

MR. NICOLSON’S CANE

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One of the most widely recognized artifacts in American patent law iconography is also among its most peculiar: Samuel Nicolson’s cane. The cane played a leading role in the Supreme Court’s analysis in City of Elizabeth v. American Nicholson, a nineteenth-century decision that has become a fixture in the patent law canon. The case is the leading enunciation of the doctrine of experimental use, which spares inventors from forfeiting patent rights when they can show that otherwise disqualifying sales or uses were undertaken as experiments to perfect their inventions. This Article argues that the modern experimental use doctrine needs to rediscover its roots. It first shows that the modern doctrine has become a victim of a shift toward formalist analysis. It then tells the story of the City of Elizabeth case, demonstrating that the experimental use doctrine at its outset was an essentially instrumental doctrine serving as a discretionary hedge against patent forfeiture. The Article concludes that restoring this character to the experimental use doctrine will best serve the objectives of the current patent system and provides lessons for approaching patentability law as it will develop under the newly implemented America Invents Act.

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INTRODUCTION

Contract law has its hairy hand¹ and its Rose of Aberlone,² and tort law its scales on the Long Island Railway platform.³ American patent law celebrates its own peculiar iconography, and among its most recognized artifacts is a cane dating to the 1840s, once owned by an inventor named Samuel Nicolson of Boston. Generations of law students have become acquainted with Mr. Nicolson’s cane, thanks to the novelistic deposition testimony of a toll-booth collector who worked for Samuel Nicolson at the Boston & Roxbury Mill Corporation.⁴ The testimony turned out to be crucial in preserving the validity of Samuel Nicolson’s valuable patent on a method for paving streets with wooden blocks.⁵ In the pivotal case, *City*

1. Hawkins v. McGee, 146 A. 641 (N.H. 1929).

2. Sherwood v. Walker, 33 N.W. 919 (Mich. 1887).

3. Palsgraf v. Long Island R.R., 162 N.E. 99 (N.Y. 1928).

4. City of Elizabeth v. Am. Nicholson Pavement Co., No. 203 (filed Oct. 13, 1875), Transcript of Record at 75–84 (deposition testimony of Joseph L. Lang, taken Oct. 13–14, Nov. 2, 1870) [hereinafter Transcript]. Page references to the transcript are to the print version. I will use the spelling “Nicolson” to refer to the inventor and “Nicholson” to refer to the company. The spelling is inconsistent in the sources.

5. U.S. Patent No. 11,491 (issued Aug. 8, 1854), *reissued* as U.S. Patent No. Re. 1,543 (Dec. 1, 1863), *reissued* as U.S. Patent No. Re. 2,748 (Aug. 20, 1867). The patented technology was said to have been used extensively in several major U.S. cities in the late 1860s and early 1870s. See FRANK G. JOHNSON, THE NICOLSON PAVEMENT AND PAVEMENTS GENERALLY 115 (1867) (listing cities); *Street Pavements*, 3 ENGINEERING NEWS (No. 21) 170 (May 27, 1876).

of *Elizabeth v. American Nicholson Pavement Co.*,⁶ Justice Joseph P. Bradley quoted at length the toll-booth collector's testimony,⁷ which vividly depicted Nicolson's daily visits to the test sections of wooden pavement, "striking it with his cane, and making particular examination of its condition."⁸

City of Elizabeth is the seminal case on the doctrine of experimental use, a doctrine that limits certain types of patent validity challenges.⁹ Inventors who put their inventions "on sale" or into "public use" before applying for a patent may jeopardize their rights to obtain patent protection.¹⁰ But a use that an inventor undertakes to determine whether an invention works as intended will be deemed *experimental*, and will have no patent-barring effect no matter how public the use otherwise may be.¹¹ *City of Elizabeth* provided the occasion for the Supreme Court's first definitive enunciation of this doctrine.¹² *City of Elizabeth* also first explained

6. 97 U.S. 126 (1877).

7. *Id.* at 133–34.

8. *Id.* at 133.

9. *See, e.g., Dey, L.P. v. Sunovion Pharm., Inc.*, 715 F.3d 1351, 1359 (Fed. Cir. 2013) (identifying *City of Elizabeth* as the "seminal 'experimental use' case"). The doctrine discussed here is not to be confused with the common-law experimental use defense to infringement discussed, for example, in *Madey v. Duke University*, 307 F.3d 1351, 1355–57, 1360–63 (Fed. Cir. 2002), although some have argued that the two experimental use doctrines should be symmetrical. *See, e.g., Andrew S. Baluch, Note, Relating the Two Experimental Uses in Patent Law: Inventor's Negation and Infringer's Defense*, 87 B.U. L. REV. 213 (2007).

10. 35 U.S.C. § 102(a)(1) (2011) (providing that patent protection may be barred if the claimed invention was "in public use" or "on sale" before the effective filing date of the claimed invention); 35 U.S.C. § 102(b)(1) (2011) (providing exceptions to the § 102(a)(1) bar for disclosures made one year or less before the effective filing date). For patents applied for before March 13, 2016, the applicable rule is found in 35 U.S.C. § 102(b) (1952) (providing that patent protection may be barred if the claimed invention was "in public use" or "on sale" more than a year before the application filing date). Analogous language was in place as of the time of Nicolson's patent. Patent Act of 1836, ch. 357, §§ 6, 7, 15, 5 Stat. 117, 119–20, 123 (providing that patent protection was barred if the invention was "in public use, or on sale, with the consent or allowance" of the inventor before the application filing date); Patent Act of 1839, ch. 88, § 7, 5 Stat. 353, 355 (modifying the 1836 Act to provide that the bar applied only to activity occurring more than two years before the application filing date, or activity amounting to abandonment of the invention to the public at any time before the application filing date).

11. *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 64 (1998) (noting that "an inventor who seeks to perfect his discovery may conduct extensive testing without losing his right to obtain a patent for his invention—even if such testing occurs in the public eye"); *Dey*, 715 F.3d at 1359 ("During experimentation, the public might have knowledge of an invention (because they see it), but may not be using the invention within the meaning of the statute (because the inventor is experimenting.)"); *Trading Techs. Int'l, Inc. v. eSpeed, Inc.*, 595 F.3d 1340, 1362 (Fed. Cir. 2010) (citing *City of Elizabeth*, 97 U.S. at 134–35).

12. *City of Elizabeth*, 97 U.S. at 134 (ruling that "[t]he use of an invention by the inventor himself, or of any other person under his direction, by way of experiment, and in order to bring the invention to perfection" is not a barring public use); *see also id.* at 137 (distinguishing between use of the invention "for a profit" and use of it "by way of experiment").

the underlying policy balance—the public’s interest in blocking inventors from improperly extending the patent term, while also allowing inventors time to perfect their inventions:

It is sometimes said that an inventor acquires an undue advantage over the public by delaying to take out a patent, inasmuch as he thereby preserves the monopoly to himself for a longer period than is allowed by the policy of the law; but this cannot be said with justice when the delay is occasioned by a *bona fide* effort to bring his invention to perfection, or to ascertain whether it will answer the purpose intended. His monopoly only continues for the allotted period, in any event; and it is the interest of the public, as well as himself, that the invention should be perfect and properly tested, before a patent is granted for it.¹³

Most critically, *City of Elizabeth* relied on a set of factual considerations in deciding whether the inventor was engaged in good-faith experimentation or merely giving the invention over to the public for free use.¹⁴

It was in the context of these factual considerations that the toll-booth collector’s testimony, and Mr. Nicolson’s cane, became so pivotal. Samuel Nicolson had installed a 100-foot section of wooden pavement¹⁵ on the Mill-Dam Avenue where it traversed the Boston & Roxbury property.¹⁶ It had been in use for nearly six years before Nicolson filed his patent application—and the longstanding use became the basis for the defense asserted many years later in the *City of Elizabeth* litigation that the patent was invalid under the public use bar.¹⁷

American Nicholson Pavement Company, holder of the relevant patent rights in the *City of Elizabeth* litigation, responded to the defense by presenting evidence that the use on Mill-Dam Avenue had been experimental.¹⁸ American Nicholson called numerous witnesses to testify in support of the experimental use claim, including a Boston & Roxbury toll-booth collector named Joseph L. Lang. As Lang testified, the Mill-Dam Avenue was unquestionably open for public travel and heavily used, but that made it ideal for testing the pavement:

[I]t was a place where most everybody went over it, rich and poor. It was a great thoroughfare out of Boston. It was frequently travelled by

13. *Id.* at 137, quoted in *Pfaff*, 525 U.S. at 64–65.

14. *City of Elizabeth*, 97 U.S. at 135–36.

15. More particularly, he had installed three or four strips of different variations of wooden pavement, as described in more detail *infra* Part IV.

16. The section of roadway called Mill-Dam Road was referred to as part of Western Avenue, and still later became included as part of Beacon Street, its current name. *Collection Guides: Boston and Roxbury Mill Corporation Records*, MASS. HIST. SOC’Y, <http://www.masshist.org/collection-guides/view/fa0342/> (last visited July 29, 2017) (containing an organizational timeline of the Boston & Roxbury Mill Company).

17. Transcript, *supra* note 4, at 51, 53 (answer of *City of Elizabeth* defendants, filed July 15, 1870).

18. *Id.* at 70–84 (testimony of witnesses Stanwood, Nutting, and Lang); *id.* at 86–87 (testimony of witness West); *id.* at 104–05 (testimony of witness Stafford).

teams having a load of five or six tons, and some larger. As these teams usually stopped at the toll-house, and started again, the stopping and starting would make as severe a trial to the pavement as it could be put to.¹⁹

The testimony greatly fortified the claim of experimental use, but the true *pièce de résistance* was Lang's statement about Mr. Nicolson's peregrinations on the pavement with his cane:

Mr. Nicholson [*sic*] was there almost daily, unless prevented by sickness or some other circumstances, and when he came he would examine the pavement; he would often walk over it, cane in hand, striking it with his cane, and making particular examination of its condition. He asked me very often how people liked it, and asked me a great many questions about it; I have heard him say a number of times that was his first experiment with this pavement, and he thought that it was wearing very well . . . I think I may safely say he has asked me about what people said of it, how they liked it, a hundred times; he talked to me about it so much that sometimes it was a bother to me to collect my toll when he was talking; he said this was a good place to test it; he would come down and spend ten or fifteen minutes looking over the pavement; then come into the toll-house and get his money, and often, when he went, look it over again . . .²⁰

Lang's testimony persuaded the trial court to reject the public use defense, and the Supreme Court to uphold that result.²¹ More significantly, Lang's testimony became a critical piece of the factual matrix against which all later claims of experimental use would be measured, and Nicolson entered patent law legend as the canonical experimental user.²² *City of Elizabeth* became a fixture in patent law casebooks, and generated a substantial body of case law and commentary that continues to expand nearly a century and a half after the Supreme Court handed down its opinion.²³

19. Transcript, *supra* note 4, at 77 (testimony of Joseph L. Lang), *quoted in City of Elizabeth*, 97 U.S. at 134.

20. Transcript, *supra* note 4, at 77 (testimony of Joseph L. Lang) (counsel's intervening question omitted); *quoted in City of Elizabeth*, 97 U.S. at 133–34 (alteration in original).

21. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 703, 707 (C.C.D.N.J. 1873) (No. 311); *City of Elizabeth*, 97 U.S. at 136–37.

22. Even his obituary testified to his experimental use, long before the Court explained the doctrine in *City of Elizabeth*:

He manifested in respect to his invention one quality which is rare among inventors—that of patience in perfecting and testing the invention before seeking to obtain patent for it . . . his care and attention to secure a valuable and reliable pavement before seeking a patent, are worthy of all commendation, and if his example in this respect were more generally followed, the country would be saved from a host of imperfect inventions.

Obituary. Samuel Nicolson, CHI. TRIB., Jan. 13, 1868, at 2, <http://archives.chicagotribune.com/1868/01/13/page/2/article/obituary>.

23. For a sampling of commentary, see William C. Rooklidge & Stephen Jensen, *Common Sense, Simplicity and Experimental Use Negation of the Public Use and On Sale*

Indeed, the experimental use doctrine has proven to be considerably more durable than Nicolson's wooden pavement.²⁴

But in recent years the experimental use doctrine has diverged from the premises that animated *City of Elizabeth*. Originally a policy-driven, discretionary hedge against the forfeiture of patent rights, the doctrine has become rule-bound and rigid in some modern applications. Moreover, the passage of the America Invents Act ("AIA"), which converted the U.S. patent system to a first-inventor-to-file system, has triggered a reevaluation of the vast jurisprudence of the statutory bars to patentability, of which the experimental use doctrine is a part. Indeed, the U.S. Patent and Trademark Office ("PTO") has expressed ambivalence about whether the experimental use doctrine even applies to post-AIA patents.²⁵

It is therefore an appropriate time for a fresh examination of the experimental use doctrine. This Article argues that the modern doctrine needs a good solid nudge back towards its *City of Elizabeth* roots, if not comprehensive reform. That is important for two reasons. First, the experimental use doctrine in its original incarnation still has an important role to play in insulating inventors against the loss of patent rights under the pre-AIA provisions.²⁶ Second, in the post-AIA era, it will be critical for courts either to endorse the traditional experimental use doctrine or to replace it with some other ameliorative anti-forfeiture mechanisms that can be deployed in appropriate cases. The history of the *City of Elizabeth* experimental use doctrine offers lessons that could inform either exercise.

A paper about a street-paving patent demands a roadmap. Part I of this Article surveys modern experimental use jurisprudence for the purpose of highlighting its central failings: the submergence of policy balancing and the turn toward inflexible rules. It also asserts that this trend is out of step with the Supreme Court's current anti-formalist leanings in patent law.

Bars to Patentability, 29 J. MARSHALL L. REV. 1, 4 n.3 (1995) (collecting scholarship); see also William C. Rooklidge & W. Gerard von Hoffman, *Reduction to Practice, Experimental Use, and the 'On Sale' and 'Public Use' Bars to Patentability*, 63 ST. JOHN'S L. REV. 1 (1988).

24. The last remnants of the Nicolson pavement disappeared from American cities long ago. Sections of wooden pavement can still be seen in a few cities, but all appear to be of slightly newer vintage than the Nicolson pavement. See, e.g., Ryan J. Reed, *The Creosoted Wood Block: One Step in the Evolution of St. Louis Paving*, LANDMARKS ASS'N OF ST. LOUIS, INC., http://www.landmarks-stl.org/news/the-creosoted_wood_block_one_step_in_the_evolution_of_st_louis-paving/ (St. Louis) (last visited July 17, 2017); Serhii Chrucky, *Wood Block Alleys* (Dec. 13, 2008, 12:42 AM), <http://forgottenchicago.com/articles/wood-block-alleys/> (Chicago); Ashley Hahn, *Camac Street's Wooden Blocks Repaired*, PLAN PHILLY (Nov. 5, 2012), <http://planphilly.com/eyesonthestreet/2012/11/05/camac-streets-wooden-blocks-repaired/> (Philadelphia). On the reasons for the eventual demise of the Nicolson pavement and the implications for experimental use adjudication, see *infra* Part IV.

25. The PTO has declared that the AIA legislative history does not "expressly address[]" the experimental use doctrine, and that "[b]ecause this doctrine arises infrequently before the Office, and is case-specific when it does arise, the Office will approach this issue when it arises on the facts presented." Examination Guidelines, 78 Fed. Reg. 11,059, 11,063 (Feb. 14, 2013) (PTO's response to Comment 12).

26. Those provisions apply to all patents having effective filing dates before March 16, 2013. *Id.* at 11,059.

The remaining parts provide a history of *City of Elizabeth* and analyze its modern implications. Part II explores the background policy principles against which the *City of Elizabeth* experimental use doctrine emerged, using aspects of Nicolson's patent strategy as a lens. Part III connects these background principles to the emergence and evolution of the experimental use doctrine. It asserts that the early cases, culminating with *City of Elizabeth*, established a purposive analysis for experimental use that allowed courts discretion to deploy the doctrine to ameliorate the harsh consequences of the public use statutory bar. Part IV critiques an alternative strain of thinking that informs some experimental use cases, referred to here as the "experimental stage" analysis. Using evidence from the *City of Elizabeth* record and other archival sources, this Part shows that experimental stage analysis tends to produce an experimental use doctrine that is wooden in application—that is, insufficiently responsive to the idiosyncratic nature of the inventive process and overzealous in working forfeitures.

I close with brief conclusions and recommendations.

I. MODERN EXPERIMENTAL USE DOCTRINE: THE FORMALIST TURN

Modern patentees continue to invoke the experimental use doctrine to attempt to fend off the on-sale and public use bars, sometimes successfully.²⁷ But the modern experimental use doctrine is problematic in some basic respects. Much of the trouble traces back to the Supreme Court's 1998 decision in *Pfaff*.²⁸ In *Pfaff*, the Court adopted a two-part test for analyzing the on-sale bar to patentability: first, the alleged transaction must be "a commercial offer for sale," and, second, the subject matter of the transaction must be "ready for patenting."²⁹ The two-part rule replaced Federal Circuit case law that had found the on-sale bar to be triggered when the subject matter of the sale was "substantially complete."³⁰ The Federal Circuit's approach "seriously undermine[d] the interest in certainty," specifically the "interest in providing inventors with a definite standard for determining when a patent application must be filed."³¹ The Court chastised the Federal Circuit for adopting a totality-of-the-circumstances test for on-sale bar determinations.³²

27. See, e.g., *Sanofi v. Glenmark Pharm. Inc.*, 204 F. Supp. 3d 665, 698 (D. Del. 2016) (concluding that a clinical trial of a drug undertaken to "test a particular treatment hypothesis" is "the quintessential experimental use").

28. *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55 (1998).

29. *Id.* at 67.

30. *Id.* at 65; *UMC Elecs. Co. v. United States*, 816 F.2d 647, 655–56 (Fed. Cir. 1987) (adopting the substantial completeness standard).

31. *Pfaff*, 525 U.S. at 65–66.

32. *Id.* at 66 n.11. Federal Circuit Judge Newman previously had acknowledged that the "totality of the circumstances" test had been criticized as "unnecessarily vague." *Seal-Flex, Inc. v. Athletic Track & Court Constr.*, 98 F.3d 1318, 1323 n.2 (Fed. Cir. 1996) (citing ADVISORY COMM'N ON PATENT LAW REFORM: A REPORT TO THE SECRETARY OF COMMERCE (1992)).

The Court also acknowledged the existence of the experimental use doctrine,³³ but did not explain how the doctrine should subsist in an environment that privileged bright-line rules over flexible standards, nor did it explain where the doctrine should fit within the new two-part framework. Instead, after reciting the proposition that “[t]he law has long recognized the distinction between inventions put to experimental use and products sold commercially,” and quoting *City of Elizabeth*,³⁴ the Court simply declared that “[t]he experimental use doctrine . . . has not generated concerns about indefiniteness,” and so there should be no “unmanageable uncertainty” about a rule that inquires whether subject matter was “first marketed commercially.”³⁵

Pfaff gave rise to two profound changes in experimental use jurisprudence. First, it submerged the policy-balancing methodology that had previously dominated the statutory bar analysis. Before *Pfaff*, the Federal Circuit had explicitly adopted a policy-dominated, totality-of-the-circumstances standard to govern both the on-sale and public use bars,³⁶ and the experimental use negation of those bars.³⁷ Indeed, for much of the Federal Circuit era, the court had insisted that the statutory bar policies “in effect, define[d]” the analysis.³⁸ Frequently, the Federal Circuit had articulated that analysis in the form of a rather intimidating 13-factor list of relevant factual considerations.³⁹ In the wake of *Pfaff*, the Federal Circuit dutifully acknowledged that the totality-of-the-circumstances test no longer would govern statutory bar determinations, saying that it would apply the *Pfaff* test “without balancing various policies [of the bar] according to the totality of the circumstances.”⁴⁰ This may be more than merely a rhetorical shift; it could undermine the role of the experimental use doctrine as a discretionary anti-forfeiture tool.

Second, *Pfaff* generated a doctrinal problem: how to situate the experimental use doctrine within the two-part framework for on-sale and public use

33. *Pfaff*, 525 U.S. at 64–65.

34. *Id.*

35. *Id.* at 67 (concluding that the evidence in the case of an accepted purchase order made it clear that there was an offer for sale and that it was “commercial rather than experimental in character”).

36. *See, e.g.*, *Manville Sales Corp. v. Paramount Sys., Inc.*, 917 F.2d 544, 549 (Fed. Cir. 1990) (“In order to determine whether an invention was on sale or in public use, we must consider how the totality of the circumstances comports with the policies underlying the on sale and public use bars.”).

37. *See, e.g.*, *Lough v. Brunswick Corp.*, 86 F.3d 1113, 1120 (Fed. Cir. 1996) (“To determine whether a use is ‘experimental’ . . . the totality of the circumstances must be considered . . .”); *Baxter Int’l, Inc. v. COBE Labs., Inc.*, 88 F.3d 1054, 1060 (Fed. Cir. 1996) (“An analysis of experimental use . . . requires consideration of the totality of the circumstances and the policies underlying the public use bar.”).

38. *TP Labs., Inc. v. Prof’l Positioners, Inc.*, 724 F.2d 965, 973 (Fed. Cir. 1984).

39. *See, e.g.*, *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1353 (Fed. Cir. 2002) (utilizing the 13-factor list).

40. *Medicines Co. v. Hospira, Inc.*, 827 F.3d 1363, 1373 (Fed. Cir. 2016) (en banc) (quoting *Weatherchem Corp. v. J.L. Clark, Inc.*, 163 F.3d 1326, 1333 (Fed. Cir. 1998)).

bars.⁴¹ The *Pfaff* opinion complicated this task by ruling that an invention could be “ready for patenting” if it were the subject of a description that was “sufficiently specific to enable a person skilled in the art to practice the invention,”⁴² which the Federal Circuit subsequently interpreted to require something beyond mere evidence of conception.⁴³ But a person could only experiment on subject matter that had already been conceived, suggesting that as a matter of logic, experimental use evidence could never negate a ready-for-patenting showing.⁴⁴

The Federal Circuit eventually addressed the problem, but only through a contrivance. In his concurring opinion in *EZ Dock*, Judge Linn attempted to integrate existing experimental use doctrine into the first prong of the *Pfaff* test. The key was to shift the experimental use inquiry away from an assessment of “whether the invention was under development, subject to testing, or otherwise still in its experimental stage at the time of the asserted sale.”⁴⁵ Instead, according to Judge Linn, the question posed by the experimental use doctrine was whether or not the transaction constituting the alleged sale was incidental to the inventor’s primary purpose of experimentation—thus making the experimental use inquiry a natural fit for *Pfaff*’s first prong.⁴⁶ In time, after first offering some confused rhetoric about overlaps between the ready-for-patenting inquiry and experimental use,⁴⁷ the Federal Circuit adopted Judge Linn’s proposition that experimental use fit within

41. In *Invitrogen*, the Federal Circuit adopted a two-part test for the public use bar that was inspired by *Pfaff*. Under the test, a public use bar arises where, before the critical date, the invention is (1) in public use; and (2) ready for patenting. *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1379 (Fed. Cir. 2005). Whether subject matter was “in public use” in accord with the first prong of this test necessitated an inquiry into whether the alleged use was “(1) accessible to the public; or (2) commercially exploited.” *Id.* at 1380 (emphasis added).

42. *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 67–68 (1998).

43. See, e.g., *Robotic Vision Sys., Inc. v. View Eng’g, Inc.*, 249 F.3d 1307, 1313 (Fed. Cir. 2001) (requiring that there be an enabling disclosure in addition to a “complete conception”).

44. *EZ Dock v. Schafer Sys., Inc.*, 276 F.3d 1347, 1356 (Fed. Cir. 2002) (Linn, J., concurring). Judge Linn pointed out that in cases before *Pfaff*, there had been “a symmetry, and often a simplicity” to the analysis of whether an experimental use negated an on-sale bar. An invention could only be the subject of an experimental use claim before it had been reduced to practice, and an offer to sell an invention before it was reduced to practice seldom triggered the on-sale bar. *Id.* (citing *RCA Corp. v. Data Gen. Corp.*, 887 F.2d 1056, 1061 (Fed. Cir. 1989)). *Pfaff* changed the trigger point for the on-sale bar without changing the endpoint of experimental use, such that “the heretofore complementary nature of the two tests and the symmetry that such congruence brought to the analytical framework disappeared.” *Id.*

45. *Id.*

46. *Id.* In making this suggestion, Judge Linn was returning the experimental use doctrine to its *City of Elizabeth* roots.

47. *Id.* at 1352 (majority opinion) (observing that a litigant may show readiness for patenting by showing reduction to practice, and that this overlaps with experimental use, but insisting that the court would “apply the experimental use negation without conflict with the ‘ready for patenting’ prong of the [*Pfaff*] test”).

the first prong of the on-sale bar test.⁴⁸ With similar sleight of hand, the court also eventually adopted a similar approach for the public use bar, ruling that evidence of experimentation would be relevant to determining whether the invention was being commercially exploited, one of the options for showing that subject matter satisfied the first prong of the public use test.⁴⁹

Judge Linn's *EZ Dock* analysis is a pragmatic response to a doctrinal puzzle, yet it reflects an unresolved tension in experimental use jurisprudence, arising when one attempts to force a discretionary inquiry into a matrix of crystalline rules. Judge Linn's opinion instructs courts to look to "an objective evaluation of the facts" to determine whether a transaction was commercial or experimental, and recommends that courts consult the Federal Circuit's pre-*Pfaff* list of 13 experimental use factors in making this objective evaluation.⁵⁰ But that, of course, is a recommendation to engage in the very type of totality-of-the-circumstances approach that the *Pfaff* opinion decries. And this suggests that the post-*Pfaff* experimental use doctrine could be prone to severe oscillations between rule-oriented and standard-oriented adjudication, depending upon whether a judge chooses to emphasize the rigidity of the *Pfaff* two-part framework or the flexibility, such as it may be, of the multi-factor standard embedded within that framework.

The Federal Circuit's decision in *Electromotive Division* ("*EMD*") well illustrates the problem. On the one hand, *EMD* reiterated the post-*Pfaff* proposition that the Federal Circuit applies the *Pfaff* test "without balancing various policies . . . according to the totality of the circumstances."⁵¹ On the other hand, while *EMD* inquired into experimental use by reiterating the 13-factor list,⁵² the court anointed two of the factors as both "effectively . . . dispositive": the inventor's control over the testing, and customer awareness of the testing.⁵³

48. See, e.g., *Atlanta Attachment Co. v. Leggett & Platt, Inc.*, 516 F.3d 1361, 1365 (Fed. Cir. 2008) (stating that the court must consider whether activities carried out in connection with any alleged commercial offers "were experiments as opposed to an attempt to profit from the invention, that is, whether the primary purpose of the offers and sales was to conduct experimentation"); *Electromotive Div. of Gen. Motors Corp. v. Transp. Sys. Div. of Gen. Elec. Co.*, 417 F.3d 1203, 1210 (Fed. Cir. 2005) ("[T]he first prong of the *Pfaff* test entails an assessment of whether the circumstances surrounding a pre-critical date sale objectively show that it was primarily made for experimentation"); *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1353 (Fed. Cir. 2002) ("If there is adequate proof that a device was sold primarily for experimentation, the first prong of *Pfaff* would not be met and it would be unnecessary to consider either whether the device was an embodiment of the claimed invention or whether the invention was "ready for patenting" at the time of the sales.").

49. *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1380 (Fed. Cir. 2005) (reciting the public accessibility and commercial exploitation criteria, and concluding that "[t]hus, the test for the public use prong includes the consideration of evidence relevant to experimentation, as well as, *inter alia*, the nature of the activity that occurred in public . . .").

50. *EZ Dock*, 279 F.3d at 1357 (Linn, J., concurring).

51. *Electromotive Div. of General Motors*, 417 F.3d at 1209 (citation omitted).

52. *Id.* at 1213.

53. *Id.* at 1214–15.

The *EMD* methodology is troubling. It suggests a vision of the experimental use doctrine that may be unhinged from the policy analysis that originally informed the doctrine. It also encourages a formalist and, indeed, reductionist rendition of experimental use.

Modern courts contending with post-*Pfaff* experimental use doctrine need to rediscover and account for the doctrine's history. The remainder of this Article takes up that task.

II. BACKGROUND PRINCIPLES FOR EXPERIMENTAL USE: NICOLSON'S PATENT STRATEGY AS A LENS

Although the modern jurisprudence discourages courts from admitting that they are engaging in a policy-balancing exercise when they apply the statutory bars (and decide matters of experimental use), generations of judges deciding statutory bar cases before the modern era were not subjected to such a constraint. Indeed, even *Pfaff* itself invokes elements of the familiar policy rhetoric: (1) the patent system implements “a carefully crafted bargain” that seeks to bring about “the creation and public disclosure” of technical advance, “in return for an exclusive monopoly for a limited period of time;”⁵⁴ and (2) the statutory bar, and the experimental use limitation, are tools that can help calibrate this quid pro quo by balancing “the public's right to retain *knowledge* already in the public domain” against “the inventor's right to control whether *and when* he may patent his invention.”⁵⁵

Before *Pfaff*, it was common for courts to frame their statutory bar analyses in accord with two pairs of policy considerations, the first pair dealing with disclosure and the second with time. Specifically, in deciding whether an inventor's uses or sales activities barred patent rights, courts frequently asserted that they were accounting for the following policies:

- (1) discouraging the removal, from the public domain, of inventions that the public reasonably has come to believe are freely available;
- (2) favoring the prompt and widespread disclosure of inventions;
- (3) allowing the inventor a reasonable amount of time following sales activity to determine the potential economic value of a patent; and
- (4) prohibiting the inventor from commercially exploiting the invention for a period greater than the statutorily prescribed time.⁵⁶

54. *Pfaff*, 525 U.S. at 63 (citing *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 151 (1989)).

55. *Id.* at 65 (emphasis added).

56. See, e.g., *Baxter Int'l, Inc. v. COBE Labs., Inc.*, 88 F.3d 1054, 1058 (Fed. Cir. 1996) (quoting *Tone Bros., Inc. v. Sysco Corp.*, 28 F.3d 1192, 1198 (Fed. Cir. 1994)). While the pedigree of these particular recitations may be debated, the four-part list is usually attributed to Patrick J. Barrett, Note, *New Guidelines for Applying the On Sale Bar to Patentability*, 24 STAN. L. REV. 730, 732–35 (1972). Barrett drew on the legislative history of the 1939 changes to the grace period: S. REP. NO. 876, at 1–2 (1939); H.R. REP. NO. 961, at 1–2 (1939). And Congress, in turn, was surely informed by Justice Story's perceptive statements justifying the recognition of the concept of a statutory bar in *Pennock v. Dialogue*:

Thus, to understand the provenance of the *City of Elizabeth* experimental use doctrine, with an eye towards understanding modern doctrine, one should first read the underlying policy calculus in view of the background legal landscape as it would have been understood in Nicolson's day.⁵⁷ Two elements of that landscape are covered in this Part: the caveat practice and the term-extension legislation. In contrast to the modern policy calculus, both of these nineteenth-century practices reflect a greater solicitude for the acts of building and commercializing inventions (rather than merely disclosing information), and a greater willingness to tolerate inventors' often protracted and uneven efforts to achieve these milestones, collectively reflecting a strong impulse against forfeiture of rights.

Samuel Nicolson needed the patent law's solicitude. He was already in his mid-50s when he began his tests on his wooden block pavement.⁵⁸ His efforts to protect and commercialize the invention would consume his time and resources for over 20 years, until his death in 1868 at age 76,⁵⁹ as the timeline in Figure 1 details. Another decade would pass before the Supreme Court would deliver its opinion in *City of Elizabeth* sustaining the infringement allegations and upholding the validity of Nicolson's patent against various challenges, including one based on the public use bar.⁶⁰

If an inventor . . . should for a long period of years retain the monopoly, and make, and sell his invention publicly, and thus gather the whole profits of it . . . and then, and then only, when the danger of competition should force him to secure the exclusive right, he should be allowed to take out a patent, and thus exclude the public from any farther use than what should be derived under it during his fourteen years; it would materially retard the progress of science and the useful arts, and give a premium to those who should be least prompt to communicate their discoveries.

27 U.S. (2 Pet.) 1, 13 (1829).

57. My aim here is not to defend a normative claim that the nineteenth-century view of the relevant policies is invariably superior, but rather to show how far the pendulum has swung away from the policy thinking that informed the experimental use doctrine when it was created.

58. *Obituary. Samuel Nicolson*, *supra* note 22 (noting that Nicolson was born in December 1791).

59. Term Extension File, Paper No. 12, at 5 (unpublished) (on file with author) (Deposition of George T. Bigelow) (claiming that Nicolson had made "constant efforts to introduce the patent into use," starting in Boston and continuing from 1855 onward to cities in the southern and western United States) (copy on file with the author). He "made journeys to distant parts of the country" to promote his patent, although his efforts presumably were hampered by the Civil War.

60. The Court rendered its decision on the last day of 1877 term.

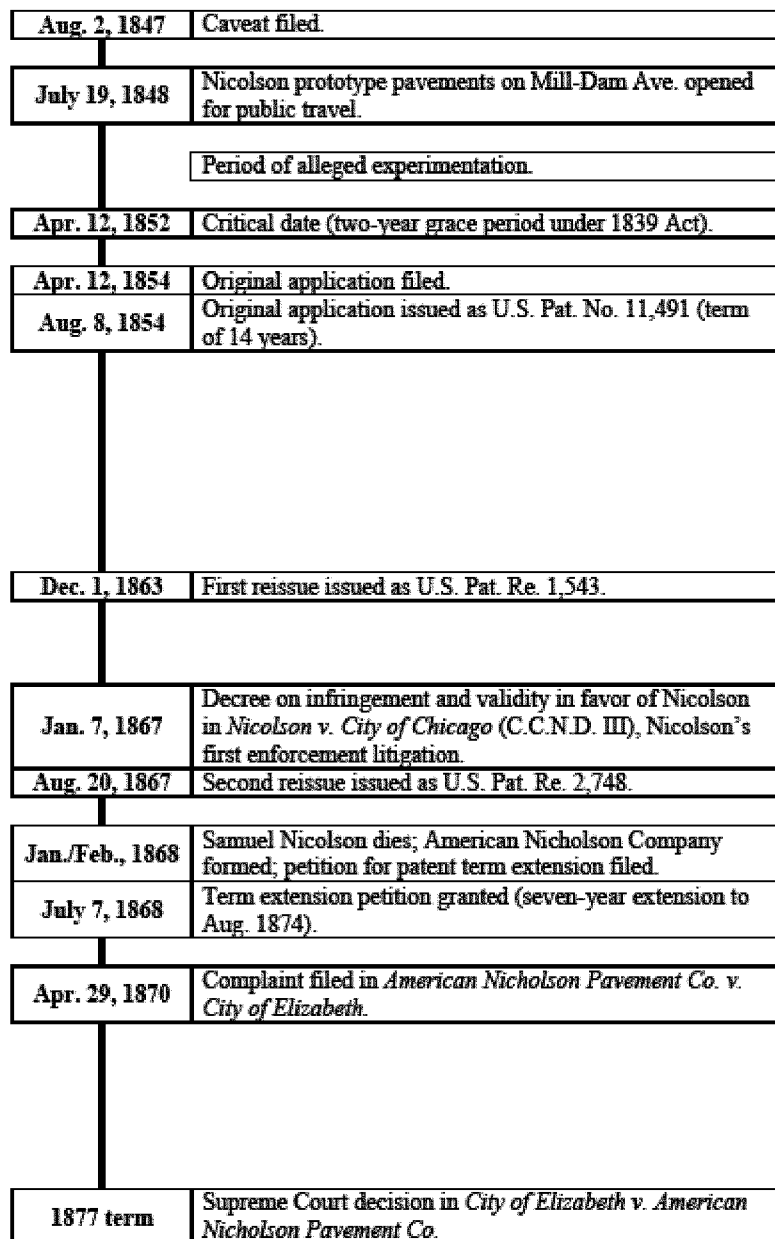


Figure 1: Timeline of Events: Nicolson Patent and Litigation

A. *Nicholson's Caveat*

In one sense, Nicolson was the prototypical individual inventor for whom we might think the experimental use doctrine is designed as a safety net. Although he made the invention while serving as treasurer and superintendent of the Boston & Roxbury Mill Corporation (where his duties included overseeing the company's

nine miles of roads),⁶¹ he seems to have paid for his own patent application costs,⁶² and I have found no evidence that the Boston & Roxbury Corporation ever claimed to own the patent rights.

In other ways, Nicolson was operating as a sophisticated corporate inventor. He had made a career in business, having entered the merchant trade at an early age, and he had 21 years' experience at Boston & Roxbury at the time of the invention.⁶³ It appears that he used Boston & Roxbury resources to construct the pavement test sections.⁶⁴

Moreover, he had prior experience with the patent system, having invented and patented Nicolson's Improved Ship's Windlass,⁶⁵ Nicolson's Steering-Wheel and Guide (for ships),⁶⁶ Nicolson's Railroad Alarm-Signal,⁶⁷ and the Ice-Breaker for Boats and Other Vessels.⁶⁸ The windlass seems to have gone into widespread use.⁶⁹

Perhaps most remarkably, he consulted with a patent lawyer *before* he began testing his invention. We know this because the patent lawyer, R.H. Eddy, filed a caveat document on Nicolson's behalf,⁷⁰ a fact that would later prove to be of considerable significance in the experimental use analysis.

61. Term Extension File, Paper No. 36, at [65] (numbers supplied; no numbers in original) (unpublished) (on file with author) (deposition of Samuel Nicolson).

62. Term Extension File, Paper No. 3, at 10–14 (unpublished) (on file with author).

63. *Collection Guides: Boston and Roxbury Mill Corporation Records*, *supra* note 16 (noting that Samuel Nicolson became superintendent/agent in July 1827).

64. Term Extension File, Paper No. 3, at 42 (recording that Nicolson received remuneration from Boston & Roxbury Mill Corp for the construction of the road).

65. U.S. Patent No. X5291 (Dec. 1, 1828) (no specification; only drawing has survived); *see also* Samuel Nicolson, Letter, *Nicolson's Improved Ship's Windlass*, *MECHANICS' MAGAZINE*, May 25, 1833, at 113–114 (drawings, accompanied by letter from Samuel Nicolson dated Apr. 4, 1833, offering to sell windlasses).

66. U.S. Patent No. 381 (Sept. 12, 1837).

67. U.S. Patent No. 2,145 (June 26, 1841).

68. U.S. Patent No. 3,668 (July 16, 1844).

69. 5 WILLIAM QUEREAU FORCE, *ARMY AND NAVY CHRON., AND SCI. REPOSITORY* 222 (1837) (noting that the windlass was “too well known to require a description,” and that it had been “put on board four hundred and fifty vessels.”) It is not clear what role, if any, Nicolson played in commercializing this invention, or whether he profited from it.

70. Transcript, *supra* note 4, at 270–73. Eddy was credited as being the “first regular solicitor to appear before the United States Patent office in behalf of an inventor.” *ILLUSTRATED BOSTON: THE METROPOLIS OF NEW ENGLAND* 175 (1889). In time, Eddy would bill himself as operating the largest “agency” in New England offering patent drafting services, including specifically the preparation of caveats. *GEORGE ADAMS, THE BOSTON DIRECTORY (ADVERTISING SECTION)* 21 (1856). In October 1846, Eddy had filed the application for Morton's famous patent for the use of ether in surgery, one of many patent applications that he would ultimately draft. *See Morton v. N.Y. Eye Infirmary*, 17 F. Cas. 879 (C.C.S.D.N.Y. 1862) (No. 9,865). It is not clear whether Nicolson had used the caveat practice in connection with any of his other patents.

At the time, the caveat practice allowed an inventor of “any new art, machine, or improvement thereof” who wanted “further time to mature the same” to file a caveat document at the Patent Office for a \$20 fee.⁷¹ The document was to set forth “the design and purpose” of the invention and its “principal and distinguishing characteristics,” and was to request “protection of [the inventor’s] right till he shall have matured his invention.”⁷² The right being protected was merely a right to receive notice if another party filed an application within a year that “may in any respect interfere” with the caveat filer’s invention.⁷³ The caveat filer had three months from receipt of the notice to file a full patent application, with the likely result that the Patent Office would initiate interference proceedings.⁷⁴ At that point, the caveat filing could serve as evidence of the filer’s conception date for purposes of establishing priority.⁷⁵

Both the extended lapse of time between Nicolson’s caveat and application and the content of the caveat document itself tell us something about how we should understand the *City of Elizabeth* experimental use doctrine and the policy calculus that undergirded it.

71. Patent Act of 1836, § 12, 5 Stat. 117, 121. Curiously, the caveat provision did not extend to articles of manufacture or compositions, which may perhaps explain why Nicolson’s invention was eventually claimed as a paving *method*. The caveat practice had been codified in 1836, although a version had become available informally before that time. See James P. Hughes, *Patent Law Through Patent Administration: The First Patent Superintendent’s Creation of Reissue Practice and Law*, 18 FED. CIR. B.J. 451, 456 (2009) (describing Superintendent Thornton’s propensity for creating extra-statutory procedures, including the caveat practice); Edward C. Walterscheid, *Priority of Invention: How the United States Came to Have a “First-to-Invent” Patent System*, 23 AIPLA Q.J. 263, 313–17 (1995) (describing the pre-1836 informal caveat practice). The caveat practice was discontinued in 1910. Act of June 25, 1910, 36 Stat. 843.

72. Patent Act of 1836, § 12.

73. *Id.* Indeed, in the early 1900s, when debating whether to retain the caveat practice, Congress heard complaints that the caveat system misled inventors into thinking that they had secure rights. See, e.g., *Arguments Before the Comm. on Patents of the H.R. on H.R. 18884, H.R. 18885, H.R. 18886, H.R. 18887, H.R. 18888, and H.R. 19389, to Revise and Amend the Statutes Relating to Patents*, 61st Cong. 20–21 (statement of Edward B. Moore, Commissioner of Patents, U.S. Patent and Trademark Office) (observing that some inventors might have been misled into believing that the caveat conferred rights enforceable against infringers); *id.* at 20 (testimony of Commissioner Moore) (asserting that the caveat system “misleads many of the inventors” because it “gives very little protection”).

74. Patent Act of 1836 Act, § 12.

75. H. REP. NO. 497, at 1 (1910) (noting that the caveat provision was intended to “give inventors, before they applied for a patent, an opportunity of completing their invention, and at the same time establish proof of priority in case a patent for the same or similar invention was applied for by others.”); 2 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* § 436 (1890) (“The purpose of a caveat is to secure to an inventor the opportunity to have the question of priority between himself and a rival inventor determined before the issue of letters-patent to either.”).

1. Tolerance for (Good-Faith) Delay

Although the caveat afforded inventors no substantive rights, it reflected an attitude that valued experimenting and building over mere disclosing of ideas. The Senate Report describing the caveat provision made this orientation explicit:

The first conception of ingenuity, like the first suggestions of science, are theories which require something of experiment and practical exemplification to perfect. Mechanical inventions are at first necessarily crude and incomplete. Time is required to develop their imperfections and to make the improvements necessary to their adaption to practical uses.⁷⁶

Thus, the caveat practice invited inventors to *delay* filing patent applications. And it imposed no fixed time constraint on them. Caveat filings were good for one year, but they could be renewed for successive one-year periods by payment of a fee, evidently without limitation.⁷⁷

Analyzing Nicolson's experimental use claim against the backdrop of the caveat practice shows us how deferential the patent system was to the inventor's subjective judgment about when an invention was ready to be patented. First, even though Nicolson took six years to conduct his tests, there is no evidence that Nicolson ever paid to renew his caveat filing,⁷⁸ nor is there any indication that the *City of Elizabeth* courts knew about that fact, or cared about it.

Moreover, an enduring curiosity of the *City of Elizabeth* case, left unexplored in the opinion, is exactly why Nicolson decided to file a patent application when he did. How did he know that six years of cane tapping was enough? Why not three, or eight?

There is evidence to suggest that Nicolson's decision may have been based on happenstance. In a deposition given in earlier litigation, Nicolson testified that after his test strips of pavement had been in place for "about five years," some blocks had to be taken up so that a pipe could be laid.⁷⁹ That provided Nicolson the opportunity to inspect the blocks, which he found to be "in satisfactory condition."⁸⁰ Not long afterwards, he had Eddy file the patent application.

By the time of the *City of Elizabeth* litigation, the Nicolson patent owners had lined up ample expert testimony supporting the assertion that six years of testing was reasonable given the nature of the invention.⁸¹ The point here is not to second-

76. S. REP. No. 338, at 19 (1836); see Rooklidge & Jensen, *supra* note 23, at 9 n.34 (quoting this passage).

77. 2 ROBINSON, *supra* note 75, § 443.

78. Term Extension File, Paper No. 3, at 10–14 (unpublished) (on file with author) (detailed report of Nicolson's expenditures related to the patent, with no indication of payment of caveat renewal fees from 1847–54.)

79. Term Extension File, Paper No. 36, at [70–71] (unpublished) (on file with author).

80. *Id.*

81. Charles E. Stafford, the inventor of another wooden pavement, provided the following deposition testimony:

guess the testimony or to interrogate Nicolson's credibility. Rather, it is to observe that the patent system of Nicolson's day afforded inventors a substantial measure of autonomy in judging when an invention had "matured" sufficiently to warrant a patent application filing.⁸²

The caveat practice, then, can be seen as facilitating de facto patent term extension.⁸³ And that should affect one's views about the statutory bar policy calculus as it operated in Nicolson's time: the patent system acknowledged the need to police inventor behavior in the name of confining inventors' exclusive rights to the statutory term, but was prepared to exercise considerable deference to inventors' good-faith judgments about the time needed to perfect their inventions. This was true even if it meant tolerating a longer de facto patent term in the interest of avoiding the forfeiture of rights.

Indeed, the Court in *City of Elizabeth* made explicit the laissez-faire perspective on term extension:

It is sometimes said that an inventor acquires an undue advantage over the public by delaying to take out a patent, inasmuch as he thereby preserves the monopoly to himself for a longer period than is allowed by the policy of the law; but this cannot be said with justice when the delay is occasioned by a *bona fide* effort to bring his invention to perfection, or to ascertain whether it will answer the purpose intended. His monopoly only continues for the allotted period, in any event; and it is the interest of the public, as well as

If I were experimenting as an original inventor of wooden pavement in determining the question of its durability in comparison with stone pavement, and had not the advantage of the practical experiences of others in wooden pavements, I should need to prove by actual use the best method of laying the pavement, and the shape of the blocks and their capacity to resist the action of the elements and the wear and tear of the vehicles. . . . I think it would require at least five years for me to determine whether such a wooden pavement could be successfully used in competition with stone pavement, and in an ordinary thoroughfare.

Transcript, *supra* note 4, at 105; *id.* at 107 (providing the deposition testimony of Charles Waterbury, a contractor, who opined that it would require about six years to demonstrate that the pavement was cheaper than and as durable as stone pavement); *id.* at 110 (providing the deposition testimony of Joseph Canning, a contractor, who stated that six to eight years was reasonable). This testimony also shows how blurred the line is between experimentation and market testing. A comparison with stone pavement could qualify as either. For further development of this point, see *infra* Part II.

82. 2 ROBINSON, *supra* note 75, § 440 (caveat may be filed by inventor who "for reasons known to himself, but into which neither the Patent Office nor the law inquires, . . . desire[s] further time to mature his invention before filing his own application for patent.")

83. By the early twentieth century, concerns grew that caveat practice was being used to achieve undesirable term extension. H. REP. No. 497, at 1 (1910) (describing data from a Commissioner's Report that 1,600 caveats had been kept alive for 5 to 15 years, suggesting that inventors might be using caveats to achieve the functional equivalent of patent term extensions).

himself, that the invention should be perfect and properly tested, before a patent is granted for it.⁸⁴

The *City of Elizabeth* experimental use doctrine thus should be understood as an outgrowth of this deferential approach towards good-faith delay.⁸⁵ That is, the caveat practice informed the statutory bar policy calculus before the experimental use doctrine was fully formed. The caveat practice empowered the principle that inventors should have reasonable control over deciding when an invention was ripe for patenting, and tilted away from concerns about improper term extension. That created fertile ground for an emergent experimental use doctrine.

The caveat practice also informed experimental use at a doctrinal level—the two essentially came to operate in tandem. In the most straightforward manifestation of this relationship, *Nicolson's* caveat provided evidence corroborating the claim that the pavement tests were done for experimental purposes to perfect the invention.⁸⁶ In addition, *City of Elizabeth* demonstrated that a caveat filing could provide the foundation for disqualifying a statutory bar. Technically, a caveat was not supposed to do this; it could provide evidence to antedate alleged prior invention evidence, but it could not defeat a public use bar.⁸⁷ However, it might if combined with other evidence of experimentation, as *City of Elizabeth* demonstrated. In a sense, then, the outer edges of the caveat practice had defined a doctrinal gap which the experimental use doctrine then filled.

2. Bias Towards the Tangible

The disclosure in a caveat needed only to be “precise enough to enable the examiners . . . to determine whether an invention described in a subsequent application is probably the same.”⁸⁸ The fact of a caveat filing did not prove that the invention was incomplete as of the caveat filing date, and could not be used to estop inventors from later claiming that the invention was complete at the time.⁸⁹ Rather,

84. *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 137 (1877).

85. *But cf. Egbert v. Lippmann*, 104 U.S. 333 (1881) (rejecting the patent owner's experimental use assertion and taking an infamously stingy approach to the public use bar). Perhaps the different outcome can be attributed to factual distinctions. Or, perhaps the decidedly non-deferential approach to the patent owner in *Egbert* lends some force to the feminist critique of that opinion. See Kara W. Swanson, *Getting a Grip on the Corset: Gender, Sexuality, and Patent Law*, 23 YALE J.L. & FEMINISM 57 (2011).

86. *City of Elizabeth*, 97 U.S. at 133; see *infra* Part II.

87. 2 ROBINSON, *supra* note 75, § 439 (noting that the caveat does not “afford [the caveator] any protection against public use, nor supply the place of due diligence in perfecting his invention and reducing it to practice”); *Bell v. Daniels*, 3 F. Cas. 96, 98 (C.C.S.D. Ohio 1858) (No. 1858) (“[I]f, during the time which elapses between the filing of his caveat, and his application, he allows his invention to go into public use, his caveat will not protect him.”). Notably, the *Bell* court alluded to experimental use, *id.* at 99, but did not appear to recognize that the caveat filing itself might corroborate the claim of experimentation.

88. 2 ROBINSON, *supra* note 75, § 441.

89. *Id.* § 446; *Arguments Before the Comm. on Patents of the H.R. on H.R. 18884, H.R. 18885, H.R. 18886, H.R. 18887, H.R. 18888, and H.R. 19389, to Revise and Amend the Statutes Relating to Patents*, 61st Cong. 19 (statement of S.T. Fisher, Att’y of Wash., D.C.) (asserting that the caveat system was understood as of the early twentieth century as providing

having filed a caveat “as a matter of precaution,” the inventor was free to “proceed with his experiments,” with the expectation that the results obtained “may vary in many particulars” from the original disclosure in the caveat.⁹⁰

Nicolson’s caveat was a short document comprised of a one-paragraph petition accompanied by a two-paragraph description and two drawings, shown below as Figure 2.⁹¹ The petition was largely boilerplate, although it departed from the language of the statute in asserting that Nicolson “is now engaged in making experiments for the purpose of perfecting” his invention.⁹²

The accompanying description disclosed some details about the illustrated pavement (the “checkerboard” embodiment),⁹³ and alluded to a few alleged advantages of the invention, perhaps indicating that Nicolson had already constructed a prototype.⁹⁴

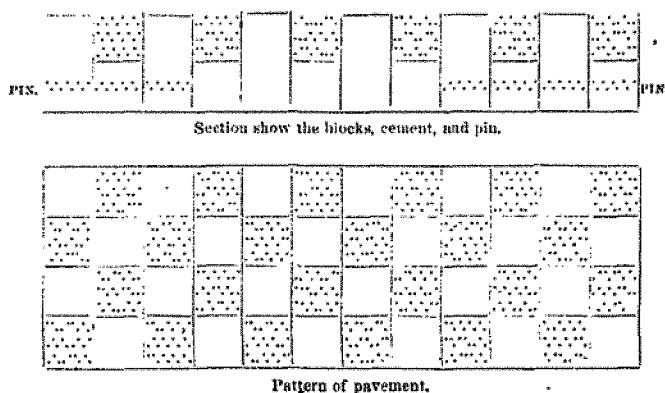


Figure 2: Nicholson’s Caveat Drawings

evidence of conception of an invention, not evidence of a completed invention.). *But cf.* GEORGE TICKNOR CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS IN THE UNITED STATES OF AMERICA § 170 (Boston, Little, Brown & Co. 2d ed. 1854) (using the title “Caveat for Incomplete Invention” for a treatise section on caveats).

90. 2 ROBINSON, *supra* note 75, § 448.

91. Transcript, *supra* note 4, at 115 (reproduction of drawings).

92. *Id.* at 114. The petition also requested that the caveat filing be treated as “the preliminary application or petition required by law to be made in order to obtain letters-patent,” perhaps reflecting a misapprehension on Nicolson’s part as to the actual legal effect of the caveat. *See id.*

93. According to the caveat document, the pavement was formed from rows of eight-inch vertical wooden blocks, each block being adjacent to a four-inch vertical block, arrayed to form a surface having a checkerboard pattern of four-inch recesses. *Id.* at 114–15. The blocks were pinned together in sets of three or four to keep them vertically aligned. *Id.* at 115. A fill material was packed into the recesses and sealed over with tar to resist moisture. *Id.* The caveat said relatively little about preparing the ground, merely mentioning that tar paper should be laid on the ground before placing the blocks in position. *Id.*

94. For example, the description alluded to the benefit of including coarse salt in the fill material, alleging that as the salt melted it would penetrate and preserve the wood from decay. *Id.* Additionally, the caveat claimed that the arrangement of wooden blocks would “prevent horses from slipping, the hoof grasping on each square.” *Id.*

Some six years later, when he filed his patent application, Nicolson had added little additional disclosure. The drawings (shown below as Figure 3) were more refined but much the same.

S. Nicolson.
Wood Pavement.
N^o 11,491. Patented Aug. 8, 1854.

Fig. 2.

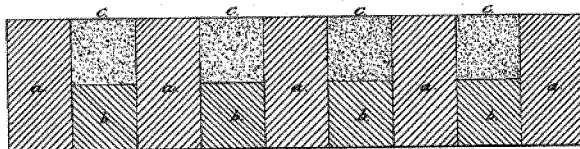


Fig. 1.

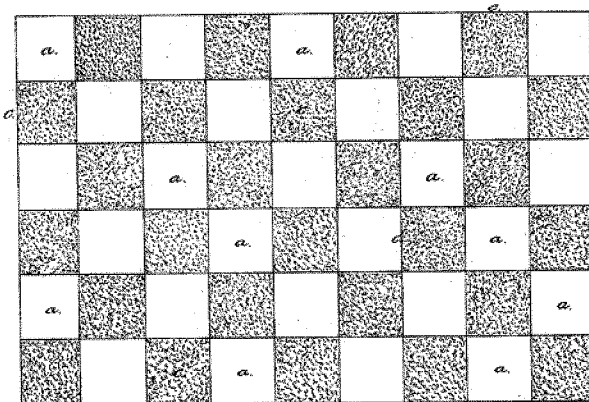


Figure 3: Nicholson's Patent Drawings

To be sure, he added a short description (without drawings) of an alternative embodiment that he deemed to be less preferred,⁹⁵ and some additional details about preparing the ground with a foundation or other flooring for the pavement. However, the patent expresses some ambivalence about whether those preparations were important.⁹⁶ He added some laudatory comments about the

95. This turned out to be the commercially valuable implementation of Nicolson's method. See *infra* Part III.

96. See '491 Patent, *supra* note 5, at p. 1, col. 2 ll. 85-90, p. 2, col. 1 ll. 10-16.

benefits of the invention, and remarked that “for the purposes of experiment, I have had some of it in use for six years on a road over which travel has been very great.”⁹⁷

Thus, as of the caveat filing date, Nicolson was probably capable of providing an enabling written description of the invention that he later claimed in the patent. That is, Nicolson’s invention may well have been “ready for patenting” in the modern post-*Pfaff* sense as of the caveat filing date. While it may be that it was not until the patent-application filing date that Nicolson became assured in his own mind that the invention worked for its intended purposes, there is little about the disclosure added in the patent application (as compared to the caveat) that would convey as much to a person of ordinary skill.

This comparison between Nicolson’s caveat and patent documents well illustrates the implications of patent law’s devotion to physicalism in Nicolson’s time. Professor Chris Cotropia has used the label to describe patent rules that oriented themselves around “a manifestation of the invention that goes beyond the textual and graphical description that appears in the patent itself.”⁹⁸ The rule that invention entails the construction of a physical prototype—an actual reduction-to-practice requirement—is the most obvious example. As Professor John Duffy has pointed out, the idea that the disclosure of information could constitute a constructive reduction to practice evidencing the completion of invention had not yet crystallized; it was not until later in the nineteenth century or beyond that the informational theory of the patent system took hold in American patent jurisprudence.⁹⁹

So, the existing patentability rules did not hurry Nicolson off to the Patent Office the moment he was able to articulate the details of a (probably) working invention. The caveat practice, operating in tandem with the experimental use doctrine, validated his decision to delay filing. Moreover, the *City of Elizabeth* Court made clear that the building and testing of a physical prototype could still qualify as experimental use even if the physical prototype is identical to the invention as conceived and described before the testing.¹⁰⁰ Seen in the context of Nicolson’s caveat filing, this rule is consistent with the deferential approach, and reflects the bias towards building.

97. *Id.* at p. 2, col. 1 ll. 11–15.

98. Christopher A. Cotropia, *Physicalism and Patent Theory*, 69 VAND. L. REV. 1543, 1548 (2016). Cotropia identifies the actual reduction to practice requirement as an example of physicalism in early U.S. patent law. *Id.* at 1549–51. *See also* Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 125–27 (2009) (calling for an actual reduction to practice requirement for modern patent law, and pointing out that such a requirement would not necessarily demand proof of “a perfected invention” or evidence that the invention is developed to the stage of commercial feasibility).

99. John F. Duffy, *Reviving the Paper Patent Doctrine*, 98 CORNELL L. REV. 1359, 1366–71 (2013).

100. *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 135 (1877) (remarking that even if, during the testing, the inventor “may not find that any changes are necessary, yet he may justly be said to be using his [invention] only by way of experiment”).

B. The Term-Extension Practice

The concern stated in the statutory bar policy calculus over an inventor's illegitimate efforts to prolong the patent term must also be balanced against another background principle embedded in the patent law of Nicolson's era: the principle that an inventor should have the opportunity to extend the patent term if circumstances had prevented the inventor from adequately commercializing the invention. Like the caveat, the term-extension practice reflected a willingness to give effect to inventor autonomy, and another type of physicalist preference—namely, the preference for putting inventions into commercial use.

Nicolson's patent had been issued under the 1836 Act, which provided patents with a term of 14 years from issuance but also made them eligible for a potential term extension of up to 7 years.¹⁰¹ In addition to meeting various procedural requirements, a patentee petitioning the Patent Office for a term extension had to demonstrate that “the recompense received by him during the original term of his patent is not commensurate with the benefit conferred by his inventive act upon the public.”¹⁰² This was to be accomplished by submitting a statement “of the ascertained value of the invention” along with an account of “receipts and expenditures” associated with commercializing the invention.¹⁰³ The Patent Office was also to account for the public interest, although the statute did not specify exactly how.¹⁰⁴ Term-extension petitions under this provision soon had become “very common,” according to one nineteenth-century commentator.¹⁰⁵

Nicolson's term-extension petition laid out, in heartbreaking detail, his struggles to bring wooden pavement to the cities of America. In 1855, within months after the original patent issued, Nicolson gave up his position at Boston &

101. Patent Act of 1836, ch. 357, § 5, 5 Stat. 117, 118–19 (14-year term); *id.* § 18 (authorization for grants of term extension). For background on the genesis of the extension practice, see Tyler T. Ochoa, *Patent and Copyright Term Extension and the Constitution: A Historical Perspective*, 49 J. COPYRIGHT SOC'Y U.S.A. 19, 51–54 (2001); Edward C. Walterscheid, *Defining the Patent and Copyright Term: Term Limits and the Intellectual Property Clause*, 7 J. INTEL. PROP. L. 315, 367–78 (2000). In 1861, Congress eliminated the seven-year extension provision (applicable to patents issued after that time) but also lengthened the basic term from 14 to 17 years from issuance, and left open the possibility of extension by special legislation. Act of Mar. 2, 1861, ch. 88, § 16, 12 Stat. 246, 249. However, these changes only applied prospectively, and so did not affect Nicolson's patent, although the *City of Elizabeth* Court may have been aware of them.

102. 2 ROBINSON, *supra* note 75, at § 837; Patent Act of 1836, § 18 (providing that an extension could be granted if “the patentee, without neglect or fault on his part . . . failed to obtain, from the use and sale of his invention, a reasonable remuneration for the time, ingenuity, and expense bestowed upon the same, and the introduction thereof into use . . .”).

103. Patent Act of 1836, § 18; *see also* 2 ROBINSON, *supra* note 75, § 841 (advising that the statement of value should be supported by “the testimony of disinterested persons”).

104. Patent Act of 1836, § 18.

105. Chauncey Smith, *A Century of Patent Law*, 5 Q. J. ECON. 44, 48 (1890) (noting the irony that petitioners began to assert that their patents were valuable as a reason for granting the term extension).

Roxbury.¹⁰⁶ He spent most of his time from then on attempting to commercialize the invention.¹⁰⁷

It did not go well. By 1856, Nicolson had become insolvent, and he never seemed to regain his financial footing. He was traveling extensively in the late 1850s, promoting his patent, but it was not until late summer of 1859 that he began to receive a trickle of revenue from these efforts.¹⁰⁸ The first proceeds were from a Chicago paving contract.¹⁰⁹ From then through the end of 1867, Nicolson received over \$71,000 in payments for the use of the patented technology (or for geographically restricted assignments of the patent) in the Northeast, Midwest, and on the West coast.¹¹⁰ But it was not enough to keep pace with his overwhelming debts—especially when he became embroiled in patent litigation, starting in Chicago in late 1864.¹¹¹ By May 1866, to cover his accrued (and anticipated) lawyers' fees in the Chicago litigation, he granted Larned & Goodwin a partial assignment in the patent rights.¹¹² Judge Drummond ruled in favor of Nicolson in early 1867,¹¹³ awarding nearly \$28,000 in damages and an injunction. Chicago subsequently settled and took a license, the royalties from which presumably went to Larned & Goodwin.¹¹⁴

106. Term Extension File, Paper No. 12, at 4 (unpublished) (on file with author) (deposition of George T. Bigelow); *Collection Guides: Boston and Roxbury Mill Corporation Records*, *supra* note 16.

107. Term Extension File, Paper No. 3, at 15–16 (unpublished) (on file with author) (alleging that Nicolson spent “a large proportion of his time” from 1854–1858, and “the whole of his time” from 1858 to his death, on this endeavor).

108. Term Extension File, Paper No. 3 (“Statement in writing of the Receipt and Expenditures of Samuel Nicolson in connection with the Nicolson Patented Wooden Block Pavement”), at 10–14 (unpublished) (on file with author) (detailing expenditures); *id.* at 1 (asserting that Nicolson received no revenue on the patent from the issue date through late summer, 1859); *id.* at 3 (describing revenues from Chicago contract).

109. *Id.*

110. *Id.* at 3–9.

111. Term Extension File, Paper No. 36, at [3] (unpublished) (on file with author) (Deposition of William Bradley, clerk of court, confirming the filing of *Nicolson v. City of Chicago* in equity in the Circuit Court for the Northern District of Illinois in November 1864). The court's records of the case seem to have been lost in the Chicago fire of 1871. Correspondence with Glenn Longacre, Archivist, National Archives (Chicago), July 19, 2016; Transcript, *supra* note 4, at 285 (testimony regarding loss of the record in the fire). Some elements of the record were filed in the petition for term extension and thus have survived.

112. Term Extension File, Paper No. 3, at 6 (unpublished) (on file with author). It was not unusual for patent lawyers to act as market intermediaries. See Naomi R. Lamoreaux & Kenneth L. Sokoloff, *Intermediaries in the U.S. Market for Technology, 1870–1920*, in FINANCE, INTERMEDIARIES, AND ECONOMIC DEVELOPMENT 209 (Stanley L. Engerman et al. eds., Cambridge Univ. Press 2003).

113. Term Extension File, Paper No. 36, at [4] (unpublished) (on file with author).

114. The City of Chicago evidently appealed Judge Drummond's decision to the Supreme Court, retaining former Justice Benjamin Curtis to represent them. While the appeal was pending, Nicolson's successors filed another suit based on the second reissue patent. Transcript, *supra* note 4, at 40 (Letter from S.F. Norton to Geo. W. Tubbs (May 28, 1870)).

Nicolson died on January 6, 1868 with no surviving spouse or children, but his niece was married to George T. Bigelow, recently retired from service as the Chief Justice of the Massachusetts Supreme Judicial Court.¹¹⁵ Mr. Bigelow was appointed to administer Nicolson's estate, and he moved rapidly regarding the patent. He had little choice. Bigelow estimated that it would be necessary to generate at least \$40,000 to \$50,000 from the patent to cover Nicolson's outstanding debts.¹¹⁶ But the 14-year term of Nicolson's patent was nearly exhausted; it was due to expire in July 1868.

So Bigelow swiftly petitioned for a term extension, amassing a gigantic supporting record. The handwritten record of proceedings spans several hundred pages, mostly transcripts of testimony from at least two dozen witnesses lauding the value of Nicolson's invention.¹¹⁷ The required statement of expenditures revealed that Nicolson had incurred \$8,800 in out-of-pocket expenses in his business dealings,¹¹⁸ and estimated the value of Nicolson's time over the 14 years at \$70,000,¹¹⁹ and together those expenditures exceeded the revenue realized under the patent (which was recorded to be less than \$70,000).¹²⁰ Bigelow testified that the value of the patented technology, "if it were generally introduced into the larger cities and villages, could properly be estimated at several millions of dollars."¹²¹ In due course, the Patent Office agreed to extend as of July 7, 1868, for seven years,¹²² an event duly reported in *Scientific American*.¹²³

All of this is informative on the doctrine of experimental use because it forms part of the background set of principles against which the statutory bar policy calculus operated at the time. The patent law of Nicolson's time expressed concern over improper de facto term extension before application filing, but that concern subsisted in a patent system whose governing statute invited patentees to petition for term extension at the end of the original term on liberal and subjective conditions. Moreover, those conditions reflected a bias in favor of inventions that were not only built, but also developed into commercial products and used. These considerations point to the recognition of an experimental use doctrine that would take seriously

Curtis recommended against settling, but the City ultimately did settle. *Id.*; see also *id.* at 41–42 (copy of Dec. 3, 1869 order of Judge Drummond in *Bigelow v. City of Chicago*); *id.* at 42–43 (settlement agreement between Chicago and Goodwin & Larned).

115. *Obituary. Samuel Nicolson*, *supra* note 22, at 2.

116. Term Extension File, Paper No. 36, at [3–4] (unpublished) (on file with author). To put that amount in context, Nicolson's salary as treasurer of the Boston & Roxbury Mill Company had been \$5,000 annually. *Id.* at 4.

117. Term Extension File, Paper Nos. 4–11, 13–33 (unpublished) (on file with author).

118. Term Extension File, Paper No. 3, at 10–14 (unpublished) (on file with author).

119. *Id.* at 17.

120. *Id.* at 9.

121. *Id.* at 18.

122. Transcript, *supra* note 4, at 4 (American Nicolson's complaint). Accordingly, Nicolson's patent had expired by the time the Supreme Court rendered its decision.

123. *The Nicolson Pavement—Important Patent Extension*, *SCI. AM.*, July 22, 1868, at 56 (reporting on the "important patent extension" of the Nicolson pavement patent).

inventors' assertions of experimental purpose as a way to avoid patent forfeiture in appropriate cases.

In his duties as administrator of Nicolson's estate, besides extending the term of Nicolson's patent, Bigelow also sold off patent rights covering most of New Jersey; the rights wound up in the hands of investors who quickly formed the American Nicholson Company.¹²⁴ A contractor and mill operator named John W. Brocklebank voiced his disappointment, claiming that he was supposed to have had an interest in the Nicolson patent, but he got "chis'led out of it."¹²⁵ He and another contractor named Charles Trainer, who had testified as a witness in support of the term extension,¹²⁶ would appear again in the Nicolson patent saga. Litigation on the Nicolson patent commenced around the country,¹²⁷ but New Jersey became the site of the defining battle over the validity of the Nicolson patent, and the viability of the experimental use doctrine.

III. THE PURPOSIVE ANALYSIS OF EXPERIMENTAL USE: ORIGINS AND EVOLUTION

This Part turns from policy to doctrine. The doctrinal analysis for experimental use generally depends on two sets of considerations: (1) the nature of the inventor's activities, including the inventor's purpose for engaging in them; and (2) the stage of development of the invention undergoing the testing. These considerations overlap, but are also distinct. A decision to privilege one set over the other is likely to determine the outcome of the analysis. Such a decision also has other important consequences. Although all experimental use doctrinal analysis has tended to be fact-bound, a tilt towards the purposive considerations has opened up at least some room for discretionary and instrumental approaches to the doctrine. A tilt towards the latter considerations has driven the experimental use doctrine towards formalism. This dynamic is important because if an experimental use assertion fails, the consequence is harsh: forfeiture of patent rights, with no room for mitigation.

In this Part, I analyze the experimental use doctrine from its indifferent emergence in the early nineteenth century through its apotheosis a few decades later in *City of Elizabeth*. I argue that *City of Elizabeth* adopted a strongly purposive analysis for experimental use, one that ties closely to the instrumental goal of providing a discretionary hedge against patent forfeiture.

124. Transcript, *supra* note 4, at 60–61 (articles of incorporation); *id.* at 66–67 (memorializing the relevant transfers).

125. *Id.* at 166 (deposition of John W. Brocklebank, taken Apr. 6, 1871).

126. Term Extension File, Paper No. 29 (unpublished) (on file with author).

127. See *Jenkins v. Nicolson Pavement Co.*, 13 F. Cas. 531 (C.C.D. Cal. 1870) (No. 7273) (holding that an assignment under the original patent to practice the invention in California did not extend to the reissue or the extension), *rev'd*, 81 U.S. 452 (1871) (reversing based on general contract principles); *Bigelow v. City of Louisville*, 3 F. Cas. 355 (C.C.D. Ky. 1869) (No. 1400) (accepting the defendant's license defense to infringement); *Nicholson Pavement Co. v. Hatch*, 18 F. Cas. 211 (C.C.D. Cal. 1868) (No. 10,251) (declining to find infringement).

A. “An Honest Experiment”: City of Elizabeth at Trial

City of Elizabeth by no means originated as a test case for the experimental use doctrine. Indeed, it was not entirely clear that the doctrine even existed before *City of Elizabeth*. And only in hindsight was it clear that the trial court had relied on such a doctrine.

1. Street Fight: The Origins of the City of Elizabeth Dispute

The *City of Elizabeth* exegesis on the experimental use doctrine came about as an indirect result of an elaborate scheme concocted by George W. Tubbs and others, aided by the disgruntled John W. Brocklebank. Brocklebank and his fellow contractor Trainer had been involved in projects to lay Nicolson pavement, and had managed to patent an improvement which, Brocklebank later testified, overcame a defect in the Nicolson pavement.¹²⁸ Tubbs and colleagues persuaded the New Jersey legislature to amend the City of Elizabeth’s contracting regulations to allow construction contracts to be awarded based on the request of a majority of the affected property owners that the City use a patented process.¹²⁹ Then they formed the New Jersey Wood Paving Company, took a license under the Brocklebank & Trainer patent,¹³⁰ and offered shares to property owners. A majority obligingly requested that the Brocklebank & Trainer patent be used.

American Nicholson promptly asserted the Nicolson patent against Tubbs individually, the New Jersey Wood Paving Company, and the City of Elizabeth, seeking a preliminary injunction during the bidding process.¹³¹ In an opinion by Justice William Strong (riding circuit), sitting with Circuit Judge William McKennan, the court denied the motion without speaking to the experimental use issue, instead relying on the legally erroneous ground that the defendants must not be infringing because they were operating under a license to the Brocklebank & Trainer patent.¹³²

The City duly awarded a contract to the New Jersey Wood Paving Company. Evidently, the City was already in financial trouble due to its spending on street construction,¹³³ but the entrepreneurial zeal of Tubbs and colleagues put the City over the edge. Within about a year after the Supreme Court’s *City of Elizabeth* decision, the City was forced into bankruptcy, one chief reason reportedly being the “expenditure of immense sums of money in payment” for laying Nicolson

128. Transcript, *supra* note 4, at 165 (deposition testimony of John W. Brocklebank, taken Apr. 6, 1871); Improved Wooden Pavement, U.S. Patent No. 85,786 (issued Jan. 12, 1869).

129. See *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 691, 696 (C.C.D.N.J. 1874) (No. 309).

130. Transcript, *supra* note 4, at 116–17 (copies of relevant agreements).

131. See *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 708, 711 (C.C.D.N.J. 1870) (No. 312).

132. *Id.* at 710.

133. See EDWIN F. HATFIELD, HISTORY OF ELIZABETH, NEW JERSEY: INCLUDING THE EARLY HISTORY OF UNION COUNTY 687 (N.Y., Carlton & Lanahan 1868) (reporting that the city’s “bonded debt, chiefly for street improvements,” was nearly \$1 million).

wooden pavement “on streets not built on, and which may not be built on for years to come.”¹³⁴

After the preliminary injunction denial, the case proceeded to trial before Judge John T. Nixon,¹³⁵ who was well aware of the contract bidding shenanigans. His decision surely reflected his dim view of the defendants. At trial, the parties continued to clash over infringement, and on three claims of invalidity, including one based on the public use bar.¹³⁶ The last of these brought Judge Nixon to the question of experimental use.

2. Antecedents to the City of Elizabeth *Experimental Use Doctrine*

The experimental use doctrine, as Judge Nixon would have found it, was a cipher. Courts at the time seemed certain that it existed, but had never explained where it had come from, or why. They treated the doctrine as if it had been there in patent law all along, like some incontrovertible fact of the natural world.

If Judge Nixon had researched the question, he would have found that the doctrine—or, really, its unlabeled antecedent—had made its way into jury charges in a few cases that had arisen under the 1793 Act.¹³⁷ In *Morris v. Huntington* (1824), the court had charged the jury that if an inventor “has been practicing his invention with a view of improving it, and thereby rendering it a greater benefit to the public before taking out a patent, that ought not to prejudice him.”¹³⁸ Two Supreme Court

134. *Costly Street Pavement: The American Nicolson Company*, N.Y. TIMES, May 15, 1879, at 8. Charles F. Blake, one of the lawyers for defendants on appeal to the Supreme Court, had to sue the city for payment of attorney’s fees. *Blake v. City of Elizabeth*, 3 F. Cas. 591 (D.N.J. 1879) (No. 1495) (Judge Nixon’s charge to the jury).

135. Transcript, *supra* note 4, at 1 (hearing held in early February 1872; order for injunction issued in March 1872). Regarding Judge Nixon, see Stephen B. Presser, *Judicial Ajax: John Thompson Nixon and the Federal Courts of New Jersey in the Late Nineteenth Century*, 76 NW. U. L. REV. 423 (1981) (casting Nixon as a predecessor to the legal realists in an era thought to be dominated by formalist thought).

136. *Am. Nicholson*, 1 F. Cas. at 707–08 (infringement issue); *id.* at 705 (rejecting a claim of anticipation over prior art that had not been presented in the *Chicago* litigation); *id.* at 705–06 (rejecting a claim that the reissues were improper). See *infra* Part III for a discussion of the relevance of these theories to our understanding of the experimental use doctrine.

137. The relevant provision of the 1793 Act barred patent protection where the subject invention was “known or used before the application,” and recognized an invalidity defense where an invention had been “in use . . . anterior to the supposed discovery of the patentee . . .” Act of Feb. 21, 1793, ch. 11, §§ 1, 6, 1 Stat. 318–23.

138. 17 F. Cas. 818, 820 (C.C.D.N.Y. 1824) (No. 9831); see also *Whitney v. Emmett*, 29 F. Cas. 1074, 1077–78 (C.C.E.D. Pa. 1831) (No. 17,585) (charging the jury that a patentee is permitted to “try experiments on the effect and operation of his machinery, in order to know whether the thing patented can be produced in the mode specified,” and if necessary, “a public experiment may be made”); *Treadwell v. Bladen*, 24 F. Cas. 144, 146–47 (C.C.E.D. Pa. 1827) (No. 14,154) (instructing the jury that “every inventor uses the machine he invents before he applies for a patent, with a view to satisfying himself whether it answers the purpose for which it was intended”); *Mellus v. Silsbee*, 16 F. Cas. 1332, 1334 (C.C.D. Mass. 1825) (No. 9404) (Story, J., riding circuit) (charging the jury that an inventor

cases, *Pennock v. Dialogue* (1827) and *Shaw v. Cooper* (1833), contained statements that, read in hindsight, might have articulated an experimental use doctrine, but they were hardly definitive.¹³⁹ Nor had the courts in any of these cases attempted to explain how an experimental use doctrine would align with the evidently absolute language of public use in the 1793 statute.

The 1836 Act had codified the concept that an inventor's own pre-filing uses or sales could bar patent protection, but had not expressly adopted any experimental use limitation.¹⁴⁰ Nor did the 1839 grace period legislation, which provided that activity occurring within two years of the application date would not give rise to a bar.¹⁴¹ The enactment of the 1839 legislation triggered an argument that the two-year grace period limiting the effect of the bar was meant to displace the open-ended experimental use limitation. Yet courts continued to allude to the possibility that an inventor's uses or sales occurring more than two years before filing might still be saved from the statutory bar if they were experimental.¹⁴² However, these pronouncements were frequently dicta, without explanation or definition, and almost invariably came in cases in which the use in question was found to bar patent protection.

By contrast, Judge Nixon would have found a much more robust line of cases that used evidence of experimentation in a different context—namely, to analyze whether evidence of a use in public by a third party before the patent

“is not to be estopped [from patent protection] by licensing a few persons to use his invention to ascertain its utility”).

139. In *Pennock*, the germinal case on the public use bar, counsel in the case seemed to assume that the experimental use doctrine existed. *Pennock v. Dialogue*, 27 U.S. 1, 3 (1829) (argument of Webster for patentee, asserting that British cases had held that “any public use of an invention, even for experiment, renders it no longer a new machine,” but that in the United States, “a more just view . . . of the rights of inventors” had prevailed); *id.* at 6 (argument of Sergeant for defendant, arguing that the invention had been sold, “not to experiment with, in order to bring the invention to perfection; but for public use, as a thing already completed . . .”). But Justice Story did not definitively identify any experimental use doctrine, merely commenting that an inventor could “employ others to assist in the original structure” without running afoul of the public use bar, presumably a reference to his prior statement in *Mellus*. *Id.* at 13. In *Shaw*, the Court noted that the patentee had cited the jury instruction from *Morris*, but then rejected the patentee's claim that he had been “endeavoring to make his invention more perfect” when engaged in the alleged public use. *Shaw v. Cooper*, 32 U.S. 292, 322 (1833).

140. Act of July 4, ch. 357, § 6, 5 Stat. 117, 119 (providing that an invention may be patentable if it is “not, at the time of his application for a patent, in public use or on sale, with his consent or allowance . . .”).

141. Act of Mar. 3, 1839, ch. 88, § 7, 5 Stat. 353, 354 (“[N]o patent shall be held to be invalid by reason of such purchase, sale, or use prior to the application for a patent . . . except on proof of abandonment of such invention to the public; or that such purchase, sale, or prior use has been for more than two years prior to such application for a patent.”).

142. See, e.g., *Agawam Woolen Co. v. Jordan*, 74 U.S. 583, 607–08 (1868) (commenting that the “forbearance to apply for a patent during the progress of experiments, and until the party has perfected his invention and tested its value by actual practice, afford no just grounds” for a presumption of abandonment); see also *Rooklidge & Jensen*, *supra* note 23, at 62 n.16 (collecting circuit court decisions).

applicant's invention date defeated the novelty of the applicant's claimed invention.¹⁴³ Such a use could qualify as novelty-defeating prior art only if the subject matter allegedly used was "complete and operative" and "practically employed."¹⁴⁴ In numerous cases, courts held that an alleged prior use that amounted to a mere "abandoned experiment" could not be "complete and operative" and therefore could not qualify as a patent-defeating prior use.¹⁴⁵ For example, in *Parkhurst v. Kinsman* (1849), the court asserted that a third party's "[c]rude and imperfect experiments, equivocal in their results, and then given up for years" could not defeat the novelty of a later-claimed invention.¹⁴⁶ Courts concluded that the law did not intend to deprive an inventor of a patent based on evidence of a prior invention that had "never been reduced to practice" but rather was "the mere speculation of a philosopher or a mechanic, which had never been tried by the test of experience, and never put into actual operation by him"¹⁴⁷ This was because experimental activity that was subsequently abandoned "alone is of no benefit to mankind," courts concluded.¹⁴⁸

It is not clear whether existence of the well-established doctrine of abandoned experiment encouraged Judge Nixon and his predecessors to accept the experimental use doctrine as an intuitive patent law *fait accompli*. The two doctrines differ in more than just context. The abandoned experiment doctrine has an evidentiary purpose that the experimental use doctrine lacks—it reflects a mistrust of prior use evidence involving subject matter that might not be fully developed. The experimental use doctrine is a hedge against forfeiture of rights, unlike the abandoned experiment doctrine. In another respect, though, the doctrines are similar: both display a preference for physical embodiments over mere disclosures of information. Judge Nixon probably lacked the time to contemplate these nuances, but in any event, in contrast to the developed case law of abandoned experiment, the sparse and indifferent jurisprudence of experimental use offered Judge Nixon virtually no guidance, and his opinion reflected that fact.

143. See Act of July 4, 1836, § 6 (patents may be granted for inventions "not known or used by others" before the inventor's invention date).

144. 2 ROBINSON, *supra* note 75, § 317.

145. *Id.* § 427 n.3 (citing a line of American cases tracing back to the late 1840s, in a string citation occupying a full treatise page).

146. 18 F. Cas. 1198, 1201 (C.C.S.D.N.Y. 1849) (No. 10,761); see also GEORGE TICKNOR CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS IN THE UNITED STATES OF AMERICA § 44 (Boston, Charles C. Little & James Brown 1st ed. 1849) (asserting that a third party's prior "trials and experiments . . . will not vitiate the grant" of a patent; and that the third party's activities will be presumed to be mere experiments if there is evidence that the third party "abandoned the pursuit of the object at which he was aiming").

147. *Bedford v. Hunt*, 3 F. Cas. 37, 38 (C.C.D. Mass. 1817) (No. 1217) (Story, J., charging the jury). *But cf.* *Watson v. Bladen*, 29 F. Cas. 424, 426 (C.C.E.D. Pa. 1826) (No. 17,227) (holding that a third party prior use qualified as prior art even if the use was for experimental purposes; urging that *Bedford* be limited to truly speculative prior uses).

148. *Many v. Jagger*, 16 F. Cas. 677, 682 (C.C.N.D. N.Y. 1848) (No. 9055) (mere "abortive experiment" not given prior art effect because it "alone is of no benefit to mankind").

3. Judge Nixon's Implicit Adoption of Experimental Use

Judge Nixon's opinion rejecting the public use challenge is informative for modern scholars in several ways, although it is problematic in others. First, the Nixon opinion did not recognize an independent experimental use doctrine, nor cite any cases whatsoever in its analysis, perhaps reflecting the embryonic nature of the case law as of 1874. Judge Nixon simply asked whether there had been "such a public use of the invention, such a dedication of it to the public, or such an abandonment by the patentee, as to void the patent," and answered all three questions together by examining all of the evidence before him, including evidence of experimentation.¹⁴⁹

Second, in arriving at the conclusion that Nicolson was "making an honest experiment,"¹⁵⁰ Judge Nixon did rely on aspects of evidence that we would associate today with the evidentiary factors of the experimental use doctrine,¹⁵¹ but he did not anchor them to any coherent or discernible experimental use test.

Third, and consistent with the background principle of deference, Judge Nixon seemed to be relying at least in part on Nicolson's intent. Judge Nixon said that "[i]n the absence of all intent, and indeed in the face of a manifest contrary intent," he was unwilling to infer from the record that there could have been "any . . . public use of the invention, or any . . . dedication or abandonment."¹⁵² Indeed, a number of Nixon's other patent decisions rendered around the same time likewise exhibit solicitude towards inventors who had taken time to reduce their inventions to practice.¹⁵³

Fourth, Judge Nixon's analysis relied heavily on the caveat filing, informed by the principle that "[t]he obvious design of [the caveat provision] is to afford inventors the opportunity of perfecting their discoveries and inventions."¹⁵⁴ Here the analysis went astray. Instead of using the caveat filing as evidence corroborating Nicolson's experimental purpose, Nixon lapsed into the language of priority of

149. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 703, 706 (C.C.D.N.J. 1873) (No. 311) (indicating that the court considered the questions "closely related to each other in their essential qualities" and all deriving "out of one transaction").

150. *Id.* at 707.

151. Specifically, Nixon pointed out that the Boston & Roxbury was a private corporation, the roadway was under Nicolson's control as treasurer, the site of the tests was a favorable one for testing strength and durability, and the mode of construction could not be learned from the portion of the pavement exposed to the public. *Id.*

152. *Id.*

153. *See, e.g., La Baw v. Hawkins*, 14 F. Cas. 895, 898 (C.C.D.N.J. 1874) (No. 7,960) (rejecting alleged prior use evidence as mere abandoned experiments); *Knox v. Loweree*, 14 F. Cas. 819, 821 (C.C.D.N.J. 1874) (No. 7910) (upholding validity against abandonment claim; long delay between invention and filing was justified "by the state of the country at the time, and the residence of the inventor within the limits of the so-called Confederate government"); *Webster v. New Brunswick Carpet Co.*, 29 F. Cas. 554, 556-57 (C.C.D.N.J. 1874) (No. 17,337) ("The delay of Webster in taking out his patent, after he had completed his invention, seems to be satisfactorily explained. . . . It is the old story of poor inventors patiently waiting at the door of rich capitalists.").

154. *Am. Nicholson*, 1 F. Cas. at 706-07.

invention, speaking of Nicolson's ability to rely on the caveat to "supersede" later inventors, as long as Nicolson used "due diligence" in perfecting his invention.¹⁵⁵ This, of course, was not a public use or experimental use analysis. But the opinion remains illuminating, notwithstanding the error, because it reinforces the point that the nineteenth-century patent law privileged implementation over ideas. Judge Nixon took pains to assert that Nicolson had disclosed in the caveat all that he later claimed in the patent application.¹⁵⁶ But rather than chastising Nicolson for waiting to file a patent application for six years after he possessed a complete disclosure, Judge Nixon saw no problem with using the caveat document as conception evidence and validating Nicolson's delay by crediting him as sufficiently diligent to preserve rights.

B. Towards an Instrumental View of Experimental Use: City of Elizabeth at the Supreme Court

As I have indicated, the Supreme Court's decision in *City of Elizabeth* is notable for reasons already familiar to generations of patent lawyers: it definitively announced the existence of the experimental use doctrine, offered guidance on applying the doctrine, and articulated a policy rationale. The Court did not self-consciously strive to create a purposive analysis of experimental use, but, that is in fact what the Court did. And, in turn, the Court's opinion paved the way (or laid the foundation, or some other roadway metaphor) for an instrumental understanding of experimental use as an anti-forfeiture tool.

155. Indeed, one of Nixon's conclusions was that by virtue of the "legal effect of the caveat, and the experiments under it," he could carry back Nicolson's invention date to the caveat filing date, and thus antedate an English patent that had been enrolled at the patent office in England in 1850, after Nicolson's caveat date but long before his U.S. application filing date. *Id.* at 707 (citing GEORGE TICKNOR CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS § 270 (3d ed. 1867)). The cited section did discuss the caveat provision, which included no reference to an inventor's diligence. But the section also quoted extensively from Judge Sprague's opinion in *Johnson v. Root*, 13 F. Cas. 823 (C.C.D. Mass. 1858) (No. 7411), which included a discussion of both caveats and priority of invention, including the role of diligence in that inquiry. Judge Nixon evidently became confused and merged the two.

156. Although he did not point to any particular caveat text that supported his assertion, Judge Nixon insisted that "the combination for which [Nicolson] afterward received his patent is suggested," despite the fact that the caveat only described the checkered pavement embodiment. *Am. Nicholson*, 1 F. Cas. at 706. The later-claimed combination must have been "in his mind" when Nicolson filed the caveat because only months later he constructed the test strips including all of the variations of the invention, Judge Nixon pointed out. *Id.*

1. *The Purposive Analysis of Experimental Use*

Justice Bradley delivered the opinion of the Court, with no reported dissents.¹⁵⁷ The Court upheld Judge Nixon's decision on validity and infringement, but reversed on damages.¹⁵⁸

Regarding the experimental use issue, the Court evidently saw no need to canvass the precedent or announce that it was now recognizing definitively a doctrine of experimental use. It recited the doctrine without ceremony,¹⁵⁹ citing only *Shaw v. Cooper* and a section of the Curtis treatise.¹⁶⁰ American Nicholson's counsel had similarly treated experimental use as an established doctrine, claiming that "all the cases" prescribe that an inventor be given a "reasonable time" to experiment.¹⁶¹

157. Various sources credit Bradley with significant expertise in patent law. See CHARLES BRADLEY, *Preface* to JOSEPH P. BRADLEY ET AL., MISCELLANEOUS WRITINGS OF THE LATE HON. JOSEPH P. BRADLEY ix (Charles Bradley ed., 1902) (asserting that Bradley "has never been surpassed, if he has been equaled," as a judge in patent matters, quoting to prominent patent lawyer George Harding); Jonathan Lurie, *Mr. Justice Bradley: A Reassessment*, 16 SETON HALL L.J. 343, 372 (1986) (claiming that Bradley was adept at "discussing the intricacies of patent litigation, an area in which he frequently spoke for the Court"). How frequently may be questioned, but Justice Bradley did author at least two opinions of lasting significance: *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126 (1877), and *Cochrane v. Deener*, 94 U.S. 780 (1876). Most sources analyze his constitutional jurisprudence, particularly his early Reconstruction-era decisions on Fourteenth Amendment equal protection.

158. *City of Elizabeth*, 97 U.S. at 144 (concluding that only the New Jersey Wood Paving Company, not Tubbs and the City, should have been liable to account for profits); see also *City of Elizabeth v. Am. Nicholson Pavement Co.*, 24 L. Ed. 1059 (1878) (declining American Nicholson's motion to amend the Court's decree, which had stated that Judge Nixon's decision had been reversed, even though it had effectively been affirmed as to the New Jersey Wood Paving Company and reversed only as to the other defendants). The defendants had made the extraordinary argument that there could be no liability for the plaintiff's lost profits because the plaintiff would not have received the contract bid (given the defendants' manipulation of the bidding process). The remedy issue had been tried before a special master, who had filed a report in late 1873. Transcript, *supra* note 4, at 1–2. Judge Nixon ruled on the Master's Report in fall 1874. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 691 (C.C.D.N.J. 1874) (No. 309).

159. See *supra* note 12 and accompanying text for the relevant quotation.

160. *City of Elizabeth*, 97 U.S. at 134 (citing GEORGE TICKNOR CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS IN THE UNITED STATES OF AMERICA, § 381 (3d ed., rev. & enlarged 1867). The Court probably meant to cite § 382, which cited *Shaw v. Cooper* for the proposition that "where the patentee alone makes the thing for the purposes of experiment and completion, without selling it to be used by others, the term 'public use' is not applicable." CURTIS, *supra*, § 382.

161. Transcript of Record (Briefs and Exhibits) at 81 (Respondent's Brief). (The Transcript of Record contains a separately-numbered section containing briefs and exhibits, referred to hereinafter as "Transcript (Briefs and Exhibits).") Clarence A. Seward (William H. Seward's nephew) of the Blatchford, Seward & Griswold firm (predecessors to Cravath) represented American Nicholson, but it does not appear that the firm's patent archives stored in the MIT Libraries contain any material on the case.

The Court adopted a totality-of-the-circumstances approach to determine whether the alleged public use was experimental, declaring that “it is necessary to examine the circumstances under which this pavement was put down, and the object and purpose that Nicholson had in view.”¹⁶² It is clear that the Court took seriously the object and purpose—concluding in the very next sentence of the opinion that it was “perfectly clear from the evidence that he did not intend to abandon his right to a patent.”¹⁶³ Elsewhere, the Court indicated that the inventor’s “good faith” and “bona fide intent to test the qualities” of the invention would be critical.¹⁶⁴

Using a hypothetical invention (a machine), the Court offered guidance on the circumstances that were likely to be important, and how they might figure in a proper analysis. The nature of the invention mattered because some inventions, such as pavement, could only be experimented on publicly as a practical matter.¹⁶⁵ The qualities being tested also mattered because some qualities, such as durability, might justify “a long period, perhaps years” of testing “to enable the inventor to discover whether his purpose is accomplished.”¹⁶⁶ All of these were indications that the inventor intended to keep the invention “under his own control.”¹⁶⁷ Other circumstances were likely to be unimportant, and certainly were not dispositive, such as whether alterations to the invention were made as a result of the testing,¹⁶⁸ whether the public was “incidentally deriving a benefit” from the invention during the period of alleged testing,¹⁶⁹ and whether the invention was being tested on the inventor’s own premises or those of another.¹⁷⁰

Nicolson’s assertion of experimental use fared well under this analysis. The Court was readily persuaded that Nicolson “wished to experiment on his pavement” and that he had “subjected it to such use, in good faith.”¹⁷¹

The Court seemed satisfied that there was ample evidence to substantiate Nicolson’s claim of good faith: the caveat filing;¹⁷² the fact that Nicolson was engaged in durability testing (which explained the “considerable length of time”

162. *City of Elizabeth*, 97 U.S. at 133.

163. *Id.*; *see also id.* at 134 (evidence that invention is on sale or in public use more than two years before the filing date is “conclusive evidence of abandonment”).

164. *Id.* at 135.

165. *Id.* at 134.

166. *Id.* at 135.

167. *Id.*

168. *Id.*

169. *Id.* (distinguishing situations in which the invention was in use “by other persons generally”).

170. *Id.* (specifying that the activity, regardless of location, would still constitute a “mere experimental use” as long as the invention was being “used under the surveillance of the inventor” to test whether the invention would “answer the purpose intended”). This is a rare early use of the phrase *experimental use*.

171. *Id.* at 136.

172. *Id.* at 133 (noting that Nicolson had filed the caveat “and he constructed the pavement in question by way of experiment, to test its qualities”). American Nicholson’s lawyers had argued that the caveat filing negated an inference of abandonment. Transcript (Briefs and Exhibits), *supra* note 161, at 75–76 (Respondent’s Brief).

taken by the testing, and the need to place the test strips “in a public roadway”;¹⁷³ the fact that Nicolson’s pavement strips were only about 75 to 100 feet long;¹⁷⁴ the fact that the strips were placed on a road that, while open to public travel, was a toll road belonging to Boston & Roxbury, of which Nicolson was stockholder and treasurer;¹⁷⁵ the fact that Nicolson evidently conducted the tests at his own expense; and the fact that each strip was placed adjoining the toll gate so that the inventor could “see the effect upon it of heavily loaded wagons, and of varied and constant use; and also to ascertain its durability, and liability to decay.”¹⁷⁶ Toll-booth operator Lang’s testimony about Mr. Nicolson’s cane corroborated much of this, as did the testimony of “several other witnesses in the case” according to the Court.¹⁷⁷ And it was not problematic that the public “had the incidental use of the pavement.”¹⁷⁸

This set of considerations, taken collectively, might be referred to as a purposive approach to experimental use. It is purposive in that it allows courts discretion to place more weight on questions about the nature and purpose of the inventor’s activity than on a technical assessment of the stage of development of the invention (understanding that these two categories are not entirely distinct). This is a matter of weight; the analysis does not claim that the inventor’s asserted subjective intent to experiment should be the sole criterion for experimental use.¹⁷⁹ But neither does it mean that experimental use should only apply when there is a showing that the inventor’s lone purpose was experimental, or even that the purpose was substantially experimental.¹⁸⁰ Instead, the purposive approach credits an inventor’s

173. *City of Elizabeth*, 97 U.S. at 136.

174. *Id.* at 133.

175. *Id.* Boston & Roxbury’s control over the road may not have been quite as extensive as the Court made it out to be. The defendants had called a title examiner, William Dexter, who testified that Boston & Roxbury operated the road under a franchise from the City of Boston. Transcript, *supra* note 4, at 158 (testimony of William S. Dexter, Apr. 5, 1871). Under the terms of the franchise, the City set the toll rate and could set open the toll gates and deny Boston & Roxbury the authority to collect tolls if Boston & Roxbury failed to keep the road in repair. *Id.* at 158–59.

176. *City of Elizabeth*, 97 U.S. at 133.

177. *Id.* at 133–34.

178. *Id.* at 136. Somewhat confusingly, the Court averred that “[h]ad the city of Boston, or other parties, used the invention, by laying down the pavement in other streets and places, with Nicholson’s consent and allowance, then, indeed, the invention itself would have been in public use” *Id.* But the succeeding sentences make plain that the Court was not saying that merely because Boston was a public entity, the use would suddenly be public. The key was that Nicolson “did not let it go beyond his control. He did nothing that indicated any intent to do so. He kept it under his own eyes, and never for a moment abandoned the intent to obtain a patent for it.” *Id.*

179. *See Paragon Podiatry Lab., Inc. v. KLM Labs., Inc.*, 984 F.2d 1182, 1186 (Fed. Cir. 1993) (inventor’s subjective belief is “merely a fact to be taken into account” in resolving the experimental use question). *Cf. Shaw v. Cooper*, 32 U.S. 292, 322–23 (1833) (concluding that the question of abandonment for purposes of the statutory bar did not “turn upon the intention of the inventor,” apparently meaning that it could not turn *solely* on the inventor’s intention) (cited in *City of Elizabeth*, 97 U.S. at 134).

180. *But see Smith & Griggs Mfg. v. Sprague*, 123 U.S. 249, 256 (1887) (ruling that the experimental use doctrine only applies where the use is “*substantially* for the purposes

assertion that he or she was motivated at least in part by an experimental purpose, and then looks for circumstantial evidence that corroborates the credibility of the inventor's account, which may include indicia of the reasonableness of the assertion.¹⁸¹ Again, it is a matter of weighing, to be done on a case-specific basis.

2. Some Modern Implications

As we have seen,¹⁸² modern experimental use doctrine, especially after *Pfaff*, tends towards formalism to the extent that it must be assimilated into the *Pfaff* two-part framework, and it can be reductionist to the extent that it privileges one or two factors as dispositive, discouraging decision-makers from entertaining a less-constrained, discretionary inquiry into the totality of the circumstances. But this latter methodology is just what the Supreme Court adopted in *City of Elizabeth*. Modern courts should reconsider the drive towards formalism in view of the original, anti-forfeiture objective of the experimental use doctrine.

A move back towards the purposive analysis matters for modern experimental use adjudication. To offer just one example, a greater focus on the purposive analysis might cause courts to rethink any absolute rule demanding that a public use or on-sale bar be found when the inventor's activity is said to cross the line from experimentation to market testing. The rule that market testing constituted a sale for purposes of the on-sale bar was crystallizing even as of the time of *City of Elizabeth*,¹⁸³ and it is a bit curious that it seems not to have been asserted in the *City of Elizabeth* litigation. After all, it is difficult in general to disaggregate an inventor's motives, and the *City of Elizabeth* facts hint that Nicolson was typical in this regard. Even granting the power of the evidence corroborating Nicolson's experimental motive, there can be little doubt based on the available record that Nicolson's activities were concurrently experimental and commercial. For example, Nicolson had given ambiguous testimony in the *Chicago* litigation, stating on the one hand that his filing delay was due to his desire to test durability,¹⁸⁴ but on the other that

of experiment" (emphasis supplied)). Moreover, the Court insisted that the "proof, on the part of the patentee" of experimentation "should be full, unequivocal, and convincing." *Id.* *City of Elizabeth* does not demand this approach.

181. For a judicial statement directed to such indicia of reasonableness, see, for example, *Int'l Tooth-Crown Co. v. Gaylord*, 140 U.S. 55, 63 (1891) ("Granting that, under the rule laid down in [*City of Elizabeth*], a patentee has a right to test the durability of his invention as one of the elements of its success, it is manifest that his experiments to that end should extend no further, either in time or in the number of cases in which it is used, than is reasonably necessary for that purpose.")

182. See *supra* Part I.

183. *Consol. Fruit-Jar Co. v. Wright*, 94 U.S. 92, 94-95 (1876) (distributing prototypes of glass jar to "test their salability in the market" held to trigger a bar to patentability); see also *Smith & Davis Mfg. Co. v. Mellon*, 58 F. 705, 707 (8th Cir. 1893) (post-*City of Elizabeth* decision stating that "a trader's, and not an inventor's, experiment" will not be saved by the experimental use doctrine from triggering a statutory bar).

184. Term Extension File, Paper No. 36, at [70] (unpublished) (on file with author).

his purpose was to “test the value of my invention”¹⁸⁵ and to “exhibit a better mode of pavement than any previously known.”¹⁸⁶ As Nicolson summarized it:

Not until its merits had been tested have I ventured to recommend its adoption. I have patiently waited until I could present it with the stamp of approbation which time has impressed upon it. The favorable result of all experiments, and the approbation of scientific and official gentlemen, justify me in the belief, that I offer the public a safe, durable, and economical pavement.¹⁸⁷

Judge Nixon may have been echoing these sentiments in the trial court opinion, attributing Nicolson’s delay to his need to establish the “value and practical utility” of the invention. This determination entailed “calculations as to cost,” presumably useful for persuading potential customers that the pavement was, indeed, economical.¹⁸⁸ Even toll-booth operator Lang, of the legendary cane-tapping testimony, conceded on cross-examination that in 1849, only a year into the alleged experimentation, he had heard Nicolson say that the pavement was a success.¹⁸⁹

City of Elizabeth is a useful study because it reminds us that in real cases it may be virtually impossible to disaggregate with precision an inventor’s motives for putting an invention into use before filing a patent application. Surely Nicolson’s motives were mixed; he was sincere in his claims to be experimenting, while also hoping to demonstrate the commercial value of the invention to potential customers.¹⁹⁰ Even the caveat filing should not be viewed as a conclusive indication that Nicolson’s sole purpose was experimental.¹⁹¹

Judge Learned Hand seemed to read the *City of Elizabeth* facts in this light in his opinion in *Aerovox v. Polymet*.¹⁹² According to Hand’s view of the facts, “it did not appear that [Nicolson] delayed for any other reason than to learn how well

185. *Id.* at 66.

186. *Id.* at 69–70.

187. *Id.* at 71.

188. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 703, 707 (C.C.D.N.J. 1873) (No. 311).

189. Transcript, *supra* note 4, at 81 (Cross-examination of Joseph Lang, Nov. 2, 1870).

190. Recall that Nicolson had a long history of patenting and attempting to market various inventions. *See supra* notes 65–68 and accompanying text. And his marketing materials regarding the pavement invention make a great deal of the test activity. SAMUEL NICOLSON, *THE NICOLSON PAVEMENT* 4–9 (Boston, Henry W. Dutton & Son, 2d ed. 1859).

191. For example, in *Johnson v. Root*, 13 F. Cas. 823, 830 (C.C.D. Mass. 1858) (No. 7411), the court declared that a caveat could not be taken as conclusive evidence that the invention was in the process of being completed, instructing the jury that “it may happen that a person may choose to file a caveat while he is going on and making improvements upon an invention which he has already completed, so as to be of practical utility.” *Id.*; *see also* Walterscheid, *supra* note 71, at 315 (citing correspondence from the pre-1836 era of informal caveat practice suggesting that some inventors were filing caveats for inventions that had no then-existing commercial market, then filing patent applications only later, when a market had developed).

192. *Aerovox Corp. v. Polymet Mfg. Corp.*, 67 F.2d 860, 862 (2d Cir. 1933).

his pavement would wear; apparently it was already as good as he hoped to make it.”¹⁹³ Courts should not limit the experimental use doctrine to cases in which the invention was in the experimental stage, meaning cases in which “the inventor is trying to reduce the invention to a stable form, to adapt it completely to its purposes.”¹⁹⁴ Rather, experimental use could apply where an inventor sought to test the invention, “not only to put it into definitive form, but to see whether [the] ideas are worth exploiting.”¹⁹⁵

Finally, *City of Elizabeth* may provide a foundation for a view of the experimental use doctrine that is more instrumental than descriptive. That is, the experimental use doctrine could be seen as a means for operationalizing background principles prevalent at the time—such as the bias in favor of building and the tolerance for an inventor’s good-faith delay. Moreover, the fluid, discretionary nature of the experimental use doctrine (in the purposive analysis) may have been essential as a hedge against the severe consequences of violating the statutory bar. Understood in this way, the experimental use doctrine implemented the judicial impulse against forfeiture.¹⁹⁶ Indeed, seen in this way, the analysis for experimental use may ultimately be less a probe into whether the inventor’s activity is descriptively experimental, and more an assessment of the social benefit of allowing inventors time to work through failures and successes, even if the inventor’s methodology is unconventional. It may also be seen as an inevitable judicial response to a statute that imposes forfeiture with no avenue for mitigation.¹⁹⁷

IV. THE EXPERIMENTAL STAGE ANALYSIS FOR EXPERIMENTAL USE: A CRITIQUE

Modern experimental use cases invariably cite *City of Elizabeth* but do not necessarily keep faith with its purposive analysis as I have described it. Indeed, in the Federal Circuit era, some cases reflect an impulse to discount the purposive

193. *Id.*

194. *Id.*

195. *Id.* However, Hand did not adopt the purposive analysis in quite the form I have described. He was concerned that inventors would abuse the experimental use doctrine and so accepted the proposition from *Smith & Griggs* that would demand that the inventor’s primary purpose be experimentation. *Id.*

196. For a rare pre-*City of Elizabeth* acknowledgement of this idea, see *Birdsall v. McDonald*, 3 F. Cas. 441 (C.C.N.D. Ohio 1874) (No. 1434).

Public use in good faith for experimental purposes and for a reasonable period, even before the beginning of the two years of limitation, cannot affect the rights of the inventor. The objection rests on the principle of forfeiture, and it not to be favorably regarded. Every reasonable doubt should be raised against it.

Id. at 443.

197. For example, the statute did not (and still does not) permit courts to simply reduce the inventor’s patent term by an amount of years equivalent to the length of the inventor’s delay in filing. For an argument recommending such a disclaimer approach to the statutory bar, see Thomas K. Landry, *Certainty and Discretion in Patent Law: The On-Sale Bar, the Doctrine of Equivalents, and Judicial Power in the Federal Circuit*, 67 S. CAL. L. REV. 1151, 1175–79 (1994).

analysis. In a dubious quest for certainty and objectivity, these cases have tended to interrogate the stage of development of the invention more closely, along with probing how the inventor's alleged work relates to or enhances the technical features of the invention. I lump all of these together as constituting an *experimental stage* form of analysis for experimental use.

In this Part, I consider how Nicolson's claim to the benefit of the experimental use doctrine might have fared under application of this modern experimental stage analysis.

A. Experimental Activity and Nicolson's Invention as Claimed

As we have seen, *City of Elizabeth* focused its analysis on Nicolson's purpose for conducting the allegedly patent-defeating activities. The Court's central mission was to verify Nicolson's credibility. Relying on its assumptions about the general nature of the invention, the Court took for granted that Nicolson's tests reflected activity likely to advance the social utility goals of the patent system, hence making the activity worthy of being labelled experimentation rather than public use. Indeed, the Court insisted that whether the inventor changed the invention as a result of the experimentation was not dispositive, so long as the use was "pursued with a bona fide intent of testing the qualities" of the invention.¹⁹⁸

While courts generally have accepted the notion that the existence of changes are not dispositive,¹⁹⁹ they have otherwise struggled to decide how closely to scrutinize the quality and nature of the test activity underlying an inventor's experimental use claim. Periodically courts have developed subsidiary rules that may cast the vitality of the experimental use doctrine into doubt.

A good illustration is the question of how tightly the inventor's activity must be tied to the features of the claimed invention to qualify as experimental use. The Federal Circuit's predecessor court had pronounced it "settled law" that evidence of "experiments performed with respect to non-claimed features of an invention" would not count as the sorts of experiments that would negate the public-use or on-sale bars.²⁰⁰ The Federal Circuit has paid lip service to this rule,²⁰¹ but has frequently found room to maneuver around it. For instance, the court has upheld claims of experimental use even as to experiments that were not expressly recited in

198. *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 135 (1877).

199. *See, e.g., Honeywell Int'l, Inc. v. Universal Avionics Sys. Corp.*, 488 F.3d 982, 997 (Fed. Cir. 2007) (citing *City of Elizabeth*, 97 U.S. at 135, and concluding that although evidence of changes would strengthen the experimental use case, the doctrine "does not require changes to the claimed invention to substantiate an experimental use"). *But cf. Root v. Third Ave. R. Co.*, 146 U.S. 210, 225 (1892) (finding it relevant that the inventor had "made no experiments with a view to alterations").

200. *In re Theis*, 610 F.2d 786, 793 (C.C.P.A. 1979).

201. *W. Marine Elecs., Inc. v. Furuno Elec. Co.*, 764 F.2d 840, 847 (Fed. Cir. 1985) (experimental use only negates a bar when the inventor was testing claimed features of the invention).

the claim,²⁰² where the court was satisfied that the feature was inherent given the nature of the invention.²⁰³

The *City of Elizabeth* opinion itself provides no express guidance on this rule.²⁰⁴ Had it applied to Nicolson's patent, the outcome is unclear: Nicolson had not expressly claimed durability as a feature; it was, at best, inherent. Then again, Nicolson's claims were directed to paving *methods*, so durability was merely an inherent feature of a *product* of the claimed invention, and perhaps that is a stretch.

Regardless, closer examination of the full record of the case illuminates the implications of the claimed-features rule. In particular, it casts doubt on the wisdom of that rule, and more generally illustrates the perils of tying the instrumental aspirations of the experimental use doctrine to hindsight-inspired second-guessing about an inventor's experimental path.

1. Must the Experiments Be Directed to the Eventual Commercial Embodiment?

City of Elizabeth's otherwise quite detailed exegesis on Nicolson's testing activities omits some crucial details. Although Nicolson had filed his caveat expressly disclosing only the checkerboard embodiment, in his testing before the critical date he tested four "modifications" of his invention, laid down on the Mill-Dam Avenue over a concrete foundation: the checkerboard embodiment; a transverse groove embodiment (in which rows of blocks were arranged to create intervening transverse grooves between the respective rows, with wood strips and fill material inserted into the grooves); an embodiment using eight-inch upright round spruce blocks; and a variant of the checkerboard embodiment in which the blocks were not nailed together.²⁰⁵ The fourth modification proved unsatisfactory (due to developing "a slight unevenness of surface"),²⁰⁶ and the third modification

202. *Honeywell Int'l*, 488 F.3d at 998 (citation omitted) ("Although these demonstrations did not always relate to claimed features, this court permits testing to determine the workability of an invention even if the claims do not expressly set forth the intended use under examination.").

203. Usually these cases have involved outdoor durability testing. *See, e.g.*, *EZ Dock v. Schafer Sys., Inc.*, 276 F.3d 1347, 1353 (Fed. Cir. 2002) (polyethylene floating dock); *Seal-Flex, Inc. v. Athletic Track & Court Constr.*, 98 F.3d 1318, 1320 (Fed. Cir. 1996) (all-weather activity mat); *Manville Sales Corp. v. Paramount Sys. Inc.*, 917 F.2d 544, 550 (Fed. Cir. 1990) (luminaire for outdoor light pole); *see also* *Electromotive Div. of Gen. Motors Corp. v. Transp. Sys. Div. of Gen. Elec. Co.*, 417 F.3d 1203, 1205 (Fed. Cir. 2005) (planetary bearings for turbocharger drive trains).

204. This is not surprising. Although Nicolson's patents did include claims, they were not required to be included in patent documents until the passage of the Patent Act of 1870, ch. 230, § 26, 16 Stat. 198–217.

205. *NICOLSON*, *supra* note 190, at 4–7 (depicting the four "modifications" of the "method").

206. *Id.* at 8; *see also* Term Extension File, Paper No. 36, at [69] (unpublished) (on file with author) (Nicolson deposition testimony in the *City of Chicago* litigation, confirming that the fourth modification proved unsatisfactory and was not tried again).

was merely the product of expediency and was the subject of only limited later testing.²⁰⁷

At the conclusion of this six years of testing, Nicolson's experiments seem to have convinced him of the advantages of the checkerboard embodiment—or so one would conclude based on the disclosure in Nicolson's original patent application. Nicolson did add text expressly referencing the transverse-groove embodiment, but it warranted only a single paragraph of description (and no drawings).²⁰⁸ Most remarkably, the text of the patent suggests that Nicolson's tests had left him less than satisfied with the transverse-groove embodiment. According to the patent, the transverse groove embodiment was considered not "of so much value as the [checkerboard embodiment]."²⁰⁹

But not long afterwards, Nicolson had flip-flopped. As early as 1859 he was extolling the virtues of the transverse-groove embodiment as being best suited "for such great thoroughfares as . . . Broadway in New York."²¹⁰ By the end of 1863, he had succeeded in having the original patent reissued,²¹¹ and the primary purpose appears to have been to rehabilitate the transverse-groove embodiment. He deleted the negative comments about that embodiment, and added a drawing (shown below in Figure 4, on the right) and supporting description.²¹²

207. *Id.* at 66–67 (Nicolson deposition testimony in the *City of Chicago* litigation, explaining that the round blocks were used around the edges of the test strips because the material was at hand and he did not have enough blocks of the checkerboard or transverse groove type to extend "a great distance on the road"); NICOLSON, *supra* note 190, at 10 (describing limited further use of the third modification in tests conducted after the critical date).

208. '491 Patent, *supra* note 5, at p. 1, col. 2 ll. 91–111. The original patent also included a claim that could be read as a process or article claim: "To so combine the blocks or wooden portion of the pavement, that there may be cells . . ." It arguably read on both embodiments. *Id.* at p. 2, col. 2 ll. 40–57.

209. *Id.* at p.1, col. 2 l. 107. Apparently, this conclusion was based on the fact that the fill material was only introduced between rows of blocks, not individual adjacent blocks within a row. *Id.*

210. NICOLSON, *supra* note 190, at 12.

211. U.S. Patent No. Re. 1,583 (reissued Dec. 1, 1863). Nicolson had some prior experience with reissues. *See* U.S. Patent No. Re. 97 (reissue of Nicolson's railroad alarm-signal patent, reissued July 3, 1847, based on a reissue application filed June 15, 1847, by attorney R.H. Eddy).

212. '583 Patent, *supra* note 211, at col. 2. He also added numerous functional recitations to the claim, but, like the claim in the original patent, it seemed to cover both embodiments. *Id.*

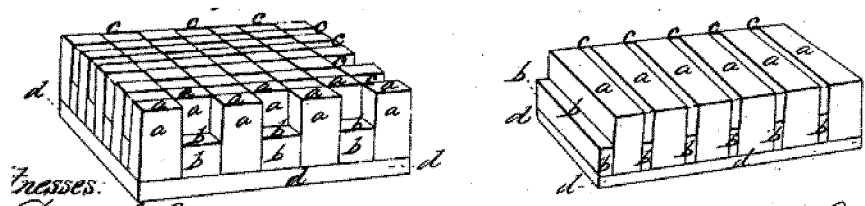


Figure 4: Drawing of the Transverse Groove Embodiment

Nicolson asserted the reissue in the *Chicago* litigation. By the time of his deposition in that case (August 1865), he was expressing the view that the transverse groove embodiment was “the most satisfactory.”²¹³

The transverse-groove embodiment received even further attention in a second reissue that issued after Nicolson won the *Chicago* litigation, a document that presumably benefitted from knowledge of the prior art asserted in that litigation.²¹⁴ Most notably, the second reissue added four independent claims directed to Nicolson’s process, including two that appeared to be specifically directed to the transverse-groove embodiment: claim 1, which called for the steps of laying a foundation on the roadway, arranging blocks on the foundation to leave a channel between rows, and filling the channel with a fill material; and claim 2, which was similar, but added the step of inserting an auxiliary set of blocks or wooden strips into the grooves.²¹⁵ The second reissue also added to the recitation of supposed advantages of the invention, including some seemingly directed to the transverse-groove embodiment.²¹⁶

It was commonplace for patentees to apply for reissues at the time.²¹⁷ The liberality of reissue practice, and the abuses that it invited, eventually triggered legislative reforms.²¹⁸

213. Term Extension File, Paper No. 36, at [69] (unpublished) (on file with author) (deposition testimony of Samuel Nicolson).

214. U.S. Patent No. Re. 2,748 (reissued Aug. 20, 1867). This was the patent-in-suit in the *City of Elizabeth* litigation.

215. *Id.* In the *City of Elizabeth* litigation, the trial court found that the defendants had infringed claims 1 and 2, and the Supreme Court affirmed. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 703, 707 (C.C.D.N.J. 1873) (No. 311); *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 137–38 (1877). The remaining reissue claims, not asserted in the litigation, were directed to a process that yielded the checkerboard embodiment. ‘748 Patent, *supra* note 214, at p. 3, col. 1 (claims 3–4).

216. See ‘748 Patent, *supra* note 214, at p. 2, col. 2 (suggesting that the transverse groove embodiment was “effected in a cheap, simple, and expeditious manner”).

217. One scholar claims that reissues as a percentage of all patents in force spiked in the late 1850s—a result, he argues, of “aggressive entrepreneurs” who bought patents, had them reissued with broader claims that covered competing devices, and sued on them. Kendall J. Dood, *Pursuing the Essence of Inventions: Reissuing Patents in the 19th Century*, 32 *TECH. & CULTURE* 999, 1004–07 (1991).

218. On the notoriety of reissue practice, and reforms implemented later in the nineteenth century, see *id.*; Hughes, *supra* note 71; P.J. Federico, *Intervening Rights in Patent Reissues*, 30 *GEO. WASH. L. REV.* 603 (1961–62).

The 1836 Act reissue provision in force at the time did not expressly authorize broadening reissues,²¹⁹ and it required that any reissues be for the “same invention” as the original.²²⁰ Nicolson’s reissues arguably failed on either score, or both. Indeed, at trial, the *City of Elizabeth* defendants asserted that the second reissue was void because it covered more than what was described in the original patent.²²¹ Judge Nixon recognized that Nicolson had changed his views on the relative importance of the checkerboard and transverse-groove embodiments, but concluded that “such modification of opinion on his part as to their relative value, does not disturb the fact that both forms were described, although imperfectly, in his first specifications.”²²² For reasons that are not clear, the *City of Elizabeth* defendants did not claim error on the point at the Supreme Court.²²³

Should Nicolson’s change of mind affect the experimental use analysis? Under a purposive analysis, the answer is probably no, unless it had lined up with other evidence that collectively cast doubt on Nicolson’s credibility. But under an

219. Patent Act of 1870, ch. 230, § 13, 16 Stat. 198–217 (authorizing the grant of reissues in cases where a patent was invalid “by reason of a defective or insufficient description or specification” arising through inadvertent error). However, shortly after deciding *City of Elizabeth*, the Court approved of broadening reissues in *Miller v. Brass Co.*, 104 U.S. 350, 353 (1881), construing the reissue provision of the 1870 Act, § 53, 16 Stat. at 205–06. The Court also applied the doctrine of laches to preclude broadening reissue applications filed more than two years after the issue date of the original patent. *Miller*, 104 U.S. at 354–55; see also *In re Staats*, 671 F.3d 1350, 1354 (Fed. Cir. 2012) (recounting the history). For the current rule, see 35 U.S.C. § 251(d) (2012) (two-year limitation on broadening reissues).

220. Patent Act of 1836, ch. 357, § 13, 5 Stat. 117 (requiring that the reissue be “for the same invention”); cf. 35 U.S.C. § 251 (2012) (modern requirement, specifying that the reissue must be “for the invention disclosed in the original patent”). The 1836 Act did not contain the proscription against adding new matter into the specification. That restriction was added in the 1870 Act, § 53, 16 Stat. at 209–10.

221. *Am. Nicholson Pavement Co. v. City of Elizabeth*, 1 F. Cas. 703, 705–06 (C.C.D.N.J. 1873) (No. 311); see also Transcript, *supra* note 4, at 125–26 (testimony of patent lawyer Francis C. Treadwell on behalf of defendants) (asserting that neither the caveat nor the original patent disclosed leaving a channel between the blocks to be filled with tar or gravel or the like; but the reissued patent did add this disclosure).

222. *Am. Nicholson*, 1 F. Cas. at 706. He concluded that Nicolson included nothing in the two reissues that “was not fairly indicated and suggested” in the original patent. *Id.* at 705. Although Judge Nixon did not cite it, he was undoubtedly invoking *Seymour v. Osborne*, 78 U.S. 516, 544 (1870), in which the Court had ruled that the statutory authority to reissue patents for the same invention gave the patentee permission “to redescribe his invention, and to include in the description and claims of his [reissue] patent, not only what was well described before, but whatever else was suggested or substantially indicated in the specification or drawings which properly belonged to the invention as actually made and perfected.” *But cf.* *U.S. Indus. Chems., Inc. v. Carbide & Carbon Chems. Corp.*, 315 U.S. 668, 676 (1942) (invoking the same authorities but ruling that “it is not enough that an invention might have been claimed in the original patent because it was suggested or indicated in the specification. It must appear from the face of the instrument that what was covered by the reissue was intended to have been covered and secured by the original.”).

223. Transcript (Briefs and Exhibits), *supra* note 161, at 5–6 (Appellants’ Brief) (listing alleged errors).

experimental stage analysis that closely interrogates the technical features of the subject matter, there may be a temptation to question whether Nicolson was drawing the wrong inferences from his extended exercise in cane-tapping. Six years of tapping convinced him that the transverse-channel embodiment was “of not so much value” as the checkerboard embodiment, and then he changed his mind when the marketplace gravitated towards the transverse-channel embodiment. Hindsight thus tells us that his experiments may not have been objectively well-directed.

But this line of reasoning shows why the experimental stage analysis is normatively suspect. It may encourage judges to ignore the contingent nature of experimentation. It opens the door to too much second-guessing. Played out to its extreme and applied in the *City of Elizabeth* litigation, it could have stripped Nicolson—that canonical good-faith experimenter—of the benefit of the experimental use doctrine. This should trouble us. A well-designed experimental use doctrine should give judges adequate room to insulate inventors in appropriate cases who engage in good-faith experimentation, potentially even in cases in which that experimentation leads the inventor down the wrong path.

2. *The Prior Art: Must Experiments Relate to the Claimed Novel Features?*

Consider another extension of the experimental stage analysis: a court might scrutinize the inventor’s alleged experimental activities to ensure that those activities were aimed at perfecting the *novel* features of the claimed invention. Nicolson may not have fared well under this test.

Nicolson was by no means the first to experiment with wooden pavements, nor the first to pursue the potential bonanza from patenting it. Pavements using upright wooden blocks of various geometries had been laid down in London, New York City, and Philadelphia in the 1830s, and in Russia before then.²²⁴ Numerous patents had been issued in England,²²⁵ and the *City of Elizabeth* defendants had produced at least 18 of them in their effort to invalidate the Nicolson patent.²²⁶

224. ALEX B. BLACKIE, *WOOD PAVEMENT; ITS ORIGINS AND PROGRESS* (London, Sherwood, Gilbert, & Piper 1843) (early use in London); REPORT OF THE FRANKLIN INSTITUTE OF THE STATE OF PENNSYLVANIA FOR THE PROMOTION OF THE MECHANIC ARTS, ON THE BEST MODES OF PAVING HIGHWAYS 5–16 (1843) (recommending against wooden pavement based on experience in Philadelphia, where wooden pavement had demonstrated poor durability); ALEX B. BLACKIE, *WOOD PAVEMENT AND ITS ADVANTAGES: WITH A VIEW OF THE DIFFERENT SYSTEMS* 15–18 (London, Simpkin, Marshall, & Co. 1842) (touting durability of a patented wooden pavement used in London); REPORT OF THE STREET COMMITTEE: UPON THE RESOLUTION ON THE SUBJECT OF CONTINUING WITH THE WOODEN PAVEMENT IN BROADWAY (Doc. No. 186) (1838) (favorable report on the use of wooden pavement in New York City); see also CHARLES LE ROY HILL, *WOOD PAVING IN THE UNITED STATES* 5 (U.S.D.A. 1908) (Circular No. 141) (describing early Russian practice).

225. See, e.g., *WOOD PAVEMENT AND ITS ADVANTAGES*, *supra* note 224, at 35 (providing a list).

226. As had the City of Chicago in defending its case against Nicolson. *Am. Nicholson*, 1 F. Cas. at 706.

Indeed, the main thrust of their invalidity argument was that Nicolson's invention lacked novelty, not that his patent should be barred for public use.²²⁷

Judge Nixon had brushed aside the novelty arguments at trial with a conclusory statement that none of the prior art references "suggests the combination which [Nicolson] has made."²²⁸ In fact the court seemed to be relying less on its own novelty analysis and more on a presumption of validity, undergirded by the fact that the patent had been reissued and extended, and previously litigated.²²⁹ The Supreme Court was more meticulous, summarizing the disclosures of each of several prior patents and identifying specifically how they differed from Nicolson's invention as claimed in claims 1 and 2 of his second reissue.²³⁰ The Court concluded that "[t]hough it may be true that every one of [the claimed] elements had been employed before, in one kind of pavement or another, yet they had never been used in the same manner as [Nicolson] combined and arranged them"²³¹

The voluminous *City of Elizabeth* transcript includes copies of the cited prior art references, allowing for an independent evaluation of the anticipation analysis. That evaluation is too tedious to replicate here in any detail,²³² but it reveals that few, if any, of the cited prior art references included a foundation (claimed as Nicolson did) combined with a transverse-groove arrangement, and none appeared to disclose that combination further including strips inserted into the transverse grooves.

Yet it is not clear that Nicolson's cane tapping would have revealed defects in the performance of the foundation.²³³ As for the strips, we know only that Nicolson was less enthusiastic about the transverse-groove embodiment after his tests. Later there were routine complaints that the strips loosened and worked up through the fill, and this was the problem that Brocklebank & Trainer had supposedly addressed with their patented pavement that the City of Elizabeth had licensed.²³⁴ Perhaps that would have been evident on simple visual inspection, but

227. See, e.g., Transcript (Exhibits and Briefs), *supra* note 161, at 10–22 (Appellants' Brief).

228. *Am. Nicholson*, 1 F. Cas. at 705. Judge Nixon did not refer to the claims in his novelty analysis, but rather characterized Nicolson's combination as including the foundation, the blocks, the strips, and the fill material. *Id.*

229. *Id.* (also referring to the patent's "long use and the public acquiescence"). The statutory presumption of validity did not yet exist.

230. *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 129–133 (1877).

231. *Id.* at 129–30. Curiously, obviousness does not seem to have been alleged, although there would have been a legal basis for it at the time. *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850).

232. A chart summarizing the analysis is on file with the author.

233. Indeed, one wonders whether the cane tapping would really have revealed much about wood rot starting at the bottom of the blocks, which seemed to be one of the other major durability complaints.

234. See, e.g., Transcript, *supra* note 4, at 23 (affidavit of Greenleaf Stackpole dated June 1, 1870). A number of witnesses testified similarly. *Id.* at 227–36; see also *id.* at 165

there was no evidence that Nicolson observed this problem, or carried out any test procedure that would have alerted him about whether strips were coming loose.²³⁵

On these facts, it would be easy enough for a modern litigator, abetted by an experimental stage vision for the experimental use doctrine, to poke holes in Nicolson's cane tapping story. Nicolson's tests surely were not optimally tuned to elicit information about the features that would later prove important in distinguishing his claimed invention from the prior art.

But we can guess that most inventors would flunk such a test for experimental use. Perhaps this explains why some judges have shown an instinctive aversion to the claimed-features rule, paying it mere lip service while straining to circumvent it by discerning inherently claimed features. On the other hand, perhaps a strict novel-features test, and the experimental stage approach more generally, has encouraged other judges to approach claims of experimentation with a presumption of skepticism, as may have occurred in the Federal Circuit's *Lough v. Brunswick* decision.²³⁶ The lesson to take away from the review of the *City of Elizabeth* prior art and Nicolson's test activities is that such an approach is tantamount to discarding the experimental use doctrine altogether.

B. The Demise of Nicolson Pavement: Must the Inventor Have Drawn the Objectively Correct Inference from His or Her Experiments?

One reason that *City of Elizabeth* is so intriguing as the exemplar of experimental use is that, at this distant remove, we can see immediately that Nicolson was wrong: his wooden pavement did not work as intended. As of the late 1850s and early 1860s, when Nicolson's own promotional efforts were at their

(deposition testimony of Brocklebank regarding the strips); *id.* at 19–20 (deposition testimony of Trainer).

235. On the other hand, the strip-loosening controversy was never quite resolved. While many experts blamed it on the design, Nicolson proponents attributed it to poor construction techniques, especially in Chicago. *The Nicholson Pavement*, CHI. TRIB., Oct. 10, 1866, at 2 (letter from Nicholson's patent lawyers (and assignees), Goodwin & Larned, asserting that the pavement in Wells Street "lasted over nine years without material repairs" and fails only due to defects in laying the pavement); *see also Correspondence—Wood Pavements*, THE AM. ARCHITECT AND BUILDING NEWS, Sept. 28, 1878, at 110 (asserting that the Nicolson pavement "resisted the great fire," but that afterwards contractors hastily repaved the streets using such low-quality workmanship and materials that the pavement soon decayed, ruining the reputation of wooden pavement).

236. 86 F.3d 1113, 1121–22 (Fed. Cir. 1996) (taking issue with the inventor's lack of recordkeeping and informal approach to testing his invention); *see also* Timothy R. Holbrook & Mark D. Janis, *Patent Law's Audience*, 97 MINN. L. REV. 72, 123 (2012) (critiquing *Lough* on various grounds); Craig A. Nard, *Legal Forms and the Common Law of Patents*, 90 B.U. L. REV. 51, 89, 96–97 (2010) (citing *Lough* as an example in which a rule-bound jurisprudence may have cabined judicial discretion undesirably).

height, enthusiastic reports appeared frequently in the popular press and elsewhere.²³⁷ Some even claimed health benefits would result.²³⁸

But doubts were arising even before the *City of Elizabeth* litigation commenced,²³⁹ and by the time the Supreme Court finally rendered its decision, the tide had begun to turn. The primary complaint concerned durability. Reports suggested that Nicolson pavement began to decay after four or five years, and was wholly gone after six to eight years.²⁴⁰ One source claimed that not only the blocks, but also the foundation material rotted from exposure to moisture.²⁴¹ Predictably, the results were unpleasant. The road surface became rough and irregular, and this led to the “lodgement of an immense quantity of animal and vegetable filth” between the blocks, only accelerating the decomposition of the “putrifying mass.”²⁴² Far from promoting cleanliness and health, the putrefying mass became a source of “gases . . . fungi and infusoria . . . which, entering the air we breathe, are poisonous, engendering zymotic diseases, such as typhoid, malarial and intermittent fever, dysentery, diphtheria, and etc.”²⁴³ In other words, literally and figuratively, it stank.

237. See, e.g., *Nicholson Pavement*, MINING AND PETROLEUM STANDARD AND AMERICAN GAS-LIGHT JOURNAL, Sept. 3, 1866, at 73 (lauding the prospect of “Nicholson pavement” being laid at the corner of Nassau and Wall Street, New York); *The Nicholson Pavement*, TURF FIELD AND FARM, Sept. 1, 1866, at 144 (Nicolson pavement in New York); *The Nicholson Pavement*, DETROIT FREE PRESS, Oct. 9, 1866, at 5 (enthusiasm for Nicolson pavement to be installed on Lafayette Street, Detroit); *The Streets of Chicago*, CHI. PRESS & TRIB., Jan. 8, 1859, at 1 (letter to the editor urging adoption of Nicolson pavement in Chicago; remarking that Nicolson had recently been in the city supervising the installation of the pavement); see also NICOLSON, *supra* note 190, at 19–32 (collecting numerous testimonials); THE NICOLSON WOODEN PAVEMENT: ITS MODE OF CONSTRUCTION BY THE NEW ENGLAND NICOLSON PAVEMENT COMPANY (undated) (touting advantages); NORTHWESTERN STAFFORD PAVEMENT CO., WOODEN PAVEMENTS: THEIR UTILITY IN THE STREETS OF LARGE CITIES (Chi., Northwestern Stafford Pavement Co. 1869) (promoting another patented wood pavement technology).

238. Letter from A.A. Hayes, M.D., in JOHNSON, *supra* note 5, at 88 (“We may confidently expect to find the vicinity of the pavement protected from those diseases produced by miasmatic exhalations, and in this view the substitution of your pavement for other kinds becomes a great public benefit.”).

239. See, e.g., *Street Pavements*, SCI. AM., June 15, 1867, at 381 (reporting that “[t]he charms of the Nicolson pavement are almost overpowering to the judgment,” but noting that despite the “rush for the Nicolson pavement” in some cities, there was some contrary evidence that the Nicolson pavement used in Chicago had become “completely used up by travel and rot” after five or six years); *Wooden Pavements*, SCI. AM., May 25, 1867, at 333 (“[T]here is no sufficient reason to conclude that the Nicolson pavement is the *ne plus ultra* of human ingenuity and nature’s resources.”). But cf. *Nicolson Block Pavement*, CHI. TRIB., June 16, 1867, at 2 (responding to the Scientific American articles; claiming that poor installation was to blame, and that “the Nicolson is destined to become the common pavement of American streets.”).

240. See, e.g., *Street Pavements*, *supra* note 5, at 170. It is curious that Nicolson’s tests lasted just about this same amount of time.

241. HILL, *supra* note 224, at 6.

242. *Street Pavements*, *supra* note 5, at 170.

243. *Id.* (quoting a governmental committee report from Washington, D.C.).

These facts may suggest that Nicolson was not only wrong in his ultimate conclusions, but also misguided in his methods. In addition to tapping, he should have been sniffing, one might argue.²⁴⁴

This returns us to the question of whether the experimental use doctrine should reflect a purposive approach or embrace a more formalized, technical experimental stage analysis. To what degree should the doctrine be about formulating a plausible, objectively verifiable picture of the inventor's subjective purpose—and to what extent should it be about scientific rigor and ultimate technical achievement? The two need not be viewed as mutually exclusive, but the Nicolson narrative teaches us that pushing the experimental stage analysis to its endpoint would have resulted in a different outcome in *City of Elizabeth*, and the experimental use doctrine itself.

In time, the Nicolson pavement was widely pronounced a failure,²⁴⁵ although the idea of wooden pavement in general still had adherents up until the dawn of the automobile age.²⁴⁶ The doctrine of experimental use has had a happier fate so far, although it, too, suffers from some anomalies that are not always evident on the surface.

CONCLUSION

In her influential essay *Crystals and Mud in Property Law*,²⁴⁷ Carol Rose suggests that property rules progress in a predictable pattern: bright-line rules (“crystals”) attempt to specify clear boundaries around entitlements, but, in time, as these rules are applied and periodically lead to forfeitures, decision-makers derogate from the bright-line rules to serve justice in individual cases, and what was once crystalline becomes muddy. In turn, complaints about the uncertainty of muddy standards triggers an incursion of crystalline rules.

The history of the experimental use doctrine exhibits this tug-of-war between crystals and mud. *City of Elizabeth* articulated a purposive analysis for experimental use that was well-suited to provide a discretionary hedge against the otherwise crystalline rules of patent forfeiture under the statutory bar. Some modern cases, questing for certainty in statutory bar analysis, have failed to recognize the benefits of an amorphous, policy-centered experimental use doctrine. Whether in the guise of an experimental stage analysis that is overly engaged with technical features of inventions, or in the form of a reductionist test that places too much faith in assessments of an inventor's control over prototypes, these cases undermine the

244. Thanks to my colleague Mike Mattioli for this pungent commentary.

245. *A New Pavement in Fifth-Avenue*, N.Y. TIMES, July 17, 1884, at 8 (referring to Nicolson pavement as having “proved a failure in this city”); *Street Pavements*, *supra* note 5, at 170 (advising cities to tear up the pavement at the first sign of decomposition, and recommending against its further use).

246. See FREDERIC ARNOLD KUMMER, CREO-RESINATE WOOD PAVEMENTS FOR STREETS AND BRIDGES (2d ed. 1903) (evidently a promotional treatise created on behalf of the United States Wood Preserving Co.).

247. Carol M. Rose, *Crystals and Mud in Property Law*, 40 STAN. L. REV. 577, 577–78 (1988).

very purpose of having an experimental use doctrine. They attempt to pile new crystalline rules atop the already-hard-edged rules of the statutory bar, a recipe for instability.

Courts should resist this impulse. The *City of Elizabeth* case teaches that “[r]igid standards are especially unsuited” to the statutory bar analysis.²⁴⁸ Courts were correct, over long experience before *Pfaff*, to be “careful to avoid erecting [such] standards.”²⁴⁹ The history of *City of Elizabeth* is a useful reminder of the ambiguities inherent in the inventive process and the need for a nimble experimental use doctrine. The Supreme Court should disavow contrary comments in *Pfaff* and bring this area into line with other patent law inquiries that are guided by open-ended standards.

The history of *City of Elizabeth* also provides some guidance for a looming debate affecting patents that are subject to the AIA. As the Federal Circuit’s decision in *Helsinn v. Teva*²⁵⁰ indicates, courts are beginning to grapple with the issue of whether Congress intended to incorporate the public use and on-sale bar jurisprudence—including, of course, the experimental use doctrine—into the post-AIA statutory bar provision.²⁵¹ If courts decide against incorporation, then the clock may be turned back to the time of *City of Elizabeth*, and courts may have to decide whether the post-AIA provision leaves room for a judicially crafted discretionary hedge against forfeiture.²⁵² Whether or not that hedge against forfeiture takes the form of the experimental use doctrine, the jurisprudential lesson of *City of Elizabeth* is clear: forfeiture is a harsh penalty, and is it inevitable that courts will look for

248. *UMC Elecs. v. United States*, 816 F.2d 647, 653 (Fed. Cir. 1987) (quoting *W. Marine Elecs. Inc. v. Furuno Elec. Co.*, 764 F.2d 840, 844 (Fed. Cir. 1985)).

249. *Id. But cf. Landry*, *supra* note 197, at 1192 (in an article written before *Pfaff*, arguing that “the predictability and certainty of a bright-line test” for the on-sale bar “ought to trump judicial discretion” exercised via the totality-of-the-circumstances test). Landry’s analysis remains worthy of study even though events have largely passed it by. While Landry skillfully highlighted the administrative costs associated with the use of open-textured standards for the on-sale bar, several of his alternative prescriptions for bringing particularized rules to the on-sale bar would be prone to significant error costs. What his analysis best shows is the likely futility of attempting to balance competing interests in statutory bar analysis through a simple, bright-line rule.

250. *Helsinn Healthcare S.A. v. Teva Pharm. USA, Inc.*, 855 F.3d 1356 (Fed. Cir. 2017).

251. The statutory-construction question revolves around whether the addition of the phrase *otherwise publicly available* to the relevant provision imposes a new meaning on the phrases *public use* and *on sale*, which were carried over from the predecessor provision. See Mark A. Lemley, *Does Public Use Mean the Same Thing it Did Last Year?*, 93 TEX. L. REV. 1119, 1135 (2015) (noting the issue and arguing that if “the touchstone for the new meanings of public use and on sale is public availability,” one should not assume that those new meanings carry with them “an unarticulated exception” for experimental uses).

252. In *Helsinn*, the court ruled that the AIA “did not change the meaning of ‘on sale’ in the circumstances involved here.” *Helsinn*, 855 F.3d at 1360. In particular, the court ruled that if the existence of a sale is public, there need be no showing that the subject matter of the sale was disclosed to the public for the on-sale bar to be triggered. *Id.* at 1371. The court thus appeared to leave intact the relevant pre-AIA jurisprudence on the on-sale bar. But the court explicitly declined to address whether the AIA had changed the public-use jurisprudence. *Id.* at 1369.

ameliorative mechanisms to apply in worthy cases. Experimental use may need to be renamed in the post-AIA system, but it or its successor will continue to influence decision-making under the statutory bar, and that is a good thing.

