Red, white, and blue shields along America’s highways have become one of the most recognized trademarks in the country. The four-pointed signs, embossed with the route number of the superhighway, brand the Dwight D. Eisenhower National System of Interstate and Defense Highways.

The roadway’s remarkably long governmental name is usually shortened to the Interstate System or the Interstate. Despite its omnipresence, the Interstate System remains hidden in plain sight. A strange truth for one of the largest civil engineering projects in the world. Most of the tens of millions who drive on it daily are unable to grasp the system’s magnitude or have heard the story of its making.

The Interstate System celebrates its 60th anniversary in 2016. This article is in conjunction with Linda Hall Library’s exhibitions on the Interstate, Ribbons Across the Land: Building the U.S. Interstate Highway System and Gas, Food, Lodging, which highlights Route 66.

“The Big Road,” as truckers often call the Interstate System, is a 46,876-mile grid of 68 superhighways spanning north and south, east and west across the United States, including Alaska and Hawaii. Approximately 55,000 bridges and more than 100 tunnels were built to allow Interstate System traffic to pass through mountains, over rivers, and below cities. Local roads existing before the Interstate System was created now pass below and above the Big Road making the Interstate System a freeway - a roadway free of obstructions.

The “free” in freeway is defined as the ability of a motorist to proceed without grade crossing, traffic lights, or entrances along the road except at interchanges. Older sections of the Interstate System that were built as toll roads before the Big Road’s official launch in 1956, have been grandfathered into the system. The Pennsylvania Turnpike (also known as I-76) is one example where a tolling authority is permitted 60 years later, to charge for the usage of the roadway.
President's Message

Celebrating America’s Great Road Trip

In recent years much attention has been given to our country’s aging infrastructure and for this reason, we thought it appropriate for the Library to focus on the matter too. But in seeking ways to bring these problems to wider attention, it became obvious that their magnitude is such that in trying to do justice to all of the factors involved, we would address none of them with the specificity they deserve.

Airports, bridges, tunnels, canals, dams, electricity, hazardous waste, levees, lighthouses, ports, mass transit, rail beds, roads, sewers, telecommunications, utilities, water supply, wastewater... the list goes on and a needed wide-ranging public policy discussion has been hampered by the lack of a precise definition for “infrastructure.”

Regardless, we can agree that highways are an identifiable and essential component of the nation’s infrastructure. Highways move people and goods from place to place, and remain a vital element of our national defense system. Lately, highways seem to be in a perpetual state of construction or repair. But these minor nuisances are negligible compared to the prospect of doing without highways altogether.

This year marks the 60th anniversary of the Federal Highway Act of 1956 authorizing funds to build 41,000 miles of the Interstate Highway System. Without this landmark legislation, the United States may have had to drive on its outmoded system of two-lane highways for many more years, impeding trade, commerce, and tourism, and endangering our national security.

Join us this fall for the West Gallery exhibition and lecture series, Ribbons Across the Land: Building the U.S. Interstate Highway System, as we revisit the creation of the Interstate Highway System. And stay along for the ride as we take a sentimental journey on that most fabled of highways, Route 66. Known to millions as the “Mother Road,” Route 66 claims large pieces of our imagination. The East Gallery exhibition, Gas, Food, Lodging, is a nostalgic trip along an iconic road.

Library News

Hitting the Road in Search of Fellows

Two members from of the Library’s Research and Scholarship team have been participating in academic conferences in search of the best and brightest scholars for the 2017 Linda Hall Library Fellows program.

Research and Scholarship Vice President Tania Munz and Ben Gross, the Associate Vice President for Collections, have participated in two conferences since April and will attend a third in November. The Library’s Fellows program provides in-depth research opportunities, ranging from a week to a year, to scholars around the world.

“We’re raising awareness of the program to increase the diverse projects that benefit from our collections and to make scholars aware of the resources we have in a broad range of subjects,” Munz said. “We’re also seeing the Fellows alumni are good ambassadors for the Library and our collections. They speak very highly of their time here.”

In April, Munz and Gross met with history of science scholars at the Midwest Junto at the University of Oklahoma. Later that month, they met with history of technology scholars at the Maintainers Conference in New Jersey.
In November, the pair will join Linda Hall Library President Lisa Browar to participate in the annual conference for the History of Science Society, held this year in Atlanta. In addition to meeting scholars and exhibiting at the conference, Munz will participate in a panel discussion on funding opportunities in the history of science. Gross will participate in a panel discussion on managing information in a 21st century research library. Fellows in the program play a role in gathering and defining the collection to help manage information at the Library.

“Beyond our commitment to becoming an international destination for scholarship in science, engineering, and technology, the Fellows really get to know different parts of our collections,” Gross said. “In developing their projects, historians identify secondary sources in our collections that connect to rare books or other primary sources. Those connections help us better understand all aspects of our collections.”

The application deadline for fellowships is January 16, 2017.

Exhibition Featuring Library’s Books Opened “On Time” at New York’s Grolier Club

Linda Hall Library staff prepared 86 books for shipment to the Grolier Club in New York City, where they will be installed at an upcoming exhibition of On Time: The Quest for Precision.

This is believed to be the largest number of rare books loaned by the Library for an exhibition. On Time was first displayed at Linda Hall Library in 2012. The new installation opened on September 14 and will run through November 19. The exhibition explores the history of precision timekeeping through the ages as explained in selections from the Library’s History of Science collection of rare books, and through additional horological objects on loan from a member of the Grolier Club. Bruce Bradley, History of Science Librarian Emeritus, curated the exhibition.

The Grolier Club is the oldest existing bibliophilic club in North America. It was founded in 1884 and is a private club whose members are devoted to the history of books and printing, binding, and illustration.

“Club members will find much to interest them in this exhibition (see below),” said Lisa Browar, Linda Hall Library President and Grolier Club member. “The items on display not only chronicle the history of precision timekeeping, but each of the books is noteworthy for its illustrations as well as the printing and binding techniques employed in its construction.”
Mike Brown was almost six years old when President John F. Kennedy made his famous "moon shot" speech, announcing America's commitment to land a man on the moon and safely return him to Earth by the end of the 1960s.

“I watched the speech on TV, and I was so excited,” Brown said. “I was born in the year of Sputnik, so maybe it was destiny.”

In the first grade, Brown’s fascination with NASA carried over to the school cafeteria where he ate from a lunchbox featuring the Mercury space program.

Brown kept the lunch box, which now is prominently featured in his office. His excitement for space exploration has never waned, and it led Mike and his wife Millie to make a generous gift to the Linda Hall Library to bring NASA astronaut Scott Kelly to Kansas City to present “The Sky Is Not The Limit: Lessons From A Year In Space” in October.

Mike Brown’s interest in science, engineering, and technology led him to a degree in electrical engineering, a graduate degree in microbiology, and launching two highly successful start-up businesses, Innovative Software and Euronet. Millie Brown has a
similar fascination with science with a background in nursing and participated in the same molecular biology graduate program (the couple decided to go to graduate school in between start-up launches.)

The Browns believe that understanding math and science are crucial to success and economic growth in today’s world, and it has led them to support programs that will improve students’ understanding of science and math through their support of STEAM programs at Rockhurst High School, St. Teresa’s Academy, and Bishop Miege High School, among others.

“We’re not trying to create more workers for any one profession, whether it’s engineering or nursing. We believe every citizen in America must be better educated in math, science, and technology,” Millie said. “Science and technology has changed every aspect of our lives and will continue to do so.” Mike Brown added, “Look at how science and technology has changed the world in the past 50 to 100 years, compared with the thousand years before it. In the past 100 years, technology has evolved at a breakneck pace.”

He believes that developing a mindset from the rigors of understanding science and solving mathematical equations is important no matter what career. Although he doesn’t work as an engineer, Mike Brown applied the concepts learned from his degree in electrical engineering towards building two successful businesses. In school, he frequently had to break down complex, highly technical problems into smaller increments, which he uses as a problem solving philosophy in business.

To improve science and math comprehension among current high school students, the Browns are leading a STEAM effort (the “A” adds art and entrepreneurship to STEM education) at Rockhurst, Miege and St. Teresa High Schools, with the intent on exporting best practices to any school in the area that might be interested.

Linda Hall Library President Lisa Browar is on a committee of area business and civic leaders to accomplish this goal.

“We are eager to make the Library’s collections available to intellectually-curious high school and college students who will benefit from them in the same ways that Mike and Millie Brown did,” Browar said.

The Scott Kelly lecture is an important part of increasing interest in science and math. Millie Brown wants the experience to inspire students, teachers, and parents, much like Mike’s experience hearing President Kennedy talk about putting a man on the moon more than 50 years ago.

“We believe the Linda Hall Library can be a catalyst in inspiring the community when it comes to science and technology,” she said. “The Library highlights courageous scientists throughout history searching for the truth.”
The primary purpose behind the Interstate System’s construction was to connect population centers, commercial markets and state capitals while reducing travel time and saving lives along the way. The Interstate System is a physical column that supports society’s vital institutions. The system is a product of engineering-minded men. As a result, numeric logic rules its design.

The Interstate System, at a minimum, runs two lanes of highway in each direction. In some cities, as many as 16 lanes course through urban cores. Traffic on the mainland’s even numbered highways run east and west and on the odd numbered Interstate routes traffic flows north and south. Each travel lane is 12-feet wide with a 10-foot break down lane on the right and a three-foot shoulder on the left. Bridges, tunnels, and overpasses are designed with 16-foot clearances - a standard that Department of Defense engineers recommended to allow the deployment of military vehicles moving from forts to ports during military mobilizations.

Generals George Washington and Dwight Eisenhower knew the militaristic value of a good road. Upon becoming President of the United States, each made road building a national priority: President Washington, surveyed on horseback what he thought to be the route for the nation’s first interstate named the National Road, for which President Thomas Jefferson would later approve the legislation. In 1956, President Eisenhower would authorize the construction of the first interstate superhighway system.

The first and 34th Presidents believed they were solidifying the nation by building roads to create stronger economies and a safer homeland. President Washington called for the construction of an “artificial” road - a “smooth way” to connect our frontiersmen to the Eastern states for fear that the British and the Spaniards would win them over. Eisenhower, launched the construction of superhighways - a model of the German autobahns - in part to provide a way for Americans to mobilize should the Soviet Union launch a nuclear strike.

The Border War took a turn when both Kansas and Missouri were two of the three states to lay claim to the first project under the Federal Aid Highway Act that led to the Interstate System.
In 1916, Americans were stuck in the mud. Asphalt and concrete roads existed only in cities. Early on, farmers were the biggest supporters of turning muddy rural highways into paved “all weather roads.” They were eager to get perishable goods to market faster than railroad companies were shipping them. Joining farmers in the struggle to build good roads were bicyclists wanting to traverse long distances over smooth surfaces and an exploding population of car owners.

This diverse group led the Federal Government into the Golden Age of modern road building between 1920 - 1940. The sum of $75 million to be spent over five years, the amount sanctioned by the Federal Aid Road Act of 1916, was more symbolic than significant. However, in passing the act, Washington officials signaled that building and improving the nation’s primary roadways was a priority. Perhaps most significantly, the legislation established a partnership between the Federal road agency and the states that remains in effect today. This volunteer arrangement has come to stand as a remarkable example of democracy as well as a scientific joint venture that has advanced civil engineering.

The year after the 1916 Highway Act passed, the nation was at war in Europe. In America, World War I paradoxically stalled road building as well as stimulated it. Immediate construction was postponed in order to mobilize the military. At the same time, railways, overwhelmed by war shipments, were unable to deliver the fleets of trucks that General John “Black Jack” Pershing, head of the American forces in Europe, was demanding for his forces in Europe.
In 1917, the roads in the Northeast, the most populated part of the country, were unmarked dirt paths. Highway signs didn’t exist. In what was considered a reckless act at the time, the trucks were driven 600 miles from where they were marooned by the railways, across the Midwest, over the Appalachian Mountains to the waiting ships on the Northeastern Coast. Mapping and marking the route for the first time, military officials paraded convoys of trucks down the main streets of small towns in Ohio and Pennsylvania with banners on the trucks proclaiming, “Berlin or Bust.” Suddenly, trains were no longer the only form of mechanized long distance transportation.

Lt. Col. Dwight D. Eisenhower, a 28-year-old West Point graduate, was dismayed that he was kept from the European theater of war. Ordered to stay stateside, he had found himself on the hallowed battlefield at Gettysburg, training soldiers in the newly founded military art of firing weapons from moving trucks meant to simulate tank warfare. Distraught that his military career was over, Eisenhower contemplated leaving the Army.

Fate intervened when, in the summer after the armistice, Eisenhower was invited to be an observation officer on the first motorized military convoy to cross the continent. The longest truck train in history, a five-mile-long convoy with a representation of nearly every type deployed in The Great War, pulled out from the still-standing Zero Milestone behind the White House in July of 1919. The parade across the nation had dual purposes. First, to show Americans the weapon that had victoriously turned the tide of the war - the truck. Second, the convoy drove home the need to build better roadways for the modernizing nation.

The road trip took more than two months of pulling, pushing, and digging in order to get the army vehicles over the mountains, deserts, and grasslands. Nearly 90 structurally deficient bridges collapsed under the convoy’s weight. They inched along at the same speed as a horse - about five miles per hour over mostly dirt, mud, and dusty roads. Upon completion of the epic road trip, Lt. Col. Eisenhower submitted an official report suggesting to his superiors that more federal investment be made in the nation’s highways.

Years after leaving the White House, Eisenhower wrote an autobiography titled, At Ease: Stories I Tell to Friends. In the book he wrote a chapter, “Through Darkest America With Truck and Tank,” explaining how the “old convoy” and the German autobahn drove him to launch the construction of the Interstate System. The President’s granddaughter, Susan Eisenhower, says the Interstate System was her Presidential grandfather’s proudest domestic achievement.

The Interstate System has made a revolutionary impact. Eisenhower’s vision of “wider ribbons across the land” changed social, economic, and commercial patterns of the nation more than any other engineering project. The civil engineering work forced minimalism into design in order to “mass produce” superstructures. Efficiencies brought on by economies of scale reduced costs while increasing production. The heavy equipment industry matured along with the system’s construction delivering ever larger and more powerful pieces of “Big Iron.”

The Interstate System brought the nation to peak performance in the Industrial Age and has positioned the United States to excel in the Information Age. In short, the Big Road modernized America.

Dan McNichol is an award-winning journalist and a nationally-recognized expert on the U.S. Interstate System. His books on infrastructure and transportation include The Big Dig and The Roads That Built America: The Incredible Story of the U.S. Interstate System.
Travel, engineering, and the open road make up our Fall program and exhibition schedule. Programs are free and open to the public; however, you must register for an e-ticket.

Go to lindahall.org to learn more and register.

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| 10/8  | Second Saturday Conversation  
October 8, 11:00 a.m. – Noon  
Linda Hall Library East and West Exhibition Galleries  
Linda Hall Library President Lisa Browar and Eric Ward, the Library’s Vice President of Public Programming, will discuss the historical, cultural and economic significance of specific items in the Gas, Food, Lodging and Ribbons Across the Land: Building the U.S. Interstate Highway System exhibitions. |
| 10/13 | “The Sky Is Not The Limit: Lessons From A Year In Space”  
October 13, 7:00 p.m. - 8:00 p.m.  
Unity Temple on the Plaza  
Seats no longer available. |
| 11/3  | “The Future is Now: Self-driving Vehicles are a Reality”  
November 3, 7:00 p.m. - 8:00 p.m.  
Main Reading Room  
Maarten Sierhuis is Director of the Nissan Research Center in Silicon Valley, and leads the center’s research efforts in the areas of autonomous driving, connected cars, and human-machine interaction. He will share his experiences of more than 25 years of working in artificial intelligence research and setting research strategy and forecast what we can expect from the future of travel. |
| 11/12 | “How Do I Become (An Engineer)?”  
Second Saturday Conversation  
November 12, 10:00 a.m. – Noon  
Main Reading Room  
The Linda Hall Library is partnering with Science Pioneers to help high school students learn more about the engineering profession and to better understand the academic requirements to become successful in the field. 

The event will include a one-hour panel discussion and Q&A with engineers from local firms. The panel will be followed by a networking opportunity with representatives from the schools of engineering at The University of Kansas, University of Missouri-Kansas City, Kansas State University, Missouri Western State University, and Metropolitan Community College. 

Registration is free and open to any area high school student. Visit lindahall.org for more information and to register. |
The recently acquired French translation of Principles of Philosophy will make you think (therefore you are).

BY BEN GROSS
Linda Hall Library Associate Vice President for Collections

It is arguably the most famous sentence in the history of philosophy: “I think, therefore I am.” Its author, the lawyer-turned-soldier, René Descartes (1596-1650), used this fundamental truth as the foundation for a broader intellectual agenda that would eventually encompass such diverse subjects as mathematics, optics, and physiology. The Latin version of the sentence with which many of us are familiar—“Cogito, ergo sum.”—first appeared in 1644’s Principles of Philosophy, a textbook in which Descartes summarized his theory of knowledge and his conception of a mechanical universe whose rules might be discovered through observation and experiment.

Descartes’ ideas would later inform the work of natural philosophers like Robert Boyle and Isaac Newton. It is therefore unsurprising that a copy of the Principles of Philosophy would find a home in Linda Hall Library’s History of Science Collection. Only this summer, however, did we obtain a copy of the first French edition of Descartes’ book, which was published in 1647. Normally a translation of this sort might not merit a great deal of scholarly attention, but this volume is a noteworthy exception.

Descartes had originally hoped that his Principles would replace the Aristotelian texts commonly used in Jesuit universities, but teachers were slow to embrace his ideas. Consequently, he decided to collaborate with his friend, Claude Picot, on an improved French version, which would clarify his points and address the concerns of earlier critics. Descartes worked closely with Picot on the translation and even composed an entirely new preface in which he explained the organization of his arguments.

“Philosophy as a whole is like a tree,” Descartes wrote in this expanded introduction, “of which the roots are Metaphysics, the trunk is Physics, and the branches emerging from this trunk are all the other branches of knowledge.” Similarly, his book would begin with metaphysical questions about the existence of God and free will before moving on to describe a physical system based upon matter in motion, where the cosmos was filled with whirling vortices that explained the movement of the planets. He then provided illustrated discussions showing how this framework could explain everything from the behavior of magnets to the explosiveness of gunpowder.

Although many of Descartes’ ideas were later proven incorrect, they were widely discussed long after his death. Copies of the updated Principles of Philosophy found their way into many collections, including that of Charles Le Goux la Berchère (1647-1719), the archbishop of Narbonne. The archbishop maintained an impressive library, and his copy of Descartes’ book—now in Linda Hall’s rare book room—still bears his coat of arms on its front cover. Opening to the frontispiece reveals the signature of his successor as archbishop, René François de Beauveau. Another inscription on the same page indicates that book was later owned by French naval officer and naturalist Louis Isidore Duperrey, who explored the Pacific Ocean on several major 19th century voyages. This distinguished pedigree, along with the broader historical significance of Descartes’ natural philosophy, makes this book a welcome addition to our holdings.
(Images clockwise from top) Title page of Descartes’ *Principles of Philosophy* (1647), signed by two of its previous owners, the Archbishop of Narbonne and explorer Louis Isidore Duperrey; Descartes’ explanation for the Earth’s magnetism, which he theorized was due to the circulation of invisible, corkscrew-shaped particles between the northern and southern hemispheres; An illustration of Descartes’ mechanical universe, where space was filled with a fluid that transmitted motion to stars and planets.
The Fall 2016 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.

Cover Photo: Construction of Interstate 70 in Kansas. Photo is courtesy of the Kansas Department of Transportation.