FLYING MACHINES
A History of Early Aviation

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Print Is Here to Stay at the Linda Hall Library

Earlier this year, Publisher’s Weekly reported that 682 million printed books were sold in 2017, or 8 million more than in 2016. This follows a 3.3 percent increase in 2015. In fact, the number of books sold each year since 2013 has increased over the previous year. If the printed book allegedly is on life support, this is a surprising sign of vitality.

Printing arrived in the West from Asia over 500 years ago, spreading rapidly throughout Europe and the New World, increasing literacy and access to knowledge. A resilient technology, printing has persisted due to its utility and the lack of a viable alternative until the advent of digital technology. Print’s demise is not imminent, but it is endangered. Eventually, all newly-created knowledge will only be recorded digitally.

As a receptacle of intellectual history, the printed record must be preserved. Contrary to belief, the sum of all human knowledge has not been digitized, and given its magnitude, it is unlikely that it ever will be. But we must remember that digitized information is not safe from decay. It is fragile and must be refreshed regularly or else suffer from progressive degradation until it is unreadable. Currently, the only way to assure intellectual history’s continued availability is to retain printed publications.

Retaining scientific information in print is at the heart of the Linda Hall Library’s mission, and the investment in ensuring the collection’s longevity through conservation and preservation is considerable. To that end, our climate-controlled stacks are free of dust and harmful contaminants. While our collections continue to be digitized for ease of use, print will not be set aside in favor of electronic formats. As “guardians of science’s collective intellectual heritage,” we will strive to secure the long-term survival of the printed record, and its availability for use.

Lisa M. Browar, President

A Good Way To Start Your Saturday

This fall’s Second Saturday Conversations offer an eclectic mix of topics of interest. Learn more at lindahall.org.

September 8, 11:00 a.m.  
Sports Concussion Awareness  
Dr. Michael A. Rippee, assistant professor of Neurology at the University of Kansas Medical Center

October 13, 11:00 a.m.  
To Be Announced

November 10, 10:00 a.m.  
How Do I Become an Engineer?  
Designed for high school and college undergraduate students, the event will include a panel discussion with engineers, and a discussion with members of area engineering schools.

December 8, 11:00 a.m.  
Coffee with the Curator  
A discussion of Flying Machines and early aviation.

Where Were You When We Landed on the Moon?

Where were you when Neil Armstrong said, “One small step for (a) man. One giant leap for mankind”? The Library is collecting memories of the night of July 20, 1969 for its Spring exhibition celebrating the 50th anniversary of the Apollo 11 moon landing. We’re also collecting images of memorabilia. Both of which will be used on a special web page to commemorate the anniversary. Send images and recollections to VP for Communications Jon Ratliff at ratliffj@lindahall.org.
Record Number of Fellows to Conduct Research

The Linda Hall Library is pleased to announce the recipients of its research fellowships for the 2018-19 academic year. These scholars will receive financial support to travel to Kansas City between June 2018 and August 2019 to conduct research in the Library’s extensive collections. The 16 scholars comprise the largest fellowship cohort in the Library’s history.

Notices will appear in the Hedgehog Express e-newsletter and on social media regarding upcoming research presentations by fellows. The Library will begin accepting applications for 2019-20 in September with an application deadline in January 2019. Learn more about the fellows and the application process at lindahall.org/research/fellowships.

2018-19 Linda Hall Library Fellows

**Edward Halley Barnet** (Stanford University) Residential Fellow
Homo Musicus: The Early Modern Musical Science of the Body

**Jordan Bimm** (York University) Residential Fellow
Putting Mars in a Jar: The Military Origin of Astrobiology

**Katrin Boniface** (University of California, Riverside) Travel Fellow
Manufacturing the Horse

**John Bukowski** (Juniata College) Travel Fellow
Mathematics at the Time of the Development of the Calculus

**Rebecca Egli** (University of California, Davis) Residential Fellow

**Aaron Fine** (Truman State University) Travel Fellow
Color Theory: A Critical Introduction

**Gerard Fitzgerald** (George Mason University) Residential Fellow
The Nature of War: An Environmental History of Industrialization in the United States During World War I

**Sadegh Foghani** (University of South Carolina) Residential Fellow
Engineering the Revolution: American Pragmatism, French Thermodynamics, and the Formation of Religious and Political Thoughts in 20th-Century Iran

**Rocio Gomez** (University of Arkansas) Residential Fellow
Victors and Vanadium: Scientific Discovery in the Age of Revolutions

**Emily Herring** (University of Leeds) Residential Fellow
Philosophical Biology: The Reception of Henry Bergson’s Creative Evolution in French and British Biology

**Mira Kohl** (Tulane University) Residential Fellow
A Railway for South American Unity: Bolivian and Brazilian State Building along the Frontier, 1935-1964

**Gustave Lester** (Harvard University) Travel Fellow
Interstate Geology: Mapping the Raw Materials of Industry, 1809-1867

**Stefan Peychev** (University of Illinois at Urbana-Champaign) Residential Fellow
Fire and Water: The Hydrothermal Landscapes of the Balkans in Western Travel Literature

**Brent Purkaple** (University of Oklahoma) Travel Fellow
Visualizing the Unseen: The Jesuits and Optical Illusions in Early Modern Europe

**Peter Soppelsa** (University of Oklahoma) Travel Fellow
The World War on Rats

**Henry Zepeda** (Bayerische Akademie der Wissenschaften) Residential Fellow
The Epitome Almagesti: Critical Edition and Study
Cal Rodgers at the controls of the Vin Fiz.
“Calbraith Rodgers Makes His Last Flight.”

CAL RODGERS AND THE VIN FIZ

By Richard P. Hallion
Calbraith Perry “Cal” Rodgers (1879-1912) is one of the most intriguing, enigmatic, and ultimately tragic of early American aviators. An ever-present cigar, cloth cap, and rough jacket gave him the appearance of a working-class laborer, but he came from a distinguished and well-to-do military family, his ancestors including Captain Oliver Hazard Perry and Commodore Matthew Perry. A childhood illness robbed Rodgers of much of his hearing, and the military career he earnestly desired (he went to Columbia University instead). Rodgers was an adventurous and outstanding all-around athlete and sportsman, though impulsive and given to a reserved, even taciturn, moodiness.

Rodgers took up aviation, attending the Wright School at Dayton and soloing after just 90 minutes of instruction. He proved this two months after graduation when he won a $11,285 (approximately $285,000 in 2018) prize at a Chicago air competition.

In the fall of 1910, just seven years after the Wright brothers first flew at Kitty Hawk, North Carolina, American newspaper magnate William Randolph Hearst announced a $50,000 prize (worth approximately $1.3 million in 2018) for the first aviator to complete a flight across the United States from coast to coast in 30 days or less.

Hearst’s challenge was a formidable one, and only five aviators took it up. Of these, Harry Atwood and Earle Ovington, both veteran pilots, seemingly had the best chance. But Atwood could not secure financing, and Ovington crashed at his start and abandoned his attempt. Thus, only Robert Fowler, James Ward, and Rodgers competed.

Fowler left first, taking off on September 11, 1911 from San Francisco’s Golden State Park. Ward, flying a Curtiss biplane, left from New York’s Governor’s Island on September 13. Rodgers left last, taking off from Sheepshead Bay, New York, on
September 17 in a brand-new Wright Model EX (for “Experimental”) biplane constructed specially for him.

Built of cloth-covered strut-and-wire-braced spruce spars, ribs, and longerons, the Model EX spanned not quite 32 feet, with a length of just over 21 feet. Powered by a four-cylinder, 35-horsepower Wright water-cooled engine, it had a maximum speed of approximately 52-miles per hour, carried 15 gallons of gasoline, and had a flight endurance of three and a half hours. Its pilot sat in the open, exposed to the elements.

To finance his flight, Rodgers struck a deal with Armour & Company, marketing a grape-flavored drink named “Vin Fiz.” In return for garishly painting “Vin Fiz: The Ideal Grape Drink” in large letters on the underside of the EX’s lower wings, Armour paid Rodgers $5.00 (now approximately $125.00) for every mile he flew. Understandably, the airplane itself became known as the Vin Fiz, adding further to the power of Armour’s advertising message. Armour also funded a three-car railroad train carrying spare parts and materials, with a Pullman car and coach for Rodger’s mechanics and the pilot’s relatives.

By the time Rodgers took off, his rivals Fowler and Ward were delayed following accidents that threw them off-schedule and eventually frustrated their own hopes of success. In contrast, Rodgers’ first day aloft went so smoothly that he believed he could reach Chicago in four days. But this proved a cruel illusion: the next day he suffered the first of an eventual five serious crashes, though, with the help of some solicitous citizens and local authorities at Middletown, New York, Rodgers, and their mechanics had the plane back in the air in just two days.

The accident set a pattern for the rest of the flight. Rodgers had a few days of smooth flying, but many more which ended in forced landings or even crashes—a combination of the EX’s marginal stability, tricky handling, design layout, and its awkward control system. It took him 21 days and two crashes, to reach Chicago.
Rodgers realized by now that he could not reach California in 30 days, placing him out of competition for the Hearst prize. Asked by a reporter if he would quit, he replied “I’m going to do this whether I get $5,000 or 50 cents or nothing. I am going to cross this continent simply to be the first to cross in an aeroplane.”

And so he did. Rodgers arrived in Kansas City, Missouri, on October 11, buzzing the city and landing in Swope Park as 10,000 cheering spectators looked on. Two days of bad weather gave Rodgers’ mechanics a chance to service the now well-worn airplane, and on October 14 he resumed his westward journey, reaching Dallas, Texas, on October 17. The next day, as he flew over the Texas State Fair, a large eagle flew head-on at the Vin Fiz, fortunately breaking off just before it would have collided: it was an ominous portent.

Near Austin, an ailing piston forced Rodgers into another emergency landing, and mechanics replaced the entire engine with a spare from the train. On October 25, leaving from Spofford, Texas, he had a fourth accident that shattered the plane’s propellers and damaged its wings. Even so, the plane was patched up by his faithful mechanics, and he reached El Paso on October 29, pressing on to Tucson on November 1, where he met his remaining rival, Robert Fowler, en route to Florida. The two men exchanged best wishes and went their respective ways (Fowler eventually reached Jacksonville, Florida, on February 8, 1912).

Rodgers most dangerous accident occurred on November 3, as he droned over California’s Salton Sea near Imperial. One of the engine’s four cylinders burst, fragments lacerating his right arm. Within a day, mechanics had replaced the destroyed engine and on November 4, Rodgers reached Banning, California, fighting a leaking radiator and turbulence over San Gorgonio Pass, which is still treacherous for light aircraft today. Rodgers touched down in Pasadena’s Tournament Park late on the afternoon of November 5, having covered 4,231 miles in 49 days, with his actual flying time being 82 hours and four minutes. An enthusiastic crowd estimated at 10,000 persons mobbed the plane, draping Rodgers in an American flag.

Since Pasadena is approximately 30 miles from the Pacific Ocean, Rodgers considered his flight incomplete. On Sunday, November 12, he left for Long Beach. A broken fuel line forced a brief landing near Covina, and then, after getting airborne, the reconditioned engine failed for good and the Vin Fiz smashed into the ground near Compton, leaving its pilot unconscious and with a broken ankle. His recovery took nearly a month before he left Compton on December 10 for the short hop to Long Beach, landing on the wet sand and coasting to a stop before a crowd of 50,000 onlookers. The plane had been repaired so often that when it touched down on the beach, only its rudder, an oil drip pan, and two wing struts remained of the original aircraft.

Rodgers did not long survive. On April 3, 1912, he took off from Long Beach, and while flying along the shore, ran into a flock of gulls, one of which jammed the rudder, sending the plane plunging into the surf. Horrified onlookers pulled its fatally injured pilot from the wreckage. Vin Fiz’s string of disasters was still not done. Once again, the wreckage was rebuilt and flown. Again, it crashed with fatal results, killing pilot Andrew Drew. Restored once more, the Vin Fiz flew until grounded by a lawsuit filed by Rodger’s mother in 1914. From the accumulated assemblage of spares and scraps, the Vin Fiz was, in fact, eventually rebuilt. In 1917, Rodger’s mother donated the rebuilt aircraft to the Carnegie Institute in Pittsburgh, Pennsylvania. It passed to the Smithsonian Institution in 1934, where it is currently on exhibit, little more than an assemblage of parts that, at one time or the other, were incorporated on the Vin Fiz during its multiple “lives,” and a sad case where an airplane enjoyed greater “survivability” than its pilots.

Calbraith Perry Rodgers’ flight across the United States constituted more of a tribute to his own indefatigable courage and determination than to the practicality of transcontinental flight. That would have to wait until the 1920s. By the mid-1930’s, passengers could speed across the country in new Douglas, Boeing, and Lockheed airplanes with cruising speeds of nearly 200 miles per hour: but Cal Rodgers was first.
With great clarity, John Blancett remembers his first visit to the Linda Hall Library. It was 1991, his senior year at the University of Missouri-Kansas City, and he was working alongside Dr. Debra O’Bannon, professor in the Department of Civil and Mechanical Engineering.

Blancett worked with Dr. O’Bannon on a 3-D model illustrating the way pollutants spread in a lake situation. The Linda Hall Library’s collections played a key role in their research.

“I was just exposed to this gem,” Blancett said of those early visits to the Library, adding that he enjoys the smell of books right as he enters the facility. “That was a good thing.”

Once a boy drawn to science and history, who played with Lincoln Logs and an erector set, today Blancett is a Project Manager in the Water Resources Department at HNTB. During a career of nearly 25 years, Blancett has worked on designs related to streambank stabilization, highway storm drainage, bridge hydraulics and scour analysis, water distribution and transmission, and sanitary sewer collection systems. His major projects have included Bruce Watkins Drive, the Grandview Triangle/Three Trails Crossing Memorial Highway, and the Kansas Speedway, water distribution replacement work with the City of Kansas City, Missouri, as well as numerous emergency streambank stabilization projects with the Army Corps of Engineers.

Lifelong learning holds a special importance in Blancett’s life. After graduating with a master’s degree from UMKC, he returned to Metropolitan Community College-Longview to study philosophy. He is a past president of the American Society of Civil Engineers (ASCE) – Kansas City Chapter.
City Section, and in spring 2018, he participated as a first-year judge for the 67th Greater Kansas City Science & Engineering Fair at Union Station.

Blancett fondly remembers his parents trying to expose their children to science, history, and other cultures during family outings. Today, John and his wife, Melissa, take their sons, Alex (7), and Adam (4), to similar venues across Kansas City, including Hallmark Kaleidoscope at Crown Center, Science City at Union Station, The National Museum of Toys and Miniatures, the Harry S. Truman Presidential Library & Museum, the Nelson-Atkins Museum of Art, and Powell Gardens in hopes of instilling the same love of learning that his parents gave to him “…those were the best memories,” he said. “As my boys get older, and if they have a knack for math and science, I could see how they could benefit from the Linda Hall Library and the programs it co-produces with the Linda Hall Library Foundation.”

John Blancett, who derived so much from the Library during his college years, was compelled to make his first donation to the Linda Hall Library Foundation in 2017. “It’s a matter of give and take,” he said. Among the events that made lasting impressions on him were David Levy’s lecture on the total solar eclipse, Robert Hulse’s lecture about architect Isambard Kingdom Brunel, and the exhibition, Ribbons Across the Land: Building the U.S. Interstate Highway System. He looks forward to bringing his young sons to programs that will whet their appetites for knowing more about science as they grow, and especially anticipates introducing them to the William N. Deramus III Cosmology Theater.

Blancett believes in the future of libraries for their ability to meet information needs while opening new horizons for their patrons.

“We’re really lucky to have this as part of our community,” he said of the Linda Hall Library. “It’s known throughout the United States, and we’re lucky to have it here.”

John Blancett and his family visited the Armour Swift Burlington (ASB) Bridge in Kansas City, Missouri, on the south bank of the Missouri River.
The Unusual Suspects

Joe Bussell has seen it all. The Linda Hall Library’s Head of Stacks, who will retire later this year after 18 years of service, possibly knows more about the physical locations of items in the Library’s vast collections than anyone else. Because Bussell is a visual artist whose work has been collected by the Nerman Museum of Contemporary Art as well as by many prominent private collectors, he has a keen eye for anything related to the worlds of art, photography, and design.

Joe’s travels through the stacks have revealed art and design publications acquired by the Library at a time when the subject matter they contained represented state-of-the-art technologies. At the time, their contents were useful to current practitioners and the source of scholarly investigation. With the passage of time, areas of scholarly interest moved on and these publications were used less often. Nevertheless, what goes around, comes around, and what was once the subject of scholarly inquiry may yet again prove research-worthy as historians turn their attention to mid-20th century topics.

Some of Bussell’s “finds” include the journals, American Fabrics, American Photography, and Art and Industry. These publications straddle the worlds of art and science. While they may be of less interest to contemporary scientists and practitioners, historians studying legacy technologies, product design, economics, women’s history, sociology, popular culture, and other related areas should become more familiar with them.

An issue of American Fabrics from the 1950s notes, “the American textile industry casts a major influence on the economic and social aspects of the world in which we live.” The Library holds issues of this quarterly magazine dating from 1946 until the mid-1960s. Each issue is filled with illustrative materials, including fashion photography, as well as actual fabric swatches that
display patterns and weaves now considered “vintage,” and chronicle the rise of synthetic and double-knit fabrics along with changing fashion trends from Dior’s 1950s “New Look” to the mod 1960s fashions so memorably recreated in TV’s *Mad Men*.

The history of amateur photography in the United States exists in the pages of *Photography*, created in 1907. Known by 1955 as *Popular Photography*, and later as *American Photography*, the publication is a resource for amateur photographers but more importantly, it documents American life throughout the 20th century. A 1918 issue offers bucolic nature scenes. A copy from 1942 offers instructions on the proper method of shooting identification badge photos. “Let’s Photograph Your Favorite Room” appearing in the April 1952 issue draws attention to the post-war housing boom as Americans all over the country migrated to the suburbs.

Initially published in 1936 as *Commercial Art and Industry*, later known as *Art and Industry*, and finally as *Design for Industry*, this monthly journal celebrated industrial design and manufacturing in the second half of the 20th century. From one incarnation to the next, it consistently examined the post-war advertising and manufacturing landscape by featuring articles about advertising in Japan as its post-war economy began to grow, and the work of artist Terrence Cuneo, who painted factory scenes. *Design for Industry* ceased publishing in 1959 but, like the other publications noted, not before capturing a slice of 20th century design history that offers a wealth of information for historians working on related topics.

Bussell, who holds two Master of Fine Arts degrees, says his eye “is trained to find that kind of stuff.” Here’s hoping the next Head of Stacks will keep an eye out for the interesting and unusual.
In March 1791, a small crowd gathered in Brûlon, a small town southwest of Paris, to witness a curious demonstration organized by a pair of local aristocrats named Claude and René Chappe. René led onlookers to a terrace in the center of town, where he had placed a telescope, a large wooden panel painted black on one side and white on the other, and a modified clock whose face was evenly divided into 10 sections. He explained that this final device was one of a pair invented by his brother Claude, who had established an identical setup nine miles (15 km) away in the village of La Flèche.

At a prearranged time, René started his clock. As the second hand finished one rotation, he rotated the wooden panel from black to white to signal Claude, allowing them to coordinate the motion of the two timepieces. Once the clocks were synchronized, the Chappes could use their panels to signal when
the second hand passed a particular number. In combination with a specially designed codebook, these numbers could then be converted into messages. On the recommendation of a local physician, René successfully transmitted the following message to his brother: “Si vous réussissez vous serez bientôt couvert de gloire.” (“If you succeed, you will be covered with glory.”)

The entire process took four minutes, a sluggish pace compared to today’s emails or text messages, but a massive increase in speed compared to traditional couriers. It also persuaded Claude Chappe that communication over long distances was an achievable goal that merited support from the French government. Over the next two decades, Claude became the driving force behind the establishment of Europe’s first data network—an optical signaling system that crisscrossed the continent decades before the better-known efforts of inventors like Samuel Morse, Charles Wheatstone, and William Cooke.

The Chappe’s French telegraph system had always been a family affair. René Chappe had helped Claude with his earliest experiments, their older brother Ignace had used his political connections to help get the project off the ground, and two other siblings (Abraham and Pierre Francois) served as administrators once the network was established. It was fitting that Ignace wrote the first comprehensive account of Claude’s system. The Linda Hall Library recently acquired a copy of Ignace’s *Histoire de la Télégraphie* for its History of Science Collection. Originally published in 1824, the library’s copy is an expanded second edition from 1840, which includes an extended, illustrated discussion of the semaphore telegraph. It is a must-read text for anyone interested in the historical origins of today’s networked world.

Claude Chappe was an unlikely system-builder. Originally trained for a job in the clergy, he lost his position following the storming of the Bastille in 1789. Retreating to his family estate in Brûlon, he started exploring the possibility of long-distance communication. He was not the first to consider such ideas—a century earlier, the English polymath Robert Hooke had proposed his own visual signaling scheme—but Chappe benefitted from both his own persistence and France’s chaotic political situation. With most of Europe aligned against the new revolutionary government, France’s leaders were eager to exert stronger control over their territory. As a result, when Claude reached out to Ignace, a member of the newly-established legislative assembly, to secure support for what he now referred to as his tachygraphe (“fast writer”), he found a receptive audience. Upon receiving official authorization, Chappe launched preparations for an official demonstration. He built a series of three towers providing a line-of-sight connection between the Belleville neighborhood of Paris and Saint-Martin-du-Tertre, approximately 16 miles (26 km) to the north. There were delays and setbacks. On a few occasions, angry mobs attacked the construction sites, due to fears that Chappe’s inventions were sending signals to royalists and other enemies of the revolution.

*The Napoleonic Internet*

The frontispiece of the Library’s recent addition, *Histoire de La Télégraphie* by Claude Chappe.
The Napoleonic Internet

(continued from page 13)

During construction, Chappe redesigned the tachygraphe. After eliminating the need for synchronized clocks with an array of five sliding panels, he adopted a semaphore-inspired system consisting of a large rotating bar (called a “regulator”) with two smaller bars (“indicators”) on each end. The whole apparatus could be adjusted into 98 different configurations using a specially created pulley system, allowing for a more sophisticated signaling code. On the recommendation of Ignace’s colleague in the Ministry of War, Claude also changed the system’s name from “fast-writer” (tachygraphe) to “far-writer” (télégraphe).

Following the successful demonstration of the new semaphore telegraph in July 1793, Chappe received permission to start building stations connecting Paris with Lille, a distance of 130 miles (210 km) to the north. Within a year, the new telegraph line, consisting of 23 towers, was sending dispatches about ongoing battles with the Austrian and Prussian armies. Messages now reached the capital hours before a courier could have arrived. Chappe received an official title (telegraph engineer) with a rank equivalent to a military lieutenant and a new assignment: building a telegraph line from Paris east to Strasbourg.

The work proved difficult, and Claude scrambled to find the resources to construct each tower and ensure it was fully staffed. Soon after the Strasbourg line opened in 1798, he acquired a new patron—Napoleon Bonaparte. Napoleon immediately recognized the importance of this new communication network. Although he resisted Chappe’s suggestions to open the network to commercial traffic as well as military and government dispatches, he pressed for its rapid expansion. By the time he went into exile on St. Helena in 1815, the telegraph network included 224 stations and stretched more than 1,100 miles (1,790 km). It also inspired several other countries, including Russia, Denmark, and Sweden to set up their own optical telegraph systems. Many of these networks remained in service until the 1850s when they were replaced with electrical telegraphs that did not require daylight, clear weather, or direct line-of-sight between stations.

Tragically, Claude Chappe never lived to witness the heyday of the optical telegraph. By 1800, the physical strain associated with his work, combined with accusations that he may have stolen some of his inventions, plunged him into a deep depression. After several years, the pain proved too much to bear, and in January 1805, he committed suicide by throwing himself down a well outside the headquarters of the Telegraph Administration in Paris. His tombstone was inscribed with a telegraph tower displaying the sign for “idle” or “at rest.”

Let There Be Lower Energy Light

Beginning in February, the Library’s facilities staff replaced 5,000 of the Library’s four-foot fluorescent lamps with LED lamps.

The four-month project replaced 32-watt lamps with new 10-watt LEDs, reducing the Library’s energy footprint and saving an estimated $28,000 per year energy consumption, lower cooling costs and bulb replacement. The new LED lighting will eliminate exposure to UV rays and new plastic lamps will replace glass fluorescents for reduced safety risk.

Subscribe to the Library’s free monthly e-newsletter, the Hedgehog Express at lindahall.org/news/subscribe
### Calendar of Events

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<th>Date</th>
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<tr>
<td>9.13</td>
<td>“From Drones to Flying Cars: New Frontiers in Human-Technology Interaction”&lt;br&gt;Mary “Missy” Cummings, Director of Duke University’s Humans and Autonomy Laboratory and former U.S. Navy fighter pilot</td>
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<tr>
<td>9.25</td>
<td>“Fly Girls: How Five Daring Women Defied All Odds and Made Aviation History”&lt;br&gt;Author Keith O’Brien&lt;br&gt;This event is co-sponsored by Rainy Day Books. A book signing will follow the lecture, and copies of Fly Girls will be available for purchase.</td>
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<tr>
<td>10.4</td>
<td>“Escape from Gravity”&lt;br&gt;Entrepreneur and pilot Erik Lindbergh</td>
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<tr>
<td>11.8</td>
<td>“Innovative Aircraft”&lt;br&gt;Scaled Composites Chief Engineer Matthew Stinemetze</td>
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**Can’t attend one of our evening lectures?**

Many of them are available on Livestream and Facebook Live, and later archived at [lindahall.org](http://lindahall.org). Follow us on Twitter or Facebook to learn more.

All lectures are free and open to the public; however, an e-ticket is required.

Doors open at 6:00 p.m. to view the exhibition. Evening programs begin at 7:00 p.m.

Find out more about these and other great programs, and register for tickets at: [lindahall.org/Fall](http://lindahall.org/Fall)
Flying Machines: A History of Early Aviation showcases the pioneers of aviation who soared through the air. The Linda Hall Library's uplifting fall programs will highlight the next generation of aviation and aerospace flight. Learn more about the future of flight this fall at the Library.

Funding for Flying Machines and related programs has been provided by the Victor L. and Helen B. Regnier Fund, with additional support from the Linda Hall Library Foundation President’s Circle and other generous donors.

Can’t attend? Watch via Livestream or on Facebook Live. All streamed videos are archived on lindahall.org. All lectures are free and open to the public; however, registration is required.

Learn more and register at LINDAHALL.ORG

The Fall 2018 issue shows an illustration of a hedgehog from Volume 8 of Georges-Louis Leclerc, comte de Buffon’s Histoire naturelle (1760). You can browse all 44 volumes of this natural history encyclopedia by visiting the Linda Hall Library’s History of Science Collection.