Recent decades have witnessed an enormous expansion in the United States patent system. Patent applications nearly quadrupled between 1980 and 2006, while the number of patent lawsuits taking place each year doubled during the 1990s.¹ Scholars disagree as to the source of this “patent explosion.” Some posit an increased rate of technological change, including a “third industrial revolution” centered on information technology and biotechnology. Others point to a series of legal changes that strengthened patent rights while simultaneously extending them to such areas as computer programs, biological material, and business methods.²

Whatever the explanation, these events have both heightened interest in and raised concerns about the patent system. While it remains possible to explain and extol the social benefits of patents as inducements to innovation, a gloomier view has become widespread.³ In particular, the proliferation of patent rights has purportedly led to a string of undesirable outcomes: costly litigation, the erection of barriers to scientific research and innovation, and opportunistic enforcement of patent rights by speculative actors. The institutions of the patent

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law, once feted for adding “the fuel of interest to the fire of genius,” have instead turned sinister: “Judges, Bureaucrats, and Lawyers,” as one new critique of the U.S. patent regime warns, “Put Innovators at Risk.”

In the words of two leading economists, the patent system has newly revealed its “dark side.”

If, as those same scholars suggest, “[p]atent policy is too important to leave to the patent lawyers,” then where else might we turn for a fuller understanding of present challenges? My book project, provisionally entitled Technology’s Trials, will argue that history provides a rich source of material for considering disruptive changes in the relationships between patents, law, and the economy. The book will look, in particular, to the later nineteenth and early twentieth centuries: an era already identified as the setting for an earlier (“second”) industrial revolution. Usually dated approximately from the 1870s to the 1910s, the second industrial revolution represents less a phase of economic growth than the emergence of distinctively modern industrial sectors and practices, based on mechanization, electricity, steel, synthetic chemicals, and motorized transportation. This was the period during which the United States brought together two great nineteenth-century creations, scientific invention and the large-scale corporation, and in the process became the world’s leading industrial power. It was also the single era in American history when patents and patent conflicts most conspicuously shaped the economy.

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5 Jaffe and Lerner, Innovation and Its Discontents, 56-77.
6 Ibid., 23.
The last third of the nineteenth century saw patents and patented inventions emerge as a key component of America’s industrial development. Over 600,000 patents were issued in the United States between 1865 and 1900, more than ten times the number created in the seventy-five years prior to the end of the Civil War, and more than twice as many as were granted by any other country. The exploitation of these rights became a signature theme of the period. Sprawling legal campaigns accompanied many “great inventions” of the age, from electric lamps and telephones to less esoteric articles like barbed wire and baking soda. Companies such as Bell Telephone, Alcoa, and General Electric initially “crystallized around patent rights,” and subsequently cemented their competitive positions through aggressive exploitation of pioneer patents.\footnote{Victor S. Clark, \textit{History of Manufactures in the United States. Volume ii, 1860-93} (New York, 1929), 381.} As the historian Daniel Boorstin has half-seriously observed, “The importance of any new technique in transforming American life could roughly be measured by the quantity of lawyerly energies which it called forth.”\footnote{Daniel J. Boorstin, \textit{The Americans: The Democratic Experience} (New York, 1973), 58.} Famous lawsuits and notorious monopolies were, however, only the most visible aspect of patent litigation. Behind the most sensational struggles for control of new technologies lay a much larger edifice of specialized knowledge and practice. Thanks to a patent system that was the world’s largest and most accessible—that was, in the view of one recent historian, “democratic” in its scale and inclusiveness—the United States legal system and its professional inhabitants possessed unmatched experience of patent adjudication.\footnote{B. Zorina Khan, \textit{The Democratization of Invention: Patents and Copyrights in American Economic Development, 1790-1920} (Cambridge, 2005).}

The history of this period bears on current patent debates in at least two different ways:

1. Parallels and precedents. Modern developments are far from being as unprecedented as recent coverage presumes. On the most basic level, the second industrial revolution saw its own explosion of patenting and patent litigation. Accompanying that outburst
was the widespread appearance of new technologies that challenged both the scientific capacities of the courts and the established parameters of the patent law. As if these bewildering escalations of scale and technical complexity were not enough to test the patent system, this period also coincided with structural legal change. In the same way that the creation of the U.S. Court of Appeals for the Federal Circuit in 1982 led to a “silent revolution” in modern patent law, so too the reform of the federal courts in 1891 to create the Circuit Courts of Appeals precipitated notable changes in patent adjudication and policy-making. Finally, the dark side of the patent system was abundantly in evidence. “Patent trolls,” those lurking speculators who held up businesses using previously obscure grants; “submarine patents” whose issue was deliberately delayed to gain a longer lifespan, and many other recently-familiar forms of opportunistic or abusive behavior became major concerns for judges and policy-makers.

2. Long-run historical analysis. Scholars of the patent system have already begun to embrace long-run historical work as a way to analyze the effects of patent policy on innovation and economic development. Technology’s Trials aims to contribute to that larger project. From the standpoint of legal scholarship, the second industrial revolution offers a setting in which to explore how changes in innovation, business strategies, and legal rules interacted to bring an earlier explosion of patent litigation before the courts.

In its final form, Technology’s Trials will draw on both of these analytical strategies to place today’s patent debates in historical perspective. In order to do so effectively, however, the

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13 Since 1995, U.S. patent terms have run from the date of filing, rather than that of issue, removing the benefits of creating a “submarine patent” by postponing the grant.
book will first need to reconstruct the history of patent law and litigation in the late nineteenth and early twentieth centuries. The following paper sketches out some of the methods and arguments on which this reconstruction will be based.

*Patent litigation as a “social litigation system”*

The central idea of this paper is that patent litigation in the nineteenth century became a distinct “social litigation system.” As coined by the legal historian Edward Purcell, the term refers to “a coherent and dynamic set of patterns of claims-disputing behavior that arises from an identifiable combination of social and legal factors.” Characteristic of such systems is the involvement of “certain types of parties [who] dispute a relatively limited number of issues against each other in certain consistent ways,” employing “special subsets of legal rules—both substantive and procedural.” The utility of the concept is twofold. First, it captures the importance of repeat players within a given litigation system. Second, it expands the scope of analysis beyond case law and reported—or even finally adjudicated—court actions, to take in the full variety of litigation choices, patterns of settlement, and changes in the participants’ options and strategies over time.

The eventual aim of *Technology’s Trials* is to develop a broad view of the business environments that produced patent litigation and shaped patent law—the analogue of Purcell’s study of diversity litigation between individuals and corporations. This paper represents an early step in that direction. Specifically, it examines the legal institutions that handled patent disputes, identifies some of the leading repeat players in patent adjudication, and offers a tentative sketch of patent business in the courts.

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In doing so, the paper seeks to shift the terms of historical inquiry in two ways. First, there is the matter of chronology. For various reasons, historical work on the formation of the modern patent system has focused on the antebellum period.16 Yet the later part of the nineteenth century saw the emergence of several primary institutions of American patent law. The rise of a specialist patent bar can be traced to the period after the Civil War, as can the development of patent law as a distinct sub-discipline in legal education and publishing. It is notable that, unlike more distant events surrounding the passage of the first U.S. patent law (1791) and the creation of the Patent Office (1836), these formative developments still await historical treatment.

The other goal of the paper is to place this new second-industrial-revolution focus on a quantitative foundation. Technology’s Trials aims to explore the relationship between a rapidly-expanding patent system (Figure 1) and the legal, technical, and economic conditions that shaped it and were shaped by it. Many of the preliminary questions for this exercise amount to “when,” “where,” and “how many.” In the absence of available secondary sources on the quantity of patent litigation, the paper experiments with a variety of methodologies for outlining the social litigation system.

The paper falls into three parts, each approaching the patent litigation system from a different angle. Part I considers the federal courts as a whole, examining the distribution of patent litigation between courts and over time. This section outlines the initial evidence for an “explosion” of patent litigation during the late nineteenth century, and for the prominence of such lawsuits in the business of certain federal courts. Part II surveys patent practitioners and legal authorities, again identifying the late nineteenth century as a period of fertile legal change. Part III takes a single court as a case study, in order to consider the social litigation system in action. By moving beyond the traditional sources for studying patent law (i.e. judicial opinions), this final section begins to explore the composition of the patent docket and the strategic elements of litigation.
I. Patents and the federal courts

In keeping with the project of a national patent system, jurisdiction over patent questions in the United States fell to the federal courts rather than to the legal systems of individual states. By statute, patent cases took place in the United States circuit courts, of which each state had between one and three by the later nineteenth century. The original circuit courts had been held by justices of the U. S. Supreme Court “riding circuit,” but by the later part of the century they had evolved into permanent courts that closely paralleled the U.S. district courts. Supreme Court justices continued to appear occasionally as a vestige of their circuit-riding obligation until 1891. Otherwise, suits in circuit court were heard by district judges or, from 1869, a new cadre of circuit judges (one for each of the nine judicial circuits), or sometimes by both sitting as a two-judge panel. Circuit judges were more likely to hear cases in the chief cities of their circuit, such as Boston (First Circuit), New York (Second Circuit), or Philadelphia (Third Circuit). Elsewhere, district judges often held district and circuit courts simultaneously, so that the distinction between the two largely disappeared in the late nineteenth and early twentieth centuries. Until 1891, appeals from all of these courts could be taken as of right to the United States Supreme Court itself. In that year the two-level structure of trial and appeal underwent an important change, when newly-created regional courts of appeals (one for each circuit) were interposed between the two layers.

The total volume of patent litigation handled by these courts is, unfortunately, unknown. Nevertheless, it remains possible to make some useful quantitative observations about the

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17 In this paper, “patent cases” is used to mean cases that involved the construction or validity of a patent and hence fell within the federal courts’ statutory jurisdiction. Appeals to federal courts from decisions of the Patent Office are also included. Other types of suit, such as those relating to patent contracts or licenses, or the disposition of patents in wills or in bankruptcy, are not considered unless patent infringement or the validity of a patent was also at issue.

18 The circuit courts were officially absorbed into the district courts in 1911. Erwin C. Surrency, History of the Federal Courts (Dobbs Ferry, NY, 2002), p. 48.
distribution of patent business over time and across jurisdictions. Data gathered for this project suggests that in certain states, and especially during the time period covered here, patent suits were far more prominent in the business of the federal courts than has hitherto been appreciated.

(i) Case reporting as a record of patent litigation

Neither official judicial statistics nor summary records of filings and hearings specifically identified patent suits during the nineteenth century. Absent these resources, the most accessible source of quantitative data is the record of published judicial rulings—an essentially qualitative source compiled by law reporters for the legal practitioners of the day. Reported cases have served as the basis for previous surveys of patent litigation, most notably by Zorina Khan in her study of antebellum America. However, the data-gathering possible across Khan’s period of interest—which comprised 795 total patent cases reported between 1790 and 1860—does not translate easily to later decades, when hundreds of reports appeared annually. Only the development of computerized legal research has made locating such suits a practical possibility.

Two large caveats are necessary here. First, case reports give no reliable indication of the actual volume of patent disputes that took place. Reported judicial decisions make up a subset even of the number of cases tried to a conclusion; they cannot at all reach those lawsuits settled

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20 In the analysis that follows, values are drawn from the record of federal cases reported under the West Publishing Company’s National Reporter System. The Federal Reporter, covering district and circuit courts, first appeared in 1880. In 1892, the West Company began to publish (as the Federal Cases) compendia of cases decided before 1880, retrospectively compiled from the various local and specialist reporters that had grown up earlier in the century. Both the Federal Cases and the Federal Reporter are included in Westlaw’s searchable database of pre-1945 federal reports, along with the United States Reports—a relatively comprehensive record of decisions rendered by the U.S. Supreme Court from 1789 onwards. Details of the search procedure used to locate patent cases appear in the Appendix to this paper.
by the parties either before or after a hearing began. Second, the criteria for reporting cases present sampling problems. Selection for publication occurred at the discretion of the reporter, theoretically on the basis of a case’s addition to doctrine. In practice, however, suits might attract interest for their commercial as well as legal importance. Published opinions ran the gamut from terse conclusions of fact to “elaborate essays, sometimes almost treatises, either on the whole body of the law or on a special topic, emanating from the minds of learned jurists, after long investigation and a close analysis of the conflicting arguments of acute lawyers and skilful experts.”

In general, American legal reporting tended towards a reasonably broad selection of cases—characterized by its leading practitioner, John B. West of the West Publishing Company, as a “blanket” approach—in order to arm the practitioner with a comprehensive picture of the current law. Consequently the number of reported patent decisions represents a combination of two inputs: the quantity of patent cases decided and the incidence of legally significant rulings.

Some of the limitations of the data are clear from an aggregate search of all patent cases in all federal courts. Figure 2 suggests that the state of reporting and the structure of the courts did most to affect the volume of published patent decisions. Of the three notable developments depicted, one—the growth in the number of cases reported around 1880—likely reflects the inauguration of the *Federal Reporter* in that year. The others—the appearance of a block of cases heard by the courts of appeals (with accompanying step change in the total number of cases reported) and the simultaneous dwindling away of Supreme Court rulings—clearly follow from the creation of the courts of appeals in 1891.

All is not lost, however. While case reporting reveals little about the aggregate volume of patent litigation that came before the U.S. courts, it can indicate patterns in the relative share of patent business among and within the individual federal courts.
(ii) The distribution of patent cases in the U.S. courts

One major inference from the record of published decisions is that patent litigation was geographically concentrated in particular states. Figure 3 shows that Massachusetts, New York and Pennsylvania (the first three states clockwise from “noon” in the pie chart) produced the majority of reported circuit court cases in each decade from the 1870s to the 1900s. A few other states in the Northeast and Midwest accounted for most of the rest. The predominance of the leading industrial states over those of the South and West is too great to be explained purely by some superior legal authority attaching to their judges; it almost certainly represents a real concentration of cases rather than just the discretion of local law reporters. In general, those states with the highest levels of reported patent litigation were also those whose residents received the most patents. In 1870 and 1880, this pattern held for the seven states whose residents received the most patents. In 1890, 1900 and 1910, the relationship frayed at the edge when Michigan and then California and Missouri moved ahead of Connecticut in patent issues but not in reported patent cases.23

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Figure 3. The geographical concentration of patent litigation: distribution of reported patent cases among U.S. circuit courts by state, 1870-1909

Decade totals:

- 1870-79: 744
- 1880-89: 1658
- 1890-99: 1464
- 1900-09: 1425

Note: “Other states” includes the Supreme Court for the District of Columbia.

A second and related observation from the record of case reporting is that some federal circuit courts devoted a large proportion of their efforts to patent suits. Table 1 indicates that patent cases accounted for over fifty percent of reports emanating from the district and circuit courts of Massachusetts and Connecticut, practically qualifying these courts as specialist patent tribunals. Patent decisions in New York, location of the nation’s most commercially important federal trial courts, peaked at just over a quarter of cases reported. By contrast, patent reports
remained between one and five percent of the total in the states of the South as a whole, and between two and seven percent across the states of the Great Plains and the West. ²⁴ Again, the number of reported decisions does not directly indicate the numbers of cases heard. There are several good reasons why patent cases might be reported at a higher rate than other types of cases; notably the importance of publicizing the judicial construction of the patents in question. However, because published judgments presumptively represent the more noteworthy cases, they give an idea of where particular courts focused their energies. At the very least, it is clear that patent law was a major activity of the federal courts in the leading industrial states.

Table 1. The prominence of patent law: patent cases as a percentage of total reported cases in the U.S. district and circuit courts of selected states, 1870-1909

<table>
<thead>
<tr>
<th>States</th>
<th>1870-4</th>
<th>1875-9</th>
<th>1880-4</th>
<th>1885-9</th>
<th>1890-4</th>
<th>1895-9</th>
<th>1900-4</th>
<th>1905-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>25.2%</td>
<td>42.3%</td>
<td>44.7%</td>
<td>55.7%</td>
<td>54.4%</td>
<td>49.7%</td>
<td>27.0%</td>
<td>27.0%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>28.2%</td>
<td>47.7%</td>
<td>58.9%</td>
<td>49.5%</td>
<td>51.1%</td>
<td>52.2%</td>
<td>27.2%</td>
<td>30.9%</td>
</tr>
<tr>
<td>New York</td>
<td>14.8%</td>
<td>12.9%</td>
<td>25.7%</td>
<td>21.3%</td>
<td>20.1%</td>
<td>21.6%</td>
<td>18.8%</td>
<td>17.5%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>41.7%</td>
<td>35.8%</td>
<td>26.7%</td>
<td>36.1%</td>
<td>45.6%</td>
<td>37.9%</td>
<td>35.5%</td>
<td>32.5%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>17.6%</td>
<td>14.0%</td>
<td>18.3%</td>
<td>32.0%</td>
<td>34.4%</td>
<td>29.2%</td>
<td>16.6%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Ohio</td>
<td>21.0%</td>
<td>10.8%</td>
<td>19.2%</td>
<td>24.1%</td>
<td>31.9%</td>
<td>23.9%</td>
<td>12.9%</td>
<td>21.7%</td>
</tr>
<tr>
<td>Illinois</td>
<td>10.3%</td>
<td>15.1%</td>
<td>23.6%</td>
<td>35.3%</td>
<td>39.9%</td>
<td>34.3%</td>
<td>20.4%</td>
<td>43.1%</td>
</tr>
<tr>
<td>Missouri</td>
<td>2.0%</td>
<td>7.6%</td>
<td>11.0%</td>
<td>12.3%</td>
<td>14.6%</td>
<td>12.6%</td>
<td>10.8%</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Source: WESTLAW, U.S. Federal Courts pre-1945 database

Patent cases appeared far less frequently at the appellate level, relative to the total docket, than in the trial court hotbeds. As long as the United States Supreme Court functioned as the
sole destination for appeals in patent cases, the potential for re-hearing remained extremely limited; in the great majority of cases lower court decisions were final. The number of reported Supreme Court decisions dealing with patents averaged just under nine per year during the 1870s and rose to twenty per year in the 1880s and early 1890s, before falling off to a mere handful annually after 1895. In no year did patent matters occupy more than nine percent of the Court’s reported output.25

After the reorganization of the federal courts in 1891, the Supreme Court yielded most of its patent business to the new courts of appeals and took on a loftier supervisory role. The new stratum of courts shifted the centre of gravity in patent adjudication, allowing a far larger quantity of patent cases to receive an appellate hearing and drawing responsibility for the detailed management of patent law away from both the Supreme Court and the courts of first instance. Geography continued to matter in the same way that it had before 1891. Among courts of appeals, those in the Northeast (the First, Second and Third Circuits) continued to produce more than half of all patent decisions before 1910, with a supporting role for the Midwestern industrial belt running from Ohio to Illinois (the Sixth and Seventh Circuits). One significant addition to the roster of major patent-law tribunals occurred in the 1890s, with the rise of the Court of Appeals for the District of Columbia. Established in 1893, this court generated many more reported decisions from its caseload of appeals from the Patent Office than had its predecessor, the Supreme Court for the District of Columbia.26 It should be noted, then, that the early-1890s reforms of the federal courts represented a significant change in the legal environment in which patents were proved.

25 WESTLAW, U.S. Federal Courts pre-1945 database. Data refers to calendar years rather than Supreme Court terms.
II. The contours of rule-making in American patent law

“Patent law” consists of a huge number of rules, governing everything from the standard for patentable originality to the status of patented articles on foreign-flagged ships. Only a few of these, such as the length of term allowed, have historically stemmed entirely from legislation. Otherwise, as the Yale Law School professor and federal judge William K. Townsend observed in 1901, the law “has been a development through judicial decisions rather than a creation of statutory enactments.”27 This predominance of judge-made law reflects the inherent difficulty of legislating patent policy: the variation between different types of invention and the subtlety involved in distinguishing one creative act from another have always favored flexible jurisprudence over statute.28 “In the gradual development of the policy of Congress,” the U.S. Supreme Court noted with some satisfaction in 1899, “the recognition of the judicial character of the questions involved became more and more pronounced.”29

The historical record of judge-made law is relatively strong. Case reporting, while only an indirect indicator of patent litigation, is a direct representation of “the law.” In theory, each decision chosen for publication by law reporters represented an incremental contribution to doctrine, either by laying down a new rule or by demonstrating the applicability of an existing one to the circumstances presented. In practice, the level of originality required of a reported judgment was not always high. Yet within a system based on precedent, the body of published decisions was the law: irrespective of the criteria for reporting, each addition (unless subsequently overruled) represented the creation of new case law. Seen this way, reported

decisions can act as a guide to the wellsprings of new doctrine and to periods of dynamism in rule-making.

(i) Centers of legal authority

At the circuit court level, the tribunals of the industrial East clearly dominated the formation of case law. From the high proportion of patent cases as a share of published decisions, it is reasonable to infer that judges in those states accumulated considerable experience in deciding patent questions. Whether or not one can infer competence from experience is a more vexed question: most groups involved in patent litigation lamented, at some point, the inability of overmatched jurists to keep up with scientific and mechanical questions. Judge David Brewer, who later sat on the United States Supreme Court for twenty years (1890-1910), once memorably confessed of a case that “this question has troubled me greatly. I am no mechanic; have no taste for mechanics; no mechanical turn of mind. And it has been very hard for me to weigh or appreciate the reasons and arguments based upon the facts and laws of mechanics, and I can only say, in concluding this branch of the case, that I have done the best I could.” Nevertheless, many judges would have been well used to the legal task of interpreting property rights in invention.

Among the more technically-minded, particular judges were able to stamp their mark on patent practice. Samuel Blatchford, a New York lawyer and judge who specialized in admiralty

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30 For a critical view of judges’ scientific competence, including a proposal for a specialist patent court, see Commissioner Leggett’s comments in United States Patent Office, *Annual Report of the Commissioner of Patents for the year 1873*.

31 Since this case concerned only barbed wire, one can only imagine what Brewer made of more scientifically complex cases. *Washburn & Moen Manufacturing Co. v. Grinnell Wire Co.*, 24 F. 23 (1885), 25.
and patent matters, has carried into posterity a reputation as a solid, uninspiring jurist. In the realm of patents, however, his productivity brought him great authority. As a district and then circuit judge between 1867 and 1881, Blatchford produced two thirds of the reported patent decisions in the Circuit Court for the Southern District of New York, the country’s most prolific court in this area of the law. His output of 238 opinions during this period represented approximately twenty percent of all patent cases reported in the country. Blatchford published his own series of reports, which did much to make him pre-eminent, but his genuine expertise is evident from a subsequent decade as the leading patent opinion-writer on the U.S. Supreme Court. Judges who remained at the lower level of the federal judiciary could also have a substantial influence. District Judge John Nixon of New Jersey, for example, was another jurist whose reputation rested substantially on patent decisions, of which he published over one hundred between 1870 and 1889.

While a large body of career patent opinions at the trial level allowed individual district and circuit judges to make their presence felt in case law, the decisions of appeal courts bound those below and thus enjoyed greater doctrinal authority. The Supreme Court until the 1890s, and the courts of appeals thereafter, possessed the leading policy-making function within the patent law. Especially among the personnel of the Supreme Court, particular sources of authority stood out. Although decisions of the Court were arrived at collectively by a vote of its members, some Justices wrote more opinions and engaged much more closely with patent

33 WESTLAW, U.S. Federal Courts pre-1945 database.
questions than others. Leadership in intellectual property questions came from the Court’s recognized patent experts of the pre-1891 period: Joseph Bradley, a former corporate and patent lawyer from New Jersey, and the workhorse Samuel Blatchford. As Table 2 shows, these two, along with Justices Woods, Matthews, Gray and Fuller, bore the brunt of a wave of patent cases that swept over the Court in the 1880s and early 1890s.

Table 2. Shapers of the patent law: number of career patent opinions written by justices of the U.S. Supreme Court who sat in the 1870s and 1880s

<table>
<thead>
<tr>
<th>Justice</th>
<th>Tenure on the Court</th>
<th>Number of patent opinions</th>
<th>Share of the Court’s patent decisions during tenure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blatchford</td>
<td>1882-93</td>
<td>92</td>
<td>38.7%</td>
</tr>
<tr>
<td>Bradley</td>
<td>1870-92</td>
<td>34</td>
<td>10.4%</td>
</tr>
<tr>
<td>Fuller</td>
<td>1888-1910</td>
<td>33</td>
<td>15.1%</td>
</tr>
<tr>
<td>Woods</td>
<td>1881-87</td>
<td>31</td>
<td>26.5%</td>
</tr>
<tr>
<td>Clifford</td>
<td>1858-81</td>
<td>31</td>
<td>20.8%</td>
</tr>
<tr>
<td>Gray</td>
<td>1882-1902</td>
<td>27</td>
<td>8.5%</td>
</tr>
<tr>
<td>Matthews</td>
<td>1881-89</td>
<td>26</td>
<td>15.4%</td>
</tr>
<tr>
<td>Nelson</td>
<td>1845-72</td>
<td>19</td>
<td>20.2%</td>
</tr>
<tr>
<td>Strong</td>
<td>1870-80</td>
<td>18</td>
<td>17.1%</td>
</tr>
<tr>
<td>Waite</td>
<td>1874-88</td>
<td>18</td>
<td>8.4%</td>
</tr>
<tr>
<td>Swayne</td>
<td>1862-81</td>
<td>13</td>
<td>9.5%</td>
</tr>
<tr>
<td>Miller</td>
<td>1862-90</td>
<td>12</td>
<td>3.7%</td>
</tr>
<tr>
<td>Lamar</td>
<td>1888-93</td>
<td>9</td>
<td>8.1%</td>
</tr>
<tr>
<td>Field</td>
<td>1863-97</td>
<td>9</td>
<td>2.0%</td>
</tr>
<tr>
<td>Hunt</td>
<td>1873-82</td>
<td>6</td>
<td>5.3%</td>
</tr>
<tr>
<td>Harlan</td>
<td>1877-1911</td>
<td>4</td>
<td>1.0%</td>
</tr>
<tr>
<td>Davis</td>
<td>1862-77</td>
<td>2</td>
<td>2.2%</td>
</tr>
<tr>
<td>Chase</td>
<td>1864-73</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Note: Only principal or majority opinions written while on the Supreme Court are included. Dissents and judgments delivered on circuit are not included.

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Courts did not have a monopoly on the creation and communication of legal knowledge. Expertise and even authority in the patent law resided also with practicing attorneys and other patent professionals. A few leading lawyers in the field, such as George Ticknor Curtis, William Simonds, Albert H. Walker, and William Robinson left their mark on the law of the land by writing influential treatises. Other sources of reporting, such as West’s publishing effort, similarly contributed to the organization and diffusion of the case law.

Just as important as the content of the law, however, was the development of specialized competences among practitioners at large. The building blocks of specialized patent practice appeared before the Civil War, with the development of the Patent Office bureaucracy and the rise of patent agencies such as Munn and Company, which published the journal *Scientific American*. Both groups performed similar functions of scrutinizing applications (either as drafters or examiners) and facilitating trade in invention. Unsurprisingly, the interchange of personnel between public office and private practice was common. During these years, the professional intermediaries of the patent system adopted a range of functions and designations, including patent “agents,” “solicitors,” “counsel,” and “attorneys.” Their backgrounds were similarly diverse, running the gamut through engineers, former Patent Office examiners, clerks, and lawyers. In general, legal training was not a prominent characteristic of patent practitioners. However, a small number of lawyers began to specialize in patent business before the courts. Notable figures, attracting the most high-profile cases, included George Harding, a Philadelphia patent lawyer and a figure of national legal stature, and George Gifford,

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a leading light of the New York patent bar. While neither was the first to establish a well-known patent practice, both would subsequently be hailed as the “father of the specialty.”

Notwithstanding the appearance of early specialists, a variety of different types of lawyer actually conducted infringement suits. Some were legally-trained patent agents who argued cases as well as steering applications. Others appeared, usually in harness with the specialists, for reasons other than scientific expertise. Well-connected local lawyers were commonly brought on board when trying a suit far from the plaintiff’s home jurisdiction: a practice that would famously see Abraham Lincoln retained as local counsel in Illinois during the far-flung McCormick grain-reaper litigation of the late 1850s—and then coldly snubbed at trial by his employers, the imperious Edwin Stanton (whom he would later make his Secretary of War) and the patent expert George Harding. This and other episodes suggest the preference for elite lawyers in patent litigation; likely a reflection both of the cases’ relatively high value and the benefits of having a high-status advocate in case the technical merits of the case escaped the judge. In an enduring pattern, illustrious advocates—such as Daniel Webster and Rufus Choate in the Goodyear rubber case (1850) and a parade of U.S. Senators in the Bell telephone litigation (1880-87)—brought oratory and political clout to major cases.

During the last third of the nineteenth century, a cohort of technically proficient patent litigators built their reputations amid the post-Civil War boom in patenting. Legal directories began to identify lawyers and partnerships that undertook (sometimes exclusively) patent practice. The base of specialization broadened: George Harding’s dominance over patent litigation in Philadelphia, for example, gave way by the early 1880s to a cohort of firms headed

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by Howson & Howson and Strawbridge & Taylor, both of which would remain prominent in the city’s patent business during the remainder of the century. In addition to the growth of patent law firms, many patent attorneys forged close relationships with the companies they advised, becoming as important in the boardroom as they were in the courthouse. Among the most famous examples, Thomas Edison’s counsel, Grosvenor P. Lowrey, arranged the financing of the Edison Electric Light Company, while Boston’s Frederick P. Fish, perhaps the leading patent lawyer in the country between 1890 and 1920, served as general counsel of General Electric and as the president of American Telephone and Telegraph between 1901 and 1907.41

By the turn of the century, patent lawyering had emerged as a distinct sub-discipline, complete with professional trappings. From 1891, regular classes in patent law were offered at Harvard Law School and George Washington University Law School, the latter course being taught by the U.S. Commissioner of Patents himself.42 The American Bar Association had also begun to involve itself with patent questions, forming a Section on Intellectual Property Law in 1894 and presenting a number of memorials to Congress on proposed legislation.43 Finally, as economies of scale and scope began to penetrate the legal profession itself during the 1890s, patent practice was represented among the first large law firms by the Boston and New York firm of Fish, Richardson & Neave.44

(ii) Contours of rule-making over time

The authors of treatises on patent law in the 1880s and 1890s often asserted—albeit self-interestedly—that the field was moving particularly rapidly. Leading authority Albert H. Walker prefaced the 1889 second edition of his textbook by noting the profusion of “often radical” decisions by the courts since his first foray only six years earlier. By 1895 he believed that “no book so old as the second edition, nor even one a year younger, can be a reliable guide through the patent laws of to-day.” Such statements imply that patentees in the courts of the late nineteenth century encountered a fertile legal environment. Reporting data provide some support for this view: the circuit courts of Massachusetts, New York and Pennsylvania experienced a bulge in reported patent decisions as a proportion of the total in the 1880s and 1890s (Table 1 above), while the Supreme Court took up historically high numbers of cases at the same time.

Case reports do not, however, provide the most refined indicators of broad doctrinal change. Walker estimated that perhaps two thirds of the two thousand decisions published between his third (1895) and fourth (1904) editions addressed only questions of fact, supplying little by way of new law. From this accretion Walker and his fellow treatise-writers had to tease out the law for themselves. As a result of their more discriminating approach, the citation of cases by treatises has a better claim to represent the incidence of legally significant rulings than does case reporting alone. In general, phases of rapid legal change should have attracted a higher level of citations dated to the years in question.

47 This pattern may be qualified by the way in which a treatise represents the replacement of older law. Selection of cases for citation essentially measures survival: it indicates how the law stood, and hence which cases remained current, at the date the treatise was written. If new case law had continuously superseded older decisions, one might
Figure 4, charting the dates of cases cited by William Robinson in his three-volume treatise of 1890, suggests that the legal state of the art was of relatively recent vintage. A spike in the early 1870s may reflect judicial interpretation of the most significant contemporary patent statute, passed in 1870. Otherwise the bulk of case law that Robinson deemed germane to the patent law in 1890 was rather younger, indicating either an acceleration in the incidence of judicial rule-making in the 1870s and 1880s or a high propensity to dispense with older precedent in favor of new rulings. Robinson himself preferred the former explanation, pointing to a process of fleshing out patent jurisprudence by the development of more sophisticated rules. The author attributed to “the present generation” the development of a scientific method of evaluating inventive rights. Henceforth, he proclaimed, “whenever questions of Patent Law are now presented to our courts the factors of the problem lie before them, certain and intelligible, requiring only careful distinctions and accurate reasonings to attain impregnable results.”48

Ironically, Robinson’s retrospective captured the law immediately before the new Circuit Courts of Appeal inaugurated a period of rapid addition. Yet for this very reason he provides us with a useful snapshot of the law as shaped by the pre-1891 federal court system.

expect citations to be clustered in the years immediately before the publication of the treatise. Conversely, peaks and troughs suggest a more variable rate of rule-making, with older peaks surviving as current law.

Figure 4. A “progressive” patent law: number of cases cited in Robinson, The Law of Patents for Useful Inventions (1890) for each year 1840-1889

Source: Robinson 1890, table of cases.

Would the changes highlighted by Robinson leave any trace a few years further on? A later treatise appears to confirm that the late nineteenth century was a particularly productive period for development of the patent law, locating Robinson within a bulge of law-making. Citations in Walker on Patents (1917) suggest that the first half of the 1890s was a key formative period of the patent law, whose judgments still loomed large in the jurisprudence of twenty years later. The importance of these years almost certainly reflects the establishment of the courts of appeals, less in terms of the new courts’ impact on procedure than through the expansion of appellate opinions. The 1917 edition of Walker on Patents, though no longer penned by Albert

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49 Because of the format in which Walker on Patents presents the dates of authorities, Figure 5 charts the date of each citation in the text, so that a case is counted separately each time it appears. Values obtained by this method measure the volume of individual changes in the rules rather than the number of legally-significant judicial opinions (which often contained more than one doctrinal point of note).
Walker himself, bore out the eponymous lawyer’s prediction that the years 1889-95 would set the framework of the law for years to come.50

**Figure 5. Looking back on the late nineteenth century as a formative period in the patent law: citations for each five-year period 1840-1914 in Walker on Patents (1917)**

Source: *Walker on Patents*.

In sum, patent adjudication in the late-nineteenth-century United States featured a dynamic body of case law to accompany its substantial institutional sophistication. Most features of the above survey point to an increasingly formalized, and to that extent relatively predictable, property rights regime. Patent agents, professional draftsmen, government examiners, and the Patent Office’s own dispute resolution process all operated to synchronize any issued patent to the requirements of the law. In America’s industrial states the business of patent litigation had also matured by the 1880s. Specialist counsel controlled much litigation, while sufficient experience existed on the federal bench that a case heard in the circuit courts had a good chance of competent, even expert disposition.

The overcrowded docket of the Supreme Court limited the possibility of appeal and thus the degree to which the justices could police consistency among the lower courts. Yet despite the lack of uniformity imposed from above, wild divergences between jurisdictions were unlikely: the well-developed interstate market for inventions suggests that property rights were reliably enforceable across the United States from an early date.51 “Comity,” the presumption in favor of consistency with parallel jurisdictions, must therefore have functioned reasonably well among the circuit courts.52 If a patent case did reach the Supreme Court, figures like Joseph Bradley and Samuel Blatchford provided a core of judicial expertise in the area. Moreover they led a body that was self-confident and pro-active in patent policy-making. Their efforts, along with those of some circuit and district judges, made for an energetic rate of addition to the law.

**III. Patent law in action**

While useful for tracing the landscape of legal authority, reports and citations of patent cases can provide at best a rough guide to the business of patent litigation. Sample bias associated with the decision to report a case, along with the enormous selection effect created by the exclusion of settled cases, place an unbridgeable gap between the record of published decisions and the total population of patent lawsuits.

More directly informative, though vastly less accessible, are the documentary records created during litigation and subsequently retained by the federal courts. Court archives include the dockets in which case filings were recorded by court clerks, and in many cases have preserved the filings themselves. Individual case files may contain notices of appearance by

51 Khan, “Property Rights and Patent Litigation.”
52 Although the formal rules are no more than a provisional indicator of actual practice, comity was emphasized in case law: W. D. Baldwin and Woodbury Lowery, eds., *Federal Decisions, Volume XXV: Patents, Copyright and Trade-Marks* (St. Louis, MO, 1886), 625-27.
lawyers, bills of complaint, reports of examiners, handwritten transcripts of depositions; some, all, or none of the above. Such holdings potentially provide a rich source of detail about patent suits in the U.S. courts.

Part III discusses preliminary findings from an archival study of one court: the U.S. Circuit Court for the Eastern District of Pennsylvania (EDPA), located in Philadelphia and covering the city and surrounding counties. The study is a pilot project intended to develop research methods and hypotheses that can be applied across a larger number of federal jurisdictions. The EDPA sample is also notable as a stand-alone case, since, as we have seen, Pennsylvania was one of the most significant states for patent litigation in the late nineteenth century.

This paper does not seek to claim that the EDPA’s experience of patent litigation was typical of the country as a whole. As a metropolitan and industrial center, the city of Philadelphia was exceptional. On the other hand, study of this jurisdiction benefits from the range of industrial activities that took place within its boundaries. The Eastern District, and urban Philadelphia in particular, possessed an economy considerably more diverse than the industrial monocultures associated with New England manufacturing cities. Major industries of Philadelphia and its environs ranged from heavy industries such as locomotive-building, iron and steelmaking, to machine tools, textiles, clothing, brewing, sugar refining, furniture, and chemicals. Philadelphia was the pre-eminent textile-working city in the United States during this period, producing more than 30% of the country’s carpets and 12% of its woolen goods, knit

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53 By an act of April 20, 1818 (3 Stat. 462), Congress divided the District of Pennsylvania into two judicial districts, Western and Eastern. In 1860 the Eastern District comprised 28 counties; one new county was created and added to the EDPA in each of the next two decades. A new Middle District of Pennsylvania, covering the rural counties in the center of the state, was formed out of the Eastern and Western Districts by an Act of Congress of March 2, 1901 (31 Stat. 882). In 1910, the Eastern District consisted of only nine counties. However, these counties retained more than 80% of the industrial output (by value) of the old Eastern District territory.
goods, and hosiery as late as 1910. Yet in the same year the city also reported manufacturing establishments in 211 of the Census Bureau’s 264 industry classifications, second in diversity only to New York City’s 217 and well ahead of Boston’s 175 and Chicago’s 131. Cutting across these classifications were variations in style and scale of production. Specialty and batch production existed alongside high-throughput manufacture, while a dense ecology of small-scale producers rubbed shoulders with a few massive enterprises like the Baldwin Locomotive Works, the Dobson Brothers’ textile mills, and Bethlehem Steel.

Just as importantly for current purposes, the National Archives’ holdings of the Eastern District’s records are unusual for their completeness and accessibility. From the dockets and case files it has been possible to assemble summary information for a continuous run of more than 3,000 patent suits filed between 1867 and 1900, along with a more detailed sample of all 501 patent suits commenced in the decadal years between 1860 and 1910. Rather than unfurling all the data from this survey here, I will note some of the major research questions that the material addresses, and then apply some preliminary findings to the issues of litigation volume that have already been discussed in the paper.

Briefly, the EDPA archives sustain the following lines of inquiry:

The parties. Records of the parties bringing suit reveal the repeat players in patent litigation, the industries prominently involved, and the geography of legal disputes. This type of evidence begins to show the changing industrial structures and business strategies implicated in patent litigation. As one might expect, the parties appearing in the Philadelphia circuit court

generally reflected the mainstays of the district’s industrial economy, with textile manufacturing and railway engineering prominently represented. Litigation was, however, not a strictly localized activity. Across the sample of 501 cases filed in decadal years 1860-1910, 37% of plaintiffs were located in Pennsylvania. Only 30% of cases took place between two Pennsylvania parties. The remainder of the sample points to a pattern of litigation taking place between distant industrial centers. 25% of plaintiffs were located in New York State and a further 15% in New England, with a growing proportion (14% by 1910) based in the Midwest. Not only the local economy, but regional and even national industrial conditions and business strategies were implicated in Philadelphia patent litigation.

Patents and invention. Most obviously, details of the patents at issue indicate which technologies were involved in disputes. In addition, the case files of patent suits provide insight into the interactions between litigation, on the one hand, and processes of invention and the market for inventions (both of which have received more historical attention) on the other. The late nineteenth and early twentieth centuries saw the relationship between invention and commercialization change substantially: patentees became less likely to promote their inventions independently, and more likely to patent under the auspices of a company (in which they may or may not have featured as principals) and to assign their rights to that company on or before the issue date of the grant. Patents in litigation reflected that general trend. The percentage of litigated patents still wholly owned by their inventors fell from 48% in 1860 to 23% by 1910. Over the same period, the proportion assigned to another person or firm on issue rose from 12%

57 This proportion was almost the same in 1860 (41%) as in 1910 (37%), although it fluctuated in between, peaking at 50% in 1880 and dipping to 17% in 1900.
to 35%. Patent litigation thus seems to have arisen from settings of increasingly organized innovation.

The lawyers. The roster of lawyers appearing in patent cases is a key element in marking out the development of a patent litigation system. Were the lawyers in action patent specialists? Were cases concentrated in the hands of a few, or spread among many attorneys? These questions might have significance on the level of individual lawsuits, if representation by an expert patent lawyer and/or notable repeat player increased a party’s chances of victory. Meanwhile, the overall prevalence of specialized patent lawyers gives a metric of the legal and technical sophistication required by the field. In general, the pattern in the Philadelphia sample seems to be a movement from a small coterie of local practitioners who controlled the bulk of patent litigation (George Harding alone represented 48% of the plaintiffs in patent cases in 1860 and 39% in 1870) to a wider group, drawn from other cities as well as Philadelphia, and composed largely but not entirely of self-identified patent lawyers (Table 3).

Table 3. Profile of lawyers appearing in EDPA patent cases, decadal years 1860-1910

<table>
<thead>
<tr>
<th>Year</th>
<th>1860</th>
<th>1870</th>
<th>1880</th>
<th>1890</th>
<th>1900</th>
<th>1910</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual lawyers appearing</td>
<td>44</td>
<td>52</td>
<td>81</td>
<td>91</td>
<td>74</td>
<td>95</td>
</tr>
<tr>
<td>…of which specialized patent lawyers</td>
<td>2</td>
<td>7</td>
<td>32</td>
<td>39</td>
<td>46</td>
<td>55</td>
</tr>
<tr>
<td>Location of lawyers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philadelphia</td>
<td>70%</td>
<td>79%</td>
<td>73%</td>
<td>64%</td>
<td>45%</td>
<td>42%</td>
</tr>
<tr>
<td>New York</td>
<td>0%</td>
<td>6%</td>
<td>10%</td>
<td>15%</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>Washington</td>
<td>2%</td>
<td>0%</td>
<td>4%</td>
<td>5%</td>
<td>7%</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>4%</td>
<td>9%</td>
<td>9%</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Unknown</td>
<td>25%</td>
<td>12%</td>
<td>5%</td>
<td>7%</td>
<td>7%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Source: National Archives, Mid-Atlantic Region. Records of the court.
The cases. Various details about the duration, procedures, outcomes, and costs of litigation can be discerned from court records. The chief point to note about the lawsuits in the Philadelphia sample is that only one third reached any kind of decision—or fewer than one fifth, if uncontested outcomes are excluded. While adjudicated case outcomes (over time, before different judges, compared with other jurisdictions, etc.) will form part of future analysis, patterns of settlement and licensing must be considered at least equally important. This finding also reinforces a methodological point: that the social litigation system was altogether broader than the population of adjudicated lawsuits—hitherto the entire universe of “patent law” available to historians.

In that spirit, the remainder of the paper returns to the question indirectly approached by Part I: just how much patent litigation did take place?

(i) How many patent cases?

The EDPA data provides the first direct opportunity to analyze the absolute number of patent lawsuits in a nineteenth-century federal court, as well as the changing volume of litigation over time. Table 4 below shows the number of patent suits commenced in every fifth year, 1860 to 1910, alongside the number of litigants and patents involved in every tenth year. Broadly speaking, these numbers corroborate two of the inferences drawn from the survey of reported litigation: first, that patent suits made up a large proportion of the business of the U.S. circuit

59 The sample used for this purpose comprises lawsuits filed in every fifth year between 1860 and 1910: 811 suits in total.
courts; second, that both the volume and share of patent litigation in the courts were higher in the later nineteenth century than they were in the early twentieth century.

Two separate peaks can be observed in the data: the number of suits filed reached its highest point in 1870, while the numbers of individual plaintiffs and of unique patents in litigation did so in 1880. It is worth dwelling briefly on the difference between these series. In all years, some patents were the subject of repeated litigation. At the same time (in all years except 1860), some individual lawsuits alleged infringement of multiple patents. The incidence of these practices changed over time, leading to variation in the ratios between suits, plaintiffs, and patents. In the early part of the period, fewer patents accounted for more litigation. In later years, as more suits involving multiple patents were filed, the number of patents at issue began to exceed the numbers of both lawsuits and litigants. There are thus two competing definitions of the “quantity” of litigation. The number of lawsuits filed, which included near-identical suits filed on the same patent against many defendants, determined the size of the court’s patent docket. Meanwhile the number of patents in dispute indicates the range of technologies that were involved in litigation, and to some extent the amount of judicial patent construction that was required. Both definitions will be considered in the discussion that follows.

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60 The caseload of the district court is not included here: in Part I’s analysis of reported cases, the total reports from both district and circuit courts were used to calculate the percentage of patent cases.

61 This latter point, along with the admittedly patchy state of law reporting, might help to explain why published case reports did not reflect the high volume of litigation on a relatively smaller number of patents in the 1870s.
Table 4. Patent cases commenced in the U.S. Circuit Court for the Eastern District of Pennsylvania, 1860-1910

<table>
<thead>
<tr>
<th>Year</th>
<th>1860</th>
<th>1865</th>
<th>1870</th>
<th>1875</th>
<th>1880</th>
<th>1885</th>
<th>1890</th>
<th>1895</th>
<th>1900</th>
<th>1905</th>
<th>1910</th>
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</thead>
<tbody>
<tr>
<td>Lawsuits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent cases commenced</td>
<td>93</td>
<td>43</td>
<td>106</td>
<td>79</td>
<td>88</td>
<td>82</td>
<td>84</td>
<td>57</td>
<td>66</td>
<td>49</td>
<td>64</td>
</tr>
<tr>
<td>All cases commenced (civil, non-admiralty)</td>
<td>136</td>
<td>85</td>
<td>229</td>
<td>284</td>
<td>304</td>
<td>258</td>
<td>246</td>
<td>228</td>
<td>255</td>
<td>268</td>
<td>310</td>
</tr>
<tr>
<td>Patent cases as % of civil cases</td>
<td>68%</td>
<td>51%</td>
<td>46%</td>
<td>28%</td>
<td>29%</td>
<td>32%</td>
<td>34%</td>
<td>25%</td>
<td>26%</td>
<td>18%</td>
<td>21%</td>
</tr>
<tr>
<td>Litigants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of individual plaintiffs</td>
<td>25</td>
<td>33</td>
<td>56</td>
<td>46</td>
<td>38</td>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suits per plaintiff</td>
<td>3.72</td>
<td>3.21</td>
<td>1.57</td>
<td>1.83</td>
<td>1.74</td>
<td>1.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patents</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of unique patents litigated</td>
<td>25</td>
<td>45</td>
<td>83</td>
<td>52</td>
<td>70</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patents per plaintiff</td>
<td>1.0</td>
<td>1.4</td>
<td>1.5</td>
<td>1.1</td>
<td>1.8</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patents per suit</td>
<td>0.3</td>
<td>0.4</td>
<td>0.9</td>
<td>0.6</td>
<td>1.1</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Source: National Archives, Mid-Atlantic Region. Records of the court.

According to either measure, the period does not fare badly in comparison with the modern “patent litigation explosion.” By a rough calculation, the modern-day peak of patent litigation in 2004 (3,075 cases filed) amounted to 1.9 lawsuits per 1,000 patents then in force. Approximately 3,900 individual patents were involved in suits filed in 2004, or about 2.4 per 1,000 patents in force. By comparison, the 106 patent suits filed in Philadelphia in 1870 represented 1.1 suits per 1,000 U.S. patents in force, while the 45 unique patents involved amounted to 0.5 per 1,000—and this all in a single district. One need not extrapolate across the entire country to come up with numbers approaching or exceeding those of the present day. Also

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in 1870, 228 patent suits involving 164 patents were filed in New York’s Southern District. In the courts of Philadelphia and New York City alone, then, 3.5 suits commenced and 2.2 patents appeared in litigation per 1,000 U.S. patents in force. In relative terms, this was a litigious period for patents.

Why? There are a variety of inputs to the volume of litigation. One group of factors relates to the underlying number of actual or potential patent disputes: this might include, among other things, the number of patents in force, the quality of those patents, the size and competitive structure of the industries using patented inventions, and the ability of patent owners to monitor infringement of their rights. Litigation, however, stands at a remove from the number of disputes. Lawsuits take place only where the parties in dispute fail to reach a negotiated settlement—in the terminology of law and economics, when a bargaining failure takes place. One factor that can lead to such failure is sheer uncertainty about the outcome, leading to divergent expectations on the part of the contestants about the outcome of litigation. This is a perennial consideration in patent disputes because the boundaries of a patent tend to be unclear until and unless ruled on by a judge. Divergent expectations may be further exacerbated by the indeterminacy of legal rules, such as might occur when the law is incomplete or rapidly changing, or by psychological bias (such as the personal attachment of an inventor to his claim) on the part of one of the litigants. Other contributors to litigation include asymmetric stakes,

63 National Archives, Northeast Region, New York, Files of the U.S. Circuit Court for the Southern District of New York.
65 Bessen and Meurer, Patent Failure, Introduction.
where one party seeks the signaling effect that a victory in court will provide, or otherwise has more to gain from winning the suit than the other has to lose.66

Several variables could help to explain why patent litigation apparently peaked in the later nineteenth century and declined in the early twentieth. These include the greater concentration of the industrial economy following the “merger wave” that began in the late-1890s and left fewer potential litigants in several high-technology sectors.67 A larger scale of business organization more generally may have rendered firms both more inclined and better able to seek stable technological environments through cross-licensing or patent pooling, along the lines of the Board of Patent Control (essentially a patent pool) established between General Electric and Westinghouse in 1896.68 Alternatively, high levels of patent litigation in the post-Civil War period may have been associated with the rapid rise in the number of patent applications. As well as creating a surge in the number of patents granted, the period also saw a higher proportion of applications approved by an overworked Patent Office—reflecting, in the eyes of some observers, an abdication of quality control on the part of the Office; and a consequent greater burden on the courts to resolve patent conflicts.69

Testing of these hypotheses will require further research on the changing population of litigants and patents involved in patent suits. For now, though, I want to identify a positive phenomenon, revealed by the archival data, which may have had a more significant effect on the number of cases brought.

68 Noble, America by Design, 92.
69 Robert C. Post, “‘Liberalizers' Versus ‘Scientific Men' in the Antebellum Patent Office,” Technology and Culture, 17 (1976), 24-54
(ii) Mass litigation campaigns

The composition of EDPA’s patent docket suggests that, in terms of the number of suits filed, any “boom” in patent litigation—at least measured by the number of cases filed—may have had less to do with underlying technical change and more to do with a particular type of legal and commercial strategy. Specifically, it indicates that the phenomenon of repeat litigation by certain patent owners went a long way towards driving quantitative trends in nineteenth-century patent litigation.

On closer inspection, the filing of suits in EDPA followed an unequal distribution. Figure 6 shows that the number of suits filed was initially much higher than the number of plaintiffs bringing them, though the two series converged as more plaintiffs brought, on average, fewer suits each.

Figure 6. Numbers of patent suits and plaintiffs in the EDPA

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of individual plaintiffs</th>
<th>Suits per plaintiff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>25</td>
<td>3.72</td>
</tr>
<tr>
<td>1870</td>
<td>33</td>
<td>3.21</td>
</tr>
<tr>
<td>1880</td>
<td>56</td>
<td>1.57</td>
</tr>
<tr>
<td>1890</td>
<td>46</td>
<td>1.83</td>
</tr>
<tr>
<td>1900</td>
<td>38</td>
<td>1.74</td>
</tr>
<tr>
<td>1910</td>
<td>44</td>
<td>1.45</td>
</tr>
</tbody>
</table>

Source: National Archives, Mid-Atlantic. Records of the court.
Especially during the earlier years (1860 and 1870), but to some extent throughout the sample (Table 4 below), the total number of suits was heavily influenced by the activity of a few parties. Two plaintiffs, Richard Imlay and George Gregerson, brought 40 of the 93 suits filed in 1860. A single plaintiff, the Goodyear Dental Vulcanite Company, brought 51 suits out of the 106 filed in 1870, all under Nelson Goodyear’s patent for vulcanized rubber. Edwin Lowden and John Carr jointly brought 17 suits under Lowden’s oil lamp patent in 1880. The American Bell Telephone Company initiated 31 suits in 1890, all under Alexander Graham Bell’s two basic telephone patents. Across the whole decadal sample of 501 cases, more than a quarter were brought by these five plaintiffs. All of these suits involved repeated litigation of just one or two patents on the part of each plaintiff.

Table 5. Number of patent suits filed by each plaintiff in EDPA, decadal years 1860-1910

<table>
<thead>
<tr>
<th>Number of suits filed by plaintiff</th>
<th>% of plaintiffs</th>
<th>% of suits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>72%</td>
<td>34%</td>
</tr>
<tr>
<td>2-4</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>5+</td>
<td>6%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: National Archives, Mid-Atlantic Region. Records of the court.

The sample of cases in decadal years actually understates the incidence of repeat litigation, which tended to occur in concentrated bursts over several adjacent years. Across a continuous sample of all patent suits filed between 1867 and 1900, the top thirty plaintiffs brought 1,084 suits, more than one third of the total. Table 6 below identifies the most frequently-appearing plaintiffs in EDPA patent cases.
Table 6. Most-frequent plaintiffs in EDPA patent cases, 1867-1900

<table>
<thead>
<tr>
<th>Plaintiff</th>
<th>Number of cases</th>
<th>Plaintiff location</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodyear Dental Vulcanite Co.</td>
<td>409</td>
<td>New York</td>
<td>Dental equipment</td>
</tr>
<tr>
<td>G.B. Olin &amp; Co. et al.</td>
<td>97</td>
<td>Upstate NY</td>
<td>Agricultural machinery</td>
</tr>
<tr>
<td>American Bell Telephone Co.</td>
<td>67</td>
<td>Boston</td>
<td>Telephones</td>
</tr>
<tr>
<td>Edison Electric Light Co.</td>
<td>58</td>
<td>New York</td>
<td>Electric light</td>
</tr>
<tr>
<td>Pennsylvania Salt Mfg Co.</td>
<td>44</td>
<td>Philadelphia</td>
<td>Chemicals</td>
</tr>
<tr>
<td>Henry and Lanious Keiper</td>
<td>40</td>
<td>Philadelphia</td>
<td>Engineering</td>
</tr>
<tr>
<td>Lowell Manufacturing Co.</td>
<td>34</td>
<td>Lowell, MA</td>
<td>Textiles</td>
</tr>
<tr>
<td>Salmon B. Rowley</td>
<td>27</td>
<td>Philadelphia</td>
<td>Container storage</td>
</tr>
<tr>
<td>Executors of Robert Parrott</td>
<td>24</td>
<td>New York</td>
<td>Railroad equipment</td>
</tr>
<tr>
<td>Thomas Sayles</td>
<td>23</td>
<td>Chicago</td>
<td>Railroad equipment</td>
</tr>
<tr>
<td>Eben D. Jordan</td>
<td>21</td>
<td>Boston</td>
<td>Textiles</td>
</tr>
<tr>
<td>Odorless Excavating and Mfg. Co.</td>
<td>21</td>
<td>Philadelphia</td>
<td>Waste disposal</td>
</tr>
<tr>
<td>George Gregerson</td>
<td>20</td>
<td>Roxbury, MA</td>
<td>Railroad equipment</td>
</tr>
<tr>
<td>Richard Imlay</td>
<td>20</td>
<td>New York</td>
<td>Railroad equipment</td>
</tr>
<tr>
<td>Hartford Carpet Co.</td>
<td>19</td>
<td>Hartford, CT</td>
<td>Textiles</td>
</tr>
<tr>
<td>Edward M Lowden &amp; John Carr</td>
<td>17</td>
<td>Philadelphia</td>
<td>Lamps</td>
</tr>
<tr>
<td>John &amp; James Dobson</td>
<td>17</td>
<td>Philadelphia</td>
<td>Textiles</td>
</tr>
</tbody>
</table>

Source: National Archives, Mid-Atlantic Region. Records of the court.

Those at the top share a number of characteristics. The Goodyear Dental Vulcanite Company (of New York), the G. B. Olin Company (of Canandaigua, New York), the American Bell Telephone Company (of Boston), and the Edison Electric Light Company (of New York) were all out-of-state firms. Each firm enforced broad patent rights, based on just one or two patents, against large numbers of relatively small-scale users of its technology. All were engaged in mass litigation not only within the Eastern District of Pennsylvania, but across multiple jurisdictions.

The Goodyear Dental Vulcanite Company dominated patent litigation in Philadelphia between 1865 and 1880; it also provides a leading example of a type of large-scale patent enforcement campaign that took place during the period. The company held exclusive licenses
for the dental use of Charles and Nelson Goodyear’s basic rubber patents, as well as John Cummings’ patent for hard-rubber dentures. During the mid-1860s Goodyear Dental Vulcanite began a nationwide legal campaign to extract license payments from every dentist who provided rubber dentures: a minimum of $35 dollars per year, rising to $50 if payments were not made promptly upon demand. More than two thousand cases were filed in the federal courts in a campaign of extreme bitterness and no small ruthlessness on the company’s part. According to the *New York Times*, “servants of dentists were bribed; next door neighbors were questioned, and intimidation was often resorted to.” The company’s signature method was allegedly “to employ a beautiful young lady, whom no dentist would suspect. She would call upon the dentist and have him take an impression, to be reproduced in rubber. She was liberal with her money, and only particular on the one subject of the rubber. This once obtained, she had all the evidence requisite to enable [the company] to bring suit.”

Inflamed by both the Goodyear Company’s financial demands and its methods, dentists organized collective resistance through Protective Associations and pooled their legal efforts, but were largely unsuccessful in fighting off infringement suits. The company’s extraction of tribute from the dental profession ended only when the architect of its aggressive strategy, company treasurer Josiah Bacon, was murdered in San Francisco by a desperate dentist on trial for patent infringement.

Contemporary comment indicates that the mass-litigation method was at the forefront of both patent business and patent politics during the 1870s and 1880s. One such episode concerned an audacious attempt to exert control over wood-planing technology, using an old 1847 application revived and patented in 1873. The owners of this belated grant (the Woodbury

patent), which purported to control all modern planing machines, immediately began to demand royalties from hundreds of lumber firms.\textsuperscript{72} At the same time, in the oil fields of Western Pennsylvania, E. A. L. Roberts patented and developed a nitro-glycerine torpedo for blasting wells that quickly became the industry standard. In establishing his dominance of the business Roberts filed over one thousand infringement suits and dispatched spies across oil country to identify the “moonlighters” who defied his patent.\textsuperscript{73} During the early 1880s another huge patent fight, this time centered on Iowa and Illinois, raged over barbed wire. The Washburn and Moen Company sought to control the manufacture of this essential tool for prairie farming through its fundamental Glidden patent, suing rivals and threatening farmers across the Midwest with lawsuits.\textsuperscript{74} A similar, and still more notorious campaign took place over the so-called “driven well” patent, which pertained to a simple device for extracting groundwater through a tube.\textsuperscript{75} Again, farmers who refused to pay royalties were the primary target of suits. The Northern District of New York, in particular, became a burned-over district of patent litigation, with nearly one thousand infringement cases filed in the single year 1883.\textsuperscript{76}

The rural setting of these cases might seem a long way from the urban context of Philadelphia, where patent litigation drew heavily on high-technology items (railroad equipment, telephone, electric light, chemicals) and the presence of large numbers of medical professionals (dental vulcanite). Yet important commonalities linked the large-scale litigation campaigns of

\begin{thebibliography}{9}
\bibitem{Roberts} John J. McLaurin, \textit{Sketches in Crude Oil: Some Accidents and Incidents of the Petroleum Development in All Parts of the Globe} (Harrisburg, Pa., 1898), 386-88.
\bibitem{Litigation} National Archives, Northeast Region, New York. Files of the court.
\end{thebibliography}
the period. For one thing, the anti-patent sentiment generated by these cases and others like them spilled over to affect the national politics of intellectual property during the 1870s and 1880s. Agrarian hostility to patents was a substantial force, aroused by these inflammatory attempts to demand royalties for basic rural articles, and was channeled into a series of legislative attempts to weaken or abolish the federal patent law. Anti-patent farmers also found unlikely allies in the railroads, which as heavy consumers of invention were trying to reduce their own exposure to infringement litigation.\(^7\) The combined influence of these groups made weakening of American patent law a distinct possibility, although not one that eventually came to pass. Boston lawyer Chauncey Smith recalled being assured by a Massachusetts congressman that a large number of federal legislators stood ready to repeal the patent law at any moment.\(^8\)

While extreme cases of mass litigation shaped the politics of patent law, they may also have indicated an important aspect of the patent business of the courts. The economic relationships between plaintiffs and defendants played a crucial role in the selection of cases for litigation. In this connection, a useful distinction could be drawn between “vertical” litigation by a patent-holder against downstream users or retailers of the invention, and “horizontal” litigation between competitors. The former was more likely to encompass lawsuits against smaller economic actors, such as farmers or dentists, and thus to generate more cases. Horizontal disputes between competitors, on the other hand, implied more evenly matched parties, perhaps with better information about the patented invention in question, and possibly in possession of conflicting patents on the same or related technologies. Each of these factors would tend to make settlement more likely. Some features of the EDPA sample hint at a movement away from


vertical and towards more horizontal litigation during the period studied here. These include the first appearance of cross-suits between parties in 1900 and 1910, the growing ratio of patents to lawsuits, and even the increase in the incidence of corporations, as opposed to individuals, named as defendants. Subject to further exploration, these indicators of patent litigation re-focusing towards complex corporate disputes would help to explain a decline in patent litigation in the early part of the twentieth century.

Conclusion

This study constitutes an early attempt to trace the outlines of a “system” of patent litigation: a field shaped by its own particularized rules and repeat players, while closely linked to the development of co-ordinate institutions in the legal, scientific, and business worlds. Unlike Edward Purcell’s study of diversity jurisdiction, which set out to argue for the institutional and doctrinal distinctiveness of a particular type of litigation, my project deals with an area already widely perceived as a self-contained niche subject in the law. This is a view I hope both to explore and to challenge. Over time, patent suits increasingly involved highly specialized practitioners and a developing body of doctrine—to say nothing of advancing levels of technical complexity, which further reduced the accessibility of patent disputes to many of those involved. However, patent disputes took place in generalist forums, were subject to the structural changes of the federal legal system and were affected by cross-winds from other areas of practice and doctrine. The sense that patent law forms a world unto itself has long operated to deter analysis, and to limit historical appreciation of patent litigation’s prominent place in late-nineteenth-century U.S. courts.
Appendix: Searching the record of reported patent cases

I obtained data on the number of reported patent cases in the United States from searches of the Westlaw pre-1945 federal courts database. The database includes reports from the series *Federal Cases* (a collection of district and circuit court decisions decided before 1880, compiled in 1892), the *Federal Reporter* (district and circuit court decisions from 1880 onwards), and the *United States Reports* (decisions of the United States Supreme Court). Within the database, decisions are broken down into separate fields, such as the ‘title’ (X v. Y), ‘topic’ (an index term intended for classification), ‘headnote’ (a description of the case added by the reporter), and full text of the decision. Unfortunately, no one field reliably identified cases of patent adjudication; classification practices seem to have been inconsistent and many cases lacked an entry in one field or another.

I experimented with terms-and-connectors searches in order to develop one that reliably returned patent cases only and, as far as I could tell, included all the patent cases reported. I tested each against decadal years from 1870 to 1910, checking every hit to determine whether it was genuinely a patent (for invention) case as opposed to a land or mining grant, a bankruptcy case in which the bankrupt owned patents, or other instance in which the word ‘patent’ was mentioned. No one search was perfect, but I concluded that it was possible to obtain results of several hundred hits with no more than three or four being false positives.

The base search used for reported patent cases was as follows:

```
DA(AFT 12/31/1879 & BEF 01/01/1881) & TO (PATENT!) TO (RE-ISSUE +S NO.) HE (PATENT! /s infring!) HE (infring! /s RE-ISSUE +S NO.) SY (PATENT! /s infring!) SY (infring! /s RE-ISSUE +S NO.) FT (PATENT! /s infring!) FT(infring! /s RE-ISSUE +S NO.) % TO (LAND!) % HE (land!) % SY (land!) % FT (land /p patent!) % TO (TRADEMARK) % TO (TRADE-MARK) % HE (TRADE-MARK) % HE (TRADEMARK) % mining /s patent % FT ("is #patent") % FT ("so patent")
```
In this example the terms specify

1. During the year 1880 a report with
2. ‘Patent’ or ‘re-issue’ (the latter accompanied by ‘no.’, indicating a number, in the same sentence)
   a. in the topic field OR
   b. in the headnote field if accompanied by any extension of the word ‘infring-’ (i.e. infringed, infringement, etc) in the same sentence OR
   c. in the synopsis field if accompanied by any extension of the word ‘infring-’ (i.e. infringed, infringement, etc) in the same sentence OR
   d. in the full-text field if accompanied by any extension of the word ‘infring-’ (i.e. infringed, infringement, etc) in the same sentence
3. Excluding any report with the word ‘land’ or its extensions
   a. in the topic field OR
   b. in the headnote field OR
   c. in the synopsis field OR
   d. in the full-text field if accompanied by the word ‘patent’ in the same paragraph
4. Excluding any report with the word ‘trademark’ or ‘trade-mark’ in the topic or headnote fields (since many cases unrelated to patents were classified as pertaining to the ‘Patent and Trade-Mark Office’).
5. Excluding any report with the words ‘mining’ and ‘patent’ in the same sentence
6. Excluding any report with the phrases ‘is… patent’ or ‘so patent’ in the full-text field

At first, I ran the base search in the WESTLAW ALLFEDS-OLD database to capture total annual reported patent decisions by the U.S. federal courts. Identical searches in sub-databases then yielded results for particular courts, circuits or states. In order to obtain the total number of all reports relating to a given court or jurisdiction, I used a search comprising the date condition plus the word ‘court’ (which the West Publishing Company informs me appears in every report).

Recently the database has changed in response format, particularly in reducing the maximum number of hits returned on any single search from 1,000 to 400. It may now be necessary to use periods of time shorter than one year in order to capture large-number returns.

Variants of the above search have been used to obtain, *inter alia*, data for reported patent decisions by individual judges, reports relating to electrical invention, and cases involving companies as the named parties.