The George W. Jalonick III and Dorothy Cockrell Jalonick Memorial Distinguished Lecture


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The George W. Jalonick III and Dorothy Cockrell Jalonick Memorial Distinguished Lecture Series

The George W. Jalonick III and Dorothy Cockrell Jalonick Memorial Distinguished Lecture Series was established to inform and enlighten the public about the history of flight by bringing aviation notables to the Dallas community. Dorothy and George Jalonick III were special friends of The University of Texas at Dallas and the History of Aviation Collection. This series was endowed in their memory by George W. Jalonick IV and friends of the Jalonick family.

The History of Aviation Collection

The University of Texas at Dallas houses a unique resource of aeronautical history known as the History of Aviation Collection (HAC). Located on the third floor of the Eugene McDermott Library in the Special Collections Department, the core of the HAC consists of four collections:

- The CAT/Air America Archive
- George Williams World War I Aviation Library
- Admiral Charles E. Rosendahl Lighter-Than-Air Collection
- General James H. Doolittle Collection

The HAC also holds hundreds of individual collections ranging from aviation pioneer Ormer Locklear to commercial aviation. In addition, the HAC includes more than 50,000 books, magazines and newspapers.
BLAMING WILBUR AND ORVILLE: THE WRIGHT PATENT SUITS AND THE GROWTH OF AMERICAN AVIATION

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"Probably no single phase of aviation is as little known by those who should be well-informed on the subject," engineer Charles B. Hayward remarked in 1911, "as the actual status of aviation where the Wright patent is concerned."

"The move on the part of the Wright brothers to establish the standing of their patents by having them adjudicated and, as this is an extremely lengthy process, to restrain infringers in the meantime, has led to a perfect flood of criticism - even abuse and vilification - all of which has been misguided to say the least."

If Wilbur and Orville Wright are the most honored figures in the history of aeronautics, they are also among the most misunderstood. There are a variety of reasons for that. The Wrights entered the field at a relatively late date, in 1899, and achieved the goal of powered, controlled heavier-than-air flight in a remarkably short period of time. Experimenters who had been active in prior to 1900 were anxious to share the glory. As a result, individuals like A.M. Herring, or the friends and supporters of other pioneers like Louis Mouillard, Samuel Langley, and Clement Ader, tended to overestimate the importance of their own contributions and thus underestimate the work of the Wright brothers. A generation later, journalists and historical writers sought to attract attention and generate controversy by focusing on "forgotten" pioneers like Gustave Whitehead, John Montgomery, or Richard Pearse. Understandably, the Wrights were anxious to insure that the public would have an accurate understanding of the early history of flight, untainted by false claims.

As Charles Hayward noted, however, the aviation patent suits of the period 1909-1917 were a critically important factor in reshaping the public image of the Wright brothers. This important era in the early history of flight opened on August 19, 1909, when the Wrights filed a bill of complaint enjoining Glenn H. Curtiss and the Herring-Curtiss Company from the manufature, sale or exhibition of airplanes that infringed on the Wright patents. The following day, they filed suit to prohibit the Aeronautic Society of New York from exhibiting a Curtiss airplane.

Within a few months, the Wrights were taking action against international rivals. On January 4, 1910, they sought an injunction restraining the visiting French aviator Louis Paulhan from making exhibition flights with a Voisinet airplane, which, the Wrights argued, infringed on their patent. In 1911, the brothers also brought suit against the touring English aviator Claude Graham-White.

The patent litigation spread to Europe in 1910, when the Wright licensees, the Compagnie Generale de Navigation Aerienne (CGNA), brought suit against six rival aircraft manufacturers (Bleriot, Farman, Esnault-Pelterie, Clement-Bayard, Antoinette, and Santos-Dumont) for infringing on the Wright's French patents. The following year, a consortium of five German aircraft builders brought suit against the incorporators of the German Wright Company in an effort to overturn the Wright patents in that nation.

The Wrights found that the patent suits were an effective means of dealing with independent operators like Paulhan and Graham-White. The cases involving the Curtiss Company and European firms were more difficult, expensive and time consuming, however, and seldom produced a clear-cut resolution. The courts invalidated the Wright's German patents, arguing that prior disclosure, the publication of information on the basic elements of the Wright airplane before the approval of their patent, had compromised their claims. The French suit, complicated by a very different legal system and the absence of spirited prosecution by the CGNA, was still not fully resolved when the Wright's French patents expired in 1917.

The situation in the U.S. was just as complex. As early as January 3, 1910, Judge John R. Hazel of the U.S. Circuit Court at Buffalo, NY, had issued an injunction prohibiting Glenn Curtiss from the manufacture or sale of aircraft. Curtiss posted a $10,000 bond and appealed the decision. He could legally continue flying until the appellate court reached a decision, but he took a terrible risk in doing so. If Judge Hazel's decision was upheld, Curtiss would have to negotiate a settlement with the Wrights covering all of the monies earned while the injunction was in effect. Curtiss moved forward with the prospect of financial ruin staring him in the face.

On January 13, 1914, the Judge of the U.S. Circuit court of Appeals of New York ruled in favor of the Wrights. Rather than taking immediate financial vengeance against their principal rival, the leaders of the Wright Company, sensing the opportunity for monopolistic profits, announced the schedule of rates that they would charge anyone who wished to exhibit an airplane in the U.S. Glenn Curtiss, represented by the best lawyers that money could buy, announced that he would immediately alter the control systems of his aircraft so that they no longer infringed on the Wright patent. Few knowledgeable individuals believed that to be possible, but it was...
enough to muddy the waters and set the legal process in motion once again.

Ultimately, Orville did profit from the patent suits. He sold his interest in the company to a group of New York financiers in 1915 for an undisclosed sum said to have been in the neighborhood of $1.5 million. Certainly, it appeared that the patents might enable the firm to dominate the new industry. Orville sold out at the perfect moment, acquiring a personal fortune that would enable him to live comfortably for the rest of his life. Two years later, in 1917, industry leaders, with the support and advice of the federal government, brought the era of the patent trials to an end by purchasing the rights to all aeronautical patents and creating a pool of leading manufacturers who would share access to all patents.

The patent suits absolutely consumed Wilbur and Orville's time and energy during the period 1910-1912. The family believed that the tension and exhaustion generated by the patent battles weakened Wilbur and increased his vulnerability to the typhoid that took his life on 30 May 1912. Nor could the family mistake the fact that the patent wars were joined, not only before the bar of justice, but in the court of public opinion.

The Wrigtts had expected to be attacked by those whom they were pursuing in court. It was no surprise to learn the Louis Blériot, a leading target of the French suit, found it: "...regrettable to see ... inventors make the unjustifiable claim of monopolizing an idea ..." As Charles Hayward's comments suggest, there was always substantial support for the Wright brothers desire to protect their rights and to insist on a general recognition of their priority as the inventors of the airplane. Still, it was apparent that a great many people agreed with their old friend Octave Chanute, who remarked that: "...your usually sound judgement has been warped by the desire for great wealth."

Quite apart from the impact of the legal cases on the personal image of the Wright brothers, there was, from the outset, an assumption that the patent suits had retarded the growth of American aeronautics, enabling European competitors to forge ahead of the nation that had given birth to the airplane. One federal official bluntly summed the matter up in 1917, explaining that the Wright patent suits had "...caused the United States to fall from first place to last of all the great nations in the air."

Historians of aviation have continued to cite the Wright patent suit as a primary reason for America's failure to maintain its early leadership in aeronautical technology. "The Curtiss-Wright flight," Elisabeth Freudenthal explained, "hung heavy over American aviation." This mistaken explanation for the retarded growth of American aviation prior to the First World War continues to be heard today. The author of a recent popular treatment of early aviation in the U.S. blames the weakened condition of the U.S. industry on the fact that the Wright brothers were so bold as to charge other aircraft manufacturers a fee for the use of their patent. "For most manufacturers," he notes, "any fee at all was prohibitive, and so only a few companies sprouted and they survived only weakly."

The evil wrought by the Wright patent suits has even been made apparent to those individuals who absorb the lessons of aviation history from television. "Patent claims by the Wright brothers," notes the narrator of an episode of the cable television series First Flights, "restricted others from developing new designs."

It is astonishing that this assertion has been so widely accepted at face value for so long a period of time. The evidence against it is very strong. Moreover, this is clearly an important issue. What could be of greater interest or more importance to historians or policy planners than an honest understanding of the factors encouraging or retarding the development of a complex technology that has shaped the history of a century?

There can be no doubt that the decade separating the invention of the airplane from the outbreak of the First World War was one of the richest periods of technological advance in the history of flight. During the early years of that era, the Wright brothers were clearly the Kings of the Air. They launched the air age with four flights on the morning of 17 December 1903. On the best of those flights they covered 852 feet through the air in 59 seconds. After two more years of flying in relative secrecy over a Dayton cow pasture, they were still the only human beings who had flown a powered heavier-than-air machine, and were able to cover distances of up to 24 miles in just over 39 minutes. During the course of his first public flights in France in 1908, Wilbur Wright shattered all existing European records for distance, duration, speed and altitude.

By the spring of 1909, however, other aviators were already moving beyond the Wrights. Louis Blériot's flight across the English Channel on 25 July, followed by the first great international aviation meet and competition held a month later (August 22-29) on the plain of Betheny, three miles north of the cathedral city of Reims, marked the beginning of European hegemony in the air. The six years remaining before the outbreak of war in August 1914 witnessed constant startling improvements in performance.

New developments in engine technology were of central importance. By 1914, the four-cylinder, 12.5 horsepower Wright engine of 1903 had given way to 100 hp eight cylinder water-cooled in-lines and 90-140 hp radials like the Gnome. Louis Bechereau had incorporated the monocoque structure, originally developed by the Swiss engineer Ruchonnet, in the design of the Deperdussin racing monoplanes. Hans Reissner experimented with corrugated aluminum wings, while Ponche and Primard produced the Tubavion monoplane, the first genuinely all-metal aircraft.

Henri Fabre made the first water take-off on 28 March 1910. The Russian Igor Sikorsky pioneered very large aircraft with his four-engine Bolshoi of 1913. The following year, Glenn Hammond Curtiss produced a multi-engine flying boat intended to fly the Atlantic. The ocean would have to wait for another five years, but, by August 1914, the North American continent had been flown coast-to-coast, both ways, and both the Alps and the Mediterranean had been traversed by air.
On December 17, 1903, the world’s first airplane had traveled a maximum distance of 852 feet in 59 seconds, reaching a speed of 30-35 mph and an altitude of 10-15 feet. Ten years later, only six years after the Wrights had first flown in public, the records had increased to a speed of 126.67 m.p.h. (Maurice Prevost in a Deperdussin); a distance of 634.35 miles over a closed circuit (A. Seguin in a Henry Farman); and an altitude of 20,079 feet (G. Legagneux in a Nieuport).

The American Glenn Curtiss had won the first James Gordon Bennett race, staged as part of the Reims meet in 1909. By 1913, the U.S. could not field a competitor for the same race. “We could not send an American biplane or monoplane over,” Alan Hawley, President of the Aero Club of America, explained, “because none of our machines are fast enough.” The airplane, born in America, had come of age in Europe — and the gap would grow much wider during four years of war.

How are we to explain this gap? Might not the Wright patent suits have played some role in creating the disparity? Evidence to the contrary begins with the fact that the Wright Company was much more severely damaged by the patent suits than the Curtiss Aeroplane and Motor Company. Consider the matter of aircraft sales, surely a basic measure of corporate success. Between 1909 and 1917 Wilbur and Orville Wright and the various Wright companies operating on the basis of their patents, sold a total of 26 aircraft to the U.S. Army, their largest single customer. Twelve of the Army aircraft were built and sold in 1917 by the Wright-Martin Company, the organization created after 1915, when Orville Wright sold his shares and left the firm for good.

During the same period, the companies controlled by Glenn H. Curtiss sold a grand total of 232 aircraft to the U.S. Army. This number, representing 24 distinct designs, was almost half of the total number of aircraft purchased by the Army prior to U.S. entry into W.W. I, and nearly ten times the number of Wright aircraft purchased during this period.

In addition, twenty of the first 27 aircraft purchased by the U.S. Navy were Curtiss machines. The Burgess Curtiss Company produced four of those original naval aircraft. The Wright brothers were in third place with the sale of only three machines to the Navy. After 1913, Curtiss sales to the Navy skyrocketed, while the Wright Company sales to the Navy were at an end. The precise figures for civilian and foreign aircraft sales are not available, but Curtiss’ success in marketing single and multi-engine flying boats to several Allied nations suggests that he was more successful in those categories as well.

In truth, Curtiss prospered during the patent suit era, while the Wrights suffered. At the end of the period, Glenn Curtiss was, by any measure, the most successful producer of aircraft in the U.S. He was the principal supplier of training aircraft to the U.S. government, and the only American manufacturer producing combat aircraft of his own design for the Allies.

Why did the Wright Company suffer as a result of the patent suits? The reasons are not so difficult to understand. Wilbur and Orville Wright, the engineering geniuses at the heart of the firm, paid far more attention to winning victory in the patent suit than they did to the development of new and improved product. In truth, the brothers wanted nothing more than to be recognized as the true inventors of the airplane, and for the world to appreciate the magnitude of their accomplishment. Victory in the patent suits, and any money that resulted, would symbolize the realization of those goals. Glenn Curtiss, on the other hand, wanted nothing more than to develop, build and sell improved aircraft.

The overwhelming success of the principal target of the patent suit, and the essential failure of the firm which pursued the case, is surely proof that the suit was not a significant factor retarding the growth of American aeronautics. In point of fact at the close of the period, Glenn Curtiss was the only U.S. aircraft builder operating at a level equal with the best European manufacturers.

If the patent suits do not explain the retarded growth of the industry in America, what forces were at work? Clearly the pressure of competition was an important factor encouraging technical progress. Prior to 1909, there was little to differentiate the prizes and rewards available to aviators in Europe and America. Rich purses were awarded on both continents for similar feats such as the first public flight of a kilometer, and the first circle flown in the air. Lord Northcliffe, the English press baron, established the prize for the first flight across the English Channel, while American newspapers sponsored flights linking American cities. In Europe, wealthy individuals and corporations sponsored races and long distance contests. In America, the Armbril Company established a prize for the first transcontinental flight, from coast-to-coast. Wealthy individuals on both continents, men like James Gordon Bennett and Jacques Schneider, established specialized contests, open to all comers, and designed to encourage technological growth.

After 1909-1910, however, the level of competition in Europe began to grow stiffer, and the amount of prize money expanded. The first great American meet, held at Dominguez Field, Los Angeles (January 10-20, 1910), was followed by the Harvard-Boston meet (September 3-13, 1910), where aviators competed for a grand total of $100,000 in prize money, and Belmont Park (October 22-30, 1910) where $72,300 in prizes were available.

The situation in Europe, however, was even more promising. The number of contests and competitions expanded far beyond what was available to American aviators as each of the leading continental powers sought to showcase the aeronautical achievements of its citizens. As a result of having served as the site of repeated competitions, cities like Blackpool, Hendon, Reims, Milan, Vienna, and Berlin emerged as world aviation centers. Consider, for example, the level of competitive activity at Johannisthal, the principal Berlin flying field. Between May 1910 and October 1913, Johannisthal hosted a total of seven Flugwoche (flying weeks), offering a
total of 312,900 marks in prize money. In addition, the field served as either the starting point or an important stop on a number of famous long-distance contests, including the Circuit of Germany (June 12-July 10, 1910); the Berlin to Vienna Race (June 9, 1912); and the Circuit of Berlin (August 31-September 1, 1912).14

Europe not only offered more contests and richer prizes, it provided a much higher level of competition. In the U.S. the leading aviators were members two or three touring exhibition teams who earned salaries for performing aerial stunts to thrill crowds of paying customers. There were no better pilots in the world than men like Lincoln Beachey and Walter Brookings, but they had not been tested under the constant pressure to fly higher, faster and farther against a wide range of competitors, week after week. More important, their technology had not been tested either.

With little incentive for change, American builders like Glenn Curtiss and Glenn Martin remained largely committed to the original configuration of the Wright airplane -- a pusher biplane with a canard elevator -- until 1910-1911. The traditional configuration exercised so strong a hold on designers that the canard remained in use long after a rear elevator became standard on Wright and Curtiss machines. In both cases, the canards were simply discarded by Wright and Curtiss exhibition pilots who discovered that they were of no value. A high accident rate among military aviators and the clear example of advanced European designs ultimately forced the switch to the tractor configuration.

Strenuous competition between a relatively large number of designers and aviators in Europe led to the exploitation of a wide range of configurations, the use of new materials, and improved control systems and power plants. Growing international rivalries in Europe, 1900-1914, convinced national leaders of the need to encourage the growth and development of a domestic aircraft industry through investment and subsidies. "With Russia and Austria-Hungary in their present troubled condition, and the German Emperor in a truculent mood," Wilbur and Orville had explained to Captain Ferdinand Ferber, their principal French correspondent, "a spark may produce an explosion at any minute. No government dare take the risk of waiting to develop practical flying machines independently."15

European leaders had recognized aeronautical research and development as a matter of serious concern to the state long before 1900. The French General Staff established what would become the French State Airship Factory at Chalais-Meudon in the 1870s. A small wind tunnel, perhaps the first in France, was in use at the facility as early as 1877.16

In France, philanthropy was also to play a particularly important role in underwriting aeronautical research and development. The industrialist Henri Deutsch de la Meurthe founded the Institut Aerotechnique de St. Cyr, and presented the facility to the University of Paris, where Basil Zaharoff, the munitions maker who would earn dubious post-war fame as the "merchant of death," had established the first chair in aeronautics.17

Gustave Eiffel, a serious student of aerodynamics, began to conduct aeronautical research on a platform of the Eiffel Tower in the 1890s. By 1905, he had established one of the world's great aeronautical research facilities at the foot of the Tower, complete with a wind tunnel capable of moving air through a test section five feet in diameter at a speed of 40 mph. In 1912, the 80 year old Eiffel opened yet another facility at Aubiet, equipped with an even larger tunnel capable of driving a 70mph current of air through a test section measuring 6.5 feet in diameter. Eiffel and his engineers tested a wide range of model airfoils, and developed an accurate coefficient of enlargement that enabled them to transform their results into full scale values. The achievement was of enormous practical value to aircraft designers.18

British Army officials laid the foundation for the Royal Aeronautical Establishment in 1889, when the factory and school of the Balloon Establishment moved to a permanent home on Farnborough Common. Over the next two decades the first generation of British military airships and airplanes would rise into the sky from nearby Leafield's Plain and Long Valley.

Col. J.E. Capper, who commanded the Balloon School during the critically important years, 1903-1910, drew Britain's National Physical Laboratory, the rough equivalent of our National Bureau of Standards, into aeronautics. Aware of the extent to which Col. Charles Renard of Chalais-Meudon employed wind tunnel testing to develop efficient airship hull forms, Capper, in 1902, asked Dr. G.E. Stanton of the NPL Teddington facility to test the resistance of a set of airship hull models in a wind tunnel designed to test the aerodynamic forces operating on roofs and other flat surfaces. The tunnel, unique in design and very influential, was a vertical tube, two feet in diameter, with a large fan at the bottom. A balance enabled the engineers to measure the forces operating on a test surface. Dr. Stanton had devised the first pitot and static head combination to gauge airspeed. Impressed by the results of this early cooperative venture, Capper designed and built the first experimental Farnborough wind tunnel. After 1909, aeronautical research in Great Britain was coordinated by a British Advisory Committee for Aeronautics.19

By 1914, the German universities of Gottingen, Aachen, and Berlin had become the international centers of research into fluid dynamics, especially the rapidly developing field of aerodynamics. At Gottingen, where Professor Ludwig Prandtl held forth, the aerodynamic laboratory was equipped with a low speed, closed circuit wind tunnel with a test section measuring 6.5 feet in diameter. Between 1900 and 1915, Prandtl developed the basic aerodynamic concepts that would guide developments in the field for decades to come, including the notion of the boundary layer and circulation theory. The immediate impact of this work would be apparent in the advanced wing designs of German aircraft during WW I.20

In addition to his major contributions to theoretical aerodynamics during the years prior to and during WW I, Prandtl trained a generation of graduate students who would carry the Gottingen research tradition to other parts
of the world during the post-war period. Max Munk, for example, would lead the development of the variable density wind tunnel while employed with the American National Advisory Committee for Aeronautics in the 1920s, while Theodore von Karman would introduce modern aeronautical research to Japan, and establish the Guggenheim Aeronautical Laboratory at the California Institute of Technology as an international center of aerodynamic research.21

In addition to the university-based research facilities, the Deutsche Versuchsanstalt fur Luftfahrt established a laboratory at Aldershot. Moreover, pioneering German aircraft manufacturers founded their own research facilities. The Zeppelin company, for example, hired leading graduate engineers like Claude Dormier, and funded specialized research in fields ranging from aerodynamics to materials in support of the design of both the rigid airships and large multi-engine airplanes produced by the firm. As a result of this impressive array of research initiatives, Germany produced the most technically advanced aircraft in the world by 1918, and, in spite of their defeat, introduced the rest of the world to fundamentally new ideas in aeronautics after 1918.22

Both Italy and Germany, much less technically advanced than France, Britain and Germany, had established aerodynamic research facilities long before the U.S. Nicholas Ye. Zhukovskiy had begun operating a relatively small wind tunnel at the University of Moscow as early as 1891. His work evolved into an impressive research program and, in cooperation with the German Wilhelm Kutta, a mathematical transformation of major importance to theoretical aerodynamics.23

In contrast to the situation in Europe, no American university had established a program in aeronautical engineering in 1913, when Jerome C. Hunsaker arrived at the Massachusetts Institute of Technology. Very small scale research efforts were underway at Catholic University, where A.F. Zahm established a relatively large scale wind tunnel, and under the auspices of the U.S. Navy at the Washington Navy Yard. Not until the establishment of the National Advisory Committee for Aeronautics in 1915, however, did the U.S. take an important, if belated, step toward closing the research gap.24

As early as 1912, the Secretary of the Navy pointed out that the U.S. lagged far behind other leading nations of the world in expenditures for aeronautics. France, he estimated, had spent $7,400,000 on flight to date. Russia was in second place, with an expenditure of $5,000,000; followed by: Germany, $2,250,000; and Great Britain and Italy, $2,000,000 each. Even Japan ($600,000) had out spent the U.S. ($140,000).24

While some of those funds were expended on state-supported research, most of the money was spent to build a national capacity to wage war in the air. By 1914, France was, by almost any measure, the world’s leading aeronautical power. While French government policy was neither entirely consistent nor completely rational, political decisions were, as historians

Emmanuel Chadeau and John Morrow have noted, primarily responsible for creating the strongest aviation industry in Europe.25 By 1914, the Farman company employed 1000 individuals in a series of plants scattered around Paris.25 Firms like Bleriot, only slightly smaller, had built a solid business foundation on the basis of foreign sales sparked by spectacular early achievements. The fact that two major firms, Duperousse and Nieuport, prospered in spite of the early loss of very strong founders, is striking evidence of a growing industrial maturity.

The aero engine industry had also prospered during the years, 1909-1914. In 1913 alone, the 650-800 individuals employed at the Gnome factory at Gennevilliers, produced a total of 1400 rotary engines. Renault, the second largest French producer of aero engines, produced fully one third of the power plants purchased by the French military. As Emile Lefebvre has argued, the French aero engine industry, the world leader by 1914, combined the use of the latest and best in American machine tool technology with the older French tradition of hand-crafted excellence in the metal trades.26

Following the excitement of the Reims meet of 1909, and the successful incorporation of military airplanes into the Army maneuvers in Picardy the following year, the French government began to use aircraft purchases as a means of strengthening the aircraft industry. In April 1910, for example, when a flood devastated the Voisin factory, the French government ordered 35 aircraft from the firm in a successful effort to prevent a collapse.27

In 1910-1911, a period during which the U.S. Army took delivery of 14 airplanes, the French government ordered over 200 flying machines. Across the face of an increasingly troubled Europe, success in the air symbolized the courage and strength of the nation. That was particularly true in France, where a growing number of citizens were determined that the nation which had sent the first human beings aloft should, at any price, retain leadership in the air. Proof of the extraordinary level of popular enthusiasm came in 1912, when the National Aviation Committee raised four million francs with which to supplement the national budget for military aviation.28

At the outbreak of war, it was by no means difficult to find officers who shared the view of General Ferdinand Foch to the effect that: "... l'aeroplane, c'est zero." A very large number of other officers, civilian ministers and politicians, aviators, industrialists and enthusiasts, however, had already insured that the commander of the Twentieth Corps would soon be forced to revise his opinion.29

By 1914, Germany rivaled France for leadership in the air. Interest in winged flight was slow to build, however, in a nation that reserved its initial enthusiasm for the majestic Zeppelin airships. The first three Zeppelins, developed at private expense, were underpowered and difficult to control. The loss of the LZ4 as a result of an accident at Eckertingen in August 1908 seemed to spell the end of any hope for government funding and the final collapse of the program. Public enthusiasm for the giant craft was so high, however, the Count Zeppelin and his associates were swamped with
gifts of food, wine, clothing and money arriving in the mail. Within a single day, the public contributed the price of a new airship.\textsuperscript{30}

What had begun as a disaster enabled the Count to put his enterprise on a solid financial footing. In addition to building airships, the company was an umbrella for firms that produced airship engines, hangers, the huge gas cells manufactured of goldbeaters skin, and multi-engine bombers that attacked Allied targets during WWI. The Zeppelin company, a firm operated for profit, became a national asset. The huge airships cruising over major German cities symbolized the strength of the Reich, just as success with winged flight was the pride of La Belle France. Moreover, the Zeppelin was the first aircraft able to carry a significant bomb load against the crowded cities of potential enemies. While the perspective was critically different, the Zeppelin was as powerful a symbol in London as it was in Berlin.\textsuperscript{31}

While French and British aviators and the American pioneer Glenn Curtiss made history at the Reims air meet in 1909, German officials arranged a spectacular of their own. Orville Wright demonstrated his airplane, and gave Crown Prince Frederick Wilhelm a fifteen minute flight. In addition, Mr. Wright was treated to a much-publicized flight aboard a Zeppelin. By 1912, however, the German General Staff had come to recognize the value of winged aircraft for reconnaissance, communication and artillery spotting duties. Government contracts for airplanes grew from 130 in 1912 to 432 in 1913. The National Aviation Fund, organized by government and industry officials in 1912, and headed by Prince Heinrich of Prussia, encouraged and funded aeronautical advances.

The government increased the number of firms with which it was contracting and encouraged existing manufacturers to diversify and enter the field of aircraft production. By 1914, Ruppler had a payroll of 400 workers, while Albatross employed 745. Finally, officials worked hard to convince new firms, such as Oberaeul, to begin the production of additional types of power plants.

German aeronautical planners followed a generally conservative course, emphasizing the production of slow, stable designs like the Etrich Taube, which met the specific needs outlined by the General Staff. At the same time, some support was provided to newcomers like the Dutch designer Anthony Fokker, who pursued what would become one of the most advanced designs available at the outbreak of war. In short, while Germany was generally regarded as being second in air strength to France in August 1914, the Zeppelin airship was clearly superior to any other contemporary weapons system, and German research and development programs were second to none.\textsuperscript{32}

As in France and Germany, British officials recognized the importance of at least a minimum national investment in aviation technology. Col. John Edward Capper of the balloon factory at Farnborough had taken an early interest in the work of the Wright brothers, and befriended them during trips to the U.S. At the same time, Capper ultimately opposed British acquisition of the Wright technology, arguing instead that His Majesty's Government should pursue its own experimental program. Capper supported two airplane development programs at Farnborough, one based on the notions of the American showman and manned kite enthusiast Samuel Franklin Cody, the other in support of the work of John Dunne. Cody would succeed in September-October 1908, while Dunne built and flew an important series of swept-wing, biplane gliders.

While the Royal Aircraft Factory, Farnborough, working in cooperation with the National Physical Laboratory would remain an important source of new aircraft designs during the period 1910-1914, A.V. Roe, T.O.M. Sopwith, Geoffrey de Havilland and others struggled to establish the pioneer aircraft industry in Great Britain. Some aviation enthusiasts/commentators took officials of the new Royal Flying Corps (1912) and the War Office to task for a procurement policy that seemed to favor government factory designs over those of private manufacturers. The Royal Naval Air Service, however, paid far more attention to the use of procurement authority as a means of supporting and strengthening private manufacturers like Sopwith. By the summer of 1914, the RFC had begun to forge an important relationship with Avro, de Havilland, Sopwith, and Vickers.\textsuperscript{33}

Smaller nations had also paid considerable attention to a national presence in the air. While Russian aviators tended to earn their wings on machines of foreign designs, there was no more imaginative or successful aeronautical engineer in Europe than Igor Sikorsky, who had produced the first successful multi-engine aircraft in history. By August 1914, the Imperial government had spent very considerable sums on aviation, building an air force that, in terms of sheer size, rivaled even that of France.\textsuperscript{34}

The money had not always been wisely spent, however. A scattergun procurement policy had resulted in the acquisition of a very large number of foreign models, often without sufficient spare parts. Insufficient thought had been given to the support of a national aviation industry, or to the promotion of aero engine production. There were exceptions, notably the support offered to Sikorsky, and the well-considered decision to outfit the Imperial Naval Air Service with Curtiss flying boats. Moreover, government support enabled Nikolai Zuluievskiy to establish a program of aerodynamic research that rivaled the German effort.

Austro-Hungarian and Italian officials had made considerable investments in aviation. Vienna emerged as a European aeronautical center prior to 1914, and Austro-Hungarian aviators were second only to their French brethren in terms of the number of records held. Imperial officials failed to establish an effective national aviation policy, however. The Etrich Taube, an Austro-Hungarian design, was the standard machine in Central Powers service at the outset of hostilities, yet most of these machines were built by German firms like Rumpler under license.

Early Italian aviators learned to fly on foreign machines. The first Italian aviation factory was established until 1912 to build French designs under
license. Guilio Douhet and a few other leading military officers sought to support the efforts of talented Italian designers like Gianni Caproni, who had produced his first tri-motor bomber in 1913. Nevertheless, the Italian air arm entered WWI operating Bleriot, Nieuport and Farman aircraft. Even so, by 1914 nations like Italy and Austro-Hungary had developed a strength in the air that far surpassed that of the United States.53

Whatever the relative success or failure of European governments in their efforts to support the development of flight technology and to strengthen their own relative status as aerial powers, virtually all of those nations spent more money, more effectively than did the government of the U.S. The progress of flight technology in the 20th century has been based on a variety of factors. Flight symbolized the realization of our deepest aspirations for freedom, power and control, captured the public imagination as had no other technology before or since. If human beings can fly, is there anything they cannot accomplish?

As important as public enthusiasm and potent symbolism have been in the history of aviation, they do not explain the rapid and steady advance of flight technology since 1903. The long journey from Kitty Hawk to the edge of the solar system was fueled by billions of dollars, francs, pounds, deutschmarks, rubles, lira and yen expended for a series of ever improving winged weapons systems. Ultimately, government funding resulted in aircraft with sufficient range and carrying capacity so as to be commercially viable. From that point to this, the complex interplay between commercial and military imperatives has driven the progress of technology.

The single most important factor, however, has been the assessment by national leaders of the importance of flight technology for the life, defense, health and survival of the nation. European nations discovered that fact before the United States. That fact, not the Wright patent suits, explains the rapid progress of flight technology in Europe relative to the U.S.


8 First Flights, episode broadcast by Media General Cable Network, Arts and Education Channel, October 14, 1995.


11 Ibid.


14 Ibid., p. 162.


18 Bonney, Heritage, p. 156.

19 Penrose, British Aviation, pp. 98-99.

20 Bonney, Heritage, p. 156.

21 For information on the birth of applied fluid dynamics in Germany and its transfer to the U.S. see: Paul A. Hanle, Bringing Aerodynamics to America (Cambridge, MA: MIT Press, 1982).

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2 Ibid., p. 521.


24 Bonney, Heritage, p. 156.

25 L’Aérophile, no. 6 (15 March 1914), pp. 124-127.


27 Ibid., p. 16.


32 For detailed information on German aircraft policy see: John Morrow, Building German Airpower, 1909-1914 (Knoxville: The University of Tennessee Press, 1976); John Morrow, The Great War in the Air, pp. 1-57.


Message from Erik D. Carlson, Ph.D.
Head of UTD Special Collections

In last years’ message, I wrote hoping that the next Jalnick Lecture would be as successful as the wonderful presentation by David Lewis on Eddie Rickenbacker and Eastern Airlines. I am pleased that the 2003 Jalnick Lecture surpassed all of my expectations! A capacity crowd of 131 people listened to a spellbinding lecture on early American aviation history by Tom Crouch, “Blaming Wilbur and Orville: The Wright Patent Suits and the Growth of American Aviation.”

As Head of the History of Aviation Collection based in the McDermott Library at the University of Texas at Dallas, I want to express my gratitude to the Jalnick family for their support of this important lecture series. Appreciation also goes to Dr. Larry Sall, Director of UTD Libraries, for his pioneering work in the History of Aviation Collection and continued support of its programs.

The 2003 lecture was aided tremendously by the work and dedication of the Special Collections staff - Carole Thomas, Paul Oelkrug, Toni Huckaby, Rick Biddenstadt and Thomas Allen. Thanks to Tom Koch for public relations and printing coordination for this event.

Support from friends of the History of Aviation Collection is also appreciated.
Tom D. Crouch, center, presents a copy of his Wright Bros. book to lecture sponsors George W. Jalonick IV and his wife, Mary Jalonick.

Tom D. Crouch, Ph.D.

Born in the “Birthplace of Aviation,” Dayton, Ohio, Tom D. Crouch has distinguished himself as one of the world’s leading authorities on the history of aviation. In 1974 he became the Associate Curator, Astronautics and Aeronautics at the National Air and Space Museum (NASM) at the Smithsonian Institution, Washington D.C. In 1998 he assumed his current position of Senior Curator, Aeronautics for NASM.

Besides NASM, Crouch played a major curatorial role in opening The Neil Armstrong Museum and the Ohio Historical Center. His leading books include the award winning The Bishop’s Boys: A Life of Wilbur and Orville Wright, Eagle Aloft: Two Centuries of the Balloon in America, Bleriot XI: The Story of a Classic Airplane, and A Dream of Wings: Americans and the Airplane. Among his numerous awards is the Smithsonian Distinguished Lecturer Award for 2002. In 2000 Crouch was appointed chairman of the First Flight Centennial Federal Advisory Board. He is lecturing throughout America during the 100th Anniversary of the Wright brothers first powered flight.

Metal engine plate from The Wright Flyer No. 10, part of the first series of airplanes ordered by the United States Army. Part of the History of Aviation Collection at the University of Texas at Dallas.

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