at 3–9, 14, 716 (cited in note 102).

⁴⁷² See Walterscheid, 75 J Patent & Trademark Office Society at 703 n 67 (cited in note 177).

⁴⁷³ See *id.* at 703–04.

⁴⁷⁴ D’Alembert, *Discovery* (cited in note 28).

⁴⁷⁵ See text accompanying note 147.

“progress project,” as Professors Chon, Oliar, and others argue.⁴⁷⁶ The Clause reads as two intertwined parts:

- (i) Congress can promote the advancement of systematic study of any manner of things by providing enhanced, nationally enforceable positive law rights to existing natural or common-law–literary-property rights, to the extent that they exist, or to new rights that it creates, but not in perpetuity or unbounded terms, covering the fixed expressions of those who seek to convey substantive content related to such systematic studies (and not for those fixed expressions created simply for style or entertainment); and
- (ii) Congress can promote the advancement of practical manipulations of natural materials or forces by providing enhanced, nationally enforceable positive law rights to existing natural or common-law exclusive rights, to the extent that they exist, or to new rights that it creates, but not in perpetuity or unbounded terms, covering the most important inventions (those that are “curious, useful, and[or] difficult to find”).⁴⁷⁷

A few important implications result. First, this is a *federalist* system that allows for concurrent federal-state rights. Early judicial interpretations support this concurrent-powers interpretation, *so long as* state law does not interfere with areas of federal interest or powers (such as interstate commerce).⁴⁷⁸ Second, this interpretation is consistent with a limited-government approach that focuses on authorizing Congress and the executive to do only those things of true national interest. Not everything

⁴⁷⁶ See, for example, Chon, 43 DePaul L Rev at 102 (cited in note 38); Oliar, 94 Georgetown L J at 1810–16 (cited in note 204).

⁴⁷⁷ See D’Alembert, *Discovery* (cited in note 28).

⁴⁷⁸ See, for example, *Gibbons v Ogden*, 22 US 1, 78–79 (1824) (“[T]he State law may be suffered to operate, in whole or in part, so far as it may, without actual conflict with the constitution or laws of the United States.”). Of course, this proviso could swallow the whole concurrent powers if Congress and the courts read federal interests or powers expansively. But that is a line-drawing and policy issue that the IP Clause accommodates—it does not *mandate* Congress to exercise the delegated powers to any particular degree, or even at all. Further, there was in fact a concurrent system of copyright until 1976: sound recordings were left to the states until 1973, and unpublished works until 1976. Only in the 1976 Act did Congress expressly preempt the field for copyright. See Joseph P. Bauer, *Addressing the Incoherency of the Preemption Provision of the Copyright Act of 1976*, 10 Vand J Enter & Tech L 1, 7–9 (2007). Although a bit murkier, there appears to have been a *de facto* concurrent patent system at least in the late eighteenth century, and possibly extending into the early nineteenth century. See Camilla A. Hrdy, *State Patent Laws in the Age of Laissez Faire*, 28 Berkeley Tech L J 45, 76–81 (2013).

that might get protected by patent, copyright, monopoly, or privilege systems in England or Europe should be within the federal government's power to regulate.⁴⁷⁹ This would interfere too much with states' rights. Third, the limitation of congressional powers to grant exclusive rights to "progress" fields was easily justifiable, as these were exactly the sorts of fields that directly affected the new nation's ability to grow, prosper, and even determine its boundaries and interior. There had in fact been powers proposed to directly fund or create institutions to facilitate these goals (Madison's and Pinckney's "encouragement" proposals), but the simple expedient of a debt-ridden new government, as well as concerns over central control, made these proposals impractical.⁴⁸⁰ Exclusive rights, on the other hand, had been extolled by Adam Smith and Jeremy Bentham exactly because of those rights' clever ability to incentivize activity without a major, immediate outlay of governmental funds.⁴⁸¹

By contrast, under this concurrent-powers interpretation, taste-and-sentiment fields were excluded from the IP Clause. This need be neither a negative assessment of such rights by the Framers, nor a rejection of exclusive rights for creations in those fields. Rather, federal protection could not be justified at that time, given the task of creating a *limited* government focused on direct national interests.⁴⁸² Further, the subjective and nonquantifiable nature of the taste-and-sentiment fields could lead to

⁴⁷⁹ This supports those who argue that the Framers intentionally omitted terms such as "copyright" and "patent" (and for that matter, "privilege" and "monopoly") because they did not want to either authorize or limit Congress according to the particular parameters of those terms in English or European usage. See, for example, Pollack, 18 Seattle U L Rev at 290–91 & n 161 (cited in note 179).

⁴⁸⁰ See Edward C. Walterscheid, *Originalism and the IP Clause: A Commentary on Professor O'Neil's "New Reading"*, 58 UCLA L Rev Discourse 113, 117 & n 26 (2010).

⁴⁸¹ For any bureaucracy created, the only costs would be administrative, and they would impact the judicial system only with respect to enforcement. See Jeremy Bentham, *Manual of Political Economy*, in John Bowring, ed, 9 *The Works of Jeremy Bentham* 33, 71–72 (William Tait 1889) ("[A]n exclusive privilege is of all rewards the best proportioned, the most natural, and the least burthensome. It produces an infinite effect, and it costs nothing."); Adam Smith, *Lectures on Jurisprudence* 82–83 (Oxford 1978) (R.L. Meeks, D.D. Raphael, and Peter Stein, eds) ("[Patents] are a reward for [an inventor's] ingenuity, and it is probable that this is as equal an one as could be fallen on. For if the legislature should appoint pecuniary rewards for the inventor of new machines, etc., they would hardly ever be so precisely proportioned to the merit of the invention as this is.").

⁴⁸² Note that the question whether the federal government could even create a national bank was highly contested in the early years of the Republic. See generally *M'Culloch v Maryland*, 17 US 316 (1819).

impossible value judgments for granting exclusive rights.⁴⁸³ Given the *Querelle* and the Enlightenment ideal of progress as exemplified by the *Encyclopédie* and elsewhere, it seems more natural and coherent to read the IP Clause as promoting only progress fields. This also makes sense because Congress (and any system that it authorized) could then grant exclusive rights *only* for things that are an advancement over existing knowledge (in any of the progress fields, whether art or science). This could be objective and defensible. By contrast, a reading of the IP Clause that allows Congress to grant exclusive rights in the nonprogress fields—which are grounded in taste or sentiment—may be incoherent because (in a literal sense) there is simply no progress in those fields. Thus, how can their progress be promoted (either by the system as a whole or by individual works within it)?

In the concurrent system suggested here, the states could decide whether and how to protect creations in the nonprogress fields. This would be no worse than the pre-Constitution situation in which nothing was protected at the national level. Indeed, the United States continues to have concurrent systems in areas including trademark laws⁴⁸⁴ and securities laws.⁴⁸⁵ As noted above, the nation had a kind of concurrent copyright system until the 1970s, in which certain areas (sound recordings and unpublished works) were left to the states.⁴⁸⁶ And Professor Camilla Hrdy has argued for the important role that a de facto concurrent patent system played in the immediate post-ratification period.⁴⁸⁷ Concurrent systems present challenges, including the fragmented or piecemeal rights across different states that prompted Madison and others to propose at least some national rights for progress fields. Thus, I do not argue that a concurrent IP system for taste-based fields is necessarily optimal. But the Framers may well have viewed Congress granting exclusive rights across subjectively valued fields as too high a price to pay

⁴⁸³ Professor Beebe has suggested a notion of “aesthetic progress” on the part of the Framers. See generally Beebe, *Aesthetic Progress in Intellectual Property Law* (cited in note 362). But that seems to be driven by an assumption that the taste-and-sentiment fields *have* to be part of the “progress of science” (or progress of *something*) and therefore within the scope of the IP Clause. Given that assumption, his efforts are a reasonable approach to retrofit nonprogress fields into a progress narrative.

⁴⁸⁴ See 28 USC § 1338(a).

⁴⁸⁵ See 15 USC § 77v(a).

⁴⁸⁶ See *Goldstein*, 412 US at 546 & n 22.

⁴⁸⁷ See Hrdy, 28 Berkeley Tech L J at 67–76 (cited in note 478).

for the benefits of uniformity. Statements from some Founders who wanted to develop a culture that was equal to that of Europe do not directly translate into evidence that the Framers decided to authorize protection of any and all creations. If they had so decided, they might have used language such as “to promote culture” or even “to promote the arts and sciences.” But they did not. “Useful” cannot be read out as a qualifier of “arts.” Nor can “progress” be ignored. Given the Enlightenment-era intellectual worldview and the role of “progress” within it, “promoting the progress” of something is quite different from simply “promoting” that thing.

Another objection may be that the law does in fact protect taste-based fields under copyright. Beginning later in the nineteenth century, copyrightable subject matter was expanded to include visual artwork.⁴⁸⁸ It had earlier been expanded to include musical compositions. But protection for written scores could arguably fit under the progress of science, because musicians use scores to study their field. Thus, such scores play a dual role: they of course capture the aesthetic creation, but they also provide a core text or tool for musical analysis and study.

Most relevant, the Copyright Act of 1831,⁴⁸⁹ which added musical compositions as copyrightable subject matter, gave exclusive rights only for reproduction of the printed score.⁴⁹⁰ It did not provide performance or display rights. This fits neatly into my account. The idea may have been to protect only scores qua “science”: devices for the conveyance and study of musical ideas or theory.

This may have been the proverbial camel’s nose under the tent. Once music was protected, why not other liberal or fine arts? Europe was protecting these categories. But most important were the changing senses of “science” and “art.” Case law and historical popular use indicate that, by the end of the nineteenth century, “art” was being reduced to only the fine arts. “Science” was being limited to the mathematics-based sciences that we think of today (physics, chemistry, biology, and so

⁴⁸⁸ See Judith B. Prowda, *Application of Copyright and Trademark Law in the Protection of Style in the Visual Arts*, 19 Colum J L & Arts 269, 269 n 3 (1995).

⁴⁸⁹ Ch 16, 4 Stat 36, reprinted in Stephen D. Law, ed, *Copyright and Patent Laws of the United States, 1790 to 1870* 26–42 (Baker, Voorhis 1870).

⁴⁹⁰ See *Goldstein*, 412 US at 564.

on).⁴⁹¹ There was also confusion in court decisions about what exactly “science” and “(useful) arts” were in the IP Clause.⁴⁹²

Thus, although the scope of copyrightable subject matter might have been extended under the argument that a variety of creative works in the liberal or fine arts were actually the language of the study of that field, any such extension was likely eclipsed by the sea change in the meanings of “science” and “art.” Further, as the *Querelle* and the Enlightenment receded into history during the Romantic period and beyond, the “progress project” may simply have been lost.⁴⁹³ Taste, sentiment, and creative expression of the individual became paramount and increasingly commercially valuable. So who was keeping sight of, or even understood, the antiquated “progress project” of the Framers?

The implications of my interpretation for patents are less dramatic but still important. First, the scope of patent-eligible subject matter should be cabined to the practical uses of natural materials or forces. This is exemplified, but not limited to, the useful arts listed on the Map under the category of memory.⁴⁹⁴ Thus, my interpretation does not limit patent-eligible subject matter to those artisanal activities that the Framers knew or would have understood. Instead, such subject matter extends to any work or use of natural materials (and forces) then known or later discovered. In other words, this is a structural principle, not an exclusive list of specific subject matter categories. Second, interpreting the IP Clause in light of the *Encyclopédie* gives rise to a requirement of “importance” of patent-eligible subject matter. Following the *Encyclopédie*, this importance could be shown by demonstrating that an invention is “curious, useful, and[/or] difficult to find.”⁴⁹⁵ This helps explain the “importance” requirement in the early statutes, the judicial development of a requirement of nonobviousness, and ultimately the quest for a standard of invention.⁴⁹⁶ And third, the “useful arts” are not limited to technology or science-based inventions. They include any

⁴⁹¹ See Solum, 36 *Loyola LA L Rev* at 50 (cited in note 198) (providing examples of nineteenth-century definitions of “science” as “Natural and Physical Science”).

⁴⁹² See Part I.B.

⁴⁹³ See Chon, 43 *DePaul L Rev* at 122–34 (cited in note 38).

⁴⁹⁴ See Figure 1. That list is not exclusive; note that the last entry is “Work and uses etc.,” which signifies that the practical “work and use” of any natural material should be included there as well.

⁴⁹⁵ D’Alembert, *Discovery* (cited in note 28).

⁴⁹⁶ See Parts II.A, II.B.

artisanal manipulation of natural materials or forces for practical ends, whether discovered by rigorous experiment or simply by trial and error.

While I adopt a fully distributive reading of the IP Clause, my interpretation is consistent with a unitary reading of the preamble. Authors' writings would still signify fixed expressions conveying substantive meaning—and not simply *belle lettres* style. But the exclusive rights could be even more clearly granted for writings that promote the progress of useful arts by, for example, describing or teaching advances in such an art. Following *Baker*, one might be wary of exclusive rights for fixed expression that prevents the *practice* of a useful art.⁴⁹⁷ But note that the performance right for musical compositions that was added in an 1897 amendment to the Copyright Act already arguably breached *Baker's* rule. Similarly, inventors' discoveries could promote the progress of science in exactly the way that the new scientists of the seventeenth century began using sophisticated devices and instruments to test their hypotheses. In fact, many research tools are patented.⁴⁹⁸

My interpretation also assumes some British influence on the Framers. It would seem odd to reject an Anglocentric narrative only to replace it with a Franco-centric one. The Framers had diverse opinions, and the influence of British ideas was clearly strong in the new nation. The mileage that I get out of the *Encyclopédie* terms in many ways just allows one to choose from among the elements of interpretations that have been generated by the Anglocentric narrative. My interpretation does no violence even to the early patent and copyright acts. In fact, it seems to *better* support them.

While my interpretation *does* mean that parts of copyright and patent law might not have withstood a constitutional challenge brought when the various changes were made—with the consequence that our resultant systems might be at odds with the current notion of copyright as the means to protect (Romantic) creative expression—this is not an argument against my interpretation. The Framers appeared to be trying something new

⁴⁹⁷ See *Baker*, 101 US at 100–05 (1879). See also text accompanying notes 113–14.

⁴⁹⁸ See generally, for example, Michael S. Mireles, *An Examination of Patents, Licensing, Research Tools, and the Tragedy of the Anticommons in Biotechnology Innovation*, 38 U Mich J L Reform 141 (2004) (examining the trade-offs of patenting biomedical research tools). This has not been without controversy, however, especially for patents on research *methods*. See *id.* at 148–50, 174–80 (noting that scientists disagree as to whether research tools should be freely distributed or remain patentable).

in the IP Clause, not simply authorizing Congress to replicate existing British *or* Continental patent and copyright systems. Of course, this is directly in line with the tenor of the Constitution overall, which created a fairly radical new form of government. I am not the only one to argue that Congress has added elements that might not withstand constitutional scrutiny to copyright or patent law over time.⁴⁹⁹ Under my interpretation, such problems could go quite far back. But this position is no different from those advanced by Walterscheid, Solum, and others, who would roll back parts of copyright law to the nineteenth century.

At the same time, my interpretation clears up many mysteries and may be the only way to create a coherent, compelling account of the IP Clause. But it means that parts of our patent and copyright laws may be ultra vires under the IP Clause. The question is what to do. There are two options: amend copyright and patent law to bring them back within that scope, or amend the IP Clause. Neither of these seems likely. The only other possibility is to do what we do now: largely ignore the IP Clause, mentioning it only when convenient. We could continue thus and chalk it up to the “living” Constitution as an evolving document that should not be interpreted according to the original intent *or* original understanding of those who ratified it. Or perhaps we could take some of the meaning and insights developed under the *Encyclopédie* interpretation to help guide us in law and policy decisions for our patent and copyright systems.

Finally, a word on the nature of copyright and patent rights: It is true that the IP Clause authorizes Congress to secure only existing rights, or whatever new rights that it creates. But this does not mean that the Framers rejected a natural-rights perspective of IP. In fact, it seems as if Madison supported a natural-rights view of copyright as embodied in common-law literary property (and perhaps for patents as well).⁵⁰⁰ Such rights are

⁴⁹⁹ See, for example, Walterscheid, 48 J Copyright Society USA at 773–74 & n 248 (cited in note 2); Solum, 36 Loyola LA L Rev at 56–57, 66–74 (cited in note 198).

⁵⁰⁰ See Federalist 43 at 288 (cited in note 87) (Madison). For more arguments on how a natural-rights theory underlies US IP law, see generally Adam Mossoff, *Saving Locke from Marx: The Labor Theory of Value in Intellectual Property Theory*, 29 Soc Philosophy & Pol 283 (2012); Kenneth Einar Himma, *Toward a Lockean Moral Justification of Legal Protection of Intellectual Property*, 49 San Diego L Rev 1105 (2012); Eric R. Claeys, *On Cowbells in Rock Anthems (and Property in IP): A Review of Justifying Intellectual Property*, 49 San Diego L Rev 1033 (2012); Robert P. Merges, *Justifying Intellectual Property* (Harvard 2011); Adam Mossoff, *The Use and Abuse of IP at the Birth of the Administrative State*, 157 U Pa L Rev 2001 (2009); Mark P. McKenna, *The Normative Foundations of Trademark Law*, 82 Notre Dame L Rev 1839 (2007); Mossoff, 92 Cornell

supported especially when considered from the perspective of “publication,” in the sense of “to make public.” Thus, in my interpretation, it is critical that the Framers authorized a concurrent system. Natural property rights would arise at the state level, largely through common law. This would accord well with assertions of literary property rights in the Founding era, as well as with Professor Robinson’s later claim that patent law could be derived from common law.⁵⁰¹ But such natural property rights would arise predominantly from the common-law rights of individuals to keep things private or secret. A man could not be forced to make public his writings or his trade secrets and inventions (except *possibly* in rare, limited circumstances).⁵⁰² But from this very right to withhold—especially to keep ideas within one’s own brain—arises the property right. You cannot make me disclose, and if you try to do so by force, I have a cause of action against you.⁵⁰³ You cannot misappropriate either my writings or my inventions. Of course, once I make them public through publication, my writings or inventions are fair game *unless* I can somehow condition my publication or disclosure on obtaining positive rights from the state. Accordingly, in my view, the IP Clause is *predicated* on this notion of a common law of property, privacy, and secrecy. Thus, just because the IP Clause does not cover the robust range of subject matter subsumed by current copyright and patent law does not mean that the same should not, or cannot, be protected under state law.

CONCLUSION

The IP Clause has been an enigma for courts and commentators. While the literature interpreting the Constitution is vast, until recently, surprisingly few constitutional law experts paid much attention to the IP Clause. Intellectual property experts

L Rev 953 (cited in note 147); Alfred C. Yen, *Restoring the Natural Law: Copyright as Labor and Possession*, 51 Ohio St L J 517 (1990).

⁵⁰¹ See Robinson, *The Law of Patents for Useful Inventions* at v–vi (cited in note 102).

⁵⁰² Such circumstances might include papers seized under a lawful search order (although this still might not include full *public* disclosure) or testimony compelled in a judicial proceeding on pain of contempt of court.

⁵⁰³ Even before Justice Louis Brandeis wrote about a right to privacy, the British courts had fashioned a privacy-based remedy for the unauthorized disclosure of drawings by Queen Victoria and Prince Albert. See *Prince Albert v Strange*, 64 Eng Rep 293, 311–13 (Ch 1849). See also generally Samuel D. Warren and Louis D. Brandeis, *The Right to Privacy*, 4 Harv L Rev 193 (1890).

have a longer history of interpreting the Clause, but they often had fewer tools and less expertise. In the past two decades, there has been a welcome increase in constitutional law experts looking at IP, and IP experts looking at constitutional law.

Both IP historians and constitutional law experts may be hindered, however, by the Anglocentric account of the IP Clause. This narrative is deeply entrenched in the IP Clause literature. It originated in the earliest cases and commentary on the IP Clause in the early Republic.⁵⁰⁴ Upon closer inspection, the references to British antecedents for American patent and copyright systems were directed *only* to the first statutes, not to the IP Clause.⁵⁰⁵ But later courts and commentators appear to have assumed that these references included the IP Clause itself. Thus, throughout the three waves of IP Clause literature that I identified in Part I, the Anglocentric account was reinforced and deepened, with few attempts to look beyond it.

The Anglocentric account has not generated a coherent or compelling interpretation of the IP Clause. In part, this is due to the significantly changed meanings in key terms such as “science,” “(useful) arts,” and “discoveries” since the constitutional convention. Beginning especially in the late nineteenth century, courts and commentators have flipped the respective connections of “science” and “useful arts” in the IP Clause as to writings and “discoveries.” Even more confusingly, successive courts and commentators have flipped these back and forth—that is, the reversal has not been uniform. One response to the confusion has been to simply treat these terms as part of a unitary preamble that identifies a collective area of “science and the useful arts.” A problem with this interpretation is that it still does not cover the fine arts (unless one improperly reads out the word “useful”). Perhaps most importantly, presentist accounts of the IP Clause lead to the most confusion, as neither modern scientific research results nor discoveries (usually thought of as scientific or geographic in nature today) are covered by either patents or copyrights. *Write-ups* of either can be protected under copyright, of course, which should hint at the connection between the terms “science,” “authors,” and “writings” under the widespread balanced-sentence interpretation of the Clause.⁵⁰⁶

⁵⁰⁴ See text accompanying notes 92–96.

⁵⁰⁵ See text accompanying notes 97–98.

⁵⁰⁶ See De Wolf, *An Outline of Copyright Law* at 15 (cited in note 84).

Those who have looked to the original senses of key IP Clause terms often make different kinds of presentist mistakes by consulting language dictionaries of the Founding era. But such “hard-word” dictionaries were not seen as satisfactory guides to the full or nuanced meanings of important terms—especially in the sciences and arts.⁵⁰⁷ The more authoritative resources were the dictionaries of arts and sciences that emerged (in a complicated way) from the *encyclopedia* tradition of education,⁵⁰⁸ as I recounted in Part II.

Once one acknowledges the importance of these dictionaries of arts and sciences, one should naturally consider what is widely regarded as the most important one—the French *Encyclopédie*. In fact, the *Encyclopédie* not only was the most influential dictionary of art and science but was also seen as the handbook of the Enlightenment. In an era when many educated persons in the West could read French, the *Encyclopédie* sold equal numbers of copies inside and outside France.⁵⁰⁹ Thus, its influence extended far beyond France and indeed resonated across the whole of the Enlightenment’s Republic of Letters. This complemented the acknowledged shift of Enlightenment leadership from England to France in the mid-nineteenth century.

As I examined in Part III, Madison and other Founding Fathers in fact owned and approvingly cited the *Encyclopédie*. While the work was controversial on many levels—especially for its rejection of established religions and political systems—it was begrudgingly respected even by those Americans who opposed its revolutionary positions. At the same time, the evocative justifications for literary property espoused by *Encyclopédie* authors appeared to turn up in American state constitutions and copyright statutes adopted before the convention. The *Encyclopédie*’s focus on the useful arts matched the emerging focus on manufactures, useful arts, and commerce in the states.

Accordingly, I proposed in Part IV that an interpretation of the IP Clause based on relevant *Encyclopédie* entries is warranted. While my interpretation generally adopts the balanced-sentence account based on the distinction between “science” and “(useful) arts” in the *Encyclopédie*, it is also compatible with a unitary-preamble account, as both “writings” and “discoveries” can advance both “science” and “useful arts.” Under either

⁵⁰⁷ See text accompanying notes 46–74.

⁵⁰⁸ See text accompanying notes 334–36.

⁵⁰⁹ See Darnton, 78 *Am Hist Rev* at 1345 (cited in note 383).

account, my interpretation centers on the *Querelle's* distinction between progress and taste fields on the one hand, and sentiment fields on the other. Congress's authority under the IP Clause is limited to fields and activities in which quantifiable progress can be demonstrated. Notably, this does not include the fine arts, and it therefore presents a challenge to modern copyright that seems to cover primarily works of subjective, creative expression. Instead, "authors" under my interpretation is limited to those who write to convey substance; it does not include "writers" acting as belletrists who are focused primarily on style. Equally important, the sense of "useful arts" that I glean from the intellectual worldview epitomized by the *Encyclopédie* limits patent-eligible subject matter to those processes or artifacts that manipulate natural materials or forces for practical human benefit. At the same time, my interpretation's adoption of the *Encyclopédie's* sense of "discovery" supports those who have argued for a standard of invention higher than mere novelty. This all indicates a coherent federal "progress project" that secures rights through federal statutory grants for demonstrable advances in codified or tacit knowledge. Concerns over the power of the federal government proposed in the Constitution could also have led to the limitation of both the temporal scope and the subject matter of the IP Clause.

Yet an understandable desire to limit a new *federal* power does not necessarily mean that the Framers were generally opposed to broader sets of rights for new creations at the state level. The primary question for different or broader state-based rights would be whether they conflict with federal interests, especially with regard to commerce among the states. Those that do not conflict could be allowed and enforced at the state level under positive law (where enacted) or relevant common-law doctrines. The United States currently has concurrent securities-law and trademark-law systems with the states, and thus there is no overarching constitutional reason why there could not be concurrent copyright or patent systems (as in fact existed after the Constitution's ratification).

Ultimately, this is an academic project in that I do not expect Congress or the courts to dramatically change the scope of copyright or patents on the basis of my proposed IP Clause interpretation. Further, the very different global world that we inhabit today might be incompatible with the sort of concurrent system that my interpretation suggests. But I do believe that

this project illuminates current practical debates over IP law and the IP Clause. It also gives us another avenue to craft a coherent and compelling account of the IP Clause that reduces its enigmatic quality and capacity to be a nose of wax, twisted to fit any pro- or anti-IP argument that arises.