Beautiful Ideas; Beautiful Books

by Daniel Lewis

The Burndy Library's 67,000 volumes are now part of the Huntington Library's science and technology collection. Here's a tour of some of the landmarks of Western thought that will be on display at Caltech's neighbor and counterpart research institution in the humanities.

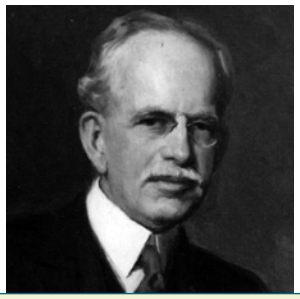
The Huntington Library has had formidable holdings in the history of science and technology for a long time, but the arrival of the Burndy Library in 2006 has given us the premiere collection in North America, and one of the largest in the world. The Burndy acquisition is the biggest in our history, second only to the founding trove amassed by Henry Huntington himself. Nearly 100 works from the combined collection, tracing the evolution of Western civilization's worldview from Ptolemy to the present, will be on permanent public display beginning on November 1. I'll tell you more about the exhibit in a moment, but first I'll describe the Burndy Library and its acquisition by the Huntington.

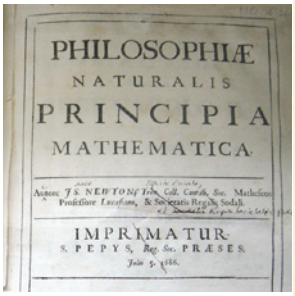
The man who assembled the Burndy collection, Bern Dibner, was born in the Ukraine in 1897 as Abraham Bernard Dibner. The family came to the United States in 1904, and he graduated with an EE degree from what was then the Polytechnic University, but is now part of NYU, in 1921. Bern D., as he was known to his friends, made his fortune by inventing the first solderless electrical connector. He founded the Burndy—a play on his name—Engineering Company in 1924, using $650 he had received in compensation for a workplace accident where he almost got one of his fingers amputated in a printing press. Twenty-four patents later, Burndy connectors can be found in everything from power lines to PCs.

The Burndy Library started in 1930, when Bern read a book about Leonardo da Vinci called *Men and Machines*. Bern was captivated by da Vinci, and was fascinated from that moment on with the history of science and technology. He spent a year at the University of Zurich in 1936 to study the subject further, and in the course of doing so began buying books. Bern continued to collect avidly until his death in 1988, and his library now holds about 67,000 volumes, manuscripts, and artworks, not to mention an eclectic assortment of scale models, antique electrical equipment, and other objects.

To guide his collecting, Bern wrote what has become one of the standard bibliographies of the history of science. This book, *Heralds of Science*, lists 200 landmark works in 11 areas: astronomy, botany, chemistry, electricity, general science, geology, mathematics, medicine, physics, technology, and zoology. Before the Burndy came to the Huntington, we had 121 *Heralds*. The Burndy had 126. Together we have 176 of the 200. The exhibit will showcase some three dozen of them, plus other works, for a total of approximately 100 rare books and manuscripts from both collections.

Above: Bern Dibner collected more than books, as this assortment of pocket sundials from the 16th through the 19th centuries attests. Right: The Burndy's books occupy roughly a mile of shelf space.





Newton's hand-revised *Principia* was later owned by Edmond Halley, who underwrote the publication of the first edition—the Royal Society's book-printing budget for the year had been exhausted on a history of fishes.

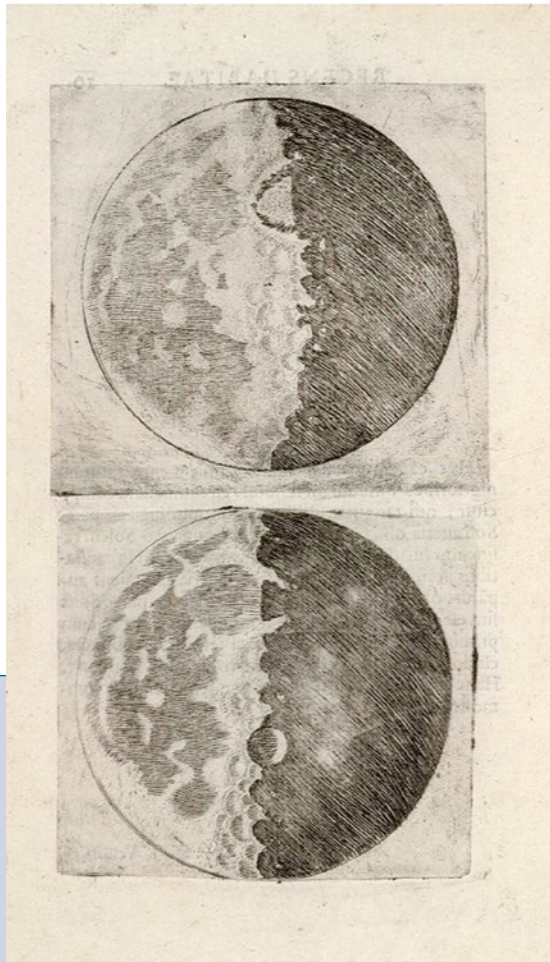
Caltech and the Huntington have deeply entwined roots. In 1906, astronomer George Ellery Hale, the founding director of the Mount Wilson Observatory overlooking Pasadena, was in the process of turning sleepy Throop Polytechnic into modern-day Caltech. At the same time, he began a campaign to persuade his San Marino neighbor Henry Huntington, a railroad magnate who collected rare books and paintings, to create a research center from his holdings. When the Huntington Library and Art Gallery was founded as a freestanding institution in 1921, Hale was one of the first trustees appointed. Ever since, many Caltech humanities faculty have made the Huntington their second academic home, and the ties between the two institutions, while mostly informal, have had many tendrils in the form of fruitful collaborations.

The Huntington, for example, had George Ellery Hale's copy of *Sidereus Nuncius*. *Sidereus Nuncius*—the *Starry Messenger* or *Starry Message*, depending on how you translate the Latin—was published by Galileo in March of 1610 as an edition of 550 copies. It was the telescope's birth announcement, and it spread across Europe like wildfire through dried kindling. It was in its pictures—the ones in the first 50 copies were hand-drawn by Galileo himself; the other 500 copies had engravings made from his drawings—that the world first saw that celestial bodies were not perfectly smooth, regular spheres, as taught by the ancients. The moon had craters, and bright spots on its dark side that were the tops of lofty mountains. This is a half-million-dollar book, and we now have two copies, because the Burndy also had one. The Library of Congress doesn't have even a single copy. It's an incredibly rare work, and it will be in the display.

One *Herald* the Burndy had that we didn't—a natural, given Bern's interest in all things electrical—is Robert Boyle's *Experiments and notes about the mechanical origine or production of corrosiveness and corrosibility*, printed in 1675. For us to acquire an English book that we were lacking on science from the 15th, 16th, or 17th centuries is highly unusual, because we're very close to complete. (It, alas, will not be in the exhibit.)

The Burndy contains one of the world's three greatest collections of print and manuscript material by Isaac Newton—the Grace K. Babson collection. We don't actually *own* this material; it is on permanent deposit here from Babson College in Wellesley, Massachusetts. The Babson has Newton's personal copy of the *Principia*, which he revised by hand in preparation for the second edition. It will be on display, where it may look familiar to some of you—the Babson loaned it to us a couple of years ago for our Newton exhibit. The Babson contains more than 500 printed editions of his work, including books from his personal library, and approximately 50 Newton manuscripts. Before we acquired the Burndy we had exactly one—a draft of a letter of recommendation he wrote for somebody.

Also on deposit at the Burndy is the Volterra collection, one of the world's strongest collections in 18th- and 19th-century physics. It was assembled by the Italian mathematician and physicist Vito Volterra (1860-1940) and belongs to the Republic of Italy, so we had to get their permission to move it. Fortunately, we had great connections—one of our curators, Mario Einaudi, is



When Galileo turned his telescope on the half moon, he saw what could only be craters and mountains—blemishes on a heavenly body presumed to be perfect—thrown into sharp relief by the sun's sidewise light. He even calculated the mountains' heights.

The Huntington Library delivers more than 350,000 items per year to the hungry eyes of some 1,700 visiting scholars, making it one of the most heavily used set of rare materials in the United States outside of the Library of Congress.

About 75 people a day use the reading room, and the Huntington gives out the largest number of fellowships of any private American institution—about 140 annually—to support full-time study for anywhere from a month to a year.

This hotbed of activity occurs largely invisibly, behind doors closed to the half-million or so members of the public who come to see the Gainsboroughs, the gardens, and the galleries.

the great-grandson of the first president of Italy after World War II. We didn't have to go dropping his name, as it turned out, but we were ready to.

These acquisitions mesh with the Huntington's holdings in a lovely way. We have the Mount Wilson Observatory's directors' papers—800 linear feet of them, running all the way up to the late 1980s. We also have the papers of Edwin Hubble, who, surprisingly, was never Mount Wilson's director, and more than 3,000 photographs of buildings, activities, and people at the observatory. These history of astronomy materials are my most heavily used group of collections. We have a spectacular compilation of Charles Darwin materials—the largest assemblage of his printed works in North America, plus about 60 original Darwin letters. We also have really wonderful holdings on the history of civil engineering, endowed by Trent Dames [BS '33, MS '34], of Dames and Moore Engineering. [William Moore, also BS '33, MS '34, was his civil-engineering classmate at Caltech.] The Burndy brought the Victor Darnell collection on bridge engineering, and a really nice collection on color and color theory, which is a great match for us as well.

The Burndy came with an endowment of $11.6 million. This includes an acquisition budget, so we can continue to grow our collection, and supports five staff positions, including mine. The others are a full-time conservator, whose job is the physical care and feeding of the books and manuscripts; a cataloger for the new acquisitions; a reader-services person; and an associate curator to assist with the increased volume of users these new works are bringing us. The endowment also funds eight research fellowships a year.

THE BURNDY COMES WEST

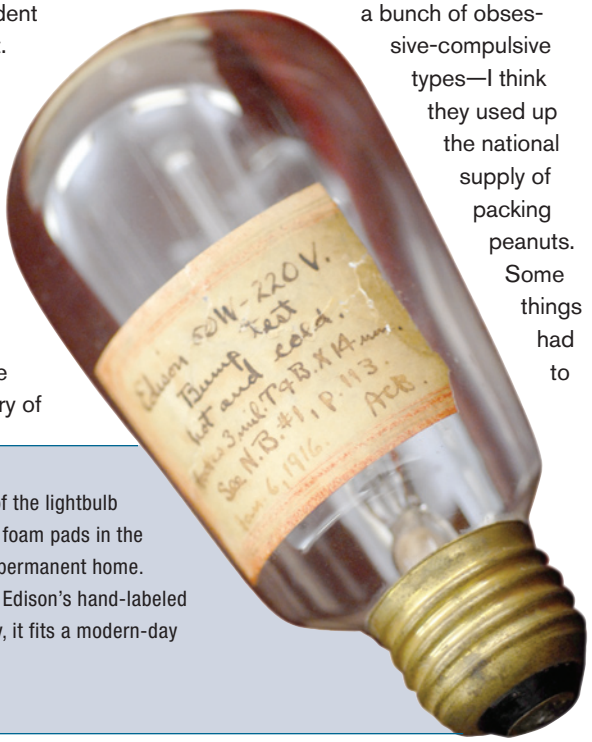
Since 1993 the Burndy Library had been housed at MIT, at the Dibner Institute for the History of Science and Technology. However, MIT wanted to go off in a different direction, and the Dibner family's 15-year lease—MIT owned the building—was running out. David, Bern's only child, and Fran, David's wife, began discussions with several institutions on the Burndy's future home, and so in early 2005 we were asked to submit a letter of interest. There were 16 applicants, one of whom made the mistake of saying, in the midst of the process, that they'd already gotten the collection. That was it for them when David found out.

David died unexpectedly in September 2005 and was succeeded as president of the library board by his son Brent. Ultimately, of course, they picked the Huntington. We made a very solid case: we're well known; we're heavily used; we have a program for managing historical collections; we didn't have to build a new building; and we're not sway to the political vagaries of a university, where a new president could come along and say, "we don't really want to collect the history of science anymore."

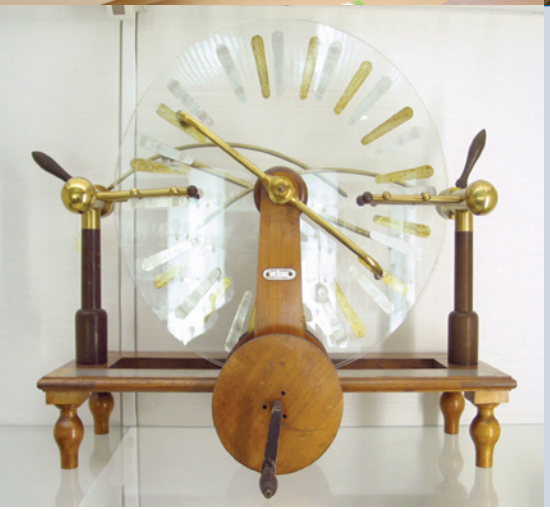
Once all the agreements had been negotiated and the papers signed, we still had to move the collection cross-country. It took all of October 2006 to pack everything. The books and manuscripts were pretty straightforward, but there were also huge oil paintings of eminent scientists, and busts, and ceramic figurines, and all those other artifacts.

There are 650 objects in the collection, and they're odd, strange, fascinating, and wonderful—everything from a rhino's horn to some of the world's largest fluorescent lightbulbs. Bern had a spectacular lightbulb collection—some very important ones of Edison's own design and manufacture, hand-labeled by Edison himself, up through modern bulbs. They were one of the few things on display at the Dibner Institute at MIT, where you could see them in a circular Plexiglas carousel in the foyer.

All of these items were carefully bubble-wrapped and boxed by a bunch of obsessive-compulsive types—I think they used up the national supply of packing peanuts. Some things had to



Left: A small portion of the lightbulb collection, laid out on foam pads in the basement, awaits its permanent home. Right: One of Thomas Edison's hand-labeled specimens. Amazingly, it fits a modern-day light socket.



Left: This Wimshurst static-electricity generator is the biggest artifact in the collection—the wooden base alone is the size of a coffee table. Above, left: It, and many of the other larger pieces of scientific hardware that will not be on display have not yet been uncrated. Above: Other strange and wonderful items Bern acquired include, from left, a Leyden jar (an early capacitor for storing static electricity), a bust of Leonardo da Vinci, a model of the Apollo moon lander, a rhinoceros horn, and a porcelain Ben Franklin. A bust of Bern himself can be seen over da Vinci's right shoulder.

be crated individually, like the Wimshurst static-electricity generator with its huge, hand-cranked glass disk. That crate is probably six feet by six feet by two feet. The smallest items were an assortment of electrical switches; oddly enough, Bern didn't save any Burndy connectors, although there is a vintage Burndy crimping tool.

We had to decide whether to ship this stuff worth, conservatively, a hundred million dollars discreetly and quietly, or with sirens running and heavily armed security guards. We went for the clandestine approach, under cover of darkness. It took six tractor trailers to haul it all, and we didn't want a conspicuous convoy, so every four days we would load up one truck. We had to load each trailer not by contents or weight, but by insurance value so that the risk was dispersed across all six trucks. One box in each trailer had a GPS unit, so that if something went terribly wrong and the truck disappeared, we could find it—in theory, anyway, because we assumed it would take a long time for the thieves to break into every carton and find the tracking device, if they even suspected its existence. Loading took a couple of hours, so each truck would leave Cambridge around midnight. The first truck left on November 1, and the last one arrived in San Marino just before Thanksgiving.

A BESTIARY OF BOOKS

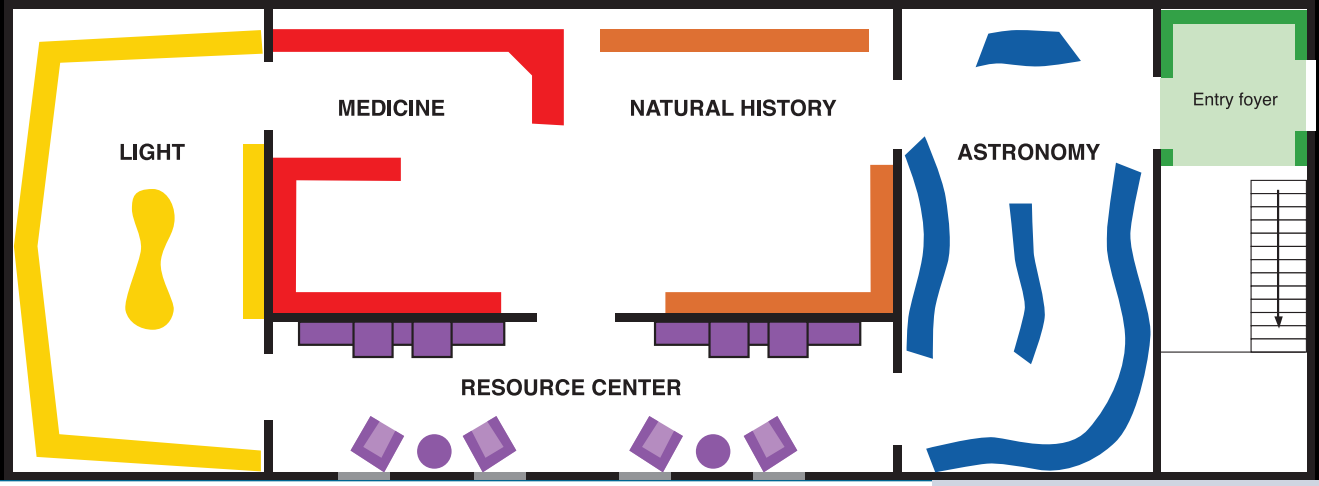
The Dibner family stipulated that we mount a permanent history of science exhibit, plus one temporary one every three years in our regular rotation. For the permanent one, we're using the former Arabella wing of our exhibition hall—a gallery of about 2,800 square feet, which had been filled with many wonderful examples of European decorative arts that have now been moved into the Huntington mansion with the rest of the European art. We had to get permission from all of the 30-odd surviving Huntington family members to do this, because it's written into our trust indenture that that wing be a memorial to Henry's wife, Arabella Huntington.

The exhibition, in the renamed Dibner Hall of the History of Science, will open to the public two years to the day after the first truck hit the road. It will be much more than just old books in locked cases. There'll be 15 audio stations where you will be able to hear Michael York read translated passages from these books as you look at them, and touch screens where you can flip through digitized scans of pages not on display. Karina White, our in-house exhibit designer, and I have been working very hard with Gordon Chun Design up in Berkeley to make this interactive, so that every section will include at least one thing that you can actually *do*.

The exhibit's title is "Beautiful Science: Ideas That Changed the World." Our goal is to impress upon the public that scientific knowledge is modified, improved upon, and sometimes overturned as we strive to understand the universe's workings more accurately. A beautiful idea broadens the imagination—a shift in scale, or in perspective, or in the concept of what is possible. And the expression of these ideas can have physical beauty as well: drawings, photos, even equations. But the history of science is far more than a cavalcade of triumphs. We try to show why one path was taken and

Incunables (*incunabula*, in Latin) are European books printed from movable type before January 1, 1501—that is, before the end of the century in which Johannes Gutenberg lived. (He died in 1468.) The Latin word means "baby clothes" or "things of the cradle," and these books are from the infancy of printing.

At left is a capital letter from the 1495 incunable of Aristotle's *De Caelo et Mundo*.



The exhibit layout.

not another, examine the interplay between theory and experiment, and analyze the relations between broad scientific trends and the work of individual scientists.

We've focused on four subjects that play to the strengths of our collections: astronomy, natural history, medicine, and light. You might look at this list and ask, "Well, where's chemistry? Where are mathematics, physics, technology?" In fact, they're all there. Chemistry, for instance, shows up in all four sections. I think this speaks to how science really works: a discipline emerges, and then it enters into the service of other disciplines.

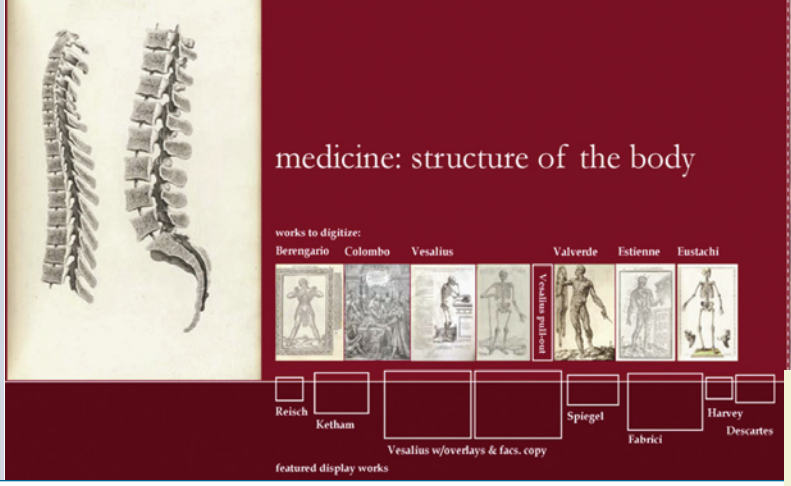
You enter through the astronomy gallery, which has black walls and ceiling. Overhead, printed in reverse so that they're white on black, are the 12 signs of the zodiac on large panels, as depicted in a set of 17th-century star charts by John Flamsteed, England's first Astronomer Royal and the founder of Greenwich Observatory. The display cases below will be fiber-optically lit from within. I'm hoping it'll be quite striking—we're really going for the "wow" factor. I also really want visitors to get the best possible look at the works themselves. We've put the Plexiglas covers just a couple of inches above the books, so that you can peer at their exquisite detail "up close and personal."

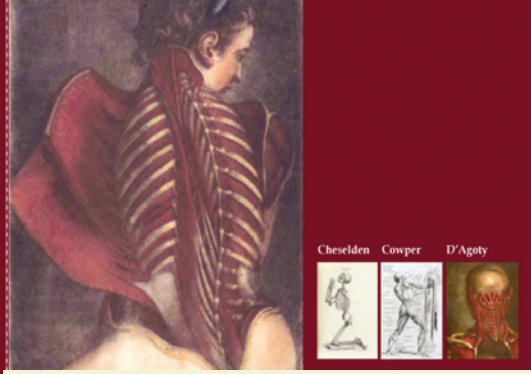
One sequence of cases, which I call "Location, Location, Location," starts with Aristotle and a 1495 incunable of *De Caelo et Mundo*, or *Of the Heavens and the Earth*, with commentary by Thomas Aquinas. Next to it is the oldest item in the exhibit, a manuscript version of Ptolemy's *Almagest*, a second-century AD Greek work. The *Almagest* was lost to human knowledge for centuries until a copy was found in the Middle East and translated into Arabic in the ninth century, and thence eventually rediscovered by Europeans. Our copy, in Latin, was transcribed by monks in the south of France in 1279. Ptolemy, like Aristotle, placed a fixed, unmoving Earth at the center of the cosmos, and the *Almagest* describes how the sun, moon, planets, and stars orbit us in nested circles within circles. An eminently practical work, it gives methods for predicting the positions of these heavenly bodies that were not superseded until Nicholas Copernicus (*De Revolutionibus Orbium Caelestium*, 1543; we have the second edition, printed in 1566) dethroned Earth in favor of the sun and Johannes Kepler (*Astronomia Nova*, 1609) replaced the circles with ellipses. There's a touch screen between Ptolemy and Copernicus where you'll be able to play with models of their two universes.

Next comes Galileo's 1632 *Dialogue Concerning the Two Chief World Systems*—his defense of Copernicus that got him in trouble with the Pope—and the annotated *Principia*. Earth gets pushed even farther from the center of affairs in 1750 by Thomas Wright, who proposed in his *An Original Theory or New Hypothesis of the Universe* that the Milky Way was "an optical effect due to our immersion in what locally approximates to a flat layer of stars." And finally, you arrive at the expanding universe filled with innumerable galaxies, as seen in Edwin Hubble's logbook of his observations through the 100-inch Hooker telescope atop Mount Wilson, from first light in 1917 to 1923.

From astronomy you'll move to natural history, where I'm running a 27-foot bookshelf containing nothing but editions—some 250 of them—of *On the Origin of Species* along

Kepler's supernova—the bright pink star above and to the right of the moon, and about an inch away from it at this scale—shines on the astronomy gallery's east wall as it would have appeared from the Huntington on February 13, 1605 at 5:45 a.m. This supernova, the second to be seen in Europe in 32 years, helped undermine the ancient view of the cosmos as being perfect and unchanging. Painted by noted astronomical artist Chris Butler, the mural is accurate down to the colors of the stars.



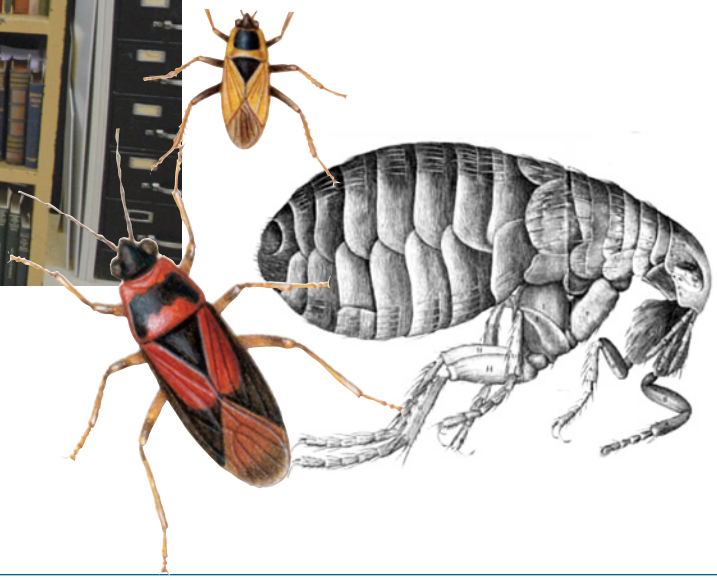


Right: Part of the wall design for the medicine gallery. D'Agoty's mezzotint "Flayed Angel" contrasts with William Cheselden's more prosaic views of the spine (*Osteographia*, 1733).

two walls. This assemblage includes not only the English first edition, but first editions in several other languages, and shows the power of this idea over time. Incidentally, Angus Carroll of the Darwin Papers Project at Cambridge University and I are doing a census to see how many copies of the first edition remain. Some 1,250 were printed, and perhaps 800 have survived. It's now a $100,000 to $200,000 book, so if you're ever at a garage sale and you see a copy bound in a green cloth with gilt letters, and on page 20, line 11, the word "species" is spelled "speceies," grab it. Bookending the evolution display you'll see a manuscript of Aristotle's *De Animalibus* from circa 1275 on one side, and on the other we'll have a copy of Gregor Mendel's *Experiments in Plant Hybridization* from 1866 and Watson and Crick's April 1953 *Nature* paper announcing the discovery of the structure of DNA.

The opposite corner of the gallery features observations of animals real and imaginary, including drawings of fleas and even smaller creatures made by Robert Hooke, using a newfangled tool called the microscope. Hooke's 1665 *Micrographia*, which you'll see there, was an instant bestseller in London. Diarist Samuel Pepys, for one,

The mezzotint, widely used in the 18th century, was one of the earliest ways to print color on a page. The plates, usually copper, were roughened with a finely serrated tool—a process that could take more than a day in itself—and then the picture was drawn with a pointed scraper and shaded with rounded burnisher. The smoother these tools made the copper surface, the less ink it held, allowing for exquisite control of light and shadow. As in modern printing processes, a separate plate had to be prepared for each color, making the entire operation very labor-intensive.



Above: Dan Lewis and Karina White peruse one of the 250-odd copies of the *Origin of Species* chronologically arranged on two book trucks. (The first edition is top left on the blue truck.) Note Flamsteed's star chart in the background.
Right: Beautiful bugs from the 1830s, drawn by the team of Meunier, Prêtre, and Vaillant, and Robert Hooke's flea.

Left: Andreas Vesalius's *De Humani Corporis Fabrica*, or *On the Fabric of the Human Body* (1543), is the first modern anatomical text. Its detailed drawings showed dissected figures in "living" poses.
Right: The first medical X-ray photograph, taken in 1896, shows dozens of buckshot lodged in the hand of Prescott Hall Butler, a wealthy New Yorker. His surgeon, Dr. William T. Bull, removed them, using the image as a guide.

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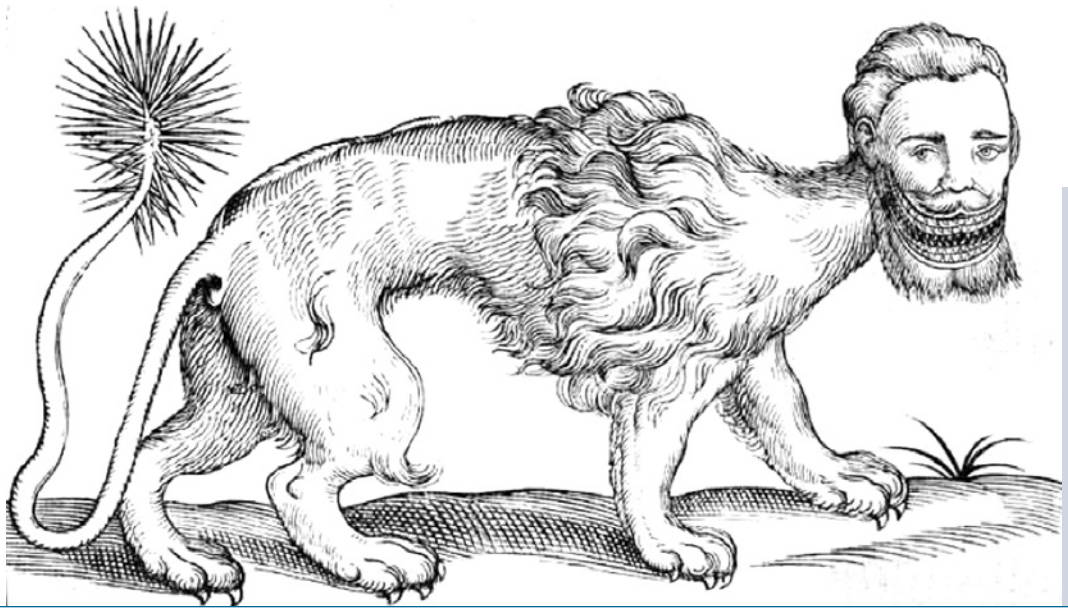
"sat up all night staring at it in amazement." You'll be able to look at a flea yourself, using replicas of one of Antony van Leeuwenhoek's pocket microscopes that sit next to his collected works. Making the microscopes was a bit of a challenge: we had to figure out how to mount the flea so that it wouldn't fall out when you handled the instrument, how to get the lighting right, and how to subtly alter Leeuwenhoek's design so that you won't poke your eye out with the thumbscrew.

The history of medicine shares the same gallery. The first thing you see is the anatomical display, which features images of skeletons and muscles starting in 1543 with Andreas Vesalius and ending with Gray's *Anatomy*, which was the definitive work on the subject nearly 150 years before a TV show borrowed the name. Well, actually, the *first* thing you see is a 10-foot-tall copy of a 1746 Gautier D'Agoty mezzotint known as the "Flayed Angel." It's a full-color rendition of a young woman whose back has been laid open like an angel's wings to reveal the bones and sinews beneath. The walls here will be a deep, rich red, and again the effect should be quite striking. (We'll also include a 1653 reprint of William Harvey's treatise on the circulation of the blood.)

Cheek by jowl with anatomy is a section on healing. This starts with copies of works by Hippocrates, Galen, and Avicenna that were printed in the 1500s, and runs through Edward Jenner's 1798 description of smallpox vaccination to some Pasteur manuscripts from the 1870s. In the middle are two herbals—the pharmaceutical catalogs of the day—from the 1500s and 1600s, and an array of bottles filled with the odiferous extracts of some of the plants mentioned therein. There's also an astonishing work from circa 1517 called the *Field Book of Wound Surgery*. Written for army doctors, this is not for the faint of heart, as 16th-century weapons had relatively low velocities and thus rarely cut cleanly into or through anything. Dealing with the extensive tissue and bone damage thus caused has an unusual kind of beauty: saving lives.

Bern collected some of the earliest X-ray pictures ever taken, including the very first diagnostic one, showing self-inflicted buckshot in the hand of a careless hunter.



Early natural-history books mixed the real and the fantastic, and Edward Topsell's *Historie of Foure-Footed Beastes* (1658) is no exception. The manticore seen here is a red-pelted man-eater with the body of a lion, a tail that shoots quills, and a human-like head—except for the three rows of serrated teeth and the mouth that runs ear to ear.

Lewis admires a particularly ornate lightbulb filament, as a portrait of Sir Goldsworthy Gurney (1793–1875) looks on. Gurney tinkered with steam-powered carriages for use on the public roads, and invented the high-intensity Bude light that replaced the limelight in theaters—which may explain his expression.

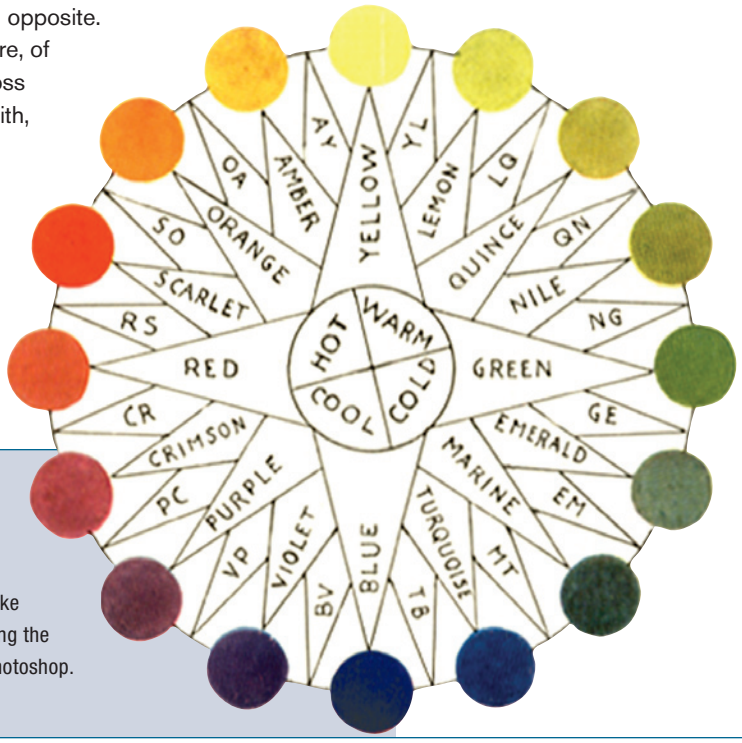
Physicist Michael Pupin at Columbia University in New York made a famous photograph of it within nine months of Roentgen's invention of the X-ray tube. The original photograph will only be on display for the first few months, as it is very sensitive to ultraviolet light, and then it will be replaced by a facsimile.

Light sensitivity, incidentally, is a big preservation issue. It's high on the list of reasons why people tend not to do permanent exhibits of rare books. You have to turn the pages of a colored work every 12 weeks so that the inks don't fade. Simply leaving an old book open is hard on it. You have to rotate the book out every couple of years in order to prevent the binding from slumping to the opened page, which is why it's good to have several copies of each work in reserve.

> The resource room will also have a 300-year-old book you can actually leaf through. There's no substitute for the immediacy of handling a rare book, turning the pages yourself, and I want people to have that experience. My more conservative colleagues think this is a terrible idea.

Light is the subject of the fourth gallery. There's a lot of science in here, because we also treat electricity and magnetism. We start with Ibn al-Haytham, known in the West as Alhacen or Alhazen, who flourished just after the turn of the first millennium, and whose works were printed in a seven-volume set in 1572. Alhacen invented the scientific method of hypothesis and experiment, which he used to prove that light entered the eye in straight lines from the outside world, rather than being emitted from the eye as Euclid and Ptolemy held. We'll reproduce an experiment that he used—but did not invent—a camera obscura, which is a box where a pinhole in one wall projects an image on the interior wall opposite.

Newton's *Opticks* is in here, of course, and in a burst of gross overkill, I recruited Greg Smith, who consults up at JPL and designed all the lenses for all the cameras on the current Mars rovers, to make Newton's prism experiment work just right. This is the one where white light goes through a prism and gets broken up into its component colors, which fall on a card. If the card is removed, a second prism recombines the colors back into white light. You see it a lot in science center exhibits, but it generally looks crummy—the light isn't bright enough, and the rainbow is too small. So Greg helped us get just the right kind of glass and work through the other details, and I hope we'll have an effective demonstration. We'll also have a bunch of treatises on color theory, including Boyle's monumental *Experiments and Considerations Touching Colours* from 1664. On the opposite wall you move from color to spectroscopy with a section that includes Norman Lockyer's 1878 *Studies in Spectrum Analysis*, which recounts his discovery (independently made by Pierre Janssen in France) of helium—by its lines in spectra taken of the edge of the sun during the solar eclipse of October 1868. Helium is the only element to have been identified in space before it was found on Earth.



Right: A color wheel from *A working system of color for students of art and nature* by Frederick Leroy Sargent, printed circa 1927.
Far right: This diagram from the same book shows how to make a gradual transition from one color to another by slowly altering the proportions of the two—a gradient filter in the days before Photoshop.

A rendering of the resource room.

Spectroscopy segues into electricity and magnetism, as represented by works by Volta, Faraday, Maxwell, and even Benjamin Franklin. Nikola Tesla is here, and, of course, Thomas Edison—this is where Bern's lightbulbs will live. We're even going to light some of them up. I've been consulting with Lee Johnson at JPL, a research engineer whose day job is developing ion-drive technologies and who knows everything there is to know about electricity and an amazing amount about lightbulbs, and we think we've got it all figured out. Oxygen is a hot filament's worst enemy, so we'll keep the bulbs in nitrogen-filled display cases in case the bulbs' vacuum seals are leaking. We'll run them at about 10 percent of their designed wattage, just enough to make the filaments glow, so there will be all these beautiful orange loops and swirls from all the different filament designs.

Accessible from all the galleries is the resource room, which will have workstations where you can download additional materials, or watch any of nine interviews we've done, mostly with scientists, about what constitutes a beautiful idea in science. But primarily, the resource room is a place for people to sit in overstuffed chairs and actually *read*. After all, we're a library. I want people to be able to read, with their own eyes, translations or modern versions of the works on display. We'll also have books about the collection's subject matter, and books by scholars who made use of the collection.

The resource room will also have a 300-year-old book you can actually leaf through. There's no substitute for the immediacy of handling a rare book, turning the pages yourself, and I want people to have that experience. My more conservative colleagues think this is a terrible idea. But there are works that aren't terribly expensive that we can replace readily, so we'll see how it goes. If the book gets shredded into a million pieces in a week, I won't try it again. But if it holds up for six months or a year, I'll just buy another one. You'd be astonished at how durable 300- to 500-year-old paper is. Or 800-year-old vellum, from before the printed era. Bindings wear out, but paper does so much more slowly—unless it's modern paper, with really short fibers made from wood pulp.

Beautiful ideas, expressed in beautiful books—you must come and see them! E&S

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Lewis recently turned his PhD thesis into a book,* Iron Horse Imperialism: The Southern Pacific of Mexico, 1881–1951, *now available in paperback.

This article was adapted from Lewis's Seminar Day talk, given May 17, 2008, by Douglas L. Smith.

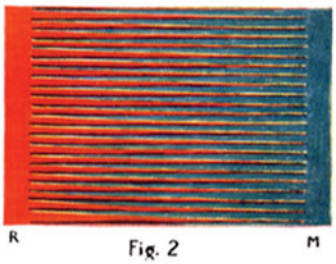

Fig. 2

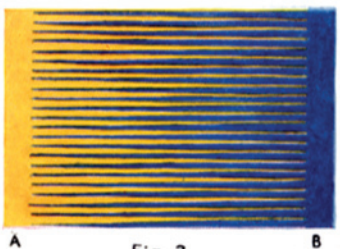

Fig. 3

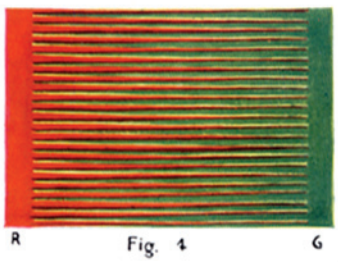

Fig. 4

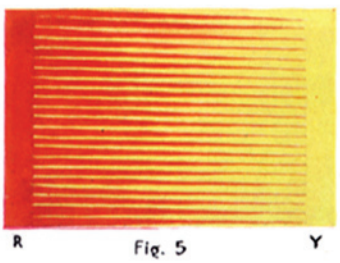

Fig. 5