"Frankenstein: Penetrating the Secrets of Nature" Exhibit Text

Section I

Frankenstein: Penetrating the Secrets of Nature

A Traveling Exhibition to America's Libraries

Frankenstein: Penetrating the Secrets of Nature was developed by the National Library of Medicine in collaboration with the American Library Association. The exhibition is based upon a major exhibition produced by the National Library of Medicine in 1997– 1998.

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Exhibition curator: Susan E. Lederer, Ph.D., Yale University, New Haven, CT
Exhibition literary consultant: Betty T. Bennett, Ph.D., American University, Washington, DC
Exhibition design: Chester Design Associates, Washington, DC/Chicago, IL
Exhibition tour management: Public Programs Office, American Library Association

The Birth of *Frankenstein*

For nearly two hundred years, the story of Frankenstein—the book, the monster, the scientist—has gripped our imaginations and haunted our nightmares. Though Mary Shelley (1797–1851) was only 20 years old when *Frankenstein; or, The Modern Prometheus* was first published in 1818, she posed profound questions in her novel about individual and societal responsibility for other human beings. To make her point, she used the scientific advances of her era and the controversy surrounding them as a metaphor for issues of unchecked power and self-serving ambition, and their effect on the human community.

This exhibition explores the woman and the world that gave birth to *Frankenstein*. It examines how playwrights and filmmakers transformed the Frankenstein story into one of the Western world's most enduring myths. Finally, it considers how Mary Shelley's unfortunate monster frequently provides a framework for discussions of contemporary biomedical advances such as cloning, which challenge our traditional understanding of what it means to be human.

The Monster
Courtesy Ronald V. Borst/Hollywood Movie Posters
Courtesy of Universal Studios Licensing, Inc.

A Dark and Stormy Night

In 1816, Mary Godwin and her lover, the poet Percy Bysshe Shelley (whom she married later that year), summered in Switzerland near the shores of Lake Geneva. The wet, uncongenial weather led them to spend much of their time indoors at the nearby villa of the poet, Lord Byron, where they avidly discussed literature, politics, and science. One night, Lord Byron suggested that he and his guests take part in a competition to write a terrifying tale. Inspired by a "waking dream" in which she envisioned "the hideous phantasm of a man stretched out, and then, on the working of some powerful engine, show signs of life," Mary began writing *Frankenstein*.

Mary Shelley
Portrait by Reginald Easton (d. 1893)
The Bodleian Library, University of Oxford

Mary Shelley was only 18 years old when she first dreamed of Frankenstein and the monster he created out of parts of other bodies.

Percy Bysshe Shelley
Portrait by Amelia Curran (d. 1847)
The Granger Collection, New York

One of the leading British Romantic poets and a political radical, Percy Bysshe Shelley (1792–1822) was expelled from Oxford University for a scandalous broadside on atheism. He wrote the preface for the first edition of *Frankenstein* (1818).

Mary Shelley and Her Family

The literary life attracted Mary Shelley from an early age. Although her mother, Mary Wollstonecraft, a political theorist and author of *Vindication of the Rights of Woman*, died eleven days after her daughter's birth in London in 1797, she exerted a powerful influence on Mary Shelley through her books. No less influential was Mary Shelley's father, William Godwin, whose political writings challenged the British monarchical system and called for radical social reforms.

Mary Wollstonecraft
Portrait by John Opie (1761–1807)
The Granger Collection, New York

Mary Wollstonecraft (1759–1797) earned her living as a governess before moving to London in 1787 to pursue a career as a writer. Within five years, she established herself as an influential and controversial political theorist. She married William Godwin in March 1797; she died in September of that year after giving birth to her namesake, the author of *Frankenstein*.

Mary Wollstonecraft
A Vindication of the Rights of Woman: with Strictures on Political and Moral Subjects Boston, 1792
Reproduced from the Collections of the Library of Congress

Mary Wollstonecraft's book argued for women's right to self-determination and equality in the intellectual, public, and domestic spheres. American feminist Susan B. Anthony presented a copy of "this earliest work for women's rights to equality" to the Library of Congress in 1904.

William Godwin
Portrait by James Northcote (1746–1831)
The Granger Collection, New York

William Godwin (1756–1836) perceived the political issues raised by the French Revolution as an opportunity to reorder the world to produce an egalitarian society structured on reason, justice, and universal education. He and Mary Wollstonecraft married in 1797; their daughter Mary was born August 30, 1797.

William Godwin
Caleb Williams
London, 1794
Courtesy Rare Book Room and Special Collections, University Library, University of Illinois at Urbana-Champaign

William Godwin's novel *Caleb Williams* supported the arguments he had made for a republican, anti-monarchical government in his masterwork, *An Enquiry Concerning Political Justice* (1793).

An Extraordinary Education

Mary Shelley's unconventional upbringing included an education that stressed the development of the imagination. In her early years, she was introduced to great works of literature, history, and mythology, and she studied French and Latin. Her father's London home attracted an extraordinary array of visitors, who included the writers Samuel Taylor Coleridge and Charles and Mary Lamb, American politician Aaron Burr, chemist Humphry Davy, poet and physician Erasmus Darwin, and chemist-inventor William Nicholson. She met Percy Bysshe Shelley there when she was 15 years old; two years later, they began their life together.

Sir Humphry Davy
Elements of Chemical Philosophy, Part 1, Vol. 1
Philadelphia, 1812
History of Medicine Division, National Library of Medicine

In October 1816, when she was working on *Frankenstein* every day, Mary Shelley recorded in her diary that she was reading Humphry Davy's *Elements of Chemical Philosophy.* Davy (1778–1829), a friend of Shelley's father, William Godwin, held popular public demonstrations of chemical phenomena at the Royal Institution in London in the early nineteenth century.

Heinrich Cornelius Agrippa von Nettesheim
La Philosophie Occulte, Vol. 1
La Haye, 1727
History of Medicine Division, National Library of Medicine

In *Frankenstein*, young Victor Frankenstein reads the entire works of Cornelius Agrippa (1486–1535), hoping to master a "secret store of knowledge" about the natural world. This text was one of the most widely read and respected books on the magical arts.

Paracelsus
Geheimnuss Aller Seiner Geheimnusse
Frankfurt, 1770
History of Medicine Division, National Library of Medicine

During his university days, Victor Frankenstein apprentices himself to Professor Waldheim, who praises both Agrippa and Paracelsus (1493–1541) as "men whose indefatigable zeal provided the foundation of modern knowledge."

A Writer's Life

The first edition of *Frankenstein* was published anonymously in 1818. Mary Shelley remains best known today for this compelling story about a creature fashioned from parts of other bodies, but she also wrote five other novels, a novella, travel books, biographies, short stories, essays, and poetry. In the four years following the publication of *Frankenstein,* however, she suffered grievous personal losses—the deaths of two children and her husband's drowning at sea.

After Percy Shelley's death in 1822, Mary Shelley relied on her writing and a small family allowance to support herself and her one surviving child. In 1839, she edited the monumental editions of her husband's works and letters. Although she had at least two suitors, Mary Shelley never remarried. She died in London in 1851 at the age of 53, her surviving son at her side.

Mary Shelley
Frankenstein; or, The Modern Prometheus, Vol. 1
London, 1818
Singer-Mendenhall Collection, Annenberg Rare Book and Manuscript Library, University of Pennsylvania

The first edition of *Frankenstein* appeared anonymously. Although some critics like novelist Sir Walter Scott praised the vigor and originality of the novel, some were far more critical of "the tissue of horrible and disgusting absurdity" in the book, and its failure to provide a useful moral lesson.

Mary Shelley
Frankenstein; or, The Modern Prometheus
London, 1831
Singer-Mendenhall Collection, Annenberg Rare Book and Manuscript Library, University of Pennsylvania

For the 1831 edition of *Frankenstein,* Mary Shelley wrote a new preface and made several changes in the text. She continued to express great affection for her "hideous progeny," which she described as the "offspring of happy days" before the deaths of her children, William and Clara, and her husband, Percy Shelley.

Diodati, The Residence of Lord Byron
W. Purser
The Granger Collection, New York

In the summer of 1816, Lord Byron and his physician John William Polidori lived in the Villa Diodati on Lake Geneva. During a gathering at the Villa Diodati, Byron proposed the famous ghost-story competition that produced Mary Shelley's *Frankenstein* and Polidori's *The Vampyre*.

Lord Byron
Portrait by William West
The Granger Collection, New York

An English Romantic poet and political liberal, Lord Byron entertained the Shelley party during the wet, uncongenial summer of 1816. During that time, he and Percy Bysshe Shelley engaged in extended conversations about the "principle of life," to which Mary Shelley was a silent listener.

Section II

Science and the Boundary of Life

In her novel, Mary Shelley did not provide detailed descriptions of the process her protagonist, Victor Frankenstein, used when he "bestowed animation on lifeless matter." But Victor Frankenstein's references to the power of electricity, and his infusion of "a spark of being into the lifeless thing" make clear that Mary Shelley, like many of her contemporaries, was fascinated by the boundary between the living and the dead and the scientific search for the principle of life.

Frankenstein reflected the interest of early nineteenth-century physicians and natural philosophers in human dissection and experiments on animals, as they explored the possibilities for generating life, resuscitating the drowned and the newly dead, and reanimating dead tissue using electricity. These researchers sought to benefit humankind and to end death and disease through their investigations into "the secrets of nature."

Reanimating the Dead

Resuscitation of those who appeared to be dead interested many people in the nineteenth century. As early as the 1760s, "humane societies," organized by physicians and reformers, began to teach the public procedures for reviving the drowned and the suffocated. Using smelling salts, vigorous shaking of the body, various methods of artificial respiration, and the application of electrical current, these societies claimed to have saved the lives of thousands of people. American physician David Ramsey sensed the dawn of a new age of medical possibility. "How many must have been lost to their friends and their community," he asked in 1801, "before mankind was acquainted with the god-like art of restoring suspended animation?"

A Physical Dissertation on Drowning
Rowland Jackson (d. ca. 1787)
London, 1747
History of Medicine Division, National Library of Medicine

In the second half of the eighteenth century, humane societies operated receiving stations where members attempted to revive drowned persons using such devices as resuscitation bellows (pictured on the left page). When Percy Bysshe Shelley's first wife, Harriet Shelley, was found

drowned in London in December 1816, she was taken to one of the receiving stations, but efforts to revive her were unsuccessful.

The Spark of Life

What separates the living from the dead? What is the "spark of life" that animates the living? Can physicians control and manipulate that spark to restore life? All of these questions were on the minds of scientists during Mary Shelley's era. In a quest for the principle of life, Luigi Galvani (1737–1798), a professor of anatomy at the University of Bologna, performed an extensive series of experiments in "animal electricity" or "galvanism" in the 1780s and 1790s. Galvani's nephew, physician Giovanni Aldini (1762–1834), conducted demonstrations of the effects of electricity on animal and human bodies for audiences throughout Europe.

In London in 1803, Aldini administered electrical current to the ears and nose of a recently beheaded ox. To the astonishment of his audience, the eyes of the ox opened, the tongue moved, and the nose of the animal stirred. Aldini performed similar demonstrations using the heads of newly executed criminals, producing quivering of the jaw, contortion of the muscles, and opening of the eyes. Mary Shelley was well aware of "galvanism"; she made explicit reference to it in the revised edition of *Frankenstein* published in 1831.

From Giovanni Aldini, ***An Account of the Late Improvements in Galvanism***
Artist unknown, 1803
History of Medicine Division, National Library of Medicine

Italian physician Giovanni Aldini administered electricity to the bodies of decapitated animals and humans and produced twitching and other physical movements. Showing that electricity could produce movement in dead bodies was not evidence of life as we understand it today, but it signaled the potential of this radical new technology.

A Galvanized Corpse
Lithograph by Henry R. Robinson
Courtesy Library of Congress, Prints and Photographs Division

Galvanism, the administration of electricity to the body, captured popular attention on both sides of the Atlantic. In this 1836 American political cartoon, newspaper editor Francis Preston Blair rises from his coffin after receiving a jolt of galvanic energy.

Voltaic pile
French (?), ca. 19th century
Conducting arc
English (?), ca. 1820
Courtesy The Bakken

In 1800, Italian professor Alessandro Volta (1745–1827) introduced the voltaic pile, which produced electrical current that could be applied to bodies for therapeutic and research purposes. The pile was constructed of alternating discs of zinc and copper, interspersed with pieces of cardboard soaked in brine. The metallic arc was used to conduct the electrical current produced by the pile over a greater distance.

The Nature of Monsters

In the eighteenth and nineteenth centuries, the origins of "monsters"—deviations from normal human development—intrigued physicians and lay people alike. Books on anatomy and embryology contained images of abnormalities, and physicians sought explanations for them. Mary Shelley visited natural history museums in England and Europe that displayed wax models of normal and abnormal human development. In *Frankenstein*, she describes how a young student (Victor Frankenstein) exercised "infinite pains and care" in selecting beautiful features for the creature he was attempting to bring to life. In spite of this care, he produced a hideous, oversized, "miserable monster," rather than a well-formed human being.

De Monstro Nato Lutetiae Anno Domini 1605
Illustration by Jean Riolan
Paris, 1605
History of Medicine Division, National Library of Medicine

Victor Frankenstein created a "miserable monster," even though he selected the body parts with great care. In the seventeenth and eighteenth centuries, physicians sought to understand abnormal births and the origins and development of "monsters."

Life Blood

A dramatic new technique for reviving those close to death was blood transfusion. In the early nineteenth century, English physician James Blundell performed human-to-human blood transfusion to save the lives of women who experienced massive blood loss during childbirth. Blundell believed that blood had the power to restore life itself. He invented several transfusion devices, including a brass "gravitator," which funneled blood from a standing donor to a reclining recipient. After a woman received a few ounces of her husband's blood, the medical journal, *The Lancet*, noted in 1834, "Life seemed to be immediately reanimated as by an electric spark."

Blood transfusion apparatus
Made by James Blundell
London, 1819
Courtesy International Museum of Surgical Science, Chicago, Illinois

In the early nineteenth century, English physician James Blundell introduced human-to-human blood transfusion in a desperate effort to save the lives of dying patients. Earlier transfusers had given human beings blood from animals. Blundell developed a copper cup with a metal handle to collect blood and funnel it from the donor to the recipient.

Blundell's Gravitator
Artist unknown
Illustration from *The Lancet*, 1828–1829
Pennsylvania State University Libraries

James Blundell continued to improve his transfusion device. In 1828, he introduced the brass "gravitator," which could be used to transfer blood in a "regulated stream" from one individual to another.

The Principle of Life

In *The Temple of Nature*, British physician and poet Erasmus Darwin described experiments in which lower organisms developed from non-living material, a process he called "spontaneous generation." In her preface to the 1831 edition of *Frankenstein*, Mary Shelley recalled how listening to conversations between Percy Shelley and Lord Byron involving the principle of life, including Erasmus Darwin's experiments, led her to speculate on whether "the component parts of a creature might be manufactured, brought together, and endued with vital warmth."

Erasmus Darwin
The Temple of Nature; or, The Origin of Society
Baltimore, 1804
Frontispiece by Henry Fuseli
History of Medicine Division, National Library of Medicine

Poet, physician, and botanist, Erasmus Darwin (1731–1802) wrote extensively about the natural world. In the philosophical notes that accompanied the lengthy poem, *The Temple of Nature*, Darwin described experiments in the spontaneous generation of worms and eels that Mary Shelley credited as part of her inspiration for *Frankenstein*. The frontispiece for the book was the work of artist Henry Fuseli (1741–1825), an early love of Shelley's mother, Mary Wollstonecraft.

Secret Toil

One of the most unsettling elements of the Frankenstein story, and one that endures with each telling of the tale, is Mary Shelley's description of the "raw" material Victor Frankenstein uses to construct his creature. He gathers pieces from charnel houses, where bones were collected and stored, and he frequents animal slaughterhouses and the dissecting rooms of hospitals to assemble the necessary parts for his living being.

Until the early nineteenth century, the only human bodies legally available in England for anatomical dissections were those of executed criminals. This irregular and inadequate supply prompted some physicians to engage in "body-snatching" and to hire "resurrectionists" to steal the bodies of the newly buried for medical schools and hospitals. Public hostility and a few notorious trials of "body snatchers" led to the enactment by the British Parliament in 1832 of the Anatomy Act, which made unclaimed bodies at hospitals and workhouses available to researchers.

The Anatomist Overtaken by the Watch . . . Carrying off Miss W—ts in a Hamper
William Austin
London, 1773
History of Medicine Division, National Library of Medicine

In this cartoon by William Austin, British surgeon William Hunter runs from the scene when his "resurrection" of the corpse of a young woman is revealed. Before 1832, anatomists, like Victor Frankenstein, retrieved bodies from graveyards and feared discovery by families.

Section III

Finding *Frankenstein; or, The Modern Prometheus*

Who was Victor Frankenstein? Why did Mary Shelley use the subtitle, *The Modern Prometheus*, for her book? Was Shelley's monster the same monster who is now so beloved in contemporary popular culture?

More than a simple parable of science gone mad, *Frankenstein* uses scientific themes as a framework for exploring larger political issues of power, responsibility, and justice in society. In interlocking stories, Mary Shelley transforms an ideal cherished by her and her circle—enlightenment through the attainment of knowledge—into a more complex examination of the good—and the evil—that may result when knowledge and power are used unwisely and for personal gain.

Shelley's classic novel begins and ends in the icy waters of the Far North. At the start of the novel, Victor Frankenstein has pursued his monster to the frozen Arctic, where he relates his strange tale to polar explorer Robert Walton. Frankenstein's creature was not born a monster. He began life as a rational being. Abandoned by his "father," Victor Frankenstein, the creature undertakes a process of self-education and a search for human connection. Alone, he learns to speak, read, and ponder his "accursed origins." Only after he is denied human relationships and acceptance by society does he turn to rage, revenge, and murder. The tragedy of Victor Frankenstein is the result of his utter failure to take responsibility for his creation.

In subtitling her novel *The Modern Prometheus*, Mary Shelley drew upon the mythological figure of the Greek Titan, Prometheus, who was punished by Zeus for giving fire, a symbol of knowledge, to humankind. For Shelley and her contemporaries, Prometheus represented the human desire to comprehend the universe. In her transformation of the Promethean myth, Mary Shelley created a new and dangerous story about discovery that is carried out for private gain and personal ambition, rather than for the enlightenment of all.

Prometheus Bound
Painting by Peter Paul Rubens (1577–1640)
The Granger Collection, New York

Mary Shelley's classic novel begins and ends in the icy waters of the Far North.

Untitled (iceberg background)
Mitsuaki Iwago (b. 1950)
Mitsuaki Iwago/Minden Pictures

Paradise Lost

> "Did I request thee, Maker, from my clay
> To mould me man? Did I solicit thee
> From Darkness to promote me?—"
>
> John Milton, *Paradise Lost*

Mary Shelley's tale begins with lines from the poet John Milton. In the novel, she creates a rational, intelligent monster, who reads *Paradise Lost* and mourns the fact that unlike the Biblical Adam, who came forth "from the hands of God a perfect creature," he himself is misshapen and hideous. But even worse, he has been abandoned by his creator.

Midnight Labors

"Who shall conceive the horrors of my secret toil, as I dabbled among the unhallowed damps of the grave, or tortured the living animal to animate the lifeless clay?"

Victor Frankenstein
Frankenstein; or, The Modern Prometheus, 1818

Victor Frankenstein visits the hospital dissecting room, the charnel house, and the slaughterhouse to collect materials for his secret experiments. Working alone, he gathers together the pieces of bodies he needs to create a living being.

Hideous Progeny

"His yellow skin scarcely covered the work of muscles and arteries beneath; his hair was of a lustrous black, and flowing . . . [it] formed a more horrid contrast with his watery eyes, that seemed almost of the same colour as the dun white sockets in which they were set, his shrivelled complexion, and straight black lips."

From *Frankenstein; or, The Modern Prometheus,* 1818

Repelled by the "miserable monster" he has fathered, Victor Frankenstein flees his laboratory, leaving the creature alone. The next morning, when the scientist returns to "his workshop of filthy creation," the monster has escaped.

Responsibility for Creation

"Remember that I am thy creature: I ought to be thy Adam, but I am rather the fallen angel . . . Make me happy, and I shall again be virtuous."

The Monster to Victor Frankenstein
Frankenstein; or, The Modern Prometheus, 1818

After murdering Victor Frankenstein's brother in revenge, the wretched creature reminds the scientist that he bears a god-like responsibility for his own research. Isolated from human society, the lonely creature seeks companionship and beseeches his maker to help him.

A Monstrous Mate

"I demand a creature of another sex, but as hideous as myself . . . we shall be monsters, cut off from all the world . . . . Our lives will not be happy, but they will be harmless, and free from the misery I now feel."

The Monster to Victor Frankenstein
Frankenstein; or, The Modern Prometheus, 1818

Victor Frankenstein agrees to create a companion—an Eve—for his monstrous Adam. But terrified that she will be "ten thousand times more malignant" than the male creature, he breaks

his promise and disposes of the body parts. Enraged, the monster takes revenge, killing Victor's beloved bride, Elizabeth.

Blasted Hopes

"Seek happiness in tranquility, and avoid ambition, even if it be only the apparently innocent one of distinguishing yourself in science and discoveries. Yet why do I say this? I have myself been blasted in these hopes, yet another may succeed."

The dying Victor Frankenstein to Robert Walton
Frankenstein; or, The Modern Prometheus, 1818

His health shattered by the deaths of loved ones and the pursuit of his creature, Victor Frankenstein dies. His final words express his failure to accept responsibility for his creation and for the consequences that ensued. Mary Shelley uses the tragic results of his actions to illustrate the necessity for scientists—and for all those who hold power over others—to act responsibly when they seek to transform the lives of the human community.

Fire and Ice

"I shall quit your vessel on the ice-raft . . . I shall collect my funeral pile, and consume to ashes this miserable frame . . . He is dead who called me into being; and when I shall be no more, the very remembrance of us both will speedily end."

The Monster to Arctic Explorer Robert Walton
Frankenstein; or, The Modern Prometheus, 1818

The tragedy of Victor Frankenstein and his creature begins and ends in the icy regions of the frozen north. Remorseful and repentant for his misdeeds, the creature goes off to build his own funeral pyre. Mary Shelley does not make it clear when—or if—he dies. But the memory of the man and the monster created by Mary Shelley nearly two hundred years ago endures.

Section IV

The Transformation of a Monster

From its first appearance in 1818, Mary Shelley's *Frankenstein* both fascinated and repelled audiences. Her story, moreover, attracted other creative artists, who freely adapted the novel for audiences in England, America, and Europe. As early as 1823, and continuing into the next century, the monster underwent a transformation in which he lost much of the intelligence and emotional complexity Mary Shelley had given him. From a sensitive, reasoning and articulate being whose crimes resulted from his mistreatment at the hands of humanity, the creature mutated into a grunting brute, whose violent and cruel nature could only be understood as the product of science daring to usurp the god-like power of creation. Almost as quickly, the name "Frankenstein" came to represent the monster as much as his maker. Although Mary Shelley's monster was nameless, many playwrights, writers, and the general public since then have called the monster "Frankenstein."

The Fate of *Frankenstein*

In 1823, Mary Shelley learned from her father about a play at the English Opera House called *Presumption; or, The Fate of Frankenstein*. The playbill advertised the "striking moral exhibited in this story," namely, the "fatal consequence of that presumption, which attempts to penetrate, beyond prescribed depths, into the mysteries of nature." Shelley's novel and its complex story of human ambition and monstrous possibilities had begun a process of simplification (many characters were eliminated) and distortion (the monster becomes a speechless, remorseless killer) that would continue in the centuries to come.

Playbill from *Presumption; or, The Fate of Frankenstein*
Opening night, July 28, 1823
Courtesy The Harvard Theatre Collection, The Houghton Library

Mary Shelley attended a performance of *Presumption* at the Royal English Opera House on August 29, 1823. "The play bill amused me extremely," she wrote to a friend, "for in the dramatis personae came, _____ by Mr. T. Cooke." Mary Shelley had not given her monster a name; later, audiences would use the word Frankenstein to refer both to the monster and his maker.

T.P. Cooke as the monster in *Presumption; or, The Fate of Frankenstein*
Lithograph by Nathaniel Whittock (fl. 1829–1848)
Courtesy The Harvard Theatre Collection, The Houghton Library

The English actor Thomas Potter Cooke played the role of the monster in *Presumption*. His face was painted green, his lips were stained black, and he wore blue body paint.

A Powerful Metaphor

In the nineteenth century, the very word "Frankenstein" could be wielded to represent issues and people considered to be out of control. British political cartoonists invoked the Frankenstein monster in attacks on the Irish and the working class. Cartoons depicting the "Russian Frankenstein"—the military monster created by Tsar Nicholas I, and "The Frankenstein of the East"—the social forces that could be unleashed by Indian reformer Mahatma Gandhi's civil disobedience campaign, illustrated the range and the power of the Frankenstein metaphor.

The Russian Frankenstein and His Monster
Illustration from *Punch*, 1854
Pennsylvania State University Libraries

During the Crimean War (1853–1856), a *Punch* cartoonist depicted British enemy Tsar Nicholas I as the "Russian Frankenstein," the creator of a militarist monster which runs amok.

The Irish Frankenstein
Illustration by John Tenniel from *Punch*, 1882
Pennsylvania State University Libraries

In 1882, artist John Tenniel depicted the Irish Nationalist leader Charles Stewart Parnell as the "Irish Frankenstein" for his support of Irish home rule. The Frankenstein monster was often used to represent uncontrollable people and political forces.

A Frankenstein of the East
Illustration by Leonard Raven-Hill from *Punch*, 1930.
Reproduced by permission of Punch, Ltd.

Mahatma Gandhi began his campaign of civil disobedience in India in 1930. This political cartoon from *Punch* suggests that Gandhi's campaign, although grounded in peaceful protest and non-cooperation, would unleash monstrous social forces.

The Celluloid Monster

Movies offered a new opportunity for the Frankenstein story to reach larger audiences in the early twentieth century. The film company created by inventor Thomas Edison released the first cinematic version of Mary Shelley's novel in 1910. The short, silent film featured actor Charles Stanton Ogle in white make-up as the monster, who came to life in chemicals boiling in a huge cauldron. Edison Films sought to "eliminate all the actually repulsive situations and to concentrate . . . upon the mystic and psychological problems." The dismal failure of the film did not deter other filmmakers from taking up the Frankenstein story.

***Frankenstein* creation scene**
Edison Films, 1910
Reproduced from the Collections of the Library of Congress, Motion Pictures Division

The first cinematic Frankenstein monster was created out of a vat of chemicals, rather than by the electrical apparatus associated with later filmic monsters.

Scenes from *Frankenstein*
Edison Films, 1910
Reproduced from the Collections of the Library of Congress, Motion Pictures Division

These scenes from the 1910 Edison Films *Frankenstein* feature Charles Stanton Ogle as the monster, Augustus Philips as Victor Frankenstein, and Mary Fuller as Victor Frankenstein's fiancée, Elizabeth. Enraged by Victor Frankenstein's refusal to create a female monster, the creature kills Victor's beloved Elizabeth.

The Edison Kinetogram, March 15, 1910
Courtesy U.S. Department of the Interior, National Park Service, Edison National Historic Site

The cover of this Edison publication features Charles Stanton Ogle in dramatic white make-up as the monster in a scene from the 1910 Edison Films *Frankenstein*. This first screen version of Mary Shelley's story was a silent film with a running time of approximately 15 minutes.

Frankenstein Goes to Hollywood

Universal Pictures gambled in 1931 that American audiences would flock to "horror films." The studio released a film version of *Frankenstein* featuring Boris Karloff, a little-known English actor, as the monster. Karloff's moving portrayal of the speechless creature, and the enduring image of the monster with his flattened head, surgical scars, and neck bolts, deeply affected audiences. A critical and commercial success, *Frankenstein* was named one of the top films of the year by *The New York Times*. Its reputation was enhanced by studio publicity stunts that

stationed nurses in theatres and fired guns backstage to startle audiences. Some critics called the film unduly gruesome, and several countries banned it. But the film's success spawned several sequels in the 1930s, including *The Bride of Frankenstein* and *Son of Frankenstein*, both starring Karloff as the monster.

Boris Karloff as the Monster in *Frankenstein*, 1931
Courtesy The Museum of Modern Art, Film Stills Archive

Poster for *The Bride of Frankenstein*, 1935
The Granger Collection, New York

In the 1935 sequel to *Frankenstein*, actress Elsa Lanchester played both Mary Shelley and the monster's intended mate. Lanchester's striking, streaked hair and stark make-up have made her image, like that of Boris Karloff's monster, recognizable to millions in the years since 1935.

Poster for the double feature *Son of Frankenstein* and *The Bride of Frankenstein*
© Bettmann/CORBIS

In these two sequels to the 1931 *Frankenstein* film, Universal Studios filmmakers drew on contemporary medical discoveries. *The Bride of Frankenstein* (1935) was likely the first film to feature an electrical pacemaker, used to maintain the heart of a murdered woman before placing it into the monster's bride. In *Son of Frankenstein* (1939), the monster undergoes fluoroscopy, a procedure which used x-rays projected on a screen to produce images of the internal organs of the body.

Making Up a Monster

The enduring visual impact of the *Frankenstein* film monster of the 1930s owed much to the skill of make-up artist Jack Pierce, who transformed Boris Karloff into a creature who would be recognized around the world. In concocting their monster, Pierce and *Frankenstein* director James Whale may have drawn inspiration from technological developments in the 1920s, including "Televox," the mechanical man produced by engineers at Westinghouse Laboratories. Constructed of metal held together by bolts, Televox did not speak, but could lift its arms, hold a telephone receiver, and operate switches. Like the *Frankenstein* monster, the Televox automaton raised questions among the public about the nature of artificial life and a future that might contain robots.

Jack Pierce and his assistant make up Boris Karloff, 1930–31
The Museum of Modern Art, New York, Film Stills Archive
Courtesy of Universal Studios Licensing, Inc.

To create the monster's distinctive appearance, make-up artist Jack Pierce (left) claimed to have studied anatomy, surgery, medicine, criminal history, criminology, ancient and modern burial techniques, and electrodynamics.

Westinghouse Laboratories' mechanical man "Televox," 1928
Westinghouse Electric Corporation

In the 1931 *Frankenstein* film, the monster was characterized by stilted, machine-like movements. To produce this effect, Boris Karloff wore a five-pound metal rod next to his spine.

One inspiration for the mechanical motion of the movie monster may have been "Televox," developed by Westinghouse engineers in the 1920s.

Section V

Frankenstein in America

What makes the monster from *Frankenstein* so immediately recognizable to people of all ages in America? Why has Mary Shelley's book remained in print in the United States since 1865?

Now a vibrant element of American popular culture, the image of the monster has been appropriated widely to entertain and to market consumer goods to the public. He appears in toys and children's games, plastic model kits, coloring books, Halloween costumes, cartoons, lunch boxes, Christmas ornaments, breakfast cereals, video games, and scores of other products. Films inspired by the Frankenstein monster continue to be made. From *I Was a Teenage Frankenstein* in the 1950s to *Mary Shelley's Frankenstein* by Kenneth Branagh in the 1990s, the story continues to be reworked for each new generation of filmgoers. But the image and story of the monster are much more than consumer commodities. They continue to help people articulate anxieties about the possibility of science changing the traditionally accepted boundaries of nature.

House of Frankenstein
Son of Frankenstein
8mm film box covers
Castle Films, New York
Courtesy Toy Scouts, Inc., Akron, Ohio

From Classic to Comic Book

Between 1865 and 1942, American publishers issued some 19 editions of the original text of *Frankenstein*. In 1960, a Braille edition was published. The fact that Mary Shelley's novel is now available in a wide variety of formats and publications, from illustrated comic books, to leather-bound volumes, to full text on the Internet, attests to its enduring appeal to audiences of all ages.

Poster for *Frankenstein* Armed Services edition
Harry Ransom Humanities Research Center, The University of Texas at Austin

Mary Shelley's novel, *Frankenstein*, has been in print continuously since 1823. During the Second World War, a special edition was issued for American servicemen and women.

Classics Illustrated Frankenstein, December 1945
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Advertisement for plastic model kits by Aurora, ca. 1962
Courtesy Boy Scouts of America, Irving, Texas
Reproduced courtesy of Universal Studios Licensing, Inc.

Frankenstein Monster wind-up toy
The Bakken Museum/Reproduced courtesy of Universal Studios Licensing, Inc.

The Frankenstein Framework

In the twentieth century, science and technology gained ascendancy in American social and cultural life. Although Americans welcomed many of the changes caused by scientific advances, some worried about society's ability to retain control of technologies that challenged their understanding of what it means to be human.

The early decades of the century, as in Mary Shelley's day, were filled with speculation about the origins of life and the boundaries between life and death. In the 1930s, when Universal's *Frankenstein* was thrilling audiences, there was also intense public interest in achieving immortality through advances in science and medicine such as organ transplants, artificial organs, mechanical respirators, and other devices.

Some of the most startling developments involved reviving the dead—and those near death—using newly developed cardiac pacemakers, and being able to maintain organs outside the body for research or transplantation. Excitement about medical breakthroughs was accompanied by questions about the ethics of experimentation, the "natural" limits of research, and the definition of "human." The development of devices such as artificial respirators caused fears that people might be kept alive against their will. Throughout the century, the Frankenstein story offered a compelling framework for the public to articulate its uneasiness about scientific ambition and the nature of scientific responsibility.

A "Glass Heart"

In the 1930s, aviator Charles Lindbergh, the first person to fly solo across the Atlantic Ocean, and the Nobel Prize-winning French surgeon Alexis Carrel, joined forces to develop a perfusion pump, or "glass heart," capable of maintaining organs and tissues outside the body by providing them with a supply of oxygenated blood. By 1935, they had sustained a variety of animal organs—hearts, kidneys, ovaries, spleens—in the germ-free Pyrex glass pump, but they did not use human tissues.

Perfusion pump
Courtesy of the Rockefeller University Archives

To help his ailing sister-in-law, aviator Charles Lindbergh worked with Rockefeller Institute researcher Alexis Carrel to create a device capable of sustaining organs outside the body. Dubbed the "glass heart" by reporters, the perfusion pump was never used with human organs.

Conquering Death

More than one hundred years after Italian physician Giovanni Aldini applied electricity to the bodies of dead animals and humans to stimulate movement, the American public was fascinated by stories about scientists' efforts to re-animate the dead. One of the researchers who captured public attention was chemist Robert Cornish, who reportedly restored a dog to life. "The fear that such experimentation on a human being would evolve a fiendish Frankenstein monster," noted one reporter in the 1930s, prevented Cornish from accepting offers from scores of people willing

to sacrifice themselves "as a test of man's power over life." The Promethean quest for power over life and death would remain a dream for the future.

"Can Science Raise the Dead?"
Popular Science Monthly, February, 1935

The possibility that humans could be successfully revived from the dead generated considerable popular enthusiasm in the 1930s.

The Criminal Brain

In her novel, Mary Shelley's monster turns to violence after he is abandoned by his creator and rejected by human society. In the 1931 film, *Frankenstein*, the monster is violent because he has received the brain of a criminal instead of the brain of a distinguished scientist. During the first part of the twentieth century, researchers looked for physical markers of criminality in the brain and other parts of the body.

Poster of Brains of Criminals
Illustration from Harry H. Laughlin, *The Second International Exhibition of Eugenics*, 1923
The Department of Special Collections, Pennsylvania State University Libraries

This poster was displayed at the Second International Exhibition of Eugenics held in 1921 at the American Museum of Natural History in New York City. The photographs supposedly demonstrated the physical differences between normal and criminal brains.

The Importance of Genes

The 1931 *Frankenstein* film illustrated the hold that "biological determinism" had on many Americans during the early twentieth century. Inferior genes were believed to explain social unrest and rising crime rates, rather than environment or education. Many Americans supported the eugenics movement, which encouraged people with "good" genes to reproduce and tried to prevent the "unfit" from having children. In the 1920s, American state fairs hosted "Fitter Families" and "Better Babies" contests, in which families competed—like Holstein cattle and Jersey cows—for "best in show."

Display from a "Fitter Families Contest"
Courtesy of The American Philosophical Society, Philadelphia

In the 1920s and 1930s, displays at state fairs and other venues explained the economic drain created by people with "inferior" genes, and touted the benefits of treating reproduction "scientifically."

"Fitter Families" contest winner
American Eugenics Society Scrapbook (no. 91)
Courtesy of The American Philosophical Society, Philadelphia

This family won the trophy in the "Large Family" class at the Kansas Free Fair in 1925. By 1930, such contests were featured at more than 40 state fairs. Families who entered the contests agreed to be examined by a physician and to take intelligence tests.

Section VI

"They may come up with a disease that can't be cured, even a monster. Is this the answer to Dr. Frankenstein's dream?"—Alfred Velluci, Mayor of Cambridge, Massachusetts, 1976, objecting to a proposed DNA laboratory at Harvard University

Frankenstein and the Frontiers of Science

During the last decades of the twentieth century, the pace of biomedical innovation intensified. So too did concern about society's ability to retain control of the dazzling new technologies that challenged our understanding of what it means to be human. News reports of artificial hearts, the human genome project and genetic engineering, stem cell research, in vitro fertilization, and especially cloning, have each fostered allusions to the Frankenstein myth.

The profound questions about human identity and scientific responsibility raised by these new technologies have prompted calls for public dialogue and expert guidance. In November 2001, President George W. Bush created a new ethics commission—The President's Council on Bioethics—to advise him and his staff on the ethical and policy issues that arise from biomedical innovations such as cloning and stem cell research.

This group, and indeed, all Americans, face serious deliberation about these issues. Should technologies like cloning be restricted? Should stem cell research that shows promise against disorders such as Alzheimer's disease, juvenile diabetes, and Parkinson's disease, be limited? Who should determine the answers to these questions that challenge our understanding of the beginnings of human life and the ends of scientific discovery?

Crossing a Barrier

The Greek word *xenos* means stranger; the transplantation of organs and tissues from one species to another is termed a "xenograft" or "xenotransplant." For a few desperately ill patients, xenotransplantation offers one solution to a chronic shortage of human donor organs. But some argue that crossing the species barrier represents another example of "Frankenstein science." When the infant identified in the media as "Baby Fae" received a baboon heart transplant in 1984, critics labeled the procedure "unnatural, unwarranted, and unsupported by medical evidence," as well as unethical. Other objections have come from scientists who warn about the potential for transmitting diseases from animals to humans. At this time, no one can safely predict whether xenotransplantation will become an accepted medical practice.

Baby Fae, October 30, 1984
UPI/Corbis-Bettman

A baby girl born with a defective heart became the first human infant to receive a baboon heart transplant in 1984. She lived for little more than a month with the animal organ, but her short life and death sparked intense debate over the limits of human and animal experimentation.

"Secrets of Nature" Revealed

In 1990, a consortium of nations and scientific organizations created the Human Genome Project, devoted to identifying all human genes and generating a complete sequence of human DNA by the year 2005. The initial sequencing of the human genome, which is the genetic blueprint of human beings, was completed in 2000 through the International Human Genome Project and a private research consortium, Celera Genomics.

The decoding of the human genome provides hope for diagnosing, preventing, and treating diseases that have long plagued humankind. The human community shares Mary Shelley's dream that this research will be used wisely—and that science will "renew life where death had devoted the body to corruption.

Agar Plates
Photograph by Bill Branson
National Cancer Institute

A scientist from the Laboratory of Cellular and Molecular Biology at the National Cancer Institute examines bacteria from which DNA is extracted for study. In the last five years, researchers have made enormous strides in understanding the genetic basis of life.

The Visible Humans

In 1993, the National Library of Medicine created "The Visible Human Project" for the benefit of researchers and the public throughout the world. A prisoner who had donated his body to science and a woman donor became the Visible Humans. Thousands of razor-thin sections of their bodies were photographed. Then the images were digitized and made available on the Internet through the Library's Web site, www.nlm.nih.gov. The Visible Humans have been used to teach young doctors medical procedures and to train physicians in novel surgical techniques.

Unlike Victor Frankenstein, who labored in secret, using stolen body parts to create a monster, scientists and the public alike now have access to a wealth of scientific information and research results through a multitude of print and other media outlets.

Visible Humans
Computerized images
National Library of Medicine

The Cloning Controversy

News reports in 1997 that Scottish researcher Ian Wilmut had successfully cloned an adult sheep (named Dolly) provoked world-wide speculation about the implications of this dazzling new technology for humans. "The most immediate medical consequences of cloning the Scottish sheep Dolly," noted a *Washington Post* reporter, "has been a major outbreak of the Frankenstein syndrome." Cloning, perhaps more than any other area of biomedical research, raises profound issues about human identity and scientific responsibility.

"Can We Clone Humans?"
Newsweek, March 10, 1997

The news media, talk shows, and made-for-television movies each contributed to public interest in cloning and its moral and social implications during the last part of the twentieth century.

"Frankenscience"

References to "Frankenfarms" and "Frankenfoods" now appear frequently in the media and on the Internet. Biotechnology companies have invested in genetically-modified crops that promise more nutritious and less expensive foods. But not everyone views this as progress. Critics of genetically-engineered foods warn about unforeseen environmental and health hazards caused by altered plants and organisms.

Environmental protestors
Washington, D.C., November 30, 1999
AP/World Wide Photos

In November 1999, protestors arrayed in butterfly wings demonstrated near the United States Capitol against the U.S. Food and Drug Administration's approval of genetically modified corn and other foods.

Looking Forward

The stunning scientific advances of the last decade raise difficult ethical and policy questions. What, if any, are the constraints on scientific inquiry? Who should decide the limits of acceptable biomedical research?

There are no easy answers to these questions. In the subtitle of her novel, *Frankenstein; or, The Modern Prometheus*, Mary Shelley invoked the myth of Prometheus, the Greek Titan punished by the gods for stealing fire and giving it to humankind. For Shelley and her circle, Prometheus was a symbol of enduring optimism about the potential of humanity. When she prepared Percy Shelley's poem, "Prometheus Unbound," for publication after his death, she explained that Prometheus used "knowledge as a weapon to defeat evil, by leading mankind, beyond the state wherein they are sinless through ignorance, to that in which they are virtuous through wisdom." Although the scientist Victor Frankenstein failed to take responsibility for his misbegotten monster, Mary Shelley has for two centuries offered the Promethean possibility that humanity could make responsible choices.

Prometheus Bound
Painting by Peter Paul Rubens (1577–1640)
The Granger Collection, New York