

LCM



LIBRARY OF CONGRESS MAGAZINE
NOVEMBER/DECEMBER 2019

INVENTING THE MODERN AGE

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The Revolutionary
Sounds of Les Paul

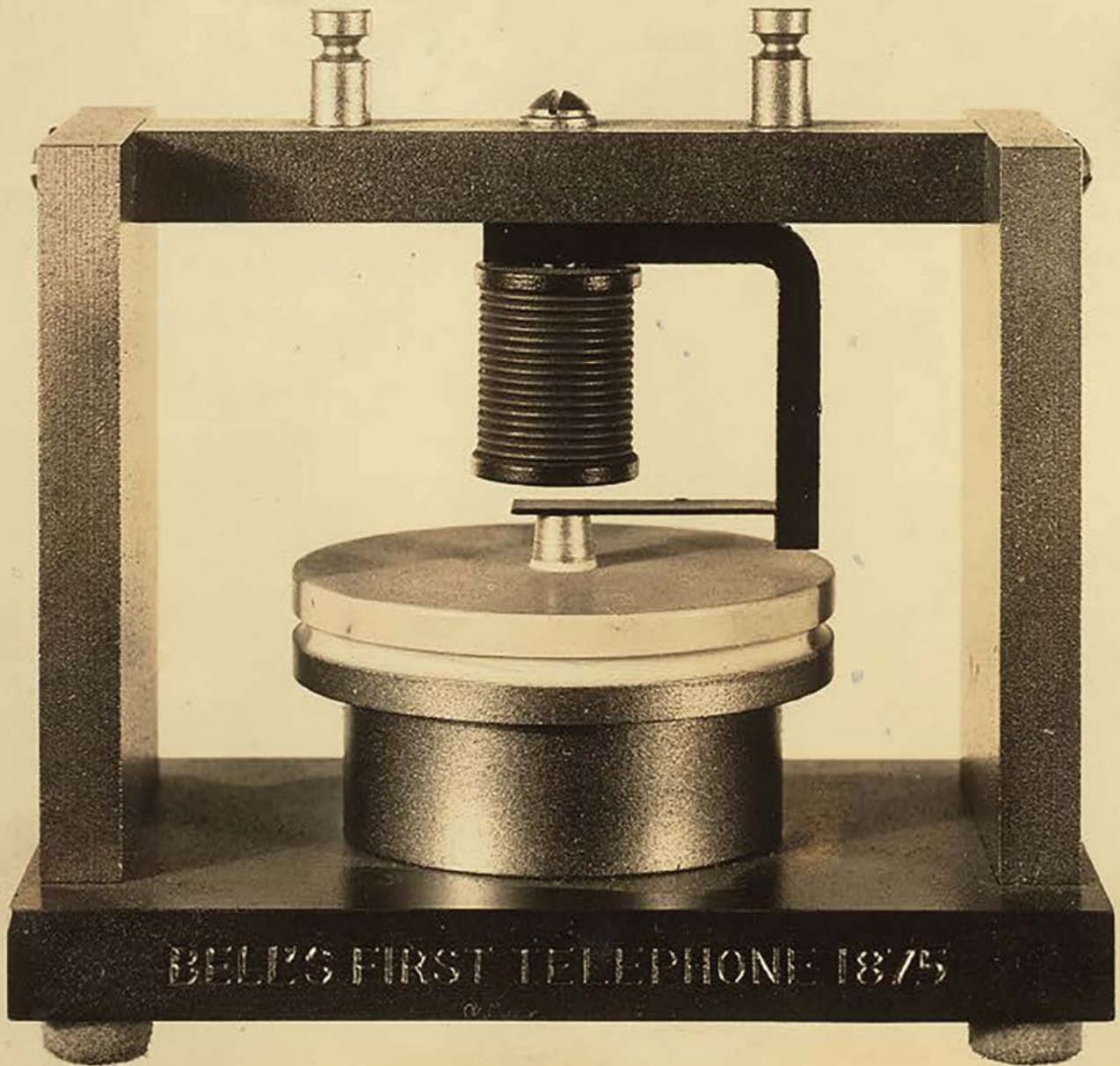
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Unrolled Again

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Mission of the Library of Congress

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■ On the cover: A bronze statue holds a glowing electric light aloft in the Great Hall of the Jefferson Building. The Jefferson was the first public building constructed in the District of Columbia with electricity in place.
Shawn Miller

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CONNECT ON

loc.gov/connect





■ British civil servant Henry Cole commissioned the creation of this Christmas card, the world's first, in 1843. Rare Book and Special Collections Division

'TIS THE SEASON FOR SAVING TIME

The invention of the Christmas card made sending holiday greetings a snap.

As the holidays approach, hunting down presents and sending season's greetings to loved ones sometimes feels like an ever-present task. Imagine having to create or handwrite every holiday card or letter you plan to send out.

The traditional Christmas card of today is a relatively modern invention. British civil servant and art patron Henry Cole was inspired to create the first card because he suffered from a nice problem – having too many friends. Each year, Cole faced a daunting pile of Christmas letters that required a reply. So, in 1843, he commissioned illustrator John Horsley to design a card that would express his sentiments succinctly.

The card Horsley created featured a central image of a family celebrating with food and drink, along with panels illustrating Christian charity and a message: “A Merry Christmas and a Happy New Year to You.” The card also included blank lines where Cole could fill in the name of the recipient and his as the sender.

Horsley used chromolithography, a lengthy process that involves multiple layers of color and shading. But once the design was finished, thousands of copies could be made and mailed. Luckily for Cole, he lived during a time when the British postal system – dubbed the Penny Post – was expanding and affordable. All Cole, and the multitudes that would follow, had to do was address the card.

The charming illustration and affordable postage made Cole and Horsley's creation an enticing alternative to writing holiday letters. Cole's acquaintances realized how efficient the card was and followed suit. Though it would take several years to catch on, the Christmas card was born.

–Jacqueline Cerda

THE MAN WHO RECORDED THE WORLD

Campaign invites the public to transcribe the papers of folklorist Alan Lomax.

For decades, Alan Lomax traveled across America, the Caribbean and Europe, with a recorder and a camera in hand, trying to document traditional folk cultures before they disappeared.

Lomax was, in fact, the most famous American folklorist of the 20th century – the first person to record blues greats Muddy Waters and Lead Belly, the man who took down the oral histories of Jelly Roll Morton and Woody Guthrie, the chronicler of religious rites in Haiti and “ring shout” rituals from the Sea Islands off the Atlantic coast.

In his notebooks, Lomax documented his encounters with performers, his extensive travels and his collaborations with famous figures such as Pete Seeger, Zora Neale Hurston and his folklorist father, John Lomax. The Lomax family, friends and colleagues transcribed many of the performances and interviews he undertook during his years of fieldwork – including his stint as a Library employee from 1937 to 1942

By the People, a web-based volunteer program at the Library, allows the public to assist such efforts by transcribing and tagging historical documents from its collections – work that improves the searchability, readability and accessibility of handwritten and typed historical documents online. Recent campaigns have focused on the papers of Abraham Lincoln, Walt Whitman, leaders in the fight for women’s suffrage, Red Cross founder Clara Barton and baseball executive Branch Rickey.

The new campaign – drawn from the Lomax papers at the Library – offers thousands of pages he produced during his field journeys, from New Hampshire to Mississippi to Haiti. In them, Lomax records the story of gospel singer Bessie Jones, visits the Gullah–Geechee singers of the Sea Islands and thumbs through Waters’ record collection. You can discover these rich traditions by



■ Clockwise from top: Alan Lomax documented traditional cultures in America, the Caribbean and Europe. Across the South, Lomax recorded and photographed folk musicians such as the Bog Trotters of Galax, Virginia. Lead Belly with his wife, Martha Promise. *Lomax Collection / Prints and Photographs Division*

helping transcribe Lomax’s notebooks and letters – documents that serve as the bedrock of our understanding of 20th-century American and Caribbean folk music and culture.

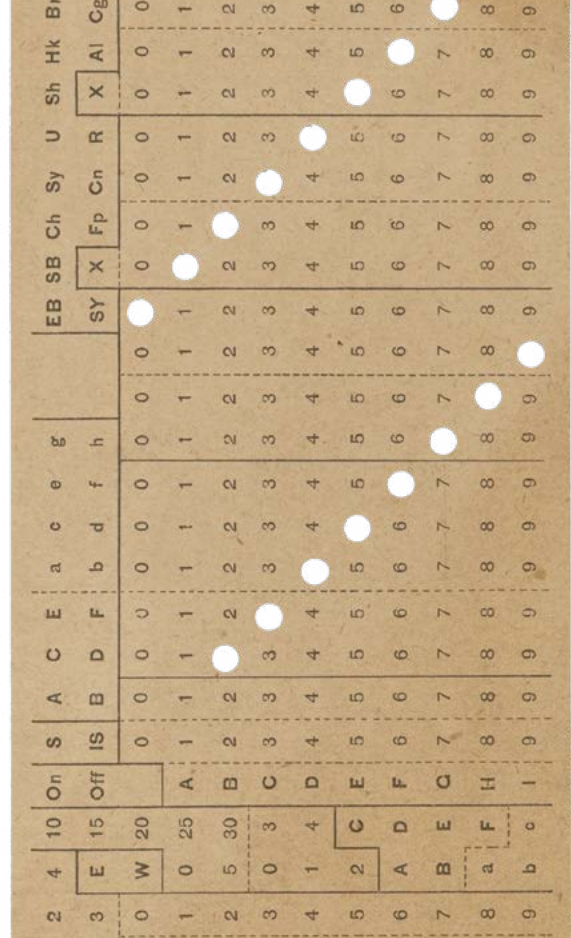
MORE INFORMATION

By the People
[Crowd.loc.gov](https://crowd.loc.gov)

CURATOR'S PICKS

PIECES OF GENIUS

We choose favorite invention-related items from the Library's collections.



HOLLERITH'S PUNCH CARD

Modern data processing began with the inventions of Herman Hollerith, an engineer who developed a mechanized method to expedite the counting of U.S. census data. His system sped the transfer of data from the census taker's sheet to a punched card like the one shown here, reducing the time required to complete the 1890 census by years. Hollerith later established his own company, which eventually became IBM.

Manuscript Division

GUTENBERG'S BIBLE

The invention of the mechanical printing press by Johann Gutenberg revolutionized bookmaking and made it possible for the accumulated knowledge of the human race to become the common property of every person who knew how to read. The Gutenberg Bible was the first great book produced in Western Europe using the press. This copy was printed by Gutenberg in Mainz, Germany, in 1455 and is one of only three perfect vellum copies known to exist.

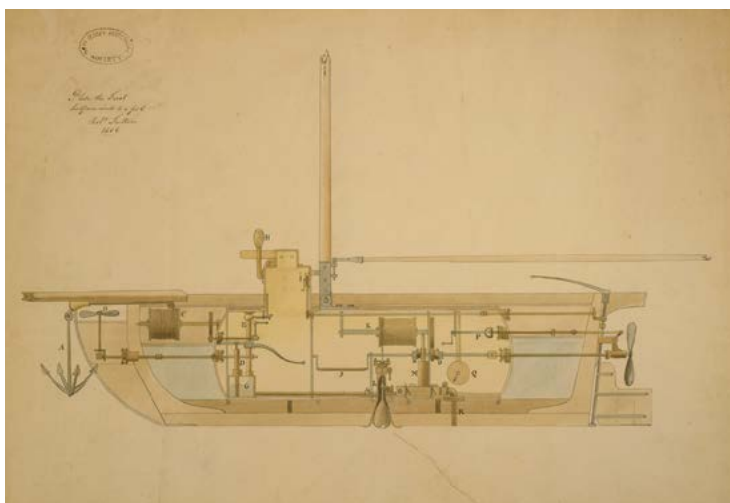
Rare Book and Special Collections Division



EDISON'S 'SNEEZE'

At the dawn of motion pictures, Thomas Edison's laboratories produced this piece of history – a short “kinetoscopic” film of a man sneezing. The “star” is Fred Ott, an Edison employee known for his comic sneezing and other gags. This photographic print of 45 frames from the film was received at the Library in January 1894 as a copyright deposit, making it the world's oldest surviving copyrighted motion picture.

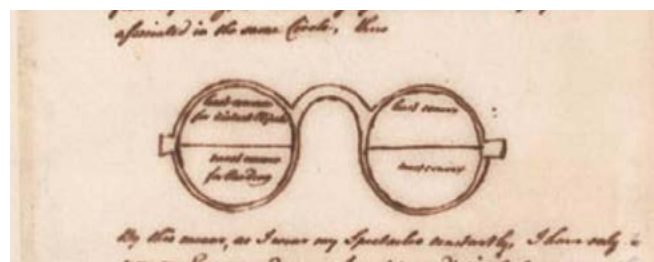
Prints and Photographs Division



FULTON'S SUBMARINE

Robert Fulton gained fame for the development of America's first commercially successful steamboat, but he also pioneered vessels that sailed beneath the waves. In 1800, he built what is considered the first practical submarine, the Nautilus – a boat rejected by the French and British navies. In 1806, Fulton submitted these designs to the U.S. Navy, which also declined. A century later in World War I, submarines finally would gain widespread use.

Prints and Photographs Division



BEN'S BIFOCALS

Benjamin Franklin is celebrated not only as a statesman but also as a scientist and inventor. He invented, for example, the lightning rod and the Franklin stove. He also devised a solution for folks who, like himself, suffered both near- and far-sightedness and were tired of switching between pairs of spectacles. In this 1785 letter, he illustrates his new glasses – the bifocals – and describes how he created them.

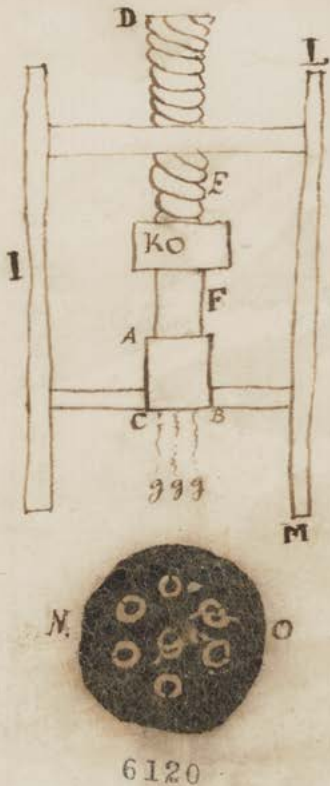
Manuscript Division

PAGE FROM THE PAST

Macaroni.

The best macaroni in Italy is made with
called Semola, in Naples: but in almost every
is commonly used; for, provided the flour be of a
extremely fine, it will always do very well. a p
water & less yeast than is used for making bread
by little at a time, viz. about 5. or 6. lb each time

the under part of which is pre
which the paste, when pressed by
forms the Macaroni g.g.g. which
cut & spread to dry. The screw is
the hole K. of which there are 4.
the screw one way, the cylindrical
or mortar perfectly well, must pre
it out of the holes. I, L, M. is a stron
-ened to the wall, floor & ceiling
N. O. is a figure, on a larger sc
ion plate, where all the bla
the real plate has a great m
the box or mortar: or rather
may be changed at will, with
for the different sorts of Mac



■ In this note of about 1787, Thomas Jefferson drew a diagram of a macaroni machine and wrote out instructions for making pasta. Manuscript Division

ALL THE PRESIDENT'S PASTA

Rendering of macaroni machine reveals Jefferson's fascination with science, invention and food.

Throughout his life, Thomas Jefferson possessed an insatiable curiosity about technology and a compulsion to figure out how things work and to make them work better.

Jefferson designed, among many other things, a swiveling Windsor chair, a folding campstool, an improved plow, a revolving clothes rack, a folding ladder, an encryption apparatus and the great clock and mechanized double doors that still grace his home at Monticello. He even designed the portable lap desk on which he wrote the Declaration of Independence.

This rendering of a macaroni maker, executed by Jefferson around 1787, reveals a future president with an inquiring mind, an aptitude for mechanical things, a knack for technical drawing – and a foodie's interest in culinary things.

As U.S. minister to France from 1785 to 1789, Jefferson acquired a taste for continental cooking and, back in America, had his own cooks trained in the French culinary arts.

At home and in the White House, he liked to serve the best European wines and to dazzle guests with delicacies such as macaroons, ice cream and peach flambé – the delectable fruits of an inquisitive spirit and practical mind.

Engineer Michael Katzmann makes it easier for the visually impaired to read.

Describe your work at the Library.

The Materials Development Division at the National Library Service for the Blind and Print Disabled (NLS) acquires books and has them converted to accessible forms, which are loaned to patrons by our network of cooperating libraries.

The audio and braille books, and the devices that render them, have been improved over the years due to technological advances. I guide the NLS book production and engineering-development sections in delivering accessible books to our visually impaired patrons. As chief, I strive to provide the tools our librarians, bibliographers, engineers, quality-assurance staff and technicians need to do their work.

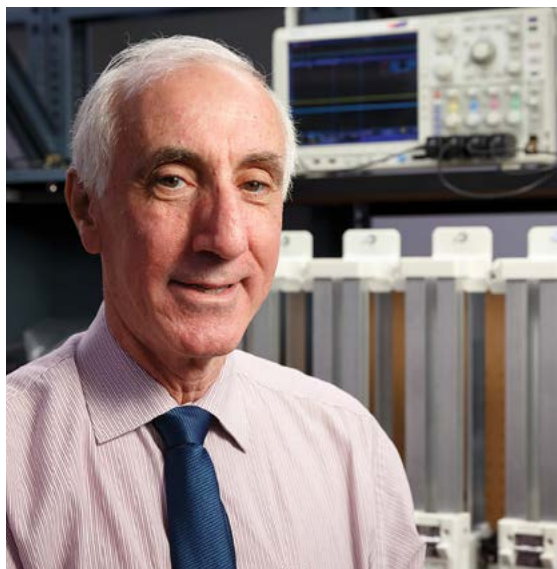
How did you prepare for your position?

I've always been fascinated by electronics and radio. At school, I became a radio amateur and later studied electronics engineering at the University of New South Wales. I have been practicing engineering for nearly 40 years – most of that in television, first in Sydney and then in the U.S.

What have been your most memorable engineering projects?

I have been lucky to work on some high-profile television events. I designed the remote-control systems for the first wireless camera systems used for live television from racing cars and in America's Cup yachting. This brought me to the U.S., where other Australian engineers and I designed, manufactured, installed and operated remote-controlled cameras in NASCAR and Indianapolis cars. This grew to include cameras for other sporting and news events, such as the Olympic and Commonwealth games, baseball, hockey and the political conventions.

I also designed components of camera systems installed in the helmets of NASA astronauts on the space shuttle and the International Space Station. Engineering for the harsh environment of car racing is tough, but the space environment is really out of this world. With massive temperature swings, no air to cool the electronics, a high-intensity radiation environment and the prospect of radio interference over every



SHAWN MILLER

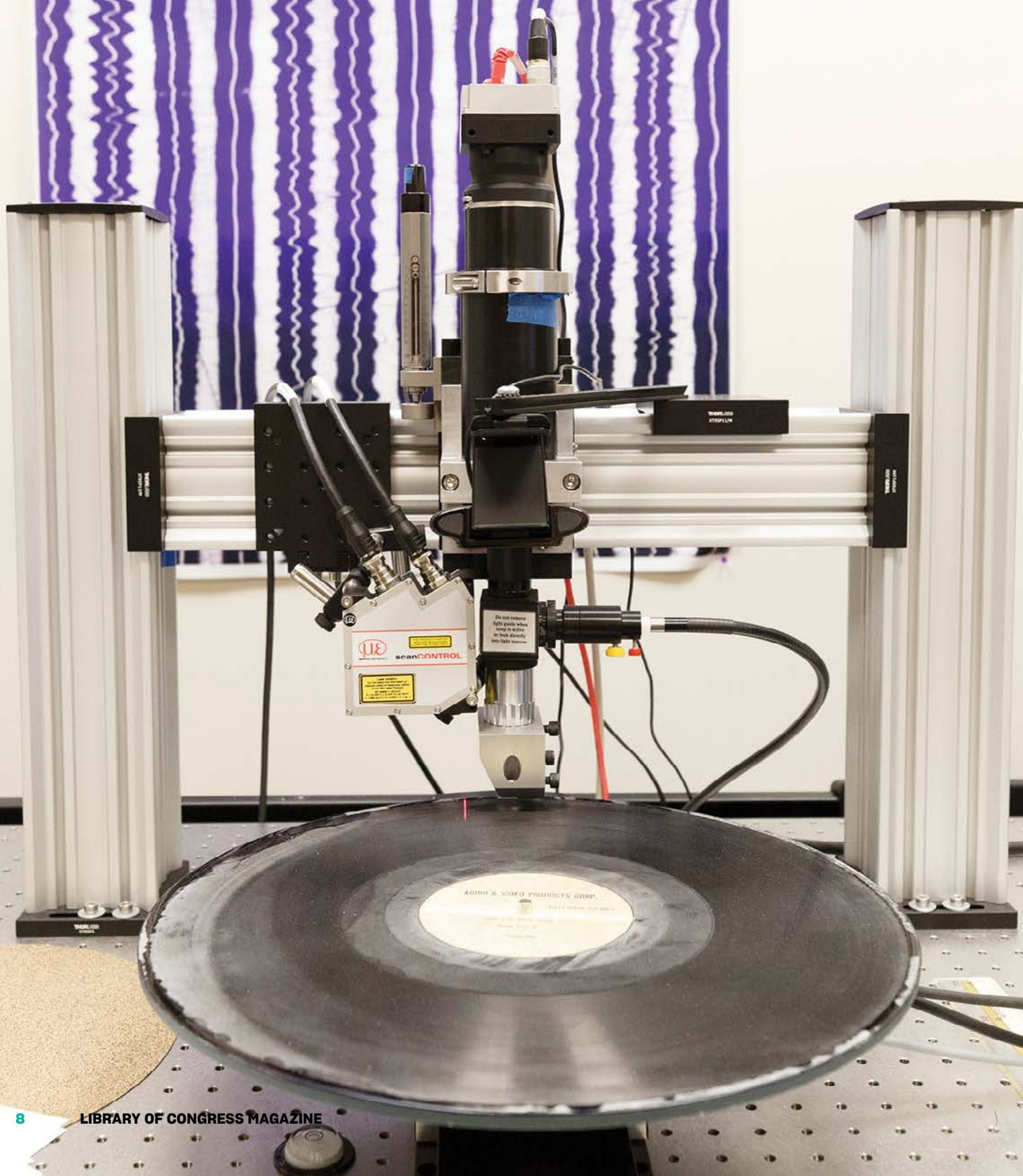
part of the globe, the challenge for me was great. I got a great sense of achievement, though, when the pictures from the cameras proved invaluable during the Hubble Space Telescope servicing and subsequent missions.

What NLS projects have been most rewarding?

My first project at the Library was to guide the engineering effort of the development of the digital talking book player. The transformation from analog cassette to digital audio involved many people. NLS staff and our design contractors worked very hard to produce the system, involving not only the player but a complete change to all aspects of book production. I saw my role as ensuring the Library's and patrons' interests weren't compromised in the engineering design.

I recall several times where the design was improved in substantial ways by my efforts. In the months following the end of the design contract and the start of manufacturing, I spent countless days, nights and weekends testing and correcting software problems. This hard work paid off in many years of trouble-free operation for our patrons. NLS has been delivering books over the internet, but the next big change for NLS is to use internet-connected "smart speakers" so patrons can more easily browse and play audio books by voice command. Every day is a new opportunity for an engineer at the Library – and why my job is always interesting.

TECHNOLOGY



PLAY IT AGAIN, LOC

IRENE system allows historical recordings that are broken or fragile to be heard once more.

On June 20, 2012, a small group gathered around a computer terminal in the basement of the Library's Madison Building, waiting with suspense as an audio file started to play: "In witness whereof," a man intoned. "Hear my voice – Alexander Graham Bell."

The famous inventor had recorded those words on a wax-and-cardboard disc 127 years earlier, but modern audiologists had no way to play them back, and no one still alive knew the sound of his voice.

"We did not know if we were going to be able to extract sound from the recording or how intelligible the resulting audio would be," said Peter Alyea, a preservation science specialist at the Library with a background in musical composition and audio engineering.

Alyea collaborated with Carl Haber, an experimental physicist at Lawrence Berkeley National Laboratory, to fine-tune the technology that allowed Bell's voice to be heard once more.

Haber was present that day in 2012, as was curator Carlene Stephens of the Smithsonian Institution's National Museum of American History, which holds the Bell recording along with hundreds of other discs and cylinders on which Bell engraved sound. His papers reside at the Library.

Haber is a member of an international team that works at the Large Hadron Collider – the world's most powerful atom smasher. His lab at Lawrence Berkeley builds cameras for radiation that image patterns that emerge when particles collide. While stuck in traffic in 2000, he heard a story on public radio about aging recordings in the Library's collections now too fragile to be played. It occurred to him that some techniques used in his lab might be employed to recover sound from the recordings without touching them.

Haber and his team started conducting experiments and reached out to the Library, eventually connecting with Alyea. The partnership resulted in IRENE (Image, Reconstruct, Erase Noise, Etc.), a custom-built system that takes two- and three-dimensional images of record grooves, producing data files. Using specially encoded software, operators can edit the data to extract sound – allowing people to hear records that might have been silent for a century. The system is named after the first record from which IRENE extracted sound: "Goodnight, Irene" by the Weavers.

Alyea has worked with Haber and his team at the Berkeley lab ever since to test and refine IRENE's capacity to extract sound from damaged or deteriorating recordings – the Library has a vast collection of such recordings in need of conservation. Stephens contacted Haber for help with the Bell recordings once she became aware of the pair's work.

IRENE has rescued sound from a variety of experimental recordings, including tinfoil recordings made in the 1870s by Bell's rival, Thomas Edison. But it is also saving sound from the more recent past. The music of jazz great Les Paul, recorded on lacquer discs that degraded, is just one example.

Alyea is now experimenting with using different-colored light sources – green, red and blue – to take two-dimensional images of deteriorating media from varied angles to obtain better-sounding audio.

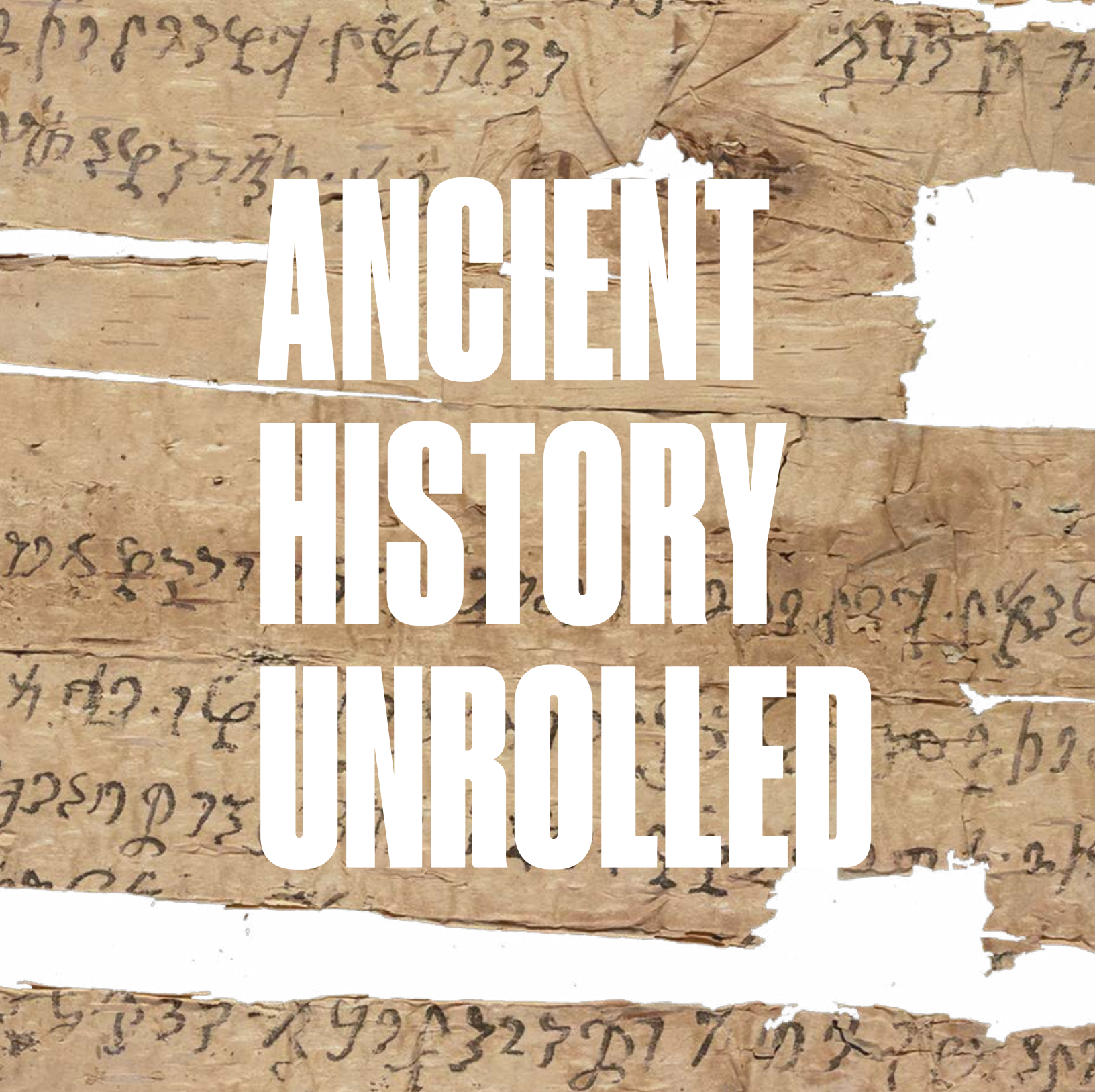
As for Bell's recordings, Alyea believes they deepen understanding of Bell, adding to what researchers can learn from his papers. "Sound recordings are very much a snapshot. It's the moment – the gaffes or even the triumphs of the moment."

–Wendi A. Maloney is a writer-editor in the Office of Communications.

■ **Opposite:** The IRENE system takes two- and three-dimensional images of record grooves and uses software to convert those images into sound.
Shawn Miller

MORE INFORMATION

Project Irene
go.usa.gov/xVnWt



ANCIENT HISTORY UNROLLED

BY WENDI A. MALONEY

The opening and conservation of an extraordinarily delicate scroll offers insights into Buddhism's formative period.

The ancient scroll arrived at the Library of Congress in a decidedly unassuming way: encased in a Parker Pen box. Inside lay one of the oldest Buddhist manuscripts known to the world, radiocarbon dated to between the first century B.C to the first century A.D.

For years, the scroll resided in the Library's climate-controlled "top treasures" vault, rarely viewed because of its fragility. This year, the Library redigitized the piece and placed it online, offering scholars and Buddhist communities worldwide access to a little-known part of Buddhist history.

The scroll originates from Gandhara, an early Buddhist center located in what is now the northern border areas of Afghanistan and Pakistan. A group of materials buried high in the arid mountains was unearthed there in the 1990s, and the Library acquired this birch-bark scroll from the collection in 2003. It is the oldest holding in the Library's Asian Division.

"This is a rare, unique item because it is very old, No. 1, and, No. 2, it does bring us, historically speaking, relatively close to the lifetime of the Buddha," said Jonathan Loar, the division's South Asia specialist. "It's also one of the oldest among the couple hundred other Gandharan manuscripts known to scholars, so even within its own unique collection it stands out."

The scroll tells the story of buddhas who came before and after Siddhartha Gautama – the sage who reached enlightenment under a Bodhi tree in eastern India in the sixth or fifth century B.C. and who became known as the Buddha. The narrative is in the first person: A scribe recounts the direct teaching of the Buddha regarding his divine lineage.

The scroll presented the Library a serious conservation challenge, even for its expert staff. "It was the most fragile thing I've ever worked on," said Holly Krueger, who recently retired as head of paper conservation. "It was completely unique, unlike anything I've ever encountered."

To assist with the delicate work of unrolling the scroll, the Library obtained the assistance of the British Library and its chief conservator, Mark Barnard, which had successfully unrolled some 30 related scrolls. To prepare, Krueger practiced unrolling a dessicated cigar – the closest material Barnard had found to the Gandhara scrolls, though not nearly as fragile. Her team crafted special tools, including



bamboo implements and glass weights to keep the scroll down. Then, for three days in advance, it was gently humidified.

Krueger and Barnard worked in an area of the conservation lab with the fewest air currents – the slightest movement could cause pieces to dislodge. The process took four hours of painstaking, but ultimately successful, work. Afterward, the scroll was encapsulated between two pieces of glass, and their edges sealed. Individual fragments were placed between separate pieces of glass, and the scroll was then imaged. Earlier this year, the Conservation Division redigitized the scroll and its fragments using advanced ultraviolet and infrared imaging.

The piece is considered one of the world's best-preserved examples of a Gandharan scroll. It lacks a title, a beginning and an end but retains 75 to 80 percent of the original text – much better, experts say, than the average Gandharan scroll.

In the scholarly and Buddhist communities, Loar said, the availability of Gandharan scrolls for study sheds new light on the earliest Buddhist literature and "deepens and diversifies what we currently know about the religion's formative history."

■ **Opposite: The scroll's text is now accessible anywhere in the world through the Library's website. Asian Division**

Above: Conservators unrolled the extremely fragile Gandhara scroll in a carefully controlled environment to maintain its integrity. Yasmeen Khan

MORE INFORMATION

Gandhara scroll
go.usa.gov/xV9Fj




■ The Paris Exposition of 1889 showcased inventions by Thomas Edison. *Prints and Photographs Division*

INVENTING THE MODERN WORLD

Over a six-decade span, a multitude of dazzling innovations changed the course of civilization.

BY NEELY TUCKER



■ The Library holds some 300 original glass plate negatives acquired in the Wright brothers' papers. This image shows the first successful powered flight in human history, on Dec. 17, 1903. *Prints and Photographs Division*

The beige strip of paper tape, not quite a yard long, lies in a slender box in the Library's Manuscript Division. The neatly inked letters stretch across the length of it. They are just below a faint series of dots and dashes.

"W-h-a-t h-a-t-h G-o-d w-r-o-u-g-h-t," it reads.

It is the first telegraphic message ever sent, from the U.S. Supreme Court chamber on Capitol Hill to the Mount Clare railroad station in Baltimore, by the telegraph's inventor, Samuel F.B. Morse, on May 24, 1844.

It was as if the world had shrunk, suddenly shrink-wrapped. People could communicate over dozens, hundreds or thousands of miles in seconds, not in days, weeks or even months. It was the birth of the modern, the world remade in the wake of the Industrial Revolution, the Victorian era giving way to age of invention.

In the next 59 years – a single human life span – the pastoral world that had dictated the life of mankind for millennia was gone, vanished in a puff of smoke from a passing locomotive. As steam-powered trains and paddle boats multiplied (themselves invented earlier in the century), a multitude of civilization-changing inventions followed. Telephones, typewriters, light bulbs, bicycles, automobiles, dynamite, vaccines, repeating rifles, the motion picture camera, x-rays, recorded sound, phonographs and records, data punch cards and radio – to name but a few – were created or taken to unprecedented levels in that time frame.

And then, on Dec. 17, 1903, on a strip of North Carolina beach, mankind took flight.

"Success four flights thursday morning," Orville Wright wrote his father that afternoon at 5:25 p.m. He sent it, of course, by telegram.

The modern world had arrived.

■ **The first telegraphic message ever sent, transmitted on May 24, 1844, and bearing the line "What hath God wrought?"**
Manuscript Division

■ Top: Alexander Graham Bell's original design sketch of the telephone. *Manuscript Division*

Middle: By 1906, telephone lines stretched across most of the United States, as illustrated in this map showing the lines of the Bell Telephone Co. *Geography and Map Division*

Bottom: In his lab notebooks, Bell recounted his first words on the telephone: "Mr. Watson – Come here – I want to see you." *Manuscript Division*

The Library houses a multitude of papers, blueprints, recordings, drawings, images and artifacts that document this dazzling era. The papers of Morse, the Wright brothers and Alexander Graham Bell are here. Collections also include those of Lee de Forest, the "father of radio"; Emile Berliner, whose innovations include flat-disc records and vast improvements in the recording industry; Herman Hollerith, whose data punch cards began modern computing (and formed the foundation of IBM); and even the Albert Tissandier Collection, which documents early balloon flights in France and across Europe. An original print of Edison Film's "The Great Train Robbery" is here, as is a cylinder recording of Kaiser Wilhelm II, the 1904 gift that inaugurated the Library's recording collection.

Here, for example, is a Bell sketch of the first telephone and notes describing the first phone call, on March 10, 1876. He wrote his father that day on letterhead from Boston University, narrating the experiment: "I called out into the Transmitting Instrument, 'Mr. Watson – come here – I want to see you' – and he came!"

"This is a great day with me," Bell wrote. "I feel that I have at last struck the solution of a great problem – and the day is coming when telegraph wires will be laid on to houses just like water or gas – and friends converse with each other without leaving home."

He was right – by 1906, more than 2.5 million American homes had telephones.

So quickly did engineers develop mass production of these breakthroughs that the world of a few years earlier began to seem quaint, in much the same way that readers today feel about the world before the





■ By 1910, Henry Ford's Model T was in mass production. *Prints and Photographs Division*



internet and cell phones. In 1910, Berliner, a genius on the level of Edison and Bell, was waxing poetic about the world gone by of Washington in the 1880s, when “it required some time to get around, but people had plenty of time then.”

“Every 4th of July the daily paper announced: ‘To-night the electric light will be shone from the Capitol,’ and everybody was down on Pennsylvania Avenue,” he continued. “All at once we would see a brilliant arc light at the lower part of the dome ... it was quite an interesting exhibition and everybody enjoyed it very highly.”

Edison invented the first commercially viable light bulb in 1879. So rapidly did electric light spread that by the mid-1890s Henry Ford was the chief engineer for the Edison Illuminating Co. in Detroit and built his first car on nights and weekends. By the time Berliner gave his nostalgic speech in 1910, Ford's Model T was in mass production.

The modern world was being fashioned around the globe, but most of the above inventions were made in the United States, even though this period was the most violent in national history. The Civil War, the violent white resistance to Reconstruction, settlers warring against Mexico and Native Americans across the West, and the assassinations of three presidents – none of it deterred a restless scientific curiosity in the national spirit.

The racism and chauvinism of the day also dictated that nearly all labs, scientific equipment and funds were reserved for white men. Further, the rough business of legally claiming originality and the resulting profits often involved contentious lawsuits,

■ Thomas Edison invented the first commercially viable electric light bulb in 1879 and pioneered the creation of motion pictures. *Prints and Photographs Division, Motion Picture, Broadcasting and Recorded Sound Division*



■ Top: The Wright brothers chronicled their history-making first flight in this diary. *Manuscript Division*

Middle: Working at Tuskegee Institute, George Washington Carver pioneered important agricultural techniques. *Prints and Photographs Division*

Bottom: "Father of the radio" Lee de Forest invented the vacuum tube that made live radio broadcast possible. *Prints and Photographs Division*



further contributing to the bars white women and people of color faced.

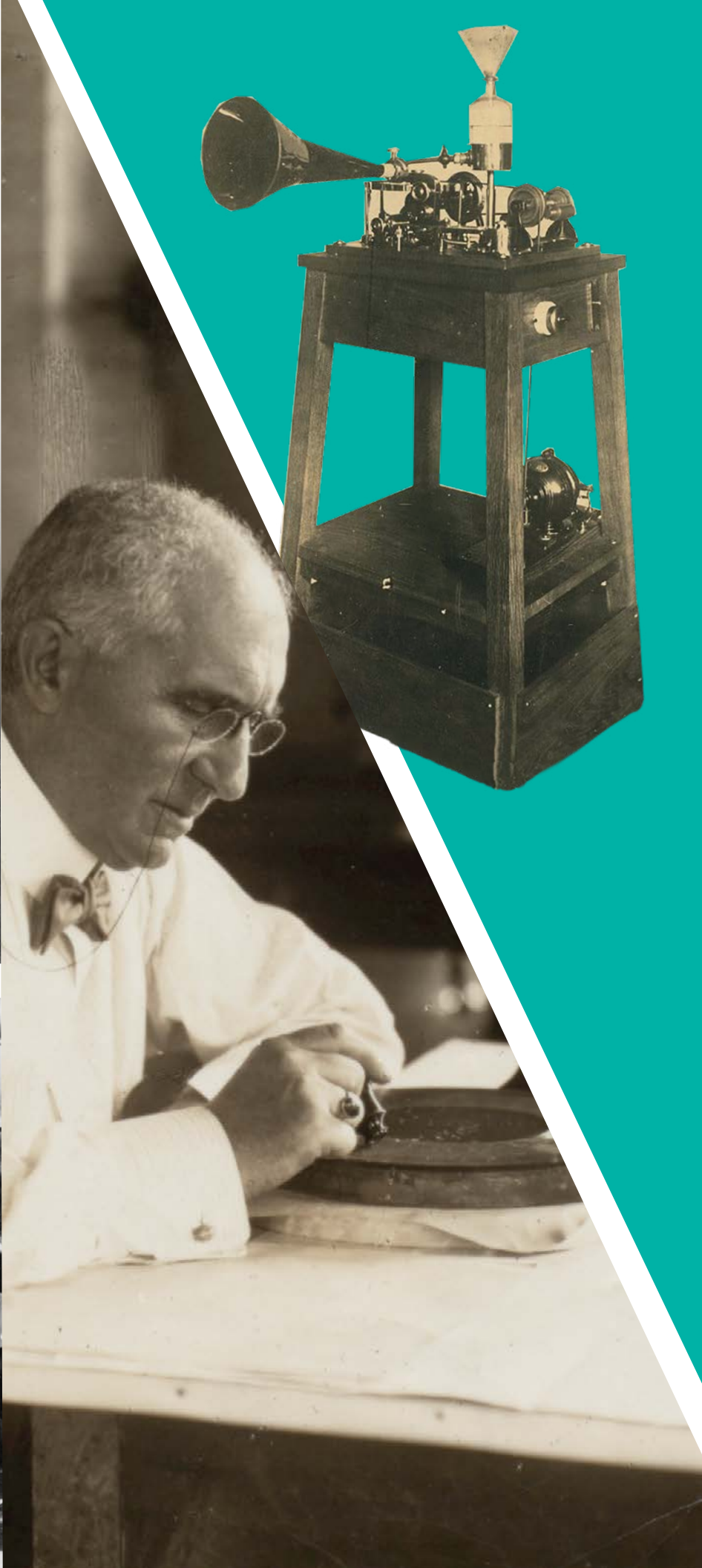
This was exemplified by Margaret E. Knight, arguably the most famous female inventor of the age. When she invented the flat-bottomed paper bag and a machine for making them in 1868, a man in the factory stole the idea and tried (unsuccessfully) to claim the copyright. She patented more than 25 other inventions, some as complex as involving rotary engines. "I'm only sorry I couldn't have had as good a chance as a boy," she was quoted as saying. Josephine Cochrane of Illinois patented the dishwasher in 1886 with less hassle; her company later became KitchenAid.

"Each weekly issue of the Official Patent Office Gazette now shows a number of new ideas invented and patented by women," wrote Fred G. Dietrich in 1899, in "The Inventor's Universal Educator. An Educational Cyclopaedia and Guide." "The records of the Patent Office bear witness to the fact that the inventive genius of the fair sex is constantly accomplishing remarkable, advantageous and profitable results."

For black Americans, discrimination was worse.

George Washington Carver, born into slavery in Missouri, found his life's calling at the Tuskegee Institute in Alabama under the auspices of Booker T. Washington. His work on nitrogen depletion in cotton fields – which, he determined, could be reversed by rotating the crop with oxygen-rich plants





such as peanuts and sweet potatoes – saved withering cotton yields. Farmers across the South took up the technique, preserving the nation’s most important crop, and Washington was developing the first of more than 400 products that could use peanuts and sweet potatoes.

Meanwhile, that pre-1837 generation of humanity, already a sepia-toned memory by 1903 when the Wright brothers took flight, was the last to vanish in the way that no generation will likely do again. It sank into the ocean of time without a record of its voices and sounds, of its images and angles of light; of its slowness of time, of its long quiet hours of late nights and early afternoons; the last to know such a time as the natural order of the world.

The birth of the modern was the beginning of a new kind of civilization, one infinitely noisier, less patient, more intrusive, more connected and more permanent. The sound and look of things could be engraved on things that lasted, so future generations could see and hear them as they lived.

Berliner, picturing how people might use his Gramophone, imagined a world in which someone might record their voice as a toddler, teenager, adult and then on their deathbed – a lifetime, recorded on a single disc, for anyone to hear, across the ages.

“Will this not seem,” he wondered, “like holding veritable communion with immortality?”

–Neely Tucker is a writer–editor in the Office of Communications.

■ Emile Berliner in his laboratory, working on a disk. Above, an early Berliner recording machine built into a large wooden stand. *Motion Picture, Broadcasting and Recorded Sound Division*

The Sound Of Genius



Conservationists at the Library's Packard Campus preserve the legacy of musical innovator Les Paul.

BY MARK HARTSELL

This is the soundtrack of a revolution.

The speakers inside this studio in the Virginia foothills are blasting out “Brazil,” a 1930s classic performed over the years by Frank Sinatra, Plácido Domingo and Carlos Santana and danced to by Donald Duck in a Disney cartoon travelogue.

The version playing now isn’t just something different, it’s something else – two-plus

minutes of record-making innovation pulled off with primitive equipment and advanced thinking, a groundbreaking recording made by a man whose name would become synonymous with rock and roll guitar.

This “Brazil,” with its light Latin rhythm and impossibly fast fretwork, was both performed and recorded by guitarist Les Paul seven decades ago in his garage studio in Hollywood. Working there, Paul helped revolutionize record-making and pave the way for some of the greatest recordings in pop music history.

Conservationists at the Library of Congress today are working to preserve the original material that forms the foundation of Paul’s legacy.

The Library acquired his archive in 2013 – thousands of recordings, films and papers that, like “Brazil,” chronicle the man’s life and work. This year, audio specialists finished preserving and digitizing most of the Paul sound recordings held at the Library’s Packard Campus for audiovisual conservation, located in the Virginia countryside southwest of Washington, D.C.



■ **Opposite:** Les Paul performs at a New York club in the 1980s in this classic image by jazz photographer William P. Gottlieb. *Music Division*

Above: An original pressing of the groundbreaking “Brazil” that Paul kept in his own collection. *Motion Picture, Broadcasting and Recorded Sound Division*

REEL #	POS.	DATE	TITLE	PC		
A ()	B ()	C ()		E		
VOL	PART	COMMENTS	HYBRID	LIM.	PEAK	BASS
	Rhythm					
	Guitar Background					
	Drum					
	Guitar Background					
	Guitar					
	Guitar					
	Drum					
	Bass					
	tickler					

REEL #	POS.	DATE	TITLE	PC		
A ()	B ()	C ()		E		
VOL	PART	COMMENTS	HYBRID	LIM.	PEAK	BASS
	Guitar	12 string				
	Guitar	Spec. tuning				
	Drum					
	Bass					
	Vocal				5KC	
	Vocal	2nd Part			5KC	
	Guitar	Lead			5KC-4	

■ This track sheet records Les Paul's work on "How High the Moon" and "Miss May I Drive You Home" in 1966. *Motion Picture, Broadcasting and Recorded Sound Division*

Paul was both a virtuoso country, jazz and blues guitar player and a brilliant technical innovator.

In the 1940s and '50s, he pioneered recording techniques and effects – close miking, delay, phasing, overdubbing, multitracking – that later became standard. He also played a key role in developing the new solid-body electric guitar that would inspire generations of great riffs and rockers: Eric Clapton, Jimmy Page, Duane Allman, Slash and countless others. He is the only person ever inducted into both the National Inventors Hall of Fame and the Rock and Roll Hall of Fame.

Paul lived a life of invention, building and modifying musical instruments and recording equipment, experimenting with

recording techniques to get the sound he heard in his head down on record.

"It's called curiosity, and I got a double dose of it," Paul wrote in his autobiography, "Les Paul: In His Own Words." "I've never stopped trying to figure out what makes things work or how to make things work better."

As a child, he invented a flipable harmonica holder. At 13, he embedded the needle from his mom's record player into his acoustic guitar and wired it to the speaker – his first amplified guitar. He built his own machine to cut records, using a nail, the flywheel from a Cadillac and belts from a dental drill.

In 1941, he built one of the world's first solid-body electric guitars, an experimental instrument he dubbed "The Log," by stretching guitar strings over a 4x4 piece of pine mounted with pickups – the primitive ancestor of guitars used years later by rock's greatest players.

In 1946, Paul withdrew to his garage recording studio for two years, intent on creating a "New Sound" that would help revolutionize record-making.

"It was me and my little circle of engineering buddies," Paul would write, "and no idea was too crazy to try."

There, he pioneered early forms of overdubbing and multitrack recording that allowed his wife, singer Mary Ford, to harmonize with herself and Paul to play multiple guitars on the same song.

He would record one layer of instruments on a disc, then add another layer by playing along to the disc he'd just made and recording both to a new disc, then repeat the process over. His final version of "Brazil" is a composite of nearly a dozen separate performances, each captured on a separate disc now in the Library's collections.

After Bing Crosby gave him one of the first commercial tape recorders, Paul quickly modified the machine so that he could carry out his experiments on tape, too.

The innovative records Paul made alone and with Ford – "Lover," "Brazil," "Tennessee Waltz," "Vaya con Dios" and "How High the Moon" – blew minds and sold millions of copies.

At the Packard Campus, audio specialists work to preserve that important legacy.



They cleaned and stabilized the discs – the “Brazil” discs began the process covered with white powdery exudation but finished a shiny black, as if they’d just been cut. The records’ sounds then were preserved as super-high-resolution digital files. To preserve heavily damaged discs, specialists used the Library’s IRENE system, which employs high-resolution cameras to take images inside the grooves then uses software to translate the images into sound.

Paul logged the discs and tapes in a gray ledger that documents his work: early records he made in the 1930s as a country performer styled Rhubarb Red; his experiments with techniques and equipment; his groundbreaking and bestselling work with Ford; his work producing other performers, such as

the cowboy band The Plainsmen, whose digitized harmonies sound as amazing today as when they were captured decades ago.

These recordings are the sound of innovation, as Paul heard it in his own studio.

“Les Paul operated at the highest technical and creative levels,” recorded sound curator Matt Barton said. “On his own and with Mary Ford, he made the most advanced recordings of his time – recordings that had to be modified just so they could be heard on the consumer playback technology of the day. As popular as these recordings were, audiences didn’t know just how good they were. So, they were also, in a sense, made for a sonic future that is now with us and can be heard in the preservation work done at the Library.”

■ These tape reels also bear the original markings made by Paul. Motion Picture, Broadcasting and Recorded Sound Division



■ HACU intern Azlin Carapia addresses a gathering at the Library. *Shawn Miller*

A PIPELINE FOR STUDENTS

Longstanding program facilitates internships at the Library for young Latinos.

Over the past two decades, the Library has hosted more than 300 student interns from across the U.S. and Puerto Rico through its partnership with the Hispanic Association of Colleges and Universities (HACU) – a program that allows students to learn about the institution while helping increase access to its holdings and expand its audience.

In recent years, these interns supported major Library endeavors such as the new exhibition “Shall Not Be Denied: Women Fight for the Vote”; information technology and digitization projects; Congressional Research Service offerings; and educational outreach for the Jay I. Kislak Collection of the Archaeology and History of the Early Americas.

“Many of the interns are recent or soon-to-be graduates, and they’re eager to connect with professionals in different subject areas,” said Kimberly Powell, who oversees

the Library’s Internship and Fellowship Programs office. “They want to learn, and they want to make an impact on the Library’s mission.”

In October, HACU recognized the fruitful collaboration by conferring on the Library its Outstanding Public Sector Partner Award.

Students apply through HACU to intern at the Library three times a year, in the fall, spring and summer. In addition to their internship assignments, students engage in educational enrichment activities, including lectures, tours and career-building workshops.

“This is an amazing opportunity,” said Jacqueline Cerda, who interned this past summer in the Library’s Communications Office. “I hoped to get a better sense of direction for where I wanted to go after graduation. Now I’m learning about different paths I can take.”

—Wendi A. Maloney

MORE INFORMATION

HACU National Internship Program
bit.ly/2DEWyrn

Internships at the Library
loc.gov/ifp/

FAVORITE PLACE



■ Kate Kiley narrates a book in a recording booth at the NLS facility on Taylor Street. *Shawn Miller*

NLS RECORDING STUDIOS

Inside a low brick building in a residential neighborhood of northwest Washington, D.C., actors give books a voice.

Down in three studios in the basement, they read books aloud and record the narration. The recordings they make are offered as audio books to blind and visually impaired readers through the talking book program of the National Library Service for the Blind and Print Disabled (NLS) at the Library of Congress.

Most of the titles offered by the talking book program are produced by commercial recording companies, but a staff at NLS – mostly actors working as Library contractors – produces about 100 well-chosen titles each year.

They have in the past, for example, recorded the dictionary and Tolstoy's epic "War and Peace" – a campaign that, at 18 months, lasted longer than the invasion of Russia by Napoleon that the novel in part chronicles.

That work, done in darkened recording booths like this one, help the NLS meet its mission: ensuring that all may read.

AROUND THE LIBRARY



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1. Actor and author Neil Patrick Harris attempts a card trick with the Library's chief communications officer, Roswell Encina, on Sept. 11 in the Coolidge Auditorium.

2. Fatou Seidi Ghali leads Les Filles de Illighadad during a Homegrown concert series performance in the Coolidge on Sept. 19.

3. Librarian of Congress Carla Hayden (second from left) and Music Division reference specialist Melissa Wertheimer (right) greet Gold Star families at a Veterans History Project event on Sept. 26.

4. Librarian of Congress Carla Hayden (left) and filmmaker Ken Burns present the inaugural Library of Congress Lavine/Ken Burns Prize for Film to Elizabeth Coffman, director of "Flannery," on Oct. 17.

5. Joy Harjo performs with her band at her opening event as the U.S. poet laureate on Sept. 19 in the Coolidge Auditorium.

6. Visitors tour the Main Reading Room during the Library's semiannual open house, held in the fall on the federal Columbus Day holiday.

ALL PHOTOS BY SHAWN MILLER

Harjo Named Poet Laureate; First Native American in Post

Librarian of Congress Carla Hayden announced the appointment of Joy Harjo as the nation's 23rd poet laureate consultant in poetry for 2019–2020.

Harjo, an enrolled member of the Muscogee Creek Nation, is the first Native American poet to serve in the position. She also is the nation's first poet laureate from Oklahoma. Harjo succeeds Tracy K. Smith, who served two terms as laureate.

Harjo is the author of eight books of poetry, including "Conflict Resolution for Holy Beings," "The Woman Who Fell From the Sky" and "In Mad Love and War." She also has written a memoir, "Crazy Brave"; a children's book, "The Good Luck Cat"; and a young adult book, "For a Girl Becoming."

The poet laureate seeks to foster a greater appreciation of the reading and writing of poetry.

MORE: loc.gov/item/prn-19-066

Light Appointed Director of Special Collections at Library

Michelle Light, formerly director of Special Collections and Archives at the University of Nevada, Las Vegas, has been named director of the Library of Congress' Special Collections Directorate.

Light's professional career in libraries spans 26 years and includes positions of progressive responsibility at the University of Washington, the University of California, Irvine, and UNLV. She earned a Bachelor of Arts degree in history from the University of Oregon and a master's degree in information (archives and records management) and a master's in history from the University of Michigan.

The Special Collections Directorate comprises six curatorial divisions that have extensive unique or rare holdings: the American Folklife Center (including the Veterans History Project) and the Geography and Map, Manuscript, Music, Prints and Photographs, and Rare Book and Special Collections divisions.

MORE: loc.gov/item/prn-19-065

Three Organizations Named Recipients of Literacy Awards

Librarian of Congress Carla Hayden announced the three recipients of the 2019 Library of Congress Literacy Awards, prizes that honor organizations doing exemplary, innovative and replicable work to expand literacy and promote reading in the United States and around the world.

The recipient of the \$150,000 David M. Rubenstein Prize is ProLiteracy Worldwide of Syracuse, New York. The organization supports programs to help adults acquire literacy skills needed to function in daily life.

The \$50,000 American Prize was awarded to American Action Fund for Blind Children and Adults, based in Baltimore. The \$50,000 International Prize goes to ConTextos, which is based in Chicago but operates literacy programs in El Salvador.

"Literacy is the ticket to learning, opportunity and empowerment on a global scale," Hayden said.

MORE: loc.gov/item/prn-19-081

New Teacher in Residence, Einstein Fellow Join Library

The Library kicked off the new school year by welcoming two teachers to its Capitol Hill campus to help make primary sources from its collections more accessible for teachers throughout the country.

Jen Reidel, a civics teacher from Bellingham, Washington, was named the 2019–2020 teacher in residence. Since 2000, the Library has recruited educators to work with its learning and innovation team to help teachers and school librarians incorporate the Library's digitized primary sources into instruction.

Amara Alexander, a K–5 engineering teacher from Chattanooga, Tennessee, will serve as the Albert Einstein fellow – the second year the Library has hosted an Einstein fellow.

Einstein fellows spend 11 months working in federal agencies or in U.S. congressional offices, applying their extensive knowledge and classroom experiences to national education program and/or education policy efforts.

MORE: loc.gov/item/prn-19-087

SHOP



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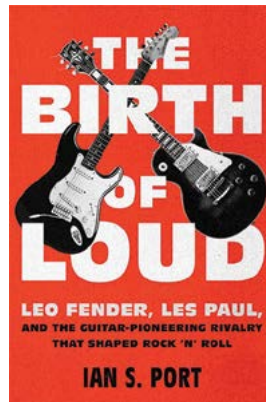
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A GIFT OF MUSIC

Generous support helps make performances and acquisitions possible.

Nearly a century ago, in an unprecedented act of philanthropy, Elizabeth Sprague Coolidge invested in the preservation and proliferation of music in America by funding the creation of the Library's acoustically superb Coolidge Auditorium.

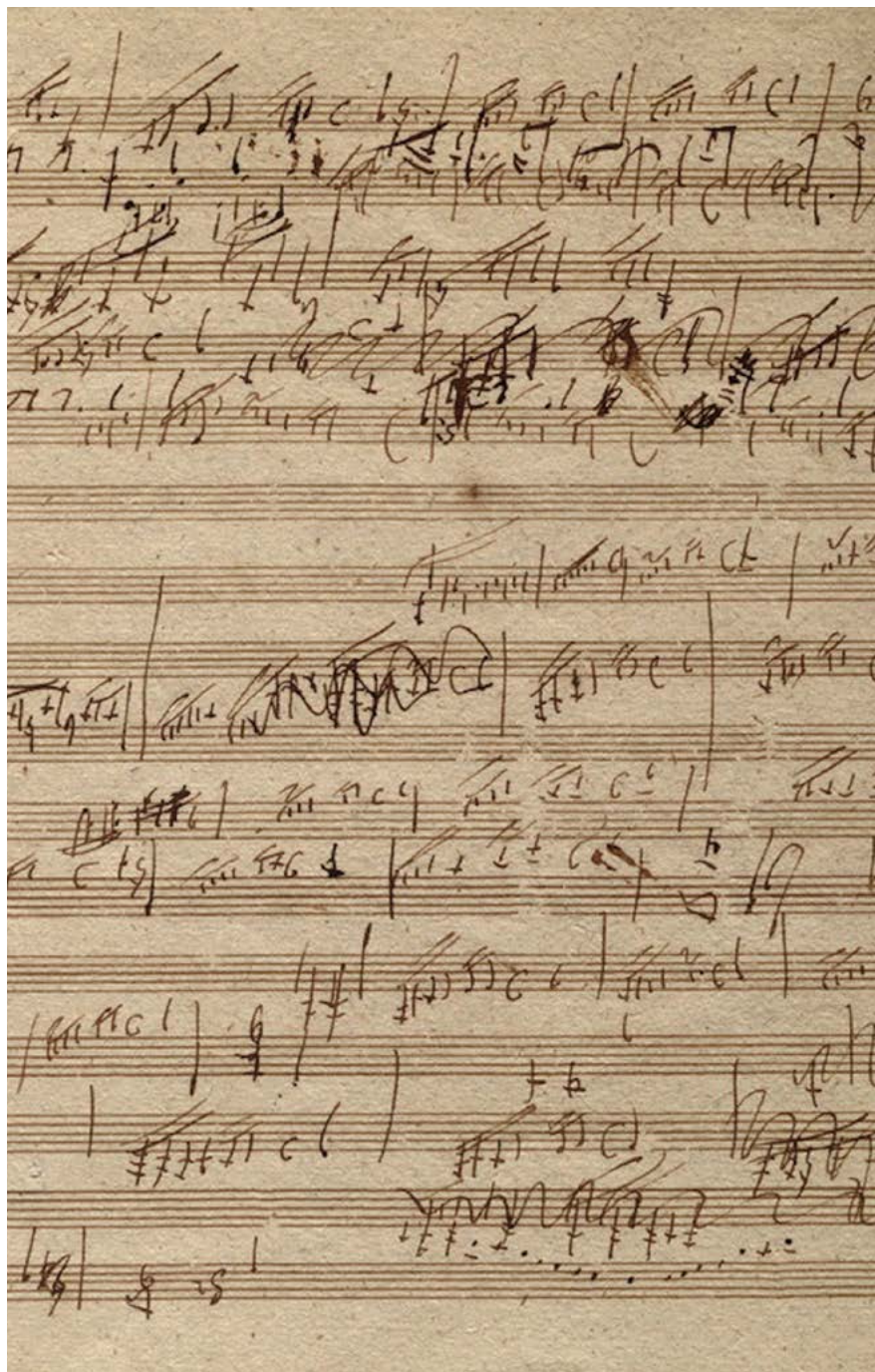
With this contribution, she also established a substantial endowment, the Coolidge Foundation, which allowed for the creation of the Library of Congress concert series.

In the years since 1925, the Music Division has seen unimaginable growth through a variety of channels. With the support of the philanthropic community – in particular, the legacy contributions of women like Leonora Jackson McKim, Gertrude Clarke Whittall, Dina Koston and Carolyn Royall Just – the division has been able to present countless performances, commission new music, collect and preserve unique treasures, facilitate educational programming and engage more patrons.

Frequent concert attendees and donors Fred and Lucia Hill see the intimate preconcert lectures as the highlight of their musical experience at the Library. When asked what they would say to others who might consider making a gift to support Library programs, the Hills' response was one of admiration for the woman who started it all.

"Elizabeth Coolidge gave all of us a special gift by lobbying Congress for permission to donate and build the concert hall. ... We now realize that we can help keep her vision of great concerts, which are free and open to the public, alive," they wrote. "Most of us can do something to support these concerts that expand our appreciation for music."

This season, fundraising efforts will focus on programming for Beethoven at 250, a festival that runs from February through December 2020 in honor of the composer's 250th birthday. You can support Beethoven at 250 and programs like it with your gift to the Friends of Music at the Library of Congress today.



■ A sketch page from Ludwig van Beethoven's great "Hammerklavier" sonata. Music Division

MORE INFORMATION

Make a gift
loc.gov/concerts/supportus/

LAST WORD

JOY HARJO

All cultures and peoples turn to poetry during times of celebration, transformation and challenge – those times when ordinary language cannot carry meaning beyond our understanding. The road from childhood to adulthood is a precarious path, yet full of miracles. We need poetry as we navigate that archetypal journey.

I came to poetry through my mother. In my earliest childhood, she sat at our kitchen table and wrote songs. Her poetry songs made safe harbors of joy in a world often turned upside-down with historical and family disruption. While she cooked – and sat at the same table that sometimes held her Underwood typewriter, as well as her fresh-made biscuits, pies, potato salad, fried chicken and cream gravy – she sang. That was the path from which I stepped into poetry.

The only book we had in our house was the Bible. I read it, labored through the “begetting” of the Old Testament to the poetry of the Book of Psalms and Song of Solomon. There, I lingered in pockets of prayer language, the love talk of a besotted lover. This was my first poetry book, followed by “The Golden Treasury of Poetry,” which I requested on my eighth birthday. I often escaped into that anthology, carried it to my hideaway, a closet in a bedroom shared by my two brothers and sister.

I went to my first library in the fifth grade. We actually had a library class in which we were required first to recite poetry. I loved the way poetry rolled over my tongue and through my ears and how the power of knowing what is unspeakable emerged. In the next place we lived, we had a branch library down the road in a shopping center. I would check out the maximum number of books every week and read everything from Dickens novels to medical texts. The library became my home away from home. Each book held a voice, a world, and even the greatest escapes.

This summer, I was welcomed into the Library of Congress as the country’s 23rd U.S. poet laureate. One of my first requests was to get to know the Library, and before my term started I got to spend time with



SHAWN MILLER

Library staff and the collections. At the American Folklife Center I heard stickball songs and a lullaby recorded early in the last century. I held Walt Whitman’s cane and saw early manuscripts of writers and poets, some of them Native American, in the Manuscript Division. And in the Prints and Photographs Division, I discovered an image of one of our ceremonial ground leaders, Chitto Harjo – a historical photograph I had never seen before. I visited many other departments, all with amazing collections available to the public for study and use.

For me it began with poetry, which is always hanging close to music and dance. They emerge from myth and history, through time and with time. My poetry was given muscle and inspiration from all my forays to the library. Poetry keeps the door open to awe and ensures that we will find our way through the broken heart field of wars, losses and betrayals to understanding, compassion and gathering together.

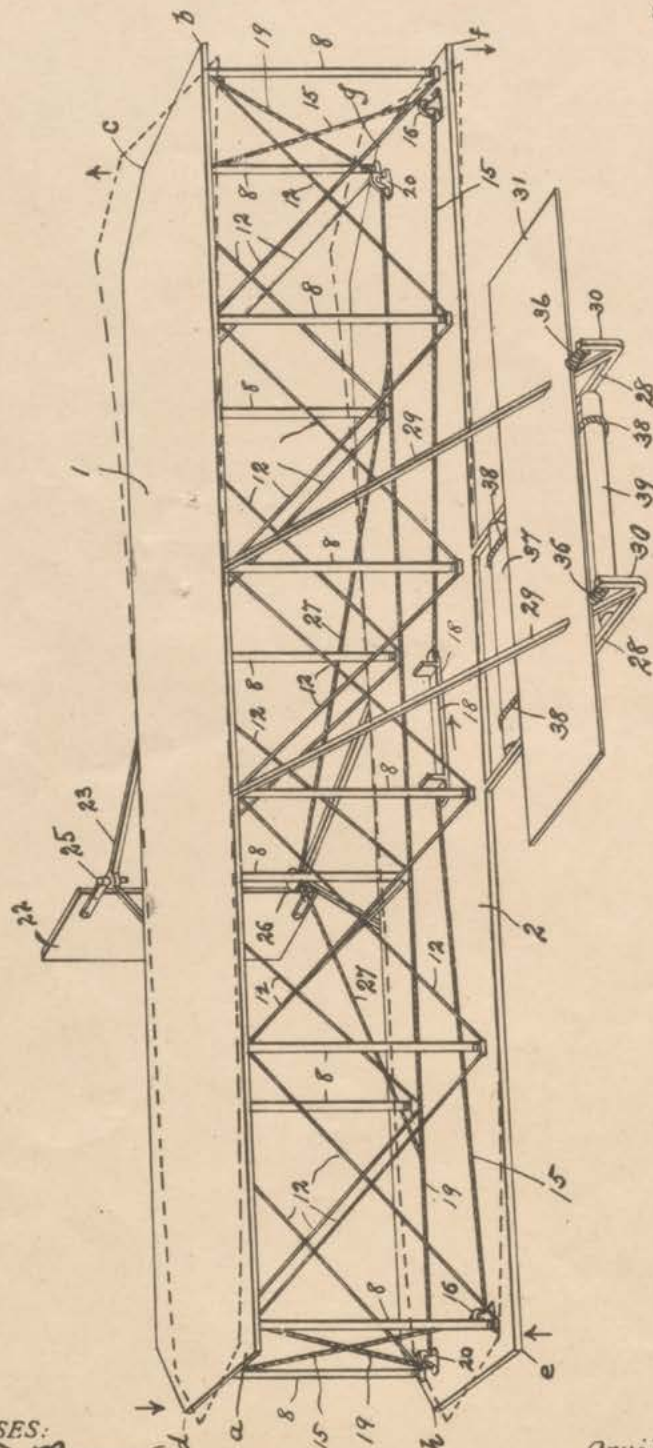
–Joy Harjo is the 23rd U.S. poet laureate.

O. & W. WRIGHT.
FLYING MACHINE.

APPLICATION FILED MAR. 23, 1903.

3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:
William F. Bauer.
Irvine Miller.

INVENTORS.
Orville Wright
Wilbur Wright.
 BY
H. A. Ford
 ATTORNEY.

■ A page from the patent granted to the Wright brothers for their "flying machine" in May 1906. Manuscript Division

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