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Herbert A. Johnson

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THE WRIGHT PATENT WARS AND EARLY AMERICAN AVIATION

HERBERT A. JOHNSON*

WRITING IN *Poor Richard's Almanack* in 1742, Benjamin Franklin provided a good vignette about the expenses and frustrations that would bedevil airplane manufacturers at the beginning of the twentieth century. He wrote:

In my travels I once saw a Sign call'd *The Two Men at Law*; One of them was painted on one Side, in a melancholy posture, all in Rags with this Scroll, *I have lost my Cause*. The other was capering for Joy, on the other Side, with these Words, *I have gain'd my Suit*; but he was stark naked.¹

Litigation is always expensive, but federal cases filed to defend U.S. patents against infringement have always been far more costly than most other judicial matters. This was particularly the case when the Wright airplane patent was litigated between 1909 and 1917. A 1918 truce was negotiated through the establishment of a patent pool among the leading airplane manufacturers, midwived by the federal government intent upon increased wartime production of aircraft. Franklin's caricature might well be descriptive of the Wright Brothers, their successor companies, and those who opposed them. In 1914, the Wrights appeared to have won in the courts, but by that time they had forfeited any hope of preeminence in airframe manufacturing. Ostensibly, Curtiss and his companies lost to the Wrights, but

* Distinguished Professor of Law Emeritus, University of South Carolina. A.B., Columbia, 1955; M.A., 1961; Ph.D., 1965; LL.B., New York Law School, 1960. An earlier version of this paper was delivered at the North Carolina First Flight Commission's Symposium on the Wright Brothers and American Aviation, held on October 22, 2001 at North Carolina State University, Raleigh. The author acknowledges with thanks the assistance and support provided by the Army War College Foundation, the U.S. Air Force Historical Research Agency, the University of South Carolina Committee on Research, and the University of South Carolina School of Law.

¹ FRED R. SHAPIRO, *THE OXFORD BOOK OF AMERICAN LEGAL QUOTATIONS* 302 (1993).

the Curtiss interests emerged as the major supplier of airplanes to the American Army and Navy in 1916 and thereafter.

Maintaining patent rights through litigation can be so expensive that unless it is funded by rapidly expanding production of the invention, the patent holder can be bankrupted by litigation costs alone.² Roy Knabenshue, a one-time exhibition pilot for the Wrights, recalled that Orville Wright once estimated that he had spent \$152,000. Glenn Curtiss some years thereafter stated that he had expended about \$175,000.³ This was not an isolated phenomenon. Lee De Forest, the inventor of the vacuum radio tube amplifier, successfully defended his invention against infringements, but the litigation costs drove him into bankruptcy. Testifying before a 1914 Congressional committee, a patent attorney stressed the financial dangers of litigating patent rights. He told of one client who attempted to defend an infringement action, but lost. His opponent received little for his trouble since the expenses of the lost suit had depreciated the infringer's assets to the point that only \$25,000 was available to satisfy the \$350,000 judgment entered against him. The same lawyer prosecuted another infringement case, and won after fourteen years and a successful appeal to the United States Supreme Court. Nevertheless, his victorious client was ruined financially and out of business; the losing infringer was flourishing. This theme was echoed by Thomas Edison, the inventor of the incandescent light bulb. He claimed that he made no money from this invention because every time he caught an infringer and was ready to sue, the infringer went out of business.⁴

The Wrights and the Wright Company invested substantial amounts of time and money in their patent infringement actions.⁵ The cost of professional legal services is reflected in

² FLOYD L. VAUGHAN, *THE UNITED STATES PATENT SYSTEM: LEGAL AND ECONOMIC CONFLICTS IN AMERICAN PATENT HISTORY* 12, 29-30, 265 (Greenwood Press 1977) (1956).

³ *Pooling of Patents: Hearing on H.R. 4523 Before the House Comm. on Patents*, 74th Cong. 115 (1936) (Knabenshue testimony, Feb. 25, 1935) [hereinafter *Pooling of Patents*].

⁴ *Id.* at 874 (Waldemar Kaempffert testimony, Dec. 6, 1935); FLOYD L. VAUGHAN, *ECONOMICS OF OUR PATENT SYSTEM* 187 (1925); VAUGHAN, *supra* note 2, at 265.

⁵ In the years 1909-1912, the patent litigation was the greatest drain on the Wright brothers' time, with Wilbur assuming most responsibility for this activity. TOM D. CROUCH, *THE BISHOP'S BOYS: A LIFE OF WILBUR AND ORVILLE WRIGHT* 447 (1989).

Harry Toulmin's January 2, 1910, letter to Wilbur Wright. As the Wright's attorney, Toulmin pointed out that the most economical way to handle fees would be through the advancement of a \$12,000 per annum yearly retainer to his firm. At the rate of \$12,000 per annum for the first two years, and \$10,000 per year for the following five years, Toulmin could be released so that most of his time could be dedicated to Wright litigation. Four days later the Wrights rejected the proposal, but the fact that such a substantial sum was suggested is strong evidence that patent litigation constituted a major portion of Wright Company business and that each case represented a large investment of funds.⁶

The saga of the Wright patent litigation is a complex account that may never be known in its entirety, but the main outlines are set forth in Part I. Part II examines the historical situation of American patent law at the time of the Wright patent litigation, and Part III considers the resulting patent pool arrangement and its economic consequences.

I. SECURING U.S. AND EUROPEAN PATENTS

A. THE WRIGHT'S BASIC UNITED STATES PATENT (1906)

The basic United States patent covering the Wrights' control system was applied for after the successful 1902 glider experiments at Kitty Hawk. Absent the drafting skills of a patent attorney, this application was rejected fairly rapidly. Filed on March 23, 1903, it covered only their glider control system, and the patent examiner rejected their invention as "inoperative." He dismissed the twisted bicycle tire box exhibit concerning wing warping as being of "no assistance."⁷ Wisely, the brothers decided that professional help was needed. At the suggestion of their local attorney, John Kirby, they contacted Harry A. Toulmin of Springfield, Ohio, who in January 1904 undertook re-

⁶ Letters from Harry A. Toulmin, attorney for the Wright Company, to Wright Company (Jan. 2, 1910), and Wright Company to Harry A. Toulmin (Jan. 24, 1910) (on file in container 53, Wright Brothers Papers, Library of Congress).

⁷ This involved a demonstration of the warping technique by twisting the two ends of a long cardboard box in opposite directions; it was claimed to have been the manner in which the Wrights initially discovered the use of wing twisting to secure lateral stability. FRED C. KELLY, *THE WRIGHT BROTHERS: A BIOGRAPHY AUTHORIZED BY ORVILLE WRIGHT* 112 (1950).

sponsibility for further processing of the application.⁸ Toulmin's first effort on their behalf, in what would become at least three decades of patent applications and infringement actions, trials and settlements, was to amend the original patent application. This permitted the Wrights to include the powered airplane as well as the 1902 glider. By May 1905, the examiner conceded that the amended application "disclosed patentable matter," even though he again rejected it.

Further amendment in December 1905 resulted in the examiner holding that the application applied to a powered flying aircraft, rather than a glider. Toulmin had argued the invention applied to both types of aircraft. Eventually, in March 1906, the new matter was withdrawn, with a careful reservation of rights that might otherwise be precluded from a subsequent application by a concept known as "file wrapper estoppel." The danger was that when Toulmin withdrew the powered airplane provisions from the application, it might be asserted later that deletion would imply that the Wrights had admitted the application did not apply to aircraft with motors. In patent practice, the files and records in the Patent Office constitute the principal documentary evidence in a subsequent infringement action. Admissions by the patentee in the course of application may estop him from offering contrary testimony in an infringement case. Furthermore, once a patentee has been granted a patent, he cannot claim that a subsequent patent on the same invention is valid.⁹ Ultimately, the Wright brothers' 1906 United States patent was held to cover a "pioneering" invention, and as such, was broadly construed to include gliders as well as powered airplanes. In addition, it protected not only specific devices but also a "combination" of wing-warping and a movable vertical rudder. It also was construed to cover an alternative control system based upon rigid wings and freely operating between-the-wings ailerons.¹⁰

⁸ See THE PAPERS OF WILBUR AND ORVILLE WRIGHT 417, 498 (Martin W. MacFarland, ed. 1953) [hereinafter WRIGHT PAPERS]; see also Rodney K. Worrel, *The Wright Brother's Pioneer Patent*, 65 A.B.A. JOURNAL 1512, 1512, 1514, 1516 (1979).

⁹ Worrel, *supra* note 8, at 1517-18. On these various implications see WILLIAM C. ROBINSON, THE LAW OF PATENTS 250 (1890).

¹⁰ Worrel, *supra* note 8, at 1518. The fixed wing and between-the-wing aileron arrangement was characteristic of the Curtiss aircraft designs. The decision awarding "pioneering" status is discussed *infra* notes 23-33.

B. EUROPEAN PATENTS (1904)

However, even as the American patent application was on the verge of success, proceedings in the Imperial German patent office ground to a halt. This was not unexpected. For some time the Wrights feared that Octave Chanute, a friend who also was involved in aeronautical experiments, disclosed aspects of their experiments to European audiences as early as 1903. Ruefully, Wilbur Wright observed, "We had been congratulating ourselves that this had been overlooked by [the German patent office]. . . . We fear it may interfere with our being granted a broad claim on twisting the wings."¹¹ Thereafter, they ventured the hope that the difference between "distort" and "twist" might work to their benefit, with Wilbur naively commenting, "I think we will succeed unless the German examiner is unreasonable and stubborn."¹² Apparently he was both, because he rejected the application. Harry Toulmin and associated German patent counsel managed to reverse that decision, but German courts thereafter applied a narrow construction to the German Wright patent, which afforded no protection to wing-warping, an essential part of the Wrights' control system.¹³

Their patent applications in Britain and France proved to be less troublesome. French patent 342,188 was issued on March 22, 1904. Eventually, it formed the basis for Wright Company litigation in French courts against the major French manufacturers—Voison, Breguet, Caudron, Morane-Saulnier, and Spad. In 1920, the newspapers estimated that several million dollars would be payable in settlement of that litigation.¹⁴ For the assignment of their rights to the German Wright Company (Flugmaschine Wright Gesellschaft), the Wrights received 200,000 marks in cash, a block of stock, and 10 percent royalties on all flying machines marketed in Germany, Luxembourg, Turkey, Sweden, Norway, and Denmark.¹⁵ British law required that a patent be put to practical use or it would lapse for non-use. The Wrights were awarded British patent 6732 AD 1904, but they waited until January 1913 to establish the British Wright

¹¹ WRIGHT PAPERS, *supra* note 8, at 481.

¹² *Id.* at 482.

¹³ See *infra* note 49.

¹⁴ Orville Wright, affidavit draft, *Wright Aeronautical Corp. v. United Aircraft Engineering Corp.*, circa 1920 (on file in container 81, Wright Brothers Papers, Library of Congress).

¹⁵ FRED HOWARD, *WILBUR AND ORVILLE: A BIOGRAPHY OF THE WRIGHT BROTHERS* 319 (1987).

Company. To that company, Orville Wright assigned his and his brother's rights under the British patent, and in return received a shareholder's proportion of the 15,000 pounds sterling the British government paid for a Crown license.¹⁶ This license authorized the British government to engage in experimentation and aircraft construction free from the risk of a patent infringement action. Securing these European patents and entering into licensing arrangements cost the Wrights both time and money, but the proceeds from license sales were substantial.

C. EARLY STEPS TO SECURE ECONOMIC BENEFITS OF THE PATENTS

Economists point out that while patents have value, the inventors or capitalists associated with them, must be capable of financing large scale production of pioneering inventions if substantial profits are to be realized. One patent attorney surmised that it normally takes six years to perfect the invention for the market, six years to amortize the costs of the project, and the remaining five or six years are available to obtain a profit.¹⁷ Most patentees must attract investment capital, and in the case of the Wright Company, the enterprise was bedeviled by a preoccupation with secrecy, the maintenance of too small a labor force, and failure to convert a single plane hand-craft manufactory into an assembly production line.¹⁸

Significantly, the Wrights moved forward to assemble capital and prepare for mass airplane production in Europe. The United Kingdom patent system required patentees to take prompt steps toward production and exploitation of their inventions, while in the United States, a patentee was under no similar obligation. In 1906, the year in which they received their U.S. patent, the Wrights developed a strategy for marketing their patent rights to European syndicates. Their preferred compensation was a combination of cash, shares of corporate stock, and royalties on airplane sales. In addition to licensing

¹⁶ Brief for Plaintiff on motion for preliminary injunction, *Wright Aeronautical Co. v. Handley-Page, Ltd.*, Dec. 3, 1920 (on file with Library of Congress in container 81 of Wright Brothers Papers); Letter from Toulmin to Wright Brothers, Mar. 5, 1908, (on file with Library of Congress in folio Toulmin, container 53, Wright Brothers Papers). Prior to 1913, the Wrights had an agreement with a syndicate established by the Short brothers in England, which became the principal European supplier of the Wright flyers. See *infra* notes 18, 19.

¹⁷ HARRY A. TOULMIN, JR., PATENTS AND THE PUBLIC INTEREST 28 (1939).

¹⁸ VAUGHAN, *supra* note 4, at 152; VAUGHAN, *supra* note 2, at 29.

the syndicates, the Wrights would provide the syndicates with publicity through demonstration flights. They would also train pilots and provide technical support as the licensees began their production. This financial plan was developed in conjunction with Charles R. Flint & Co., a New York firm of bankers and promoters.¹⁹ During 1908 and 1909, under the guidance of the Flint's European representative, the Wrights entered into a contract with the Lazare Weiller syndicate in France and the Short Brothers (Oswald, Horace and Eustace) in Britain. Their initial efforts in Britain were aided by Charles Rolls, then launching his automobile factory in partnership with Henry Royce, another Wright supporter. By 1910, the high quality of the Short Brothers' airplanes convinced the Wrights to designate the Short firm their sole representative in Britain.²⁰

Following receipt of their basic U.S. patent in 1906, the Wright Brothers seem to have hesitated in making American financial connections that would have facilitated putting their invention into marketable production. American aviation enthusiasts toyed with the possibility of buying a license among themselves. In 1908, the Aero Club of America launched an unsuccessful funding drive to purchase U.S. rights to the Wright patent and to place the invention in the public domain. Wilbur Wright indicated that they would be willing to release their rights in the patent if a sum of \$100,000 were secured by this funding initiative. Within six months of the initial solicitation only \$11,000 had been collected, and the effort was abandoned.²¹ Since the Aero Club membership consisted of several industrialists and financiers, it is surprising that more domestic investment was not forthcoming. For the Wrights, the situation must have been disheartening, given the fact that German public subscription drives to fund Zeppelin construction were, during the same time period, raising financial support equivalent to millions of U.S. dollars.²²

D. DEFENDING THE WRIGHT PATENT IN U.S. COURTS

Despite the Wright's apparent willingness to negotiate concerning their U.S. patent rights in 1908, it is clear that both

¹⁹ *Short Brothers and Wright Brothers, 1903-1978, Seventy Years of Powered Dynamic Flight*, 175 *WORLD WAR I AERO: THE JOURNAL OF THE EARLY AIRPLANE* 18 (2002).

²⁰ *Id.* at 18-19, 20-21, 22, 24.

²¹ HOWARD, *supra* note 15, at 327.

²² See HERBERT A. JOHNSON, *WINGLESS EAGLE: U.S. ARMY AVIATION THROUGH WORLD WAR I* 13-18, 52-55, 82-83 (2001).

Glenn Curtiss and the Aerial Experimental Association (AEA) of Alexander Graham Bell on one side, and the Wrights on the other, were already preparing to litigate the Wright patent's validity and scope. During the March 1908 test flight of the AEA Red Wing, Alexander Graham Bell emphasized to his colleagues the need for a complete photographic record of their work, both to aid future designers and to forestall possible patent complications. In July 1908, Orville Wright wrote to Curtiss concerning a newer AEA model, the June Bug, and, after noting the adjustable wing tips, offered to negotiate license terms under the Wrights' U.S. patent. When Curtiss advised them that he did not expect to use the plane for commercial purposes, the Wrights raised no objections, but when the June Bug was used for compensated exhibition flying they renewed their demand. Bell's patent attorneys entered the picture shortly after the first successful flight of the June Bug in July 1908.²³ It was Curtiss's success in prize competition during the summer of 1909 which triggered the Wrights' first patent action filed against the Herring-Curtiss Company.

Formed three months before the litigation began, Herring-Curtiss merged the patent interests and resources of Glenn Curtiss and Augustus Herring. *Wright v. Herring-Curtiss* proved to be decisive in establishing the Wrights' impregnable legal position. Litigation began in late 1909 when the Wrights asked the courts to issue a preliminary injunction against the Herring-Curtiss Company, Glenn Curtiss, and Augustus Herring. Such an order for injunctive relief would prevent Herring-Curtiss from manufacturing airplanes until patent rights were determined. On January 3, 1910, United States District Judge John R. Hazel, sitting in the Western District of New York, issued a preliminary injunction and wrote a strong opinion upholding the Wright patent.²⁴ Four months later the Circuit Court of Appeals for the Second Circuit reversed Judge Hazel and dissolved the injunction on a procedural technicality.²⁵ However, the substantive basis for Judge Hazel's District Court decision—that the Wright brothers had discovered a method for controlling lateral roll and that in doing so they had made a pioneering contribution

²³ It is very likely that Curtiss's restraint in not flying the June Bug for compensation earlier was based upon the cautionary advice of Bell and his attorneys. HOWARD, *supra* note 15, 234-38.

²⁴ *Wright Co. v. Herring-Curtiss Co.* (Wright I), 177 F. 257, 260-61 (C.C.W.D.N.Y. 1910), *rev'd* 180 F. 110 (C.C.A. 2d 1910).

²⁵ *Wright Co. v. Herring-Curtiss Co.* (Wright II), 180 F. 110 (C.C.A. 2d 910).

to the state-of-the-art in aviation—would dominate subsequent litigation. His holding that the Wrights were pioneers entitled them to a broad and liberal interpretation of their patent claims.²⁶

Within three years, broad construction of the Wright patent was applied once more when further proceedings took place in *Wright Company v. Herring-Curtiss Company*.²⁷ Predictably, Judge Hazel's opinion was in favor of the Wrights and most encouraging to their chances for success. As before, he stressed the pressing need to solve the problem of insuring lateral stability of airplanes in flight. Conceding that Samuel Langley, Otto Lilienthal, Octave Chanute, and Hudson Maxim had made great progress in this task, the judge pointed out that all of these experiments ended in failure. Even the published theories of Chanute "were not sufficiently definite to suggest the later improvements by the patentees."²⁸ From the Henson patent issued in Britain in 1842, to the most recent European patents, the specific combination of wing-warping features and a vertical rudder was not present as a unified proposal for controlled aerial flight. An 1868 British patent demonstrated the inventor's grasp of the mechanics of air in controlling a flying machine and incorporated some of the features later used by the Wrights. However, as Judge Hazel pointed out, the "assertions and suggestions were altogether too conjectural to teach others how to reduce them to practice, and therefore his patent is not anticipatory."²⁹

Since the Curtiss airplanes used a separately controlled vertical rudder, there was considerable legal argument over the originality of their modification of the Wright vertical rudder which was linked to the wing-warping controls. In this instance, Judge Hazel held that the vertical rudder was an essential part of the Wright invention, which in concert with the wing-warping system, secured lateral stability in flight.³⁰ However, in the Wright airplane, the use of flexible wings which permitted the wing angle of attack to be altered (or warped) was also an essential part

²⁶ *Wright I*, 177 F. at 260-61; WRIGHT PAPERS, *supra* note 8, at 907, 909, 911; ALDEN HATCH, GLENN CURTISS: PIONEER OF NAVAL AVIATION 128-30, 144, 176-77, 180, 184-86 (1942); KELLY, *supra* note 7, 288, 293; CLARA STUDER, SKY STORMING YANKEE: THE LIFE OF GLENN CURTISS 98 (1937).

²⁷ *Wright Co. v. Herring-Curtiss Co.* (*Wright III*), 204 F. 597, 597-614 (D.C.W.D.N.Y. 1913), *aff'd per curiam* 211 F. 597, 654-55 (2d Cir. 1914) (*Wright IV*); *see also* HATCH, *supra* note 26, at 232.

²⁸ *Wright IV*, 204 F. at 601.

²⁹ *Id.* at 603.

³⁰ *Id.* at 601, 603.

of their machine. It did not matter that the Herring-Curtiss wings were rigid and another method was utilized to alter the angle of incidence. Applying the doctrine of equivalents broadly, Judge Hazel stated that “[t]he employment, in a changed form, of the warping feature or its equivalent by another, even though better effects or results are obtained, does not avoid infringement.”³¹

Turning to the vertical rudder, Judge Hazel found it a valid sub-combination within the overall Wright scheme for obtaining stability in flight.³² Although it was not directly connected to the movable ailerons of the Curtiss airplane, the vertical rudder was shown by testimony to have at least occasional use in countering aerodynamic forces generated by changing the angle of incidence of one wing surface. Testimony concerning the use of the Wright and Curtiss vertical rudder was provided by both Army and Navy aviators, including Lieutenant Thomas DeW. Milling, who had flown both types of airplanes.³³

In his 1913 opinion, Judge Hazel again held the Wrights to be “pioneer inventors in the aeroplane art;” he observed that the Wrights’ “concept was practical and their combination of old and new elements meritoriously advanced the operatives of aeroplanes of this type from which astonishing flights have resulted.”³⁴ With an eye toward the confused legal definition of a “pioneer inventor,” he then commented, “even if the patentees were not strictly pioneers, . . . they nevertheless strikingly surpassed their predecessors . . . and are entitled to a liberal construction of their claims in controversy.”³⁵ A pioneer invention was defined as one that covered a function never before performed, through the creation of a wholly novel device, or one of such novelty and importance that it marked a distinct step forward in the progress of the art; it could not be a mere improve-

³¹ *Id.* at 607. See discussion of the doctrine of equivalents, *infra* note 51.

³² *Id.*

³³ *Id.* at 608-12.

³⁴ *Id.* at 605.

³⁵ *Id.* at 606. Subsequent to his 1910 decision, Judge Hazel may have read the reversal on similar issues of District Judge Charles Hough, sitting in the Southern District of New York. Hough decided that a patent for a motorcar was of “pioneering” status, only to be reversed by the Circuit Court of Appeals for the Second Circuit. *Electric Vehicle Co. v. C.A. Duerr & Co.*, 172 F. 923 (C.C.S.D.N.Y. 1909), *reversed by* *Columbia Motor Car Co. v. C.A. Duerr & Co.*, 184 F. 916 (C.C.A. 2d 1911).

ment or perfection of what had gone before.³⁶ Judge Hazel was affirmed by a per curiam opinion which expressly held the Wrights to be pioneers.³⁷ Following this decision, Orville Wright observed: "This will give us an absolute monopoly. . ."³⁸ He was mistaken. A monopoly is the elimination of economic competition; as such, it cannot be won in the court room. Indeed, it can be argued that when the Wrights were victorious in the courtroom in 1914, they had already lost the economic battle being waged in the aircraft factories of the United States.

Following their success against the Herring-Curtiss Company, the Wrights turned their attention to infringing exhibition aviators. Exhibition flying was popular with civilian dare devils, who sought monetary prizes as well as international reputations for flying skill and daring. Since many of the exhibition aircraft were built by Glenn Curtiss's firm or other manufacturers unlicensed by the Wrights, the Dayton firm sought injunctive relief and infringement damages against the exhibition pilots. These actions, filed against foreign aviators as well as against Americans, aroused severe criticism in the aviation community and the public at large. While exhibition and contest flying was profitable, it had even greater value in demonstrating new developments in airframe construction, engine development, and piloting skill. In pursuing a vigorous prosecution approach to their U.S. patent rights, the Wrights virtually isolated American aviation from knowledge of rapid European improvement of airplane design and manufacture.³⁹

³⁶ *Boyden Power-Brake Co. v. Westinghouse*, 170 U.S. 537, at 561-62 (1898). *Boyden* was a 5-4 decision that turned upon whether the invention was "pioneering." The majority held that the invention was entitled to liberal construction, but that it was not of "pioneering" quality. In 1912, it was held that to be a pioneering invention, the theory that was expounded in the patent application had to be put to use. *Manhattan Book Casing Machine Co. v. E.C. Fuller Co.*, 274 F. 964, 969 (C.C.S.D.N.Y. 1912).

³⁷ *Wright IV*, 211 F. at 655.

³⁸ *WRIGHT PAPERS*, *supra* note 8, at 1073.

³⁹ The first actions, filed in 1910, were against aviators Louis Paulhan and Claude Grahame-White. The Grahame-White litigation, based on a 1910 exhibition flight at Belmont Park, N.Y., was settled for \$17,000 in May 1911. Wilbur Wright indicated displeasure that his attorneys had permitted Grahame-White to pay so little in settlement of damages. Letters from Harry A. Toulmin, attorney to Wilbur and Orville Wright, Jan 2, 1910, Feb. 18, 1910, May 13, 1911, May 26, 1911 (on file with Library of Congress in folio Toulmin, container 53, Wright Brothers Papers). Grover Loening wrote Orville Wright that there was resentment that the Wright Company allowed flying events to occur, and decided whether to sue after the exhibition had been staged. Letter from Grover Loening to Wilbur Wright, July 5, 1914 (on file with Library of Congress, folio Loen-

Bringing infringement suits against foreign aviators met another complication. Given the cross country tours of non-U.S. pilots, it was not easy to serve them with legal process before they moved on to another state or U.S. judicial district. It was also difficult to determine which courts might accept jurisdiction over infringement petitions. Harry Toulmin and the Wright Company came to the conclusion that they should sue the producers and promoters of the exhibitions and contests, rather than attempt to locate and serve the foreign pilots. That was a practical legal solution, but a disastrous decision for public relations and economic well-being. In attacking the American sponsors of the contests, as well as those who provided assistance to foreign aviators, the Wrights alienated those members of the business community who were most enthusiastic about flying. As matters turned out, the Wright Company would soon need all the financial support it could get, and the loss of the friendship of American promoters in an effort to curtail exhibition flying was counterproductive in the long run.⁴⁰

One of the major cases against an exhibition pilot was the early suit brought by the Wrights against the French aviator, Louis Paulhan, in the United States Circuit Court for the Southern District of New York.⁴¹ The opinion in the case is important because the issues did not involve a variant method of altering the airfoil camber (the main issue in *Herring-Curtiss*), but rather a different mode of maintaining stability through use of a rudder. District Judge Learned Hand recognized that there were mechanical differences between the Curtiss planes and those of the Wrights, but he insisted that the Wright patent involved more than mere mechanics. Rather, it was the concept of obtaining lateral equilibrium through alterations in the angle of incidence of the airfoils and balancing deflections of the rudder

ing, container 38, Wright Brothers Papers). See also discussion HOWARD, *supra* note 15, at 347; CROUCH, *supra* note 5, at 418-19.

⁴⁰ On the matter of securing jurisdiction of foreign exhibition fliers, and of suing their promoters and managers, see letters from Harry A. Toulmin, attorney to Wilbur and Orville Wright, Dec. 18, 1909, Dec. 19, 1909, Feb. 19, 1910 (on file with Library of Congress in folio Toulmin, container 53, Wright Brothers Papers).

⁴¹ *Wright Co. v. Paulhan*, 177 F. 261 (C.C.S.D.N.Y. 1910). At this time, the U.S. circuit courts were the initial trial courts for many actions, but they were held by U.S. district judges, sitting either singly or in association with other district judges. Appeals from circuit court decisions were taken to the circuit court of appeals for the appropriate circuit; from the circuit courts of appeal, cases could, in most instances, be appealed to the Supreme Court of the United States.

to the left or right. As Judge Hand observed, "the invention is not of a machine, it is not an invention of this means of so turning a rudder, but it is an invention of a combination of which this action of the rudder is a part."⁴² Paulhan's counsel argued that the Wrights' invention was a mere improvement over the existing state-of-the-art. As a consequence, Judge Hand devoted considerable attention to that argument in writing his opinion. He specifically concluded that Clarence Ader of France had come close to anticipating the Wright invention, but rejected the idea that Ader was entitled to priority because he had merely suggested that a rudder might help lateral control.⁴³ Echoing the rationale of Judge Hazel's opinion in *Herring-Curtiss*, Judge Hand reasoned that it was the use and combination of previously discovered techniques that resulted in the Wrights' pioneer discovery.⁴⁴ Since exhibition flying was widely practiced throughout the United States it would have been impossible to sue every aviator who flew an unlicensed machine, or even to litigate with every promoter and sponsor of exhibitions. That being the case, the Wrights recognized that bringing a small number of suits would encourage many would-be infringers to avoid litigation and obtain licenses before staging their exhibitions. Because the key element was surprise, they were careful not to signal in advance whether they would bring a suit for injunctive relief. As a consequence the aviation world was kept guessing, American spectators were deprived of their entertainment, and the engineering progress was severely restricted. Should an exhibition aviator and his backers wish to comply with the law, the Wrights struck a hard bargain. In some cases, issuance of an exhibition license was based upon their receipt of one-third of the gate proceeds, and they insisted that their contractual claim take priority over the claims of the sponsors who provided risk capital to launch the exhibition.⁴⁵

Infringement actions against contest and exhibition flyers generated animosity toward Wright interests in the aeronautical community and the general public. On July 5, 1914, Wright employee Grover C. Loening informed Orville Wright that there

⁴² *Id.* at 264.

⁴³ *Id.* at 269-70.

⁴⁴ *Id.* at 261-71. See also John A. Eubank, *Aeronautical Patent Law*, 56 *DICK. L. REV.* 143, 145 (1952).

⁴⁵ See the negotiations conducted on behalf of the Wrights with the Aero Corporation, Ltd. (on file with Library of Congress in container 75, Wright Brothers Papers).

was strong feeling against Orville at the contest races. Many spoke kindly about U.S. infringers for their successful defiance of Wright litigation threats, and displeasure with the Wright Company was widespread. Loening specifically suggested that Wright and his company could regain goodwill with the public if they would announce in advance that they would not bring an infringement action against a particular event that they had decided to overlook.⁴⁶

Such a gesture would be contrary to Orville Wright's state of mind in 1914, demonstrated by an exchange of correspondence between him and Colonel Samuel Reber of the Signal Corps. In January 1914, Reber wrote to Orville asking what position the Wright Company would take in regard to the Army purchasing replacement parts for Curtiss aircraft already in the Army's inventory. He assured Wright that the Army did not intend to purchase any new machines that might in any way infringe the Wright patent. Reber had long relied upon the Wrights for advice and support, perhaps to the detriment of his career, but in this instance he received little assurance from Dayton, Ohio. Orville stated that the Wright board of directors had not decided what to do about aircraft that were already in use but in violation of the Wright patent. However, he rather ungraciously suggested that the Signal Corps should recover its losses from the bond that it had required of unlicensed manufacturers.⁴⁷ Given the substantial testimonial support Army aviators had given to the Wright Company in the infringement litigation, Orville Wright's attitude appears to have been unduly harsh and ungrateful. Indeed, it suggests that more than mere legal advantage or financial gain was involved in the Wright patent litigation.

E. THE PERSONAL DIMENSIONS OF THE WRIGHT PATENT LITIGATION

Winning an infringement action against Glenn Curtiss meant a great deal to Orville Wright beyond the monopoly he anticipated. It was what Wilbur Wright had worked at diligently until his death in 1912, and quite possibly Orville blamed the Curtiss

⁴⁶ Letter from Grover Loening to Orville Wright, July 5, 1914 (on file with Library of Congress, folio Loening, container 38, Wright Brothers Papers).

⁴⁷ Letters from Samuel Reber to Orville Wright, Jan. 14, 1914; Orville Wright to Samuel Reber, Jan. 17, 1914, (on file with Library of Congress in folio Reber, container 46, Wright Brothers Papers).

infringement case for Wilbur's illness and death. In 1935, Frank H. Russell, an early Wright employee and subsequent leader in the Manufacturers' Aircraft Association, told a Congressional committee:

The last 2 years of Mr. Wilbur Wright's life were devoted entirely to his fight with Curtiss on patent matters. I was the first manager of the Wright Company. I joined them in 1909 and was with them until 1911. Throughout the formative period, when we built the first airplanes, started the first exhibition business in this country, Orville Wright did all of the work, because Wilbur Wright had to devote himself, if you please, to patent suits. Wilbur Wright died of typhoid fever because he worked himself to death fighting a patent suit.⁴⁸

Orville Wright, as the survivor, may well have been driven to greater legal efforts by the need to carry out the task to which Wilbur dedicated his last years. He also inherited a good share of the tenacity characteristic of his father, Bishop Milton Wright, who proved to be an indefatigable leader of factional strife in the United Brethren of Christ Church. The Bishop was not above urging his followers to take resort to the civil courts while resolving church disputes.⁴⁹

The Wright brothers, and Orville after Wilbur's death in 1912, had ample cause to be bitter against many of their opponents in litigation over patent rights. When Orville lay close to death from his injuries in the September 1908 crash that killed Army Lieutenant Thomas E. Selfridge, Alexander Graham Bell and other members of the Aerial Experimental Association walked into the hanger at Fort Myer to measure the remains of the wrecked Wright flyer. Who could tell how much that had helped in the AEA's improvement of the June Bug?⁵⁰

Orville Wright continued to suffer from injuries he sustained in those 1908 Army trials. As a consequence, he was unable to sit or stand for extended periods of time, and found most methods of travel to be extremely debilitating. Although he continued to receive national recognition as the inventor of the first

⁴⁸ POOLING OF PATENTS (Russell testimony, Dec. 4, 1935), *supra* note 3, at 777; see also Tom D. Crouch, *Blaming Wilbur and Orville: The Wright Patent Suits and the Growth of American Aeronautics*, *ATMOSPHERIC FLIGHT IN THE TWENTIETH CENTURY* 289 (Peter Galison and Alex Roland, eds., 2000).

⁴⁹ CROUCH, *supra* note 5, at 40-43, 60-62, 215-18. Bishop Wright died on Apr. 3, 1917, shortly before the establishment of the aircraft patent pool and the U.S. declaration of war. *Id.* at 479.

⁵⁰ *Id.* at 372-75, 379-80; HOWARD, *supra* note 15, at 278.

powered heavier-than-air flying machine, his physical limitations and natural tendency toward seclusion began to isolate him from other participants in early aviation. That isolating process was accelerated in 1910, when the Wright Company filed the first of many infringement actions against European aviators who staged exhibitions in the United States with machines not under license by the Wrights. There may have been even more satisfaction in beating Augustus Herring at law, for this scoundrel had worked his way into observing the 1902 Kitty Hawk glider experiments, and used his information in 1908 to bid against the Wrights for the Army contract. He also misled Glenn Curtiss, assuring him that he held aviation patents prior in date to the 1906 Wright patent. In fact, not only did Herring not own any airplane patents, he had not built any airplanes except toy models that he sold to children.⁵¹ Curtiss discovered Herring's lies in the course of the infringement litigation, and Herring-Curtiss was bankrupt before the 1914 decree was entered. Glenn Curtiss managed to survive financially, continuing to do business as the Curtiss Aeroplane Company, and subsequently, as the Curtiss Motor Company.⁵²

Herring was introduced to the Wrights by a mutual friend, Octave Chanute. It was Chanute who urged the Wrights to desist from filing infringement suits, and it was also Chanute who was responsible for prior disclosure of technical details concerning the 1902 glider experiments. The Wrights suspected that Chanute was guilty of assisting the Herring-Curtiss Company during the course of the litigation. They also resented Chanute's 1903 inferences to the French scientific community—asserting that the Wrights were his protégés.⁵³

Even more irksome was Curtiss's rebuilding of the 1903 Langley flier under the auspices of the Smithsonian Institution. This was done to undermine the court's decision in the *Herring-Curtiss* case by demonstrating that Langley's flier was able to fly in 1903. Since the Langley flier had crashed a few days before the successful Wright flight at Kitty Hawk, this would have seriously challenged the basis for the court's judgment for the Wrights. Unfortunately for the perpetrators of this subterfuge, Orville Wright acquired complete information concerning the "im-

⁵¹ C[ECIL] R. ROSEBERRY, *GLENN CURTISS: PIONEER OF FLIGHT 237-39* (1991).

⁵² *Id.* at 152-53, 156-57, 164, 178-80, 189-90, 237-39, 256-59; CROUCH, *supra* note 5, at 400-02; HOWARD, *supra* note 15, at 308-11, 314, 316, 329.

⁵³ JOHNSON, *supra* note 22, at 93-94.

provements" that had been made in the control systems and the motor, and stood ready to expose the ruse if either the Smithsonian Institution, or Dr. Alfred Zahm, its employee, attempted to discredit the originality of the Wrights' invention.⁵⁴ The creation of a patent pool in July 1917 ended further attempts to rehabilitate the Langley flier, or the reputation of its inventor. Nevertheless, the incident alerted Orville Wright that the Smithsonian's officers, along with Alexander Graham Bell and Glenn Curtiss, were determined to undermine the validity of the Wright patent at all costs.

An interesting alignment of supporters, some for the Wrights and others for Curtiss, complicated the relationships between the Wrights and Curtiss enterprises. Glenn Curtiss profited from his affiliation with Henry Ford, who had become the implacable enemy of all patent-based monopolies. This was in large part due to Ford's earlier litigation with George Selden's successors who had claimed priority in patenting the automobile. Ford had retained W. Benton Crisp as his attorney in the Selden case, and at his request, Crisp helped Curtiss in defending against the Wright infringement actions. Crisp had won against Selden's successors by pointing out that Ford used a four cylinder combustion engine, which distinguished his motor car from the two cylinder engine utilized in Selden's patented automobile.⁵⁵ In a similar vein, Crisp advised Curtiss to operate separately the rear vertical rudders of his airplanes, taking advantage of the fact that the Wrights' 1909-14 suit against Herring-Curtiss had not passed upon this particular Wright patent claim.⁵⁶ Dispirited by the apparent need to relitigate this aspect of the patent, Orville Wright hesitated to challenge Crisp's strategy, and Curtiss continued to produce airplanes while preparing to base his defense upon differences in rudder controls.⁵⁷

⁵⁴ WRIGHT PAPERS, *supra* note 8, at 412-13, 984; CROUCH, *supra* note 5, at 253-55, 276-77, 485-90; ROSEBERRY, *supra* note 51, at 381-93. In 1925, Orville Wright told Chief Justice William Howard Taft that as early as 1910, he and Wilbur Wright knew that the Smithsonian Institution could not be trusted to be impartial when dealing with experiments conducted by Langley, a former Secretary of the Smithsonian. However, even with this suspicion, they did not believe the Smithsonian would protect the interests of private individuals pending in the courts. Letter from Orville Wright to William Howard Taft, May 14, 1925 (on file with Library of Congress in folio 1, container 84, Wright Brothers Papers).

⁵⁵ ROSEBERRY, *supra* note 51, at 345-46.

⁵⁶ *Id.* at 357-59.

⁵⁷ *Id.* at 345-47; CROUCH, *supra* note 5, at 462-63.

Curtiss's biographer, Cecil R. Roseberry, quoted Grover Loening's recollection that Orville Wright and his sister Katherine considered the patent litigation the one great hate of their lives, and that they talked of it constantly. He also noted that Holden C. Richardson, at that time a young naval constructor, was received coldly by Katherine Wright when he stayed overnight in the Wrights' Dayton home. She knew that Richardson was a friend and associate of Curtiss, and it was apparent to him that she was very bitter about the litigation.⁵⁸

F. EARLY AVIATION AND THE WRIGHT PATENT LITIGATION

Overall progress of aviation suffered from the inability, or unwillingness, of the Wrights to exploit their patent rights and to commence broad scale production of the airplane. Under normal conditions, the holder of a basic, or "pioneering" patent, is the principal buyer of improvement patents. Some economists argue that improvement patents cease to be awarded when the market for those patent rights is limited or non-existent. In the case of the airplane, the Wrights and their companies should have been the major purchaser of improvement patents. However, their failure to develop industrial capacity, coupled with their preoccupation with litigation, severely restricted their capacity to enter the market for improvement patents. The resulting meager market for airplane improvement patents undoubtedly discouraged would-be inventors and slowed technical progress. At the same time, the Wrights, as holders of the pioneering patent, had little incentive to develop or incorporate improvements unless greater marketability justified the cost of the re-tooling required to incorporate the change.⁵⁹

Of course, this situation did not exist in Europe, where the Wrights had already licensed syndicates to produce airplanes under their foreign patents or sold licenses authorizing the establishment of government aircraft factories. In addition, it should be recalled that German courts narrowly construed the Wright patent, providing substantially less protection against would-be infringers than was available under the pioneering U.S. patent. These factors made aircraft production less litigious in Europe, sparked rapid growth in manufacturing, and expanded scientific research on aviation. In addition, virtually all of the future combatants in World War I invested resources in

⁵⁸ *Id.* at 342-43.

⁵⁹ TOULMIN, *supra* note 17, at 13, 39, 52; VAUGHAN, *supra* note 2, at 26.

aviation that dwarfed the miserly appropriations made by the United States Congress for the support of military and naval aviation in the United States.⁶⁰

A variant law and economics view concerning patents is presented in Judge Richard A. Posner's discussion of patents and antitrust theory. Posner argues that restriction or elimination of price competition is the essence of antitrust policy, and that market forces will impose limitations upon the level of prices a sole seller can demand. Merger of two competing firms will not necessarily restrict competition unless those firms are large enough to control virtually all of the market; the same can be said of collusive pricing arrangements between two or more competing firms. He argues that in this context, patents, although ostensibly monopolistic, are not necessarily violative of antitrust laws such as the 1890 Sherman Antitrust Act. He asserts, "A patent is actually a poor proxy for monopoly power, since most patents confer too little monopoly to be a proper object of antitrust concern;" thus, he doubts the capacity of patents to diminish innovation, either by the patentee or by others.⁶¹

Posner's conclusion concerning the limited monopolistic impact of patents is, of course, a generalization, that may have less application to basic, or "pioneering" discoveries than to mere improvement patents. Arguably, a broad construction of a pioneering patent, carrying with it judicial flexibility in applying the doctrine of equivalents, is of substantial economic and monopolistic value. However, realization of gain, as distinct from advantage, depends upon exploitation and improvement of the invention. Regardless of the monopolistic price impact of the patent itself, when a patent covers a pioneering invention, it will exert an influence on markets for similar machines, whether or not they infringe the pioneering patent. As Posner concedes, the costs and delays in obtaining a patent and protecting the invention from infringement are considerable, and for that reason he argues that the holder of a patent may be encouraged to work on improvements rather than suppress them.⁶² The historical evidence would indicate that the Wright Company failed to

⁶⁰ For a brief survey of U.S. and foreign appropriations, see JOHNSON, *supra* note 22, at 55-57, 170.

⁶¹ RICHARD A. POSNER, *ANTITRUST LAW: AN ECONOMIC PERSPECTIVE* ix, 3, 8, 15, 17, 28, 172, note 3 (quotation) (1976).

⁶² *Id.* at 15.

pursue this path,⁶³ limiting its own profits from the airplane patent and also restricting its financial ability to purchase improvement patents from others.

Other economists working on the relationship between technological change, patents, and capital investment have arrived at conclusions that differ from Judge Posner. The careful analysis of Jacob Schmookler, covering patented inventions and capital investment between 1837 and 1957, provides a strong argument that unless there is already a substantial investment in a product, there will be little, if any, time expended upon it by inventors who subsequently enter the field. Following Schmookler's reasoning, the failure of the U.S. government to appropriate substantial funds for the support of military uses of aviation, was primarily responsible for the decline in American aviation engineering. Unfortunately, the aircraft industry is not included in Schmookler's statistical tables. However, the construction of railroad equipment is part of his data base, and arguably this area has enough similarity to aviation that the "investment first" pattern may be applicable to aeronautical technology.⁶⁴ Schmookler commented,

[F]rom the standpoint of economics, invention is mainly an economic activity. As in other economic activities, resources tend to be allocated among its branches, and probably between it and other classes of economic activity, in accord with profit expectations of net return. . . the funds available for support of invention in a given field, . . . are . . . likely to be positively associated with the amount of economic activity in the field itself.⁶⁵

The assumption of course, is that invention is an economic activity. Yet we know that patent infringement actions in aeronautics were extremely expensive, and were sustained far beyond any reasonable hope for reward, either from increased government contracts, or from any future patent pool. Joseph Corn has pointed to the "Winged Gospel" as a quasi-religious enthusiasm that swept turn of the century America, suggesting that the behavior of the early inventors and aviators more closely

⁶³ See discussion *infra* notes 61-73.

⁶⁴ JACOB SCHMOOKLER, PATENTS, INVENTION AND ECONOMIC CHANGE: DATA AND SELECTED ESSAYS 72-77, 82 (1972).

⁶⁵ *Id.* at 77. For this reason, he asserted that it was the profits to be realized from the sale of new inventions which spurred inventors to invest time and funds in their experiments. "The key event behind the appearance of a new product therefore may often not be the invention of the product itself but the growth of the potential demand for it." *Id.* at 82.

paralleled that of religious fanatics than that of calculating businessmen.⁶⁶ Otherwise, how many inventors would be inspired to actually fly their new inventions to see if they worked? Why would Curtiss ignore a growing motorcycle business to build and fly airplanes, and experiment with new aviation engines? Were these men in pursuit of riches or seeking self-satisfaction or fame? What tangible rewards awaited Wilbur and Orville Wright in 1902, or Glenn Curtiss and the Aerial Experiment Association in 1908? Perhaps the connection between invention and capital investment followed different rules in the aviation industry, and thus, Schmookler's conclusions need to be applied with caution.

We know that contemporary observers believed that patent litigation discouraged capital investment in aviation, and that it also depressed experimentation. Shortly after the United States entered World War I, a Congressman from Ohio asserted that the unsettled legal status of the airplane patents hindered the growth and development of the industry. In 1914, a New York attorney active in aviation affairs claimed that patent litigation made it impossible for manufacturers to attract capital. Wright biographer Fred Howard asserted that the infant aviation industry was "strangled by the umbilical cord" of the patent and ensuing litigation.⁶⁷ Attorney Willis Rice, testifying before a House Committee in 1935, asserted that "[i]t is very difficult to persuade capital to buy into a law suit, no matter how roseate the prospects."⁶⁸ He continued that the enormous cost of litigating patents, a sine que non to determining validity, was a serious problem that enabled patent pools to crush independent inventors, and that it discouraged members of the pool from continuing and further refining their work.⁶⁹ Writing in 1925, economist Floyd Vaughan pointed to the 1912 hearings before the House's Oldfield Committee, during which a scientist then informed the congressmen,

Woe, indeed, to the poor inventor who tries to enforce his rights against wealthy infringers, aided by skillful lawyers; his well-en-

⁶⁶ JOSEPH J. CORN, *THE WINGED GOSPEL: AMERICA'S ROMANCE WITH AVIATION, 1900-1950* (1983).

⁶⁷ 55 CONG. REC. H5123-24 (July 14, 1917) (statement of Rep. S.D. Fess); Letter from Israel Ludlow to Capt. Washington I. Chambers, Dec. 1914 (on file with Library of Congress in container 7, Aero Club of America Papers); HOWARD, *supra* note 15, at 346; JOHNSON, *supra* note 22, at 106, 115.

⁶⁸ POOLING OF PATENTS, *supra* note 3, at 573.

⁶⁹ *Id.*

graved United States patent parchment may then become his certificate of entrance to the poor house or the lunatic asylum.⁷⁰

The emphasis upon the economically “poor” independent inventor may be attributable to more than mere sentimentality. Jacob Schmookler’s data reflected that in industries other than aviation it was the small independent inventor who was most likely to make significant discoveries, and such inventors tended to avoid association with large firms. He also posited the view that it was operating personnel who made far more discoveries of importance than engineering experts or other laboratory-situated employees. Yet when such an independent or small firm inventor hit upon something new, his engineering bosses or competitor large firms tended to belittle the discovery, and joined ranks to make the newcomer unwelcome.⁷¹

Did the existence of the Wright patent, and the persistence of litigation regarding it, discourage would-be investors? Did the high likelihood of being sued for infringement drive small and independent inventors into other fields of research? These may well have been factors which are responsible for the incredibly small capital investment in aviation and the retardation of technological development in American aviation.⁷² It is difficult and speculative to explain the relationship between patent issuance, infringement litigation, and capital investment, but the lack of technological progress is a well-established and documented fact.

While economists may well differ over the relationship between patents and market domination, another less quantifiable factor must be considered. As the inventors of the first powered flying machine, the Wright Brothers occupied a preeminent place in early aviation. Unquestionably, they did not lack for challengers since a number of inventors were very close to producing a stable machine capable of sustained flight and maneuver. Between the first flight in 1903 and the issuance of their

⁷⁰ VAUGHAN, *supra* note 2, at 215-16. Roy Knabenshue asked the House Committee of Patents what a patent meant: “Have you received anything of value, or is the patent just an excuse to plunge you into a lawsuit with some other inventor. . .?” POOLING OF PATENTS, *supra* note 3, at 114.

⁷¹ SCHMOOKLER, *supra* note 64, at 38-39, 44-45.

⁷² Tom D. Crouch, a biographer of the Wright brothers and a recognized authority on early American aviation, rejects the possibility that the patent litigation was responsible for retarding technological development. See TOM D. CROUCH & PETER L. JAKAB, *THE WRIGHT BROTHERS AND THE INVENTION OF THE AERIAL AGE* 168-204 (2003).

patent in 1906, the Wright brothers were the only inventors of a powered flying machine capable of sustained flight, and Wilbur Wright's first demonstration flights in France coupled with the 1909 U.S. Army acceptance trials in the United States left no doubt of their achievement. This preeminence provided a leadership position in early aeronautics that was rapidly eroded by the patent litigation. While it is speculative to consider how aviation would have developed in the absence of the Wright patent litigation, it is not unreasonable to suggest that in different circumstances, and with other personality considerations, early American aviation might have been considerably more rapid in its technical development.

G. THE DECLINE OF WRIGHT COMPANY AIRCRAFT PRODUCTION

The Wright's seventeen-year patent term expired in 1923, and eight of those years were expended in prosecuting the *Herring-Curtiss* suit to completion. In August 1914, war broke out in Europe, creating a brisk demand for all types of aircraft, and numerous American aviation manufacturing firms sprang up to supply national and international orders. The first substantial U.S. Army procurement of aircraft was made in the summer of 1916 in response to the disastrous operations of the First Aero Squadron in the Mexican Punitive Expedition. The Curtiss Motor Company was awarded that substantial contract, but the Wright-Martin Company, successor to the Wright brothers' patent interests, was virtually eliminated from the United States government's aircraft procurement operations.⁷³

Ironically, in 1912 and 1913, as the Wright Company began to lose its share in government aircraft procurement, Orville Wright had begun to buy out the shareholders. In December 1915, he reorganized the company, sold his investment to a group of investors, and became the company's chief consulting engineer. The reorganized company continued to lose money, and in 1916, it was merged into the Wright-Martin Company. When Glenn Martin withdrew in 1917, the resulting Wright Aeronautical Company became one of the largest producers of airplane engines in the post-war years.⁷⁴

The declining economic position of the Wrights and their companies is puzzling, given their position as the foremost figures in aeronautics after the Army trials of 1908 and Wilbur

⁷³ See discussion of aircraft procurement, JOHNSON, *supra* note 22, at 107-14.

⁷⁴ CROUCH, *supra* note 5, at 464-67; CROUCH & JAKAB, *supra* note 72, at 204.

Wright's triumphant tour of France in the same year. The Aero Club of America was composed of wealthy industrials and financiers. By virtue of their Aero Club membership and their flying expertise, the Wrights in these years could easily have tapped into that wide and well-heeled networking system.⁷⁵

The membership rosters of the Aero Club included Judge Elbert H. Gary of U.S. Steel, Colonel Gustav Pabst, the brewer, as well as M. Robert Guggenheim of the American Smelting and Refining Company. Others of independent wealth included John Jacob Astor, Charles J. Glidden, Pierre Lorillard, Jr., and Harry P. Whitney.⁷⁶ While a belated resort to secrecy by the Wrights may have alienated some wealthy Aero Club members, it is even more likely that the Club's potential as a source of financial support eroded because of the Wrights' decision to sue exhibition and contest aviators along with those who promoted their activities.

Infringement suits against exhibition and contest promoters arose because the Wrights experienced difficulty in serving process and thus obtaining jurisdiction over the pilots themselves. As noted earlier, exhibitions and contests were held for short periods of time, and then quickly moved on to other states or territories subject to other U.S. District Courts. While the pilots and their equipment moved, the individuals who financed their activities, as well as those who sponsored the exhibitions and contests, remained in one place and thus were more susceptible to service of process.⁷⁷ In this instance, shrewd lawyering jeopardized the hunt for financing the Wrights' invention into a marketable and mass produced commodity.

Also of relevance was the political struggle within the Aero Club of America, which by 1910 had spun off the Aeronautical Society of America, composed of pilots and airplane manufacturers, who sought to free themselves from the socialites and others who were indifferent to the scientific aspects of avia-

⁷⁵ On the Aero Club and the "aeronaut constituency," see JOHNSON, *supra* note 22, at 13-19.

⁷⁶ *Id.* at 14-15. Dr. Tom Crouch points out that shortly after the Herring-Curtiss complaint was filed, the Wrights, in conjunction with Clinton R. Peterkin and J. P. Morgan, moved forward to form the Wright Company. Among the interested individuals were Cornelius Vanderbilt, August Belmont, and Judge Elbert Gary. Belmont and Gary were Aero Club members. Later, Robert J. Collier, the publisher, joined the group at Wilbur Wright's suggestion. CROUCH & JAKAB, *supra* note 72, at 190.

⁷⁷ JOHNSON, *supra* note 22, at 99.

tion.⁷⁸ Immediately upon establishing itself as a rival to the Aero Club, the Aeronautical Society ordered its first airplane from Glenn Curtiss. This seriously undermined the possibility of investment by members of the Aero Club, and it also aligned Curtiss and his supporters with the scientific and technical enthusiasts who demanded more concerted and well-informed efforts toward the development of American aviation. For better or for worse, the Wrights and the Aero Club continued to maintain close ties, and the Wrights became tagged with the non-scientific and dilettante reputation of the Aero Club. Such a reputation would generate caution among the financial giants of the Aero Club, despite the Club's close affiliation with the Wrights in their licensing activities.

Public sources of funding for aviation might utilize two methods. One was tax-supported procurement of airplanes by the federal government, primarily for the Army and Navy. While the Aero Club of America publicists excoriated Congress for failure to support aviation at the level common to most other world powers, the U.S. taxation system was inadequate to support such a program. Before the 1913 amendment to the U.S. Constitution sanctioned the introduction of a graduated income tax, the United States government was wholly dependent upon customs duties and internal excise taxes for its revenue. Efforts to implement a graduated income tax had met with constitutional objections, and even after 1913, the tax rate was modest until national needs during the First World War created a broad based source for the imposition of taxes.⁷⁹ Thus situated, the United States government was incapable of supporting an ambitious aircraft procurement program for the Army and Navy. To make matters worse, President Taft, in 1910, initiated a new system of budgeting, which, due to misunderstandings between the executive departments and Congress, resulted in drastic reductions in appropriations for 1911 and 1912.⁸⁰

⁷⁸ *Id.* at 21-23. These developments are traced in greater detail in BILL ROBIE, FOR THE GREATEST ACHIEVEMENT: A HISTORY OF THE AERO CLUB OF AMERICAN AND THE NATIONAL AERONAUTIC ASSOCIATION, 44-45, 51, 65 (1993). After 1910, the Aero Club, which licensed all contests and exhibitions in the U.S., had an agreement with the Wrights that it would sanction only exhibitions and contests the Wrights had approved. The Wright Company agreed to license only those local promoters approved by Aero Club. CROUCH, *supra* note 5, at 418.

⁷⁹ CAROLYN WEBBER & AARON WILDAVSKY, A HISTORY OF TAXATION AND EXPENDITURE IN THE WESTERN WORLD 387-88, 416-22 (1986).

⁸⁰ JOHNSON, *supra* note 22, at 52-55, 82-83.

The other public source for funding was a subscription campaign. Publicly funded subscriptions in Germany covered most of the cost of a Zeppelin and equipment in 1909 (\$112,000 U.S.), and even raised enough to offset the expense of a 1912 model of a Zeppelin, with its special motorized hanger, costing in excess of \$640,000.⁸¹ Yet the success of these appeals to the German people undoubtedly was attributable to patriotism following German success in the Franco-Prussian War, and also to the intense arms race that dominated European diplomacy since 1905. Perhaps taking its cue from the German national subscriptions, the Aero Club attempted to raise money to purchase the Wright's patent in 1908; it collected only \$11,000 toward the \$100,000 price established by the Wrights.⁸² Clearly the Aero Club was unable to gather a modicum of support for the purchase of the Wright patent, and that failure took place in 1908 when there was little doubt that Wright aircraft could fly for considerable distances, bank and turn, and then land safely. By 1910, the Aero Club of America, and hence the aviation community in general, was riven with sharp disagreements and dissension, and the Wrights appeared to have affiliated themselves with the least scientific members of the Aero Club. They had also sued the promoters of foreign aviators, earned the hostility of a substantial segment of the aeronautical world, and antagonized American businessmen who might otherwise have invested in the Wrights and their new invention.

Dr. Tom Crouch has advanced a strong argument that lack of governmental funding, rather than patent litigation, was the reason for slow development of American aviation after 1909.⁸³ That may well be a contributing factor to the failure of the United States to match European progress, but it is also true that until the ratification of the sixteenth amendment in 1913, sufficient federal revenues could not be raised for that purpose. On the other hand, it is plausible that private investor and consumer confidence was shaken by the pendency of the aviation patent suits, depleting non-governmental encouragement for aeronautical development.

⁸¹ *Id.* at 83.

⁸² *Id.* at 96.

⁸³ CROUCH, *supra* note 5, at 295-98. Much more persuasive is Dr. Crouch's point that basic research on aerodynamics and aeronautics was early in its inception, and much further in advancement in Europe, than in the United States. *Id.* at 293-95.

Even within the slender American market for airplanes, the Wrights were losing ground to their competitors. In December 1920, the Wright Aeronautical Company reported that less than 19 percent of its revenues had been obtained from patents, and that in the years since 1917, less than eight percent of income was derived from patents. Between 1917 and 1920, the Wright Company's successor, the Wright-Martin Company, was a member of the Manufacturers' Aircraft Association, from which it received the largest allocation of pooled patent royalties. For the same time period, a successor Wright firm asserted that since 1917 it had been the largest American manufacturer of aircraft engines.⁸⁴ However, the design and sale of airplanes rather than aeronautical engines, was the field in which the Wright patent once gave priority to its owners and licensees.

Without access to the Wright Company's financial records, we cannot be certain about the volume of its aircraft production or sales. However, Ernest L. Jones, an avid aviation magazine editor and collector of flying data, provides us with some insight into the decline of the Wright manufacturing enterprise. His manuscripts indicate that the Army purchased airplanes from the Wright Company in 1909, 1911, and 1912. The 1912 procurement was of eight airplanes, but thereafter only one Wright Company plane was purchased in 1914. The new Naval aviation branch purchased one Wright plane in 1911 and one in 1912; thereafter it restricted procurement to Curtiss airplanes. By 1916, the Army was buying 74 airplanes from the Curtiss Aeronautical Company, but none from the Wrights. In addition, by 1916 several new manufacturers had entered the American market and only the Burgess Aircraft Company operated with a Wright license.⁸⁵

Preoccupation with patent litigation seems to have been one of the major factors in the declining place of the Wright companies in airplane production. The evidence would suggest that after 1910, the Wrights neglected further developments in airplane design or in their control system. Grover C. Loening, a Columbia University graduate in aeronautical engineering, was associated with the Wright Company from June 1913 to the fall of 1914. He left to accept a position at the Army flying field at

⁸⁴ Clipping of advertisement, 1917 (on file with Library of Congress in container 81, Wright Brothers Papers).

⁸⁵ See the tables and text materials in JOHNSON, *supra* note 22, at 108-13. Dr. Crouch cites differing figures which also reflect the rapid decline of U.S. Army and U.S. Navy acquisition of Wright aircraft. CROUCH, *supra* note 5, at 290-91.

North Island near San Diego. Loening's correspondence documents the inability of the Wright Company to engineer a flying boat for military or naval use. His efforts to produce a sea-going airplane design were, according to him, frustrated by Orville Wright's insistence that the plane not resemble the seaplane developed by the Curtiss Company.⁸⁶ Having prevailed as a plaintiff in infringement litigation, Orville Wright was reluctant to put himself in the awkward position of defending against a Curtiss infringement suit.

The declining industrial position of the Wright Company and its successors, due in no small degree to Orville Wright's preoccupation with patent litigation, doomed the Wrights' fate in the field of airplane construction, and spread suspicion among its own employees and throughout the industry. As the companies fell behind in the advance of technology, other manufacturers stepped forward to consolidate their competitive position. In the end, Orville Wright was able to retire on the monies he had received through the sale of the Wright Company, but it fell to other airplane manufacturers to sustain American aviation during World War I and thereafter.⁸⁷

II. AMERICAN PATENT LAW, 1906-1918

Although Orville Wright may have been mistaken when he predicted that their victory would give them a monopoly, he was correct in his conclusion that holding a pioneering patent provided a strong position from which to defend their technological position. When the Wrights commenced their suit against Glenn Curtiss, it was well-established that the holder of a pioneering patent was entitled to a broad interpretation of the claimed invention, and that individuals who discovered improvements upon the pioneering invention would have to secure a license from the pioneer patentee before using their modification or improvement of the original pioneering mechanism. Federal courts agreed that a pioneering patent was one that "[covered] . . . a function never before performed, a wholly novel device, or one of such novelty and importance as to mark a distinct step forward in the art . . ."⁸⁸ Furthermore, the pio-

⁸⁶ Letters from Grover Loening to Orville Wright, June 22, 1910, Aug. 1, 1913, Aug. 15, 1913 (on file with Library of Congress in folio Loening, Wright Brothers Papers); see also JOHNSON, *supra* note 22, at 101-02.

⁸⁷ CROUCH, *supra* note 5, at 288; CROUCH & JAKAB, *supra* note 72, at 204.

⁸⁸ *Boyden Power-Brake Co.*, 170 U.S. 537, at 561-62; see also *Singer Mfg. Co. v. Cramer*, 192 U.S. 265, at 276 (1904); *L.A. Art Organ Co. v. Aeolian Co.*, 143 F.

neering patent was not limited by specific claims made within the patent describing the mode of achieving the overall pioneering objective.⁸⁹ Thus, those who improved upon the pioneering invention were subordinated to the broader claim of the primary patent. As the U.S. Supreme Court commented in 1876, "if one inventor precedes all the rest, and strikes out something which includes and underlies all that they produce, he acquires a monopoly, and subjects them to tribute."⁹⁰ To the Wrights, and indeed to most patent attorneys in 1910, it may well have appeared to be the fact that the holder of a pioneering patent controlled the gate to technological improvement in the field. But change was in the wind.

A. LEGISLATIVE INITIATIVES

When the Wrights commenced their infringement suit against Herring-Curtiss, the federal courts were accustomed to treating patent law as a separate sphere, particularly in regard to the recently enacted Sherman Antitrust Act of 1890.⁹¹ The Patent Act of 1790 still controlled the issuance and judicial construction of U.S. patents, but the century between the two Congressional actions had witnessed considerable economic growth, coupled with increasing confrontations between governmental power and private enterprise.

The Sherman Antitrust Act's broad provisions made it illegal to enter into contracts, combinations or conspiracies that would restrain either interstate or foreign commerce. Although the thrust of the prohibition was directed toward eliminating monopolies, Congress neglected to take into consideration governmentally authorized monopolies—those arising under the patent laws. Patents were not mentioned in the Sherman Act, leaving federal courts free to speculate whether patents and the rights they conferred were excluded from the provisions of the Sherman Act. One of the most hotly contested patent issues immediately prior to the issuance of the Wright patent was the con-

880, 884 (9th Cir. 1906); *Autopiano Co. v. Amphion Piano Player Co.*, 186 F. 159, 163 (2d Cir. 1911).

⁸⁹ *L.A. Art Organ Co.*, 143 F. at 883-84.

⁹⁰ *Morley Sewing-Machine Co. v. Lancaster*, 129 U.S. 263, 303 (1889) (quoting Justice Joseph Bradley for the Court in *Railway Co. v. Sayles*, 97 U.S. 554, 556 (1876)).

⁹¹ 15 U.S.C.A. § 1 (West 2003); see Willard K. Tom & Joshua A. Newberg, *Anti-trust and Intellectual Property: from Separate Spheres to Unified Field*, 66 ANTITRUST L.J. 167, 168-72 (1997).

flict between patent rights and the enforcement of antitrust laws. Critics of the patent system charged that it gave patent holders complete control over the distribution and sales of new inventions. Many urged that a system of mandatory licensing be adopted, compelling patentees to issue licenses to use the invention when three years had elapsed from the date of the patent. In 1902, Congress had rejected such a statute, but the proposal continued to be raised in Congress.⁹²

As the first decade of the twentieth century concluded, demands for governmental regulation of economic activity increased. The Roosevelt and Taft Administrations made effective use of the Sherman Act to restrain price-fixing, and monopolistic combinations and contracts.⁹³ Yet the isolation of patent monopolies from Sherman Act review continued, arousing both public and Congressional pressure for an altered policy toward patentees and their privileges. During the first years of the *Wright v. Herring-Curtiss* litigation the Oldfield Committee of the U.S. House of Representatives was actively involved in a review of the patent system and its impact upon creativity in invention and competition within the economy. Appointed in 1912 to consider revision of the patent code, the Oldfield Committee accomplished a great deal by publicizing the monopolistic impact of the patent laws, but none of its proposals were enacted into law. From late April to August of 1912, the committee held twenty-seven hearings at which a number of witnesses testified, and on August 8, it reported out the proposed legislation and recommended passage.⁹⁴ Noting that there was widespread public dissatisfaction with the operation of patent laws, it recommended three remedies: (1) limit the absolute right of a patentee to determine the extent and manner in which a patented article might be used, (2) limit the practice of tying (that is, prohibiting the use of the patented article without utilizing un-

⁹² The vagueness inherent in the terms of the Sherman Act, is noted in WILLIAM LETWIN, *LAW AND ECONOMIC POLICY IN AMERICA: THE EVOLUTION OF THE SHERMAN ANTITRUST ACT* 4 (1956); see MORTON KELLER, *REGULATING A NEW ECONOMY: PUBLIC POLICY AND ECONOMIC CHANGE IN AMERICA, 1900-1933* 107-08 (1990); see also JAMES W. ELY, JR., *THE GUARDIAN OF EVERY OTHER RIGHT: A CONSTITUTIONAL HISTORY OF PROPERTY RIGHTS* 87-93 (2d ed. 1998) (tracing the judicial tendency to cast strong protections around private property rights after 1880).

⁹³ See JAMES W. ELY, JR., *THE CHIEF JUSTICESHIP OF MELVILLE W. FULLER, 1888-1910* 128-34 (1995) (providing a good terse discussion of *U.S. v. Trans-Missouri Freight*, 166 U.S. 290 (1897), *Northern Securities Co. v. U.S.*, 193 U.S. 197 (1904), and *Swift & Co. v. U.S.*, 196 U.S. 375 (1905)).

⁹⁴ H.R. REP. NO. 62-1161, at 1 (1912).

patented material provided by the patentee), and (3) limit the ability of a patentee to suppress the use of the patent, or to use the patent to prohibit competition by owners of other patents.⁹⁵

The committee's proposals also addressed the patenting process and inequities that arose from its operation. One practice was the long drawn out method of obtaining a patent, during which time the would-be patentee held priority over all subsequent filers, and also continued to have his application treated as confidential information until the patent was issued. In the *Selden* case, an extremely long delay in completing an automobile patent application had threatened Henry Ford with an infringement suit by a supposed inventor who had never built an automobile.⁹⁶ To deal with this problem the Oldfield Committee recommended that a patent be issued for a term of nineteen years, beginning at the date of filing. It was believed that two years was more than adequate time in which to complete an application, and that from that time, the patentee might deduct the delay occasioned by Patent Office consideration of the applicant's submissions. The committee also addressed the practice of "shelving" a patent, which was simply holding the patent and not putting it to use, with the purpose of preventing others from providing the invention to the public. Pointing out that shelving was against the general practice of other nations, they suggested that a period of three or four years should be established during which the patented article should be made available to the public. If that were not done, the patent should either be forfeited, or subjected to a mandatory licensing system.⁹⁷

Some of the Oldfield Committee recommendations, if enacted into law, would have alleviated many of the Wrights' difficulties with patent litigation. The report asserted:

The failure of our law to provide adequate means of determining and enforcing patent rights detracts greatly from the value of patents to inventors and others interested. It often results also in depriving the public of the benefits which would flow from the development of inventions. . . Large capital thus becomes necessary, not for the development of the invention, but to protect it.⁹⁸

⁹⁵ *Id.* at 2.

⁹⁶ ROSEBERRY, *supra* note 51, at 343-45.

⁹⁷ *Id.* at 4-7.

⁹⁸ *Id.* at 24.

The Committee suggested that the trial process should be shortened by limiting testimony to matters that were material to the case, and that evidence taken before an examiner was not adequate preparation for the judge who would be called upon to decide the case. In addition, the Committee pointed out that a specialized court of patent appeals would centralize the appellate process, and thereby eliminate conflicts between the various circuit courts of appeal. Removing patent litigation from the general federal appellate system would, in the Committee's opinion, sharply limit the number of patent appeals taken to the U.S. Supreme Court by writ of certiorari.⁹⁹

The Oldfield Committee's point was well taken. The structure of the federal court system coupled with the unique characteristics of the U.S. patent system made infringement litigation hazardous, even for the well-established inventor or manufacturer. The application procedures were cumbersome and lengthy. A classic case of the day involved the so-called Selden patent upon a gasoline powered motor vehicle. The application had been filed in 1879, but the patenting procedure was drawn out so that the patent was not issued until 1895, when several manufacturers had entered the field relying upon their patents dating well after 1879. Since an application and all information concerning the invention are kept confidential by the Patent Office until the patent is issued, other inventors working on a similar invention may not be aware of the pendency of the application. This was the situation in regard to the Selden patent. However, once the patent is issued, it takes priority by virtue of its filing date, and may well supercede similar patents issued in the interim. In the Selden situation, Henry Ford was perhaps the only automobile manufacturer willing to challenge George Selden. His attorney, W. Benton Crisp, succeeded in convincing the court that Selden's priority was based upon an inequitable misuse of the patenting procedure, and thus broke the stalemate introduced by the Selden infringement action.¹⁰⁰

Patent infringement suits were tried in the United States Circuit Courts, where expert testimony was introduced by both sides, frequently in the form of deposition hearings held before trial. Judges unfamiliar with technical terminology were thus confronted with a large file of documentary evidence and steno-

⁹⁹ *Id.* at 21-23.

¹⁰⁰ The Selden patent imbroglio is well explained in CROUCH, *supra* note 5, at 461-62; ROSEBERRY, *supra* note 51, at 344-46.

graphic records of expert testimony. Appeals from their decisions might be taken to the circuit courts of appeal, which were authorized to review district and circuit court decisions within their multi-state circuits. Unfortunately for patent litigants, the circuit court of appeals rulings settled the law only within their circuit. Absent the U.S. Supreme Court's grant of certiorari, circuit courts of appeal decisions were binding precedent within the circuit; conversely, they were merely persuasive precedents in all other federal courts. This uncertainty encouraged infringement in states where the patent's validity had not been litigated. In the Wrights' situation, it also demanded close monitoring of aviation inventions in all of the federal circuits. These legal complexities suggest that while the Wright patent wars may have been complicated by a number of factors, there were also institutional and legal barriers to success in defending patent rights and to achieving profitability. Challenges of this nature faced virtually every inventor who held a U.S. patent, and particularly those who held "pioneering" patents on basic inventions.

Undaunted by their lack of success in the 1912-13 legislative sessions, members of the Oldfield Committee returned to the work of revision in 1914. However, as their report indicates, the conflict between antitrust law and patent monopolies was withdrawn from their reported bill since it was incorporated in the bill which would ultimately be passed as the Clayton Antitrust Act. Section three of the Clayton Act specifically made patented goods subject to the provisions of the Sherman Antitrust Act.¹⁰¹ This effectively ended the exclusion of patented goods from the provisions of the Sherman Act, leaving it to the federal courts to determine what rules were applicable to monopolistic practices that were based upon patent grants. As recent commentators suggest, American patent law no longer was a separate and distinct sphere from the antitrust laws. Rather, there was a tension between the two lines of statutory materials, which the courts were charged with interpreting.¹⁰² Future Wright patent litigation thus was thrust into a new phase of antitrust/patent law. Amidst the uncertainty engendered by this significant statutory change, there was one certainty: many of the earlier issues concerning the business practices of patentees and their licensees would be subject to careful examination in the years to follow.

¹⁰¹ H. R. REP. NO. 63-1082, at 1 (1914); Clayton Act, 15 U.S.C.A. § 14 (West 2003).

¹⁰² Tom & Newberg, *supra* note 91, at 168-73.

B. JUDICIAL MODIFICATIONS IN PATENT/ANTITRUST DOCTRINE

The U. S. Supreme Court, during the Chief Justiceship of Melville W. Fuller (1888-1910), established a high standard of patentability, stressing the genius or invention represented by the patent being examined. At the same time, the Court emphasized the property rights of inventors, and viewed patents as being contractual in nature. In exchange for public disclosure in the approved patent application, the patentee was entitled to a limited monopoly. Furthermore, patent holders were entitled to fix the price of patented articles, and to assign rights to resell that were conditioned upon the transferees charging a stipulated price.¹⁰³

Patent law treatises affirmed the monopolistic power conferred by the award of a patent. Walter Rogers, writing as of January 1914, noted that in *Bement v. National Harrow Co.*, the Supreme Court had awarded damages to a patentee based upon a price-fixing clause entered into after the enactment of the Sherman Act. In addition he quoted the District Judge's opinion in the Bathtub Case, *U.S. v. Standard Sanitary Manufacturing Co.*, where it was asserted that

All men know that congress never intended when it passed the Sherman act to change the patent law. It did not do so . . . The right to exclude others is the property of the patentee. It is his very own. He may do with it as he will.¹⁰⁴

Rogers asserted that "the general rule is the absolute freedom in the use or sale of rights under the patent laws of the United States."¹⁰⁵ Rogers's assertion of the patentee's paramount property rights might have been stated more forcefully than this evidence suggested to him. In his preface, he noted that he delayed publication so that he might include important cases decided in 1912 and 1913, and that even with the delay, "It goes to press at the end of a period of discussion of cases involving important principles. . ."¹⁰⁶ Indeed, William W. Thornton's treatise on the Sherman Antitrust Act drew quite a different view of the state of patent and antitrust law. While Thornton acknowledged that a patentee had authority to sell or not to sell the use

¹⁰³ ELY, *supra* note 92, at 207-09.

¹⁰⁴ WALTER F. ROGERS, *THE LAW OF PATENTS AS ILLUSTRATED BY LEADING CASES* 1290, 1302, 1303, 1313 (1914).

¹⁰⁵ *Id.* at 1307.

¹⁰⁶ The preface is dated Jan. 12, 1914, well before the enactment of the Clayton Act. *Id.* at iii.

of his patent, or even to suppress its use until the patent expired, he nevertheless found precedents which made it clear that if contracts concerning patents restrained interstate trade, they were subject to the provisions of the Sherman Act. Although a patentee might fix the price at which his transferee sold the use of the patented item, he might not control prices charged by more remote vendees. Furthermore, a patentee's rights did not include the privilege to sell or use the patented item in a manner that was contrary to state law. In other words, Thornton was arguing that the mere possession of a patent did not confer exemption from state laws; by analogy, neither did it confer immunity from the operation of federal laws like the Sherman Act. Finally, he pointed out that combinations based upon the ownership of independent patents might be seen to eliminate competition or restrain trade, and thus violate the Sherman Act.¹⁰⁷

Prior to 1914, the *Standard Sanitary Manufacturing Co. v. U.S.* antitrust case¹⁰⁸ represented a new trend in the relationship between the patent laws and the Sherman Act. The 1899 patent recognized James Arnott's discovery of a new method for applying enamel to metal plumbing fixtures, including the interior of bath tubs. By the time the government brought a suit, over 85 percent of the bathtubs sold within the United States were subject to a vertical price-fixing arrangement controlled by the Standard Sanitary Manufacturing Company, the patent's assignee. In announcing the Supreme Court's decision, Justice Joseph McKenna refused to permit a patent owner to control prices beyond those set by his immediate vendees.¹⁰⁹ In effect, the decision was a significant step toward eliminating the patent-based exception to the provisions of the Sherman Act. As such, it gave pause to the antitrust bar, and heralded the more sweeping statutory revisions made by the Clayton Act in 1914. In addition to this price-fixing patent arrangement, the lower courts in 1912 were examining a tying arrangement involving patented

¹⁰⁷ WILLIAM W. THORNTON, A TREATISE ON THE SHERMAN ANTITRUST ACT 617-18, 621, 625-31, 633, 643 (1913) (citing *Blount Mfg. Co. v. Yale & Towne Mfg. Co.*, 166 F. 555, 561 (C.C. Mass. 1909) and suggesting possible changes in the precedent established in the pro-patentee tying case of *Henry v. A. B. Dick & Co.*, 224 U.S. 1 (1912), a 4-3 decision by an under-staffed Court).

¹⁰⁸ *Standard Sanitary Mfg. Co v. U.S.*, 226 U.S. 20 (1912).

¹⁰⁹ *Id.* at 35, 37; see also WALTER F. PRATT, JR., THE SUPREME COURT UNDER EDWARD DOUGLASS WHITE, 1910-1921 80, 82 (1999). For the pivotal position of the *Standard Sanitary* case see Tom & Newberg, *supra* note 91, at 170.

shoe machinery. These cases, which would reach the Supreme Court in 1922 as *United Shoe Machinery Co. v. U.S.*, involved a tying arrangement whereby United Shoe, as owner of a patented shoe making machine, refused to sell or license that machine to shoe makers who did not use other products made by United Shoe or its subsidiaries. For antitrust specialists, including treatise writer William Thornton, these were portents of a revolution in judicial philosophy concerning patents and monopolies.¹¹⁰

Since the Wrights were primarily involved in infringement litigation in 1914, these indications of changing judicial attitudes toward patents were certainly not in the foreground of their attention. However, to the extent that the provisions of the Sherman Act might limit the previous freedom of patentees to monopolize a field, astute observers were predicting the development of new law in the field of patents and antitrust law. That prospect, coupled with the possibility of legislative enactments, created uncertainty that encouraged litigation. Law that was reasonably stable in 1909 and 1910 when the Wrights filed their infringement suits, began to enter an era of change. This was something that neither the Wrights nor their legal advisors could predict.¹¹¹

III. THE WRIGHT PATENT, THE PATENT POOL AND THE MANUFACTURERS' AIRCRAFT ASSOCIATION

After the outbreak of World War I in Europe (August 1914), the demand for military aircraft soared, and American firms with production facilities were enticed by potential profits to produce airplanes despite the threat of Wright infringement actions. Glenn Curtiss and others spent extraordinary amounts of time on research, attempting to develop control systems that would not infringe upon the Wright patent. However, the broad and liberal construction of the Wright patent as a "pioneering invention" doomed their efforts to failure in the courts. This persisted until the July 1917 formation of a patent pool between Curtiss, successors to the Wrights' interests, and other inventors.¹¹²

In times of peace, patent litigation might be tolerated by a government driven by budgetary conservatism and lulled into a

¹¹⁰ PRATT, *supra* note 109, at 81-82. On Thornton, see discussion *supra* note 92.

¹¹¹ Unfortunately, this change in antitrust law and the resulting economic consequences have not received scholarly attention.

¹¹² WRIGHT PAPERS, *supra* note 8, at 1087, n. 10.

false sense of diplomatic and military isolation from world affairs. Things changed radically even before April 1917 when the United States declared war on the German Empire. A year before, in the aftermath of the Mexican Punitive Expedition, Congress had appropriated \$15,000,000 for the purchase of airplanes, but patent litigation among the fifteen active manufacturers held up full production. Some like the Wright-Martin Company (the transferee of the basic Wright patent of 1906) demanded large royalties from the others. Its patience exhausted, Congress passed a statute authorizing the condemnation of all basic aviation patents and appropriated funds to compensate the owners. This threat finally brought the aircraft builders to their senses. Through the intercession of the National Advisory Committee on Aeronautics (NACA), a governmental board assembled to advance scientific study of aeronautics, the manufacturers were brought together in April 1917 to discuss the possibility of forming a patent pool. Patent pools are utilized when a patent block develops because key patents are held by competing firms, and none can conduct business without infringing another's patent.¹¹³

The Wright-Martin Company, holding the basic Wright patent, was extremely reluctant to enter the pool, and their determination mirrored the attitude of the rival Curtiss firm. However, the governmental threat of condemning the patents forced them and the other manufacturers to agree. A Manufacturers' Aircraft Association (MAA) was established in July 1917, and each manufacturing firm was permitted to join upon payment of a \$1,000 initiation fee. Each airplane built by member firms or by independent manufacturers, was to be subject to a \$200 fee, considerably less than the Wright Company's usual royalty of \$1,000 per airplane. However, the Wrights were to receive \$135 as their share; Curtiss was to receive \$40, and the remaining \$25 was used to pay small royalties to the other patent holders and to cover administrative costs of the Association.¹¹⁴ To facilitate wartime production even further, the U.S.

¹¹³ JOHNSON, *supra* note 22, at 114-15, 189-91; VAUGHAN, *supra* note 2, at 65; POOLING OF PATENTS, *supra* note 3, at 4-6, 96; TOULMIN, *supra* note 17, at 52.

¹¹⁴ POOLING OF PATENTS, *supra* note 3, at 3-6, 96, 548, 557, 776, 818 (testimony of Billy Mitchell, James V. Martin, Attorney Willis B. Rice, MAA President Frank H. Russell); VAUGHAN, *supra* note 2, at 64-65, 304; VAUGHAN, *supra* note 4, at 34, 35; ROBIE, *supra* note 78, at 96. The details of the MAA pool agreement, and subsequent alterations of the royalty terms during and after World War I are set forth in *Mfrs. Aircraft Ass'n, Inc. v. U.S.*, 77 Ct. Cl. 481 (1933).

government undertook to hold harmless any member of the MAA and any independent manufacturer who might be sued for patent infringement which occurred while filling government purchase orders. Thus, private manufacturers were forced to prosecute infringement suits against the government in the federal Court of Claims, rather than against the actual infringer in the U.S. district trial courts.¹¹⁵

The MAA pool restored a modicum of peace to the troubled aircraft production industry during World War I, but it could not guarantee fair competition. Neither could it end resort to the courts by patent holders. Litigation and outright infringement was too well entrenched to be totally abandoned. After the war, the Wright firm brought an infringement action against Handley-Page, a British firm which operated at home under the Crown license, but which was forced to build DH-4s (the "flaming coffin") in the United States during the war. The Wrights sued for an injunction and damages for infringing the United States patent, presumably because of the place of production.¹¹⁶ The possibilities of trans-national evasion of U.S. patent restrictions were brought to Orville Wright's attention even before the United States entered the war. In 1915, Orville Wright sent Roy Knabenshue to examine Curtiss aircraft being constructed in Buffalo, and subsequently in Toronto. Knabenshue reported that none of the airplanes had ailerons, and therefore they did not infringe the Wrights' U.S. patent. However, the Wright Company later discovered that when the aircraft were delivered in England, and thus, ostensibly covered by the Crown license, the British government installed ailerons.¹¹⁷

Within the United States, the MAA came under strong attack after the armistice was signed in November 1918. While independent manufacturers and others involved in aviation were willing to tolerate the Association's monopolistic control in the interest of the war effort, their tolerance was exhausted with the return of peace. A series of congressional investigations looked into patent pooling in general, and their attention was regularly drawn to the aircraft patent pool administered by the MAA. The 1935 congressional inquiry deduced extensive testimony concerning the antitrust aspects of the MAA's operations as a

¹¹⁵ VAUGHAN, *supra* note 4, at 64, 65.

¹¹⁶ See the litigation papers, ca. 1920 (on file with the Library of Congress in container 81, Wright Brothers Papers).

¹¹⁷ POOLING OF PATENTS, *supra* note 3, at 113.

patent pool. The best-known witness against the MAA was former Brigadier General Billy Mitchell, who was subsequently sued for libel by the MAA.¹¹⁸ Engineer Edward F. Chandler testified before the House Committee, asserting that “[t]he building of patent monopolies by the formation of strongly financed pools handicapped the smaller manufacturer, and in time will eliminate from many fields of activity the trade stimulus of legitimate competition.”¹¹⁹ Inventor Waldemar Kaempffert admitted that patent pooling may in some instances be a way of moving forward rapidly with a new invention, but he felt that it generally was an abuse of the patent system that led to self-perpetuating monopolies and unfair competition. James V. Martin, who had invented a retractable landing gear prior to the war, testified that it would have been available during the war but that it had been rejected by the influence of “the crooked brokers and bankers in this Manufacturers Aircraft Association.”¹²⁰ Martin claimed that the MAA resorted to criminal intimidation, even murder, to accomplish its monopolistic aims. General Mitchell asserted that the MAA was wholly responsible for the wartime failures of the aviation industry, and that industrialist Henry Ford closed his airplane engine factory because he would not join the MAA, which hounded him until he stopped production at his factory.¹²¹

The 1935 Congressional inquiry also produced some startling testimony concerning aircraft procurement during World War I through what today would be considered a “military industrial complex” verging on a criminal conspiracy to evade government procurement regulations. General Mitchell’s testimony was very specific and credible, but doubtless, its weight was discounted by the American public’s recollection of his 1925 court-martial and the possibility that this may have clouded his judgment. The former commander of aviation for General Pershing’s AEF stated that military officers were afraid to testify against the

¹¹⁸ Mitchell challenged the law of the libel suit, but lost his demurrer motion in the District Court for the Eastern District of Virginia. *Curtiss-Wright Corp. v. Mitchell*, 10 F. Supp. 91, 94 (E.D. Va. 1935). This is the last reported record of the case, which has received few mentions in case law since 1935. Presumably, the defamation litigation was either settled or terminated by Mitchell’s death shortly after his motion was decided.

¹¹⁹ POOLING OF PATENTS, *supra* note 3, at 664.

¹²⁰ *Id.* at 61. Martin’s testimony charged that Col. E. A. Deeds was the secret owner of Dayton-Wright Company stock at the same time that he authorized a U.S. government loan to the Dayton-Wright Company. *Id.* at 78.

¹²¹ *Id.* at 9, 11, 61, 65, 893.

MAA, which had lobbyists swarming to protect its interests whenever Congress tried to establish the truth. He asserted that from 1906 to 1923 the Wright patent "practically controlled the War Department in its aeronautical organization."¹²² This may have been a slight exaggeration, since as we have seen, the Army had begun to abandon Wright aircraft as early as 1913. During the war, according to Mitchell, the financial manipulators in control of aircraft production were held in check by the veterans of AEF aerial operations. However, they soon asserted themselves, and by 1935, they controlled a major part of the aircraft built in the United States. He also pointed out that the Aeronautical Chamber of Commerce worked hand-in-hand with the MAA, and that this group had substantial influence in the higher levels of the federal government. They had President Herbert Hoover's son on their payroll, and in a bipartisan gesture, made sure to recruit Elliott Roosevelt for a similar staff position when the Democrats took over the White House. According to Mitchell, President Roosevelt's son promptly resigned from this employment when he learned what the Aeronautical Chamber of Commerce was doing. Mitchell urged that if all government aviation activities were merged into one administrative branch, the influence of the MAA and the Aeronautical Chamber of Commerce would be minimized. In addition, he suggested that a formal bid process be used in the purchase of aircraft, and that the prevalent practice of buying aircraft through negotiation was contrary to the government's best interests.¹²³

Horace Keane provided information that cast doubt on the legality and effectiveness of all Army aircraft procurement efforts during and after World War I. An independent manufacturer of airplanes, Keane told the 1935 House Committee on Patents that a "Coffin-Deeds gang" dominated aircraft procurement during and subsequent to World War I.¹²⁴ The night after Keane submitted a design proposal to Air Service procurement officials, a military officer who was his friend visited him, and told him that they would like to give him an award, but could not because of his association with someone who had been black-listed. Later testimony suggested that the individual in dis-

¹²² *Id.* at 16.

¹²³ *Id.* at 10, 13, 15, 19, 819, 821, 838, 840, 851. Thomas A. Morgan, president of the Aeronautical Chamber of Commerce denied Mitchell's allegations, and asserted that U.S. military and naval aircraft were technologically the equal of those used by all other nations. *Id.* at 726-39.

¹²⁴ *Id.* at 791-92.

favor was James Martin. However, Keane's design later was incorporated in an Army airplane without any recognition or payment to him.¹²⁵ It was Keane's opinion, echoed by Martin and General Billy Mitchell, that the MAA automatically received all applications submitted to the Air Service Procurement Division at McCook Field in Illinois. Unless the applicant was a member of the MAA, the proposal or application was routinely rejected regardless of its merit, but the idea might well be incorporated in a future aircraft manufactured by an MAA member. Keane also claimed that the NACA had come under the influence of bankers and brokers from Detroit, Michigan and Dayton, Ohio. This influence was exerted through Colonel Edward A. Deeds, a wartime officer recruited directly into the Air Service from civilian life, and Howard Coffin, the founder of the Hudson Automobile Company, who had been appointed to head the Aircraft Production Board at the beginning of the war. Mitchell referred to the National Advisory Committee on Aeronautics as the "bribe committee" because of its activities in connection with aircraft procurement, and he also fingered NACA as the key to the suppression of aeronautical invention.¹²⁶ Neither Mitchell, nor Keane, nor James Martin, were without ulterior motives in their testimony, yet in the hindsight of history we might well ask whether even smoke of suspect origin might not be the sign of a destructive fire in World War I aircraft procurement. Historian James Hudson noted the confusion in organization and control of the Air Service in general, as well as the Aircraft Production Bureau, but based on the Hughes Committee report, he accepted the committee's conclusion that there was no graft or corruption. He also notes that tension and animosity existed between the combat pilots and the procurement branch of the Air Service.¹²⁷

IV. CONCLUSION

The Manufacturers' Aircraft Association failed to eliminate patent litigation in the aircraft industry; nor did it facilitate American production of aircraft during World War I, its imme-

¹²⁵ *Id.* at 61.

¹²⁶ *Id.* at 7, 50, 64, 66, 90, 178, 180, 787, 780-91, 795 (Billy Mitchell testimony, Feb 14, 1935, James Martin testimony, Mar. 7, 1935, Horace Keane testimony, Dec. 5, 1935).

¹²⁷ JAMES J. HUDSON, *HOSTILE SKIES: A COMBAT HISTORY OF THE AMERICAN AIR SERVICE IN WORLD WAR I* 6-10, 14-22 (1968). There should be at least a few doctoral dissertations waiting to be written on this topic.

diate short-term objective. By tacking new patents to the original Wright patent, which supposedly expired in 1923, the MAA perpetuated its existence until the last quarter of the twentieth century.¹²⁸ In 1933 it was still suing the United States government to collect amounts it claimed as royalties on aircraft produced for the government or the allies during World War I.¹²⁹

If the MAA was medicine to cure litigation sickness in the aircraft industry, it may well have been a cure that was more deadly than the disease. Through authorizing the MAA as a war-time expedient, the United States Congress created a designated exception to the antitrust laws, and intentionally chose to assign the development of aeronautics to a contract, combination and conspiracy, that had every intention of restricting trade and commerce in aircraft throughout the United States. If only a portion of the 1935 Congressional testimony is accurate, it is apparent that the development of military aviation prior to World War II was severely hindered by self-serving decisions of the MAA, perhaps augmented by accomplices within the U.S. government. In addition, there were numerous allegations that inventors who came forward with new modes of aircraft construction were systematically discouraged by government employees in conjunction with the National Advisory Committee on Aeronautics and the MAA. Absent extended scholarly analysis of the inter-war years, we can only speculate how much additional damage was caused to military and civil aviation by the existence of the Manufacturers' Aircraft Association.

Few of these consequences of the Wright patent litigation have been explored at any great length, and all were far from the minds of those Americans who gathered at Kitty Hawk on December 17, 2003 to celebrate the "First Flight" centennial. Indeed, the aeronautical achievement of the Wright Brothers, historic and memorable as it is, provided only the beginning for a tragic struggle on their part. It was a contest that they could not win, for a host of circumstances bedeviled their efforts to protect their invention and gain well-earned fame and financial well-being. The United States lacked the funding for governmental procurement or the will to raise private investment to encourage their work, nor was it ready to support the basic scientific research and engineering essential for full-scale produc-

¹²⁸ A consent order between the federal government and the Manufacturers' Aircraft Association is reported unofficially at 1975 WL 814 (S.D.N.Y. 1975).

¹²⁹ *Mfrs. Aircraft Ass'n, Inc. v. U.S.*, 77 F. Supp. 481 (1933).

tion of airplanes. The Wrights' conduct of their patent infringement cases discouraged many would-be investors and isolated them from the aeronautics community and from the mainstream of aeronautical development. Distracted by patent litigation the Wrights and their companies neglected the task of engineering development, and failed to purchase rights to new aviation inventions that would have enhanced their economic position. Perhaps the most ironic turn of events was the alteration of patent and antitrust jurisprudence even as their major cases worked their way through the federal courts.

While Orville Wright enjoyed a comfortable life as a consequence of his and Wilbur's invention, he must have been embittered by the futile story of the Wright patent litigation and the decline of the aircraft business he and Wilbur established. In the end, the Wrights were victims of circumstances far beyond their control and that was a tragedy—for them and for the United States.

