European Medicine
European Medicine and Its Practitioners

This final chapter turns to European objects in the collection. Early Jefferson publications reveal the faculty's indebtedness to its professional forbears across the sea. Dr. Samuel D. Gross was among many who penned biographies of outstanding European physicians. And artistic influence, as well as medical, flowed in both directions across the Atlantic.

Over the years the Jefferson art collection has been enriched with objects that depict European clinical and instructional scenes, portraits and other works associated with famous practitioners, and rare anatomical and obstetrical books.

Surgical, Medical, and Instructional Group Scenes

Ambroise Paré Applying a Ligature on the Arteries after an Amputation for the First Time

AMBROISE PARÉ APPLYING A LIGATURE
By Manceau & Testard, after painting by Louis Nicolas Matout (1811-88)
Engraving, mezzotint, etching stretched onto canvas
After 1864
Image size: 20 1/4 x 37 3/4 in.
Plate size: 24 1/2 x 41 in.
Sheet size: 26 x 43 in.
Inscriptions on plate below image: “PEINT PAR L. MATOUT” and “GRAVE PAR MANCEAU & TESTARD” above “AMBROISE PARÉ”
Given 1911-31 by Eugene P. Bernardy, M.D.
Accession number: 1911-1931.Pr.01

The sixteenth-century French military and civilian surgeon Ambroise Paré (1509/10-90) played an important role in propelling European surgery into the modern era. Although he began his career as a common apprentice to a barber-surgeon, Paré eventually achieved great celebrity and rose to serve French royalty.

Ambroise Paré was born in Laval, France, the son of a cabinetmaker. After a meager formal education he was apprenticed to various barber-surgeons in Laval. About 1532 he went to Paris to complete his indentured education at the Hôtel Dieu. There he assisted a surgeon, attended lectures, and did some dissecting. About 1536 he entered the French military service, and in 1541 he became a master barber-surgeon and was admitted to the guild of barber-surgeons.

Paré served intermittently as an army field surgeon for the next three decades, and was respected for treating the wounded of both sides during the Wars of Religion. He also engaged in a flourishing civilian practice in Paris and at court. He was honored to be chief surgeon to four French monarchs: Henry II, Francis II, Charles IX, and Henry III, receiving from the last the title “Counselor to His Majesty.”

Paré is credited with modernizing Renaissance surgery both by example and by his writings which were translated into many foreign languages. His reputation was so great that he was admitted (albeit grudgingly) to the College of Saint Côme in 1554, in spite of the fact that he wrote his books and delivered his lectures in the French vernacular instead of Latin, the language employed by most educated professionals.

He reported in his first treatise of 1545 that gunshot wounds were not in themselves poisonous and did not require cautery. His military experience taught him that during amputations and wound treatment it was more effective to ligate the blood vessels to suppress hemorrhage rather than the more customary technique of cauterizing with boiling oil. He devised a kind of hemostat, the “crow’s beak,” used to grasp the vessels to be ligated, as described in his Dix livres de la chirurgie (1564). Another treatise dealing with surgical anatomy including obstetrics was published in 1549. He also wrote a popular synopsis of Andreas Vesalius’s Fabrica (see below) in 1561. His collected works, Les oeuvres, were published in 1575.

Paré invented several surgical instruments, designed prostheses for limbs, and improved the hernia band. He also performed the first exarticulation of an elbow joint, described fracture at the neck of the femur, suggested syphilis as a cause for aneurysm, and did reimplantation of teeth and the restoration of missing teeth.
The battlefield print of Ambroise Paré ligating vessels is a copy by Manceau and Testard after a famous painting by French artist Louis N. Matout. His large mural was commissioned for installation in the grand amphitheater of the École de Médecine in Paris in 1864. It was the central panel of a three-part display about significant achievements by French surgeons. Matout is best remembered today for mural decorations of chapels in French hospitals and churches.

The scene shows Ambroise Paré as a field surgeon, the central figure dressed in a short black coat and tights. He is about to ligate the arteries of a wounded soldier who is held down in his chair by two assistant surgeons. The amputated leg of this ill-fated warrior lies on the ground. Paré displays the ligature with an outstretched arm, and points disdainfully toward a brazier heating irons for cauterization, indicating his renunciation of the old technique. At the same time a disapproving group of onlookers is led by another physician, dressed in an ermine-trimmed robe and cap, showing a cauterizing iron in rebuttal of Paré’s new technique.

Other wounded men and corpses sprawl in the foreground of the frenetic scene. Flanking a tent in the middle ground are soldiers on horseback and others on the ground brandishing swords and lances. A fortified castle in the distance can be seen through the smoky haze.

Dr. Samuel D. Gross praised Paré’s ligature technique as “his greatest service,” contrasting it with the ineffective method of cauterization, and empathizing with Paré’s professional tribulations:

For ages the only remedy for arresting hemorrhage was the actual cautery, or a piece of heated iron applied directly to the orifice of the bleeding vessel... The result of this practice was that the great majority of those who were subjected to it perished from secondary hemorrhage... If the artery was large, the unfortunate patient generally died soon after the accident, from the inability of the blood to form a sufficiently strong and opposing clot. In many cases the bleeding recurred from time to time until the system was completely drained of blood. The operation was not only painful, but excessively alarming, so that many persons would almost prefer death to submitting to its cruel requirements. When a limb was amputated, the custom for a long time was to plunge the stump in boiling oil or pitch...

But... Opposition met him [Paré] in every quarter. Many of his most influential contemporaries became turbulent and furious in their denunciations, and Paré...suffered for awhile in his practice...

The result of all this malice and opposition was that few of his contemporaries or immediate successors adopted the practice, which, consequently, soon fell into total neglect...

Of the value of the ligature in suppressing hemorrhage, it would be folly at the present day to speak, when its claims are so universally established.
Anatomy Lesson of Dr. Tulp

ANATOMY LESSON OF DR. TULP
By unknown artist, after painting by Rembrandt van Rijn (1606-69)
Oil on canvas
Before 1911
36 1/4 x 48 1/4 in.
Given about 1911, probably by Daniel Baugh
Accession number: 1911+c.P.01

Dr. Nicolaas (sometimes Nicolaes) Tulp (1593-1674) is best remembered today as the protagonist in Rembrandt's celebrated Anatomy Lesson of Dr. Tulp (Maurits-huis, The Hague). The painting was commissioned by the surgeons' guild in Amsterdam in 1632.

Dr. Tulp was well known among contemporaries for his interest in the pathological changes in the internal organs produced by disease. His Observationum medicarum libri tres (1641) included autopsy reports and drawings of diseased organs. The first pharmacopoeia in the Netherlands was compiled at his suggestion.

Nicolaas Tulp was born in 1593 in Amsterdam, the son of a wealthy merchant. He matriculated at the University of Leiden in 1611 and obtained his medical degree there in 1614. He was appointed praeclector of anatomy in 1628 and was charged with teaching the surgeons of Amsterdam and illustrating his lectures with public dissections (though he was neither an anatomist nor surgeon). Tulp was also prominent in civic life as a member of the town council, mayor, and curator of the Athenaeum.

The surgeons' guild was among many social and professional groups which commissioned group portraits of their members in seventeenth-century Netherlands. Rembrandt’s picture is among several anatomy lessons executed after dissection was legalized.

The painting shows Dr. Nicolaas Tulp demonstrating a dissection of the forearm of a cadaver to Amsterdam's guild of surgeons. An anatomical folio used for instruction is next to the feet of the modestly draped cadaver. The names of the seven surgeons gathered around the table are listed on the paper held by the figure closest to Dr. Tulp. Some scholars feel that the names were subsequently altered so that they no longer identify the actual personages in the painting. Other scholars have long disputed the accuracy of the anatomy displayed. Also in question are whether the setting is imaginary or real, and whether the demonstration was private or public.

The Jefferson copy is of historic interest, though much diminished in emotional intensity, details of costume and architecture, and chiaroscuro effect compared with the original work by Rembrandt. It appears to have been painted in the late nineteenth or early twentieth century. A photograph of 1912 shows the painting hanging in the museum of the Baugh Institute of Anatomy, and today it still hangs in the departmental offices. Copies of Rembrandt's instructional scene original proliferated in the nineteenth century. A version at the College of Physicians of Philadelphia was painted by Dutch artist Wilhelmus H. P. J. de Zwart (1862/67-1931) in 1887.
A famous painting of Dr. Jules Péan by the celebrated academic artist Henri Gervex was the source for Schwartzweber's photogravure. The original work (Musée d'Orsay, Paris) was painted in 1887 and exhibited at the Paris Salon that year.

Jules Émile Péan (1830-98) was one of the most important French gynecologists of his day. A native of Châteaudun, he received his medical degree in Paris in 1860. Following several hospital appointments, he organized the Hôpital International.

Known as a skilled technical surgeon, he performed the first pylorectomy for carcinoma in 1879 (though unsuccessfully). In 1886 he described the technique of morcellement for removing a tumor of the uterus by crushing off little bits at a time. In 1895 he was the first to operate on diverticula of the bladder. He also devised "Péan's position" for operating, in which the patient lies on a low table and the surgeon is seated on a high chair placed between the patient's legs.

This picture shows the French gynecologist about to perform a radical mastectomy for cancer of the breast. Notably, the setting is a ward at the St. Louis Hospital in Paris, and not a clinical amphitheater as in Eakins's paintings of Drs. Samuel D. Gross and D. Hayes Agnew. Péan is standing at the head of the table about to demonstrate to his assistants the simple hemostat he invented ("Péan's forceps") to prevent hemorrhage.

The surgeons are massed around a beautiful, bare-breasted, unconscious patient whose long hair flows over the pillow. Some look at Péan while others gaze at the patient. The partial view of a nun standing in the rear may be included for the sake of probity. Dr. Péan is inexplicably garbed in formal dinner attire.

Henri Gervex was a frequent prizewinner at the Paris salons, a chevalier of the Legion of Honor, and a member of the Institute. His highly polished figural paintings often had overtones of erotic titillation, as demonstrated here.

Scholars know that Thomas Eakins was aware of Rembrandt's Anatomy Lesson of Dr. Tulp when he planned The Gross Clinic, and it is thought that Gervex was familiar with Eakins's painting of Dr. Gross. In turn, Eakins probably took into consideration Gervex's painting of Dr. Péan when he depicted Dr. Agnew performing the same operation in 1889.
Theodor Billroth
Operating in the
Auditorium of the
General Hospital,
Vienna

THEODOR BILLROTH OPERATING
By Dr. E. Albert & Co., after painting by
A. F. Seligmann

Photogravure
After 1890
Image size: 18 1/2 x 14 1/2 in.
Sheet size: 22 3/4 x 15 1/2 in.

Painting signed and dated lower right: "A. Seligmann 1890"
Inscriptions below image: "A. F. Seligmann pinx." and "Druck & Verlag/von D'. E. Albert 
& C'" above identification of participants
with drawings of heads: "D' Boettcher D' Billroth D' V. Eiselsberg D' O. Winter/D'
Heidenthaler D' Müller D' Salzer D' L. v. Dittel" above title: "BILLROTH'SCHER 
HÖRSAAL IM WIENER ALLGEM. 
KRANKENHAUSE"

Given after 1900 by unknown donor
Accession number: 1900-1.F.09

The original oil painting and source for the photogravure of Theodor Billroth operating in the general hospital at the University of Vienna was painted by A. F. Seligmann in 1890. The picture is located at the Österreichische Galerie, Vienna.

The outstanding pioneer of visceral surgery, Theodor Billroth (1829-94) was born on the island of Rügen, the son of a clergyman. He studied medicine at Greifswald, Göttingen, and Berlin where he received his degree in 1852. After postgraduate studies in Vienna he accepted an assistant's post at the surgical clinic under Bernhard von Langenbeck in Berlin in 1856, and was named instructor in surgery and pathological anatomy.

In 1860 Billroth became professor of surgery and director of a surgical hospital and clinic in Zurich where he remained until 1867 when he moved to Vienna. He was named professor of surgery and director of the surgical clinic at the University of Vienna and practiced there until his death. His clinic attracted thousands of European and American students, and Billroth is often credited with training the next generation of leaders in the field of surgery worldwide.

Because of his interest in infection and the healing of wounds, Billroth was the first to use temperature measurement in postoperative care. He reported on the first resection of the esophagus in 1872, the first total laryngectomy in 1873, and the first resection of the pylorus for cancer with anastomoses of stomach and duodenum in 1882. He was among the first European surgeons to introduce antisepsis.

His best-remembered textbook is the monumental Die allgemeine chirurgische Pathologie und Therapie in fünfzig Vorlesungen (1863). Billroth was a member of the Academy of Sciences in Vienna, an honorary member of numerous other scientific societies, and recipient of sixteen high decorations.
One feels sure that A. F. Seligmann was familiar with Thomas Eakins’s depictions of the clinics of Drs. Gross and Agnew, and Gervex’s painting of Dr. Féan, at least in reproduction. The elements of renowned doctor in the auditorium or amphitheater discussing the procedure while presiding over an operation, training his assistants, and surrounded by an attentive audience are now familiar. According to the artist’s notes the patient was an old man on whom Billroth was performing a neurotomy for trigeminal neuralgia.3

The artist even included a self-portrait, the observer in the first row on the far right (positioned like Thomas Eakins in The Gross Clinic). Another observer is the Duke of Bavaria on the far left, a regular attendee at Billroth’s clinics. Even though the physicians are wearing operating gowns and the instruments have been sterilized, the audience is alarmingly close for maintaining sterile operating conditions.

The Thomas Jefferson University art collection also includes a two-schilling silver coin issued by the Austrian government on the centenary of Theodor Billroth’s birth in 1929.
At first glance this image of London's College of Physicians would not appear to be a depiction of medical education. The bewigged gentlemen seated around a cloth-covered table are upstaged by the vast, well-appointed room with its carved ceiling and cove decorations, tall arched windows, and painted and sculpted portrait busts on the paneled walls.

The college was a social club that provided library facilities for study and research, and also maintained control over admission to the profession by the granting of licenses. Thus the young man standing in the left foreground is a student receiving an oral examination by those at the head of the table. The others are uninvolved and talk among themselves. One elderly physician uses the light from the window to illuminate a paper.

The text accompanying the etching relates an amusing anecdote about the candidate's interrogation:

"Now, sir, in a case of desperate fever, the patient wanting relief by perspiration, how would you act?" "Why, sir," answered the student, "I should give etc. etc." "Well, sir, if that did not operate, what would you do then?" "Why, sir, I should have recourse to etc. etc." "But if that did not produce the desired effect, what remedy have you left?" "Gentlemen," said the worried student..."if all these should fail, I would direct the patient be brought here for examination; and I should despair of success by any other means, if this failed to produce relief by perspiration."4

The caricature was among 104 images by Thomas Rowlandson and Augustus C. Pugin for The Microcosm of London (1808-11), an immense, three volume publication with over a hundred thousand prints illustrating the activities and customs of a great city. It was published by Rudolph Ackermann, a German immigrant who opened an establishment called the Repository of the Arts in the Strand. This etching of the College of Physicians was one of many collaborations between Pugin, a French emigre architectural draftsman who supplied the architecture and backgrounds, and Rowlandson, an English artist who drew the figures.

Although Rowlandson was a Royal Academy-trained painter, he lost interest in "high" art in favor of social commentary. He is best remembered for his hundreds of satirical etchings, many of which dealt with medical themes such as Doctor Syntax and English Dance of Death.

The Jefferson art collection acquired another Rowlandson and Pugin print, Middlesex Hospital, London, also from The Microcosm of London. It shows the ward of London's first lying-in hospital, founded for the relief of pregnant wives of the industrious poor.

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Cholera Epidemic of 1865 in Paris

CHOLERA EPIDEMIC OF 1865 IN PARIS (OBVERSE)
Designed by Eugène Laurent and carved by Alfred Borrel

Bronze medal
3 in. diameter
1866

Signed on ledge obverse and reverse: "E. LAURENT SCULP." and "A. BORREL INCIS."
Inscription on obverse: "CARITAS AVGSTA/FIDES SPES" and "VISITE DE L'EMPEREUR NAPOLEON III A L'HÔTEL-DIEU ÉPIDÉMIE DE MDCCCLXV"
Inscription on reverse: "CARITAS AVGSTA/MISERORVM/SOROR" and "VISITE DE L'IMPERATRICE EUGÉNIE À L'HOSPICE BEAUJON ÉPIDÉMIE DE MDCCCLXV"

Given in 1940 by bequest of Pascal Brooke Bland, M.D., former chair of obstetrics
Accession number: 1940+e.M.06

Asiatic cholera, which had been pandemic in the Far East, invaded western Europe for the first time significantly in the years between 1826 and 1837. The dread
disease struck again during the following three decades. Tokens of the outbreaks were issued as amulets worn to ward off the disease, and as medals or prizes honoring those who provided outstanding aid to patients.

A large bronze medal was struck in 1866 in honor of the visits of Emperor Napoléon III and Empress Eugénie to Parisian hospitals during the cholera epidemic of 1865. The emperor visited the Hôtel Dieu, the largest hospital with a thousand beds. The empress visited the Hôpital Beaujon which had five hundred beds.

The medal was designed by Eugène Laurent and carved by Alfred Borrel. It is in high relief with deep, clear incision of the inscriptions. There is a sculptural emphasis on details of costumes, especially the deep folds in garments and bed linens. Facial features are differentiated among the characters.

The obverse, shown here, depicts the emperor wearing an overcoat and carrying his top hat standing at the bedside of an elderly male patient and grasping his hand. Flanking the central figures are a doctor gesturing toward the patient and a Sister of Charity with hands clasped in prayer. Above the emperor’s head is a scroll inscribed “CARITAS AUGUSTA” and surmounted by a crown. Below the ground line are sprays of oak and laurel bound with ribbon.

The reverse shows the empress wearing a bonnet and cloak bending over the bed of a female patient and grasping her hand. Flanking them are two Sisters of Charity, one gesturing toward the patient, the other with hands folded.

Portraits

Synthesizers of Medical Knowledge

Despite fantastic legends about the achievements of Hippocrates, most scholars of the history of medicine agree that he did actually exist and was the most celebrated physician of ancient Greece. He is considered the founder of scientific medicine and has come to be seen as embodying the ideal physician.

An ancient biographer said that Hippocrates was born about 460 B.C. on the island of Cos, off the coast of Asia Minor, and died about 370 B.C. in Thessaly. He was a member of the guild of Aesclepiadae (sons of Aesculapius) and received his medical education at the famous temple of Aesculapius at Cos. Although many legends and myths have grown up about his life, very little is known in fact except that he was an itinerant practitioner, as was customary then.

Hippocrates was also a teacher and author. Writings attributed to him were compiled under the title Hippocratic Collection, but the work probably included treatises and books by many different authors from Cos and elsewhere.
Subjects included in the collection are: anatomy, physiology, general pathology, therapy, diagnosis, prognosis, surgery (most thoroughly on fractures and dislocations, wounds, hemorrhage, cauterization, and operations to treat tumors, fistulas, ulcers, and hemorrhoids), gynecology and obstetrics, mental illness (especially modern in assigning the brain as the organ of thought and sensation, and discussions of epilepsy, delirium tremens, depression, anxiety, and origin of dreams), and ethics (exceptional discussion of physicians' behavior, appearance, and inner life).  

The Hippocratic Oath, to which medical students for centuries have sworn allegiance in either its original form or with modifications, is the most widely known document associated with Hippocrates. Yet because of inconsistencies with the Hippocratic Collection, scholars think it unlikely that the oath originated with Hippocrates or was even composed during his lifetime.

Jefferson’s plaster bust of Hippocrates is close in style and concept to a Roman marble copy of a Greek bronze original. That work was formerly thought to be a portrait of Hippocrates, but is now considered another Greek physician, Chrysippos (British Museum, London). There is a similar bust supposedly of Hippocrates in the Uffizi Gallery, Florence. Other ancient sculptures and coins with the image of Hippocrates survive, but none is contemporaneous with the physician, so his actual appearance is unknown.

In the Jefferson bust, the subject’s thoughtful expression is intensified by his bald head, knitted brows and forehead wrinkles, deepset eyes, and slightly parted lips. Folds of a toga are draped over his narrow shoulders; the anatomy of his chest is not described. The bust was acquired before 1930, and a second plaster bust of Hippocrates entered the collection at a later date.

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Portrait of Samuel C. F. Hahnemann

SAMUEL CHRISTIAN FRIEDRICH HAHNEMANN, M.D.  
(1755-1843)

By unknown artist

Engraving, etching, stipple  
1850-1900

Image size: 4 1/4 x 3 1/2 in.  
Plate size: 6 5/8 x 4 1/4 in.  
Sheet size: 9 1/2 x 6 in.

Inscription above image: “Meyer’s Conv. Lex N. 371”  
Inscriptions below image: “D’ S. HAHNEMANN”/“Inst. Bibl. exudit”

Given in 1940 by bequest of Pascal Brooke Bland, M.D.  
Accession number: 1940+e.Pr.03

Dr. Samuel C. F. Hahnemann was a German physician and founder of the discipline of homeopathy, one of several isolated, theoretical medical systems of the nineteenth century.

Samuel Hahnemann was born in 1755 in Meissen, the son of a porcelain painter. He took his medical degree at the University of Erlangen in 1779, and practiced medicine in several towns including Dresden and Leipzig. In his early years he published papers on the uncertainty of contemporary drug treatments.

In 1796 he published his first paper setting forth his views on drugs which later formed the basis of homeopathy, a system created around the turn of the century. His findings were more fully described in Organon der rationellen Heilkunde (1810), with the motto Similia sim-
Hahnemann taught that substances or drugs that provoke reactions in healthy persons can be used to mitigate similar responses that are symptoms of disease ("the law of similars"); and that the effectiveness of the drug was in inverse proportion to the size of the dose ("the law of infinitesimals"), i.e., the more a substance is diluted, the more potent it becomes. He also believed in the abolition of bloodletting, purging, and emesis as cure-alls.

In 1812 Hahnemann was appointed to the faculty at the University of Leipzig where he taught his theory, but was forced to resign by public furore after the death of an Austrian prince under his care. While living in Köthen from 1821 to 1835 his fame grew and his publications flourished through successive editions.

Disciples spread his theories throughout Europe and America. In 1844 the American Institute of Homeopathy was founded despite strong protest from the American Medical Association. The Homeopathic Medical College of Pennsylvania was opened in Philadelphia in 1848. After several mergers and changes of location the institution was renamed Hahnemann Medical College in 1869. In 1885 it merged with Homeopathic Medical Hospital of Philadelphia to become Hahnemann Medical College and Hospital. The last homeopathic course requirement was eliminated in 1945 and no degrees in homeopathy have been granted since 1950.

Today only three states have specific licensing boards for homeopathic physicians, although several thousand other health care professionals incorporate elements of homeopathy in their practices. Millions of dollars of homeopathic remedies are sold annually over the counter.6

The delicately rendered, etched portrait of Hahnemann in the Jefferson collection was cut out of one of several encyclopedias of German knowledge published in the last half of the nineteenth century. Entitled Meyer's Konversations-Lexikon, these encyclopedias were published by the Bibliographisches Institut in Leipzig. The author was Hermann Julius Meyer (1826-1909).

**Portrait of François-J.-V. Broussais**

**FRANCOIS-JOSEPH-VICTOR BROUSSAIS (1772-1838)**

By M (†)

Lithograph

1825-35

Image size: 6 3/4 x 6 1/2 in.

Sheet size: 13 3/4 x 10 3/4 in.

Signed below image on right: "M"

Inscriptions below image: "Lith. de Delpech." and "BROUSSAIS" above facsimile signature of subject

Given after 1900 by unknown donor

Accession number: 1900+f.Pr.05

François-J.-V. Broussais was born in 1772 in St. Malo, France, the son of a country practitioner. He was a proponent of the doctrine of physiological medicine, and carried on a polemic against the dominant medical ideas of his time differentiating and describing diseases according to their clinical course and anatomical seat.
His early medical studies were at the Hôtel Dieu of St. Malo and at the École de Chirurgie Navale at Brest. He shipped out as a naval surgeon and then received his doctor's degree in Paris in 1802. After medical school he served as an army surgeon during Napoléon's campaigns, and later was appointed assistant professor at a military hospital in Paris. Through government influence he was appointed professor of general pathology at the Faculté de Médecine in Paris, a seat in the Académie des Sciences Morales et Politiques, the rank of inspector general in the Service de Santé Militaire, and a commander of the Legion of Honor.

Broussais's book, *Histoire des phlegmasies ou inflammations chroniques* (1808), put forward some very original ideas. His theory of "physiological medicine" was that life depends upon irritation, especially heat which excites the chemical processes in the body. Disease depends upon localized irritation of some organ. Further, he believed that nature had no healing power, so active measures of diet and bleeding were necessary to abort disease. A weakening regime featured depriving the patient of food and leeching him all over his body, as many as thirty to fifty leeches at once. His theory of irritation was taken up by some doctors in Germany and England before being generally discredited by the medical profession.

The elegantly rendered bust-length portrait of François Broussais was published by the Delpech lithograph shop in Paris. The artist is identified only by the initial “M.” The subject's angular features, steady gaze, and military decoration give him a confident, almost tough demeanor, in contrast to his tasselled curls which lend him a softer and romantic look.

### Anatomists and Surgeons

Although it has been long been understood that one must dissect the human body to understand the patterns and relationships of its structures, this was not always the case. Around 300 B.C. human and animal dissection was practiced in Alexandria, Egypt, and the study of anatomy flourished until Egypt was absorbed into the Roman Empire around the end of the first century B.C. The Romans passed legal sanctions to protect the dead against defilement and anatomists reverted to the dissection of animals.

In the second century A.D. Claudius Galen of Pergamon wrote two great anatomical works, *On Anatomical Procedure* and *On the Uses of the Parts of the Body of Man*, based mainly on the work of the *Hippocratic Collection* and Aristotle. Galen experimented with various species of animals, especially apes, to make inferences about human anatomy.

Following Galen's death his word remained the authority, although sometimes in corrupted form, and further anatomical inquiry ceased in western Europe during the Middle Ages. However, the most important documents of Greek medicine had been translated into Arabic, and intellectual leadership passed to Islamic scholars in Asia Minor, Persia, North Africa, and Spain from about the eighth to the thirteenth centuries. Many Arabic manuscripts and Latin translations of Greek manuscripts found their way to European monasteries. Between 1100 and 1350 the center of learning shifted to Europe as fifteen universities were established in Italy, attracting students from all over the continent.

Modern scholars differ on some important issues in the complex history of dissection by physicians and artists during the late Middle Ages and early Renaissance, but do agree that gradually the practice was legalized by the church and the state. A medical faculty existed at Bologna as early as the mid-twelfth century, and postmortem examination evolved into anatomical study by the beginning of the fourteenth century. The *Anathomia* (1316) of Mondino de' Luzzi, which still relied on ancient authorities, served as the practical manual of dissection for the next two centuries. The significant contribution of Andreas Vesalius, the great sixteenth-century anatomist, was to trust only observations made from his own dissection of the human body.
Andreas Vesalius Dissecting

ANDREAS VESALIUS DISSECTING
By unknown artist, after painting by Edouard-Jean-Conrad Hamman (1819-88)
Oil on canvas
1850-1925
25 x 30 in.
Given in 1940 by Mrs. Alexius McGlannan, daughter of an unidentified Jefferson alumnus of the class of 1869
Accession number: 19404-e.P.02

Andreas Vesalius (1514-64) was born in Brussels to a family of notable physicians. His great-great-grandfather was a professor in the medical school at Louvain, his great-grandfather was physician to the city of Brussels, his grandfather attended Emperor Maximilian I, and his father served Emperor Charles V as court apothecary.

After attending universities in Louvain, Vesalius studied medicine at the University of Paris from 1533 to 1536. Even though he witnessed only a few dissections, his interest in anatomy was already established. The invasion of Provence by Charles V forced Vesalius to return to Louvain where he finished his baccalaureate degree in 1537. While there he reconstructed a skeleton from the corpse of an executed man, and on another occasion astonished fellow students and faculty by conducting an authorized anatomical demonstration, the first in that city in eighteen years.

Vesalius continued his studies at the hospital in Venice. In 1537 he was granted a medical degree by the University of Padua, a dependent city of Venice. He was immediately appointed professor of surgery, a post that also bore the responsibility of teaching anatomy. Like most contemporary anatomists he lectured from the chair (reading from the anatomical volumes of Galen), but unlike them he performed his own dissections. He also introduced the use of illustrations to clarify his discussions, another startling novelty that attracted huge crowds.

In 1538 Vesalius published his first work, Tabulae anatomicae sex, consisting of six sketches of the vascular system and the skeleton. His next publications were Institutionum anatomiarum secundum Galeni sententiam (1538), a synopsis of the views of Galen, and Epistola do- cens venam (1539), a letter supporting the classical technique of venesection. Next he contributed three revisions of chapters to a monumental edition of the complete works of Galen: Opera Galeni (1541-42).

Ironically, even while working on the latter book Vesalius was preparing his own original, anatomical treatise freeing him from Galenic authority: De humani corporis fabrica libri septem (1543). This important work demonstrated that much of Galen's human anatomy was inaccurate because it was based on the study of an-
imals only. Vesalius believed ardently that human anatomy could be learned only by dissection and investigation of the human body.

Although the initial reception to Fabrica was largely unfavorable, today it is considered by many scholars the greatest single contribution to anatomical knowledge. The work was also an exquisite and unified blend of scholarly text, innovative illustrations, and typography. Although the book was replete with errors, Vesalius made so many new discoveries that widespread fame earned him the epithet, “Father of Modern Anatomy.” A condensed and less expensive version entitled De humani corporis fabrica librorum epitome appeared the same year.

After lecturing at the universities of Padua, Bologna, and Pisa Vesalius returned to the practice of medicine and was appointed court physician to Charles V at Speyer. A revised folio edition of Fabrica was dedicated to Charles in 1555. After the emperor’s abdication in 1556, Vesalius joined the court of his son Philip II of Spain. His last work, Anatomicarum Gabrieli Fallopii observationum examen, was published posthumously in 1564.

The oil painting of Andreas Vesalius in Jefferson’s art collection is a copy after a well known depiction of 1848 by Edouard-Jean-Conrad Hamman, a Belgian portrait and history painter. Hamman’s portrait was originally owned by a private collector in Rotterdam, so the copyist of the Jefferson portrait probably worked after painted or engraved copies.

The painting shows Vesalius alone in a murky room performing a dissection. All windows are tightly shuttered except one in the top left corner that is slightly ajar, allowing in light that causes a raking, spotlighted effect. The anatomist looks imploringly toward a crucifix hanging on the wall, affirming his own piety and perhaps seeking inspiration or blessing for his work.

He wears a blue robe with maroon velvet sleeves and a white ruffled shirt. His left hand rests on the arm of a male cadaver partially covered by a sheet. The body is shown in foreshortened perspective with its head toward the viewer. The anatomist’s right hand reaches toward instruments on the table which also holds books and a skull. Folio volumes of anatomy rest on a bookstand and on nearby tables. Additional instruments are on the planked wood dissection table.

The Jefferson library has acquired several rare copies of Fabrica (images discussed below), and a silver medal issued in commemoration of a statue of Vesalius erected in Brussels in 1847.

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Portraits of William Harvey

**WILLIAM HARVEY (1578-1657)**

By Horatio Stone, M.D. (1808/10-75)

Marble

1869

29 5/8 x 16 7/8 x 13 3/8 in.

Signed and dated on back: “HORATIO STONE/FAC. ROME. 1869”

Inscription on front of base: “HARVEY”

Given in 1899 by J. Ackerman Coles, M.D. and Emilie S. Coles, in memory of their father, Abraham Coles, M.D. (JMC 1835)

Accession number: 1899-e.5.01

William Harvey, the discoverer and quantifier of the circulatory system, is another towering figure in the history of anatomy. The Jefferson art collection contains several portraits of Harvey, including a sculpture by Horatio Stone, prints by Jacobus Houbraken and Charles A. Waltner, and an anonymous seventeenth-century oil painting.

William Harvey was born in 1578 in Folkestone, Kent, England, the son of a landowning family. After
graduating from Caius College, Cambridge, he earned a medical degree from the University of Padua in 1602, where an influential teacher was the anatomist Girolamo Fabrici (1533/37-1619), discoverer of valves in the veins.

Harvey established a private practice in London, and was appointed fellow of the Royal College of Physicians and physician to St. Bartholomew’s Hospital where he remained from 1609 to 1643. In 1615 he was made the Lumleian Lecturer of the Royal College of Physicians, requiring an annual discourse and demonstration of anatomy. His reputation soared and he was named court physician to King James I and then to Charles I. When Civil War broke out in 1642 Harvey followed the court to Oxford and was appointed principal of Merton College there. When rebels reconquered the town in 1646 Harvey quit the royal service and retired.

His greatest work, *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (1628), established the continuous recirculation of the blood. By direct observation he demonstrated that the heart acts as a muscular pump that propels the blood away from the heart via the arteries and returns it to the heart via the veins, in a continuous motion. Many contemporary physicians at first opposed his ideas because they contradicted the beliefs of Aristotle and Galen. Harvey’s interest in reproduction led to a publication that became a foundation of modern embryology, *Exercitationes de generatione animalium* (1651).

The over-life-sized marble bust of William Harvey was sculpted by Horatio Stone in 1869. The vigorous conception is idealized and heroic. The subject looks down with furrowed brow and a quizzical expression. His face is broadly angular and his neck quite massive. The predominant feature is the extraordinarily thick and curly hair, beard, and mustache. However, the imposing depiction does not accord with Harvey’s appearance as described by a contemporary:

> He was not tall, but of the lowest stature, round faced, olivaster complexion; little eye, round, very black, full of spirit; his hair was black as a raven, but quite white 20 years before he died...He was...very choleric.

Horatio Stone was born in 1808 in Jackson, New York. Originally trained as a physician, he practiced from 1841 to 1847. He began sculpting professionally in 1848 and made two study trips to Italy. He moved to Washington, D.C. where he was a founder and president of the Washington Union Art Association, and was instrumental in the establishment of the National Gallery of Art and the short-lived Federal Art Commission. His marble statues and busts of Alexander Hamilton, John Hancock, Edward Dickinson Baker, Thomas Jefferson, Thomas Benton, and Chief Justice Roger B. Taney can be seen in the Capitol and the Supreme Court Building.
Portray of William Harvey
(See color plate)

WILLIAM HARVEY
By Jacobus Houbraken (1698-1780), after painting
by Wilhelm von Bemmel (1630-1708)

Hand-colored engraving
1739
Image size: 14 x 8 3/4 in.
Plate size: 14 1/2 x 9 1/4 in.
Sheet size: 18 1/2 x 12 3/4 in.

Inscription on frame of image: “WILLIAM HARVEY
M.D.”
Signed and dated lower right: ‘J. Houbraken Sculps.
Amst. 1739”
Inscriptions below: “Bemmel pinx.,” “In the
Collection of Dr Mead.,” and “Impensis J. & P.
Knapton Londini, 1739.”

Given after 1900 by unknown donor
Accession number: 1900+f.Pr.07

This large and rare print of William Harvey is
an engraving with hand-applied watercolor by
the Dutch artist Jacobus Houbraken. The
source for the image is an oil painting of Harvey
by another Dutch artist, Wilhelm von Bemmel (at the
Hunterian Collection, University of Glasgow).

In the upper half of the image William Harvey is
shown in an oval frame in front of a stone column cov-
ered with pink drapery. In the print he faces the oppo-
site direction from the painting (a print is a reversed
image of the engraved plate, and printmakers frequent-
ly do not trouble to reverse the image a second time).

Compared with Horatio Stone’s sculpture of Harvey,
the subject’s cheeks are hollower, his chin more point-
ed, and his hair flatter and more sparse. His costume is
maroon and blue with a broad, white collar. Below the
framed portrait is a large diagram of the heart and blood
vessels, flanked by foliage and pomegranates above a
caduceus and two pink and blue books.

Bemmel’s oil portrait was in the possession of Dr. Richard Mead (1673-1754) for many years. Mead was a
physician and eminent scholar who amassed a library of
ten thousand books in addition to vast numbers of
paintings, sculptures, prints, and medals. He allowed
the painting to be copied by Houbraken for his famous
engraving. After Mead’s death the painting was suppos-
edly acquired for Dr. John Hunter.10
Portrait of John Hunter

JOHN HUNTER (1728-93)
By William Sharp (1749-1824),
after painting by Sir Joshua
Reynolds (1723-92)

Engraving, etching
1788
Image size: 16 3/4 x 13 3/8 in.
Sheet size: 21 5/8 x 17 1/2 in.

Signature lower right below image: “Will’ Sharp sculpt”
Inscriptions: “Sir Joshua
Reynolds pinx/JOHN
HUNTER/London, Published 1st
Jan’ 1788, by Wm Sharp, N°
8/Charles Street, Midst
Hospital: B. B. Evans, corner of
the Old Jewry, Cheapside./& W.
Skelton, N° 23 Hay Market.”

Given in 1970 by Dr. J.
Woodrow Savacool (JMC 1938),
clinical associate professor of
medicine, and Mrs. Savacool
Accession number: 1970+e.Pr.01

Dr. John Hunter was a celebrated eighteenth-century
British surgeon credited with putting operative surgery
on a solid scientific basis, grounded in his extensive
knowledge of anatomy and pathology. Dr. Samuel D.
Gross praised Hunter as the “grandest figure in the his-
tory of our profession,” and “a philosopher whose men-
tal grasp embraced the whole range of nature’s works,
from the most humble structure to the most complex
and the most lofty.”

John Hunter was born on a small farm near Glasgow,
Scotland and studied anatomy and surgery with his
older brother, William, and later at hospitals in London.
Especially interested in comparative anatomy, John
Hunter made thousands of anatomical preparations of
animals of every sort. After serving for two years as an
army surgeon during the Seven Years War, he began the
private practice of surgery in London and opened his
own anatomical school.

He became a leading surgeon in the city, was ap-
pointed to St. George’s Hospital, and elected to the
Royal Society. His treatises on treatment of gunshot
wounds, the natural history of human teeth, venereal
disease, and his operation for popliteal aneurysm were
very influential. He discovered that when an obstruc-
tion occurs in the arteries collateral vessels are de-
veloped. Many of his American and European pupils be-
came famous in their own right, such as Drs. John Mor-
gen, Philip Syng Physick, Astley Cooper, William Ship-
pen, and Edward Jenner.

As Hunter's famed collection of more than thirteen thousand anatomical, zoological, and pathological specimens grew and more space was needed, he purchased two large homes in Leicester Square and converted the whole property into laboratories, lecture rooms, museum, and printing shops, as well as living quarters. After his death the collection was transferred to the Royal College of Surgeons where each year since the Hunterian Oration is presented.

The painter Sir Joshua Reynolds was a neighbor who finally was able to persuade Hunter to sit for his portrait in 1786. One day the reluctant subject fell into a reverie and the artist seized the opportunity to portray him while lost in thought among some of his prized possessions. Seated at a table with pen in hand, Hunter has paused for a moment in his work. On the crowded tabletop are an open folio of his comparative anatomy drawings, closed volumes of Natural History of Vegetables and Natural History of Fossils, and a bell jar with an injected bronchial tree. Above is a niche containing the skeletal legs of the Irish giant, Charles Byrne.

William Sharp was one of the most accomplished eighteenth-century English engravers. He was best known for his reproductions of portraits and history paintings by old masters and contemporary artists. Although elected an honorary member of the Imperial Academy at Vienna and of the Royal Academy of Munich, Sharp refused numerous invitations to work on the Continent.

The son of the municipal physician of Thorn, Poland, Soemmerring was born in 1755 and received his medical degree from the University of Göttingen in 1778. He was influenced by pupils of the great anatomist Albinus while pursuing further study in England, the Netherlands, and Scotland.

In 1779 Soemmerring became professor of anatomy and surgery at the Collegium Carolinum in Cassel, and in 1784 professor of anatomy and physiology at the University of Mainz. In 1797 he established himself as a physician at Frankfurt-on-Main, and then moved to Munich in 1805. Soemmerring was a member of the Bavarian Academy of Sciences, and even published on the electric telegraph. He became a privy councillor, and in 1808 was named a knight of the Order of the Civil Service of the Bavarian Crown and was granted personal nobility. He returned to Frankfurt in 1820 and practiced medicine there until his death in 1830.

Soemmerring was particularly interested in the anatomy of the brain and the sympathetic nervous system. His principal work is Vom Baue des menschlichen Körpers (1791-96). He was also admired for a series of monographs on the organs of the senses.

The bronze medal of Soemmerring by Christoph Karl Pfeuffer was struck at the Loos die-sinking establishment in 1828, commemorating the fiftieth anniversary of the subject's doctorate from the University of Göttingen. The obverse features a profile bust of the subject facing right above a caduceus, and the reverse shows the base of the brain, medulla, and cerebellum.

Dr. Samuel T. von Soemmerring was among the most famous German anatomists of the early nineteenth century. His publications had lasting influence in part because of his choice of exceptional engravers, such as Christian Koeck, to illustrate his works with remarkable accuracy and artistry.
Although M.-F.-X. Bichat died prematurely at the age of thirty, he is considered by many scholars the creator of descriptive anatomy.

Bichat was born in Thoirette in 1771, the son of a country doctor. After studying anatomy and surgery at the Hôtel Dieu in Lyons, Bichat moved to Paris where he studied with Pierre Joseph Desault (1744-95), a distinguished surgeon who took a liking to the gifted young man, invited him to live in his home, and made him editor of the *Journal de chirurgie*. In 1800 Bichat became physician at the Hôtel Dieu and gave private lectures and demonstrations in anatomy and physiology.

He was famous for three works published between 1799 and 1801, *Recherches physiologiques sur la vie et la mort, Traité des membranes*, and *Anatomie générale*, in which he studied the structure of tissues in their normal and pathological conditions. He recognized twenty-one different membranes (tissues making up the organs), differing in their textures and properties. He taught that pathology must be based not upon the topography of organs but upon the structure of the membranes. His error was to assign a specific vital property to each tissue, a now obsolete theory.

The bronze medal of Bichat was made by L. Dubour for the Galerie Metallique des Grands Hommes Français. The obverse shows a profile bust of the subject facing left. His features, wavy hair, and details of costume are finely rendered in high relief.
Alfred-A.-L.-M. Velpeau was a French surgeon best known for his contributions to the literature of surgical anatomy and operative surgery.

Velpeau was born in 1795 in Breche, the son of a village blacksmith. After initially apprenticing with his father he decided to study medicine instead, first in Tours, and then in Paris where he received his degree from the Faculté de Médecine in 1823. In 1828 he was named surgeon to the Hôpital St. Antoine, in 1830 to La Pitié, and in 1834 to La Charité. He was chair of clinical surgery at the Paris Faculté from 1834 until his death in 1867.

Velpeau's best-known publications are *Traité d'anatomie chirurgicale* (1823), the first detailed work on surgical anatomy; *Nouveaux éléments de médecine opératoire* (1832), the most comprehensive French work on operative surgery; and *Traité des maladies du sein et de la région mammaire* (1854), the most important work to date on tumors of the breast.

The bust-length image of Velpeau was done from life by Maurir for the Delpech lithograph shop. The subject's youth shines in his smooth skin, wide-eyed gaze, dimpled cheeks, curly hair, and dapper costume.
Ernst von Bergmann was a German surgeon known for his contributions to cranial surgery and to surgical pathology.

Bergmann was born in 1836 in Riga, Latvia and graduated from the University of Dorpat in 1860. During the wars of 1866 and 1870-71, he served with the medical corps in field ambulances and hospitals. After the Franco-Prussian War ended in 1871 he was professor of surgery at Dorpat until 1878 when he was called to the chair of surgery at the University of Würzburg. In 1882 he moved to the University of Berlin where he remained for the rest of his career.

Bergmann wrote on the surgical treatment of cerebral diseases, fatty embolism, surgery of the joints, ligation of the femoral vein, and diseases of the lymphatic glands. He is the author of the classic work, *Chirurgische Behandlung der Hirnkrankheiten* (1888). In 1886 he advocated steam sterilization of instruments and dressings, and in 1891 he introduced aseptic methods to the practice of surgery.

The bronze medal of Bergmann was made in 1913 by Torff for the Central Committee for Medical Education in Prussia. He is shown in a three-quarters view facing left. The artist has paid particular attention to the subject's facial wrinkles around his eyes and forehead and thick strands of luxuriant hair, mustache, and beard.
Portray of Johann A. J. Büttner

JOHANN ARNOLD JOSEF BÜTTNER (1766/68-1844)

OBVERSE

By Henri François Brandt

Bronze medal

1835

1 7/8 in. diameter

Signed obverse and reverse: “BRANDT F.”

Inscription: “I°. ARN. IOS. BUETTNER EQ. INTER SUPREMOS MED. MILIT. PRAEFFECTOS SECUNDVS/ MEDICI CASTRENSES BORUSS. D.”

Given in 1940 by bequest of Pascal Brooke Bland, M.D.

Accession number: 1940+e.M.04

REVERSE

Dated below image: “D. XV. OCTOB./MDCCCXXXV”

Inscription: “IN MEMORIAM SOLLEMN. X LUSTR. OFF. EXACT.”

In addition to the battle scene of Ambroise Paré applying ligatures discussed above, the Jefferson collection also includes portraits of two other European military physicians: Johann Büttner and Dominique Larrey.

Johann Büttner was a native of Halberstadt. He spent almost his entire career as a military surgeon in the service of the Prussian army. He rose steadily from company surgeon in 1785 to chief of the medical service in 1828. He died in Berlin in 1844.

The bronze medal made by Henri François Brandt was struck in celebration of Büttner’s fiftieth year of military service. The carving of this small object is unusually sharp and clear.

The obverse is a well executed portrait with stylized, wavy hair that recalls heads of Roman emperors. The finely detailed reverse features a semi-draped, profile figure of Aesculapius seated next to a trophy arrangement that includes a caduceus, helmet, sword, and shield emblazoned with a spread eagle. He points toward a statue of Artemis, the pre-Greek earth goddess later known as Diana, whose function was to watch over wildlife. Her haloed and crowned, columnar figure is elaborately decorated with jewelry and a costume featuring vertical stacks of primitive animals. A tall flowering plant rises up toward her outstretched right arm.
Baron Dominique-Jean Larrey was considered “the greatest military surgeon that ever lived” by many medical writers, including the Jefferson surgeon Dr. John Chalmers DaCosta. Larrey’s innovations included the introduction of field hospitals, ambulance service, and first aid to the wounded right on the battlefield.

Larrey was born in 1766 to a poor family in the French village of Beaudeau. He began his medical studies in Toulouse with an uncle who was a surgeon, and studied further at the College of Esquile. After passing examinations in Paris and Brest he was appointed chief surgeon on a war vessel, thus launching his military career.

Later as surgeon-in-chief of the Grand Army he took part in almost all of Napoléon’s campaigns in Europe, Russia, Egypt, and finally at Waterloo. Larrey was admired by his comrades-in-arms for his good nature, courage, and compassion dealing with the wounded under battlefield conditions. Larrey’s title of Baron of the Empire was bestowed by Napoléon, and in his will the emperor referred to Larrey as the “most virtuous man I have ever known” and left him a bequest.

It is reported that Larrey performed as many as two hundred amputations in twenty-four hours at Borodino. He was the inventor of the “flying ambulance” which provided first aid to the wounded immediately, not after a battle was finished. He was appointed a professor at the École de Médecine Militaire at Val-de-Grâce. His most enduring literary work is the four-volume Mémoires de chirurgie militaire et campagnes (1812-17).

In 1802 Larrey was the first to note the contagiousness of trachoma, in 1803 he became one of the first to amputate at the hip joint, and in 1812 he published the first description of trench foot. Larrey’s prodigious medical reputation saved his life after the fall of Napoléon, and in 1820 he was named a member of the newly founded Académie de Médecine.

The unidealized portrait bust of Larrey was made by Maurir for the Delpech lithograph shop. The depiction emphasizes the subject’s bulky facial contours and resolute expression. His long, wispy hair is smooth on top and curled below. The ornate, star-shaped medal hanging from a ribbon around his neck is dated 1807.
Edward Jenner was the renowned English physician and naturalist who discovered smallpox vaccination.

The son of a vicar, Jenner was born in 1749 in the small market town of Berkeley in Gloucestershire. In 1761 he began an apprenticeship with a local surgeon, with whom he worked until 1770 when he became a house pupil of John Hunter in London, studying surgery and anatomy. After his training he returned to Berkeley to become a country doctor.

Early in his practice he was asked to inoculate persons against smallpox with matter from smallpox pustules, thus giving them a mild case of the disease in order to confer immunity. He considered this relatively new practice a dangerous technique that often led to death and spread the disease further.

For many years Jenner observed that those who had suffered from what Jenner called "true cowpox," a relatively mild disease, remained immune to the ravages of smallpox. In May 1796 an outbreak of cowpox occurred and Jenner inoculated an eight-year-old boy with matter taken from the pustules of a milkmaid suffering from cowpox, and the boy recovered speedily. Later that summer Jenner twice inoculated the boy with smallpox and there was no reaction. Jenner concluded that an attack of cowpox rendered the patient immune against smallpox, and that cowpox lymph was the ideal virus for inoculation.

Jenner submitted an account of his observations to the Royal Society, but his theory was ridiculed. Undismayed, he continued his experiments and in 1798 published a booklet entitled An Inquiry into the Causes and Effects of the Variolae Vaccinae. Although it was coolly received at first, other scientists endeavored to repeat his experiments and soon his method was accepted and the practice became widespread throughout Europe and America. Later when it was discovered that immunity could be renewed by a repetition of the inoculation, smallpox became a preventible disease.

Edward Jenner spent the rest of his life promulgating his discovery and assisting in supplying dried lymph to the far corners of the world. By 1802 the British Parliament showed the nation's gratitude by awarding the physician ten thousand pounds, and in 1807 twice that amount. In 1803 the Royal Jennyferian Society was founded in London to promote vaccination, and in 1813 Jenner was awarded an honorary medical degree from Oxford University.
The portrait of Jenner is by Edward Scriven. The English engraver supplied copies of famous paintings to publishers of illustrated books, and was the official engraver to the Prince of Wales. The source for this image was an oil portrait of Jenner painted by John Raphael Smith in 1802, and the artist's own mezzotint replica. Smith was an English engraver and miniaturist.

The original painting featured a background view of Berkeley fields with cows and a milkmaid. Scriven's small engraving is limited to the figure, shown half length and leaning with his right arm against a tree branch.

The Jefferson archival collection also includes a silver medal by Anton Guilleimard commemorating the smallpox vaccination. It was struck at Prague in 1803 for the Smallpox Commission of Bohemia.

Ignaz Philipp Semmelweis was a Hungarian physician credited with the discovery of the etiology and prevention of puerperal fever. Prophylactic handwashings made him a pioneer in antisepsis during the prebacterial era.

Semmelweis was born in 1818 in Buda, Hungary, the son of a prosperous shopkeeper. He studied medicine first in Pest and then received his medical degree in 1844 from the Second Vienna Medical School. After graduation he completed a master's degree in practical midwifery and also received surgical training.

In 1846 he became an assistant at the First Obstetrical Clinic of the Vienna General Hospital where the maternal and neonatal mortality rate from puerperal fever was higher than thirteen percent. This clinic was used for the instruction of medical students. Curiously, at the same hospital's Second Obstetrical Clinic run by midwives, the mortality rate was only about two percent. The latter clinic was the teaching service for midwives. Semmelweis eventually realized that puerperal fever was not due to "epidemic constitution" as then thought.

He observed that women who were delivered rapidly before an examination had taken place never sickened, while those who had arduous labors and frequent examinations were almost certain to die from the disease; further, that the death rate was
lower during hospital vacation periods and comparatively rare in rural districts. He eventually realized that infection originated from the hands of the examining physicians and students who had just conducted autopsies. There was an immediate decline in mortality when Semmelweis insisted that all physicians must disinfect their hands with chlorine water between autopsy work and pelvic examinations. By 1848 Semmelweis widened his prophylaxis treatment to include all instruments used with patients in labor.

Far from achieving approbation for his ideas, this led to a long-lasting controversy among obstetricians. There was no chance of promotion for Semmelweis in Vienna so he returned to Pest and took charge of the maternity ward at St. Rochus Hospital. In 1855 he was appointed to the chair of theoretical and practical midwifery at the university. He did not publish his theory until 1861, in Die Aetiologie, der Begriff und die Prophylaxis des Kindbettfiebers.

Semmelweis’s ideas were not generally accepted until after his death when Louis Pasteur and Joseph Lister furnished indisputable proof. In fact the brilliant and sensitive Semmelweis was broken by the indifference of his colleagues, and was committed to an asylum in Vienna where he died soon after in 1865.

This half-length depiction of Ignaz Semmelweis by an unknown artist is a three-quarters view at a large scale. His deepset eyes look pensively into the distance. The baldness of his head is offset by thick eyebrows and bushy mustache. His collarless coat with frog closures is probably characteristic of local attire.

**Portrait of Louis Pasteur**

**LOUIS PASTEUR (1822-95)**

*By Albert Rosenthal (1863-1939), after a tintype*

*Lithograph*

*1925*

*Image size: 19 x 15 in.*

*Sheet size: 22 1/2 x 18 in.*

Signed and dated center right: “Lith. by Albert Rosenthal/after Photo tintype/Copyrg' 1925”

Inscription in pencil lower right: “To: Dept. Preventive Medicine/ Bacteriology/ Jefferson Medical College/Phila./ Albert Rosenthal/12/12/27” above facsimile signature

Given in 1927 by the artist

Accession number: 1927+e.Pr.01

Louis Pasteur was one of the founders of bacteriology. Although not a physician, he has been called the Father of Preventive Medicine.

A tanner’s son, Louis Pasteur was born in 1822 in Dole, Burgundy and reared in Arbois. He received his bachelor’s degree in letters (1840) and science (1842) from the College Royal de Besançon, and a doctorate in physics and chemistry at the École Normale in Paris (1847).

After serving briefly as professor of chemistry in Strasbourg, Pasteur was professor of chemistry and dean of the faculty of sciences in Lille, director of scientific studies at the École Normale, professor of chemistry at the Sorbonne, and finally, director of the Institut Pasteur in Paris.

Pasteur’s landmark work on fermentation, *Études sur le vinaigre: sa fabrication, ses maladies, moyens de les prévenir; nouvelles observations sur la conservation des vins par la chaleur* (1868), showed how wine was spoiled by microbes and that microbes could be destroyed by heat. His process for the preservation of wine by sterilizing procedures came to be called “pasteurization.”

Pasteur also discredited the idea of “spontaneous generation” of microbes thought to spoil milk and butter. He discovered that the bacteria of putrefaction were anaerobic, thriving only in the absence of free oxygen, while other microorganisms were aerobic. His experi-
ments showed that the microorganisms of decomposition in wine and milk were the causes and not the consequences of the changes, and that they derived from the external environment.

Pasteur rescued the French silkgrowing industry by identifying two diseases of caterpillars, and showed the way to breed healthy stock by weeding out infected eggs and removing the source of infection in the food. He also prepared vaccines against fowl cholera, anthrax, swine erysipelas, and rabies.

Pasteur devoted the last two decades of his life to the study of the germ theory of disease. By 1888 funds were collected from donors around the world, largely due to his fame for the treatment of rabies, for the Institut Pasteur, established in Paris to study the causes, prevention, and treatment of infectious diseases.

Louis Pasteur received numerous awards from the French Legion of Honor, including the Grand Cross in 1881. Other major honors were the Grand Prize Medal of the Exposition Universelle of 1867, membership and the Copley Medal of the Royal Society, commander of the Imperial Order of the Rose in Brazil, Grand Cordon of the Order of Isabella the Catholic, and membership in the Académie de Médecine and the Académie Française.

In 1892 a grand jubilee celebration in his honor was held at the Sorbonne where the frail and aging scientist entered the proceedings on the arm of the president of the Third Republic. In 1895 Pasteur was accorded a state funeral at Notre Dame Cathedral with full military honors, followed by interment at the Institut.

Albert Rosenthal's head-and-shoulders depiction of Louis Pasteur is rendered in the artist's customary lively, three dimensional style. Rosenthal presented the lithograph of Pasteur to Jefferson's department of preventive medicine in 1927.

In addition to the Albert Rosenthal portrait, the Jefferson art collection has other images of Louis Pasteur: a small bronze sculpture by Théodore Rivière, given by bequest of Pascal Brooke Bland, M.D. in 1940, an oil painting (now in poor condition) by Rudolphe F. Bubabin, presented by members of Jefferson's Pasteur Society in 1953, and a reproduction of a famous *Vanity Fair* lithograph of 1887.

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**Portrait of Robert Koch**

ROBERT KOCH (1843-1910)

By Wilhelm Mayer

Bronze medal

1908

1 15/16 in. diameter

Signed on reverse left center: “W. M.”

Inscription on obverse: “PROFESSOR D. ROBERT KOCH”

Inscription on reverse: “UT SEMENTEM FECERIS, ITA METES”

Given in 1940 by bequest of Pascal Brooke Bland, M.D.

Accession number: 1940+e.M.07

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Dr. Robert Koch was a German physician who revolutionized the discipline of bacteriology with his discoveries and techniques. He influenced authorities in many countries to introduce public health legislation based on the microbial origin of various infections.

Robert Koch was born in 1843 in Klausthal, Hannover, the son of a mining official. He earned his medical degree at the University of Göttingen in 1866 with the highest distinction. A flourishing general practice in Rakwitz was interrupted by service in the Franco-Prussian War. In 1872 he became the district physician at Wollstein where he also established a rudimentary laboratory for conducting microscopic studies.

In 1876 he announced that he had worked out the complete life history of the anthrax bacillus that caused the disease, and his meticulous work was published that year and confirmed by Louis Pasteur. Koch set forth the methods by which an investigator should work...
with bacteria, and demonstrated that a particular bacillus always causes a particular disease. His publication *Untersuchungen über die Aetiologie der Wundinfektionskrankheiten* (1878) described the bacteriology of six different kinds of wound infections.

When Koch was appointed advisor to the Imperial Board of Health in Berlin in 1880 he was provided with better equipped laboratories. He developed the methodology of steam sterilization by dry heat instead of chemical substances, and advocated nutrient gelatin as a solid medium. In 1882 he announced that he had discovered the tubercle bacillus by special culture and staining methods, and that tuberculosis was not a chronic disorder of nutrition as had been supposed. One disappointing result was Koch's isolation of a tuberculin which he maintained in 1890 would check the growth of tubercle bacillus; the remedy failed to live up to his hopes.

In 1885 Koch was appointed professor of hygiene and director of the Hygienic Institute at the University of Berlin. He resigned in 1891 to become chief of the Institute for Infectious Diseases. This research facility was established in his honor and attracted scientists from around the world.

Throughout his career Koch traveled widely to campaign against pestilences. In 1883 as a member of the German Cholera Commission he visited India and Egypt and discovered the cholera vibrio and its transmission by water, food, and clothing. In Hindustan he showed that bubonic plague was transmitted to humans by the rat-flea. He devised a method of inoculation against rinderpest in South Africa. He also made valuable studies of Texas fever, sleeping sickness, malaria, and blackwater fever.

When Robert Koch retired from the institute in 1904, disciples and admirers presented a Festschrift in his honor, the government established an annual honorarium of ten thousand marks, and the Kaiser awarded him the Order of Wilhelm. He received the Nobel Prize in 1905. The following year he received the Prussian Order Pour le Mérite, and was made a member of the Prussian Academy of Sciences with the title of Excellenz.

In 1908 proposals to establish the Robert Koch Foundation to combat tuberculosis were approved, and among the most generous benefactors were the Kaiser and Andrew Carnegie. That same year Koch was honored by Berlin physicians and received the first Robert Koch Medal, established to commemorate the greatest living physicians.

The small bronze medal by Wilhelm Mayer shows a head-and-shoulders portrait of Robert Koch. The bearded physician is wearing spectacles and looking off to the right. A branch of laurel leaves tied with a ribbon follows the curve of the medal below. The reverse of the medal features an open book, a diploma, a skull, and a caduceus from which the snake is drinking from a cup, and a Latin motto: "As you sow, so shall you reap."

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**Portrait of Wilhelm C. Roentgen**

**WILHELM CONRAD ROENTGEN (1845-1923)**  
*By Walter Schatalow*

Oil on canvas  
1965  
30 x 25 in.  
Signed lower right: "W. S."  
Inscription on rear of canvas: "Walter Schatalow/1965"

Given in 1983 by the artist in memory of Bernard L. Feuerstein  
Accession number: 1983+e.109

Wilhelm Conrad Roentgen, a German physicist, was the discoverer of a new kind of rays to which his name was given in his native land: Roentgenstrahlen, known elsewhere as X-rays.

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The son of a cloth manufacturer and merchant, Roentgen was born in 1845 in Lennep, Germany and moved to Holland as a young child. After spending two and one-half years at the Utrecht Technical School, he received his
diploma as a mechanical engineer in 1868 and doctorate a year later from the Federal Polytechnical College at Zurich.

After working as a laboratory assistant and teaching physics in Strasbourg and Hohenheim Roentgen was awarded the post of chair of physics at the University of Giessen, in Hesse (1879-88). Then he accepted the offer of the Royal University of Würzburg to be professor of physics and director of the Physical Institute, and was made rector of the university in 1894. He assumed his final post in 1900 as chair of physics and director of the Physical Institute at Munich.

Roentgen published fifty-eight important papers, most in Annalen der Physik und Chemie, but his celebrity rests mainly on two pieces of work. In 1888 he demonstrated quantitatively the electromagnetic theory of James C. Maxwell: that there will be a magnetic field in a dielectric such as a glass plate whenever the electric field changes. This effect was named the Roentgen current in his honor. In 1895 Roentgen made his momentous discovery of X-rays, bringing him international fame. He had turned his attention to the phenomena of the unexpected ease with which electric current passed through a vacuum, and that the glass wall of the vacuum tube emptied of air glowed with a greenish-yellow or blue fluorescence. He found that the cathodes, negative electrodes, welded in the glass tube, through which the current entered, radiated particles which bore the current through the vacuum to the positive electrode, the anode, causing the fluorescence.

In six weeks of concentrated work, he discovered properties of the new rays: they travel in straight lines, cannot be refracted or reflected, are not deviated by a magnet, and can travel about two meters in air. He discovered their penetrating properties and produced images of objects inside a closed door, a box, a book, and the chamber of a shotgun. Finally, when he held his hand behind the screen he could see the outlines of his own fingers.

His famous pamphlet Eine neue Art von Strahlen (1896) caused a sensation. Notwithstanding the attention, Roentgen steadfastly refused to patent his discovery and resisted all offers of commercial exploitation in the fields of medical diagnosis and the testing of materials.

The resulting publicity afforded him many honors. In 1896 after Roentgen demonstrated the effects of X-rays to the Kaiser and his court, he was immediately awarded the Prussian Order of the Crown, Second Class. He received an honorary doctor of medicine degree from the University of Würzburg and medals from the Royal Society of London and Columbia University. He was made an honorary citizen of Lennep, and a statue of him was erected on the Potsdam Bridge in Berlin. In 1901 he won the first Nobel Prize for physics, and a medal was struck in his honor.

The painting of Roentgen by Walter Schatalow shows the physicist at work in his laboratory, standing behind a table with his apparatus activating a fluorescent screen and causing it to glow. There is a reddish glow behind the table. Schatalow's overly theatrical depiction of the notably reticent scientist is unfortunately diabolical-looking, but his facial features and luxuriant beard closely resemble contemporary photographs.

**Rare Medical Books**

The Thomas Jefferson University library contains over four thousand rare books related to the history of medicine and natural science. The most generous donor of historic medical books was Pascal Brooke Bland, M.D., the former chair of obstetrics, whose holdings on anatomy and obstetrics and midwifery were especially noteworthy.

In many cases the text and accompanying illustrations were collaborative efforts between physicians and artists, producing landmark publications of lasting scientific and aesthetic importance. Several of the artists employed to illustrate texts were also well known as master printmakers and painters.

The following selections merely hint at the quality and range of the collection, with works dating from 1483 to 1788. Chronological comparisons will be made of images in the following categories: title pages and frontispieces, health and hygiene, midwifery, and anatomy. Most of the earliest learned works were printed in Latin, but because titles could run on for many lines, the common abridged titles are used. Some rare books in the Jefferson collection are later publications, not the first edition of the work. With two exceptions, all the images illustrated remain intact in their original books.
Title Page: Physicians in Discussion

PHYSICIANS IN DISCUSSION
By Hans Burgkmair the Elder (1473-1531)
Woodcut printed in black and red
Image size: 4 5/8 x 5 5/8 in.
Page size: 12 1/8 x 8 1/4 in.
Signed lower right: "H. B."

From Albucasis, Liber theoricae necnon practicae Alsaharavi... (Augsburg: S. Grim & M. Wirsung, 1519)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+c.Pr.07

A common type of illustration for title pages and frontispieces depicts a group of physicians in discussion. Examples in the Jefferson collection are books by Albucasis and Albertus Magnus published in the sixteenth century.

Albucasis (also called Alsaharavius, or Abu-L-Qasim) was a Moorish physician working in Cordova, Spain in the late tenth and early eleventh centuries. He is the author of a great medicochirurgical treatise, Altasrif ("Collection"), of which only the surgical part survives today. Adapted largely from the work of Paul of Aegina, it was the leading textbook on surgery in the Middle Ages, and included descriptions of cautery, lithotomy, amputations, wound treatment, fractures, and dislocations.

Hans Burgkmair's image of doctors in discussion was used to illustrate several books, but it appeared first as the title page in Albucasis's Liber theoricae, published in 1519. It shows a group of six anonymous doctors wearing robes seated at a table intently discussing the merits of an open book. The leaders appear to be the three figures leaning forward and gesturing. If attire designates rank, then the physician at the far left must be presiding because his gown is the only one trimmed in fur.

A native of Augsburg, Hans Burgkmair was one of several artists employed to record the personal lives of the court of Maximilian I, the Holy Roman Emperor. In addition to hundreds of woodcuts depicting the court, Burgkmair also received commissions for oil paintings of religious scenes, landscapes, and portraits. During his travels to Italy Burgkmair absorbed many new artistic ideas and helped to introduce elements of the southern Renaissance style to Germany.
Title Page: Physicians in Discussion

PHYSICIANS IN DISCUSSION
By unknown artist

Woodcut printed in black and red
Image size: 6 3/4 x 4 3/8 in.
Page size: 7 3/8 x 5 1/2 in.

From Albertus Magnus, Ein neuer Albertus Magnus...
(Augsburg: Michael Manger, 1596)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+c.Pt.04

The physicians depicted on the Albucacis title page are anonymous and differentiated mainly by costume and age. Title pages of some subsequent books feature physicians identified by name. In the case of Ein neuer Albertus Magnus the generalized images are not intended to be actual likenesses.

Albertus Magnus (1193/1200-80) was a Dominican monk and naturalist, and an important philosopher who reintroduced Aristotle and Arabic science to German universities. In the physical sciences he wrote on mathematics, mechanics, sound, astronomy, and the structure of matter. He also wrote on botany and the evolution of plants and on the embryology of animals. Some scholars think that spurious medical books were attributed to Albertus Magnus or published under his name to assure a wide circulation.

The title page of Ein neuer Albertus Magnus features bust-length portraits of physicians and scholars at the top: one mythical, ten ancient, and one medieval, each identified by name and accompanied by a companion, and many using medical props. Below is a group of full-length figures of doctors with only Hippocrates and Galen mentioned by name, but all involved in earnest discussions.
Title Page: Andreas Vesalius Dissecting

Over the centuries many anatomical atlases featured an illustration of the author or another experienced scholar teaching anatomy.

When Mondino de’ Luzzi’s Anathomia was republished as one of several treatises in Johannes de Ketham’s Fasciculus medicinae, a dissection scene was included in the 1493 Italian edition. It was thought originally to depict Mondino himself seated in an elevated pulpit-like chair, the cathedra, from which he read or lectured to the students. Below, men of lower rank included an ostensor who used a pointer to show the area of incision and give directions, and a demonstrator, often a barber-surgeon, who performed the dissection.

A more recent scholarly view of this dissection illustration is that it depicts consecutive events collapsed into a single image, and that actually physicians performed all three tasks. This view contradicts the visual implication of the illustration, but it is known, in fact, that Mondino and some other predecessors of Vesalius did perform dissections themselves.

Painters and sculptors were also taking an interest in the accurate representation of the human form by the mid-fifteenth century, and some applied Leon Battista Alberti’s (1404-72) principle of how to get the right proportions and construction: visualize the bony insides, attach muscles and tendons, cover with flesh and skin, and finally add clothes. Artists studied anatomy in life-drawing groups and observed dissections, and by the mid-sixteenth century Florentine artists themselves were performing dissections routinely. The surviving anatomical drawings of Leonardo da Vinci (1452-1519), for example, surpassed medical illustration of his own time, but his plans for a comprehensive book on anatomy never were completed.

One of the most famous images in all of medical art is the dissection title page of Vesalius’s Fabrica. Art and medical scholars have not entirely resolved the question of the identity of the artist or artists who drew the remarkable title page and innovative dissected skeletons and muscle figures, but most credit Jan Stephan (or Joannes Stephanus) van Calcar, a Flemish artist who had been a pupil of Titian in Venice (see below). The woodcut illustrations were made under Vesalius’s close supervision in Venice, a great center of printing, but he preferred to publish with the firm of Joannis Oporini in Basle. Vesalius accompanied the woodblocks on the trip over the Alps by donkey train to Basle.

The title page of Fabrica embodies Vesalius’s views expounded in the preface, in which he staunchly defends the anatomist-surgeon as the authority on human anatomy, and urges that the “barbaric butchers” currently assigned the role of dissector be replaced by knowledgeable anatomists like himself. Vesalius has descended from the chair to conduct the dissection himself without the aid of a book. (His likeness resembles the famous portrait in the frontispiece of the first and second editions of Fabrica.) An articulated skeleton with a staff is situated where the reader formerly sat. Assistants are relegated to places under the table to prepare instruments rather than help with the dissection.

The professor stands in the center of a huge crowd, both dissecting and expounding on a female cadaver lying on a table. Onlookers include students, physicians, city and university officials, representatives of the church, the general public, and figures in classical garb. A chained monkey and a dog (used in Galen’s research) are now symbolically pushed to the lower left and right borders of the scene. A nude figure clinging to a column on the left suggests the importance of surface anatomy.

The scene of Vesalius dissecting takes place in an imaginary Renaissance-style, outdoor amphitheater. In this period, however, it was customary for a temporary wooden structure to be erected to accommodate the crowds who witnessed the public dissections. Permanent anatomical theaters were not constructed until the late sixteenth century.

The Latin words that appear in the cartouche proclaim the author and title, in translation: “Andreas Vesalius of Brussels, professor in the medical school at Padua, Seven Books on the Structure of the Human Body.” Above the cartouche two putti support the family heraldic device of three weasels courant, emblematic of the town of Wesel on the Rhine from which Vesalius’s forebears came and a play on the vernacular version of his name, Wessels.
The title page of Johannes Riolan the Younger's *Encheiridium* also includes an illustration of the author dissecting. Instead of being surrounded by a vast crowd in an imaginary amphitheater as in the Vesalius title page, Riolan performs an abdominal dissection in a shallow space accompanied by physicians identified as Johann Vesling, Albert Kuyper, Guy Patin, and A. Valkob, to whom the volume is dedicated. His companions, however, seem oblivious to the dissection and stare into space.

On the platform above is a cabinet displaying the anatomist's instruments, and flanked by male and female figures holding the caduceus. Above is a coat of arms with a skull. Numerous birds and a dog accompany the allegorical figures. As on the Vesalius title page, the dissecting scene covers the entire page. The illustrator was Reinier van Persyn, a Dutch painter and engraver.

Johannes Riolan the Younger (1580-1657) was chair of anatomy and botany at the University of Paris and chair of medicine at the Collège Royal. He also became the principal physician to the queen mother, Marie de Médicis. His *Encheiridium* (first published 1648) included a systematic presentation of both morbid and normal anatomy.
In the Tabulae anatomicae (first published 1714) of Bartholomaeus Eustachius (died 1574), the dissection scene on the title page is reduced to a small rectangle in the lower half.

The author is shown dissecting the superficial muscles of a cadaver in a lecture room with curved walls. Assistants below and students above engage in animated conversation, pointedly ignoring the dissection, unlike the enthralled observers in the Vesalius title page. A skeleton standing upright on a pedestal also gestures as if included in the conversation. A group of dogs lie on the ground in front of the table. The illustrator of the title page is identified in some editions as Petrus Leo Ghezzius, a Roman artist known for satiric drawings.

Eustachius was physician to the Duke of Urbino, and then to the duke's brother, Giulio Cardinal della Rovere, whom Eustachius followed to Rome in 1549. He was appointed professor of anatomy at the Collegia della Sapienza in Rome. As an anatomist he was best known...
for new observations on the kidney, teeth, and ear.

While in Rome he prepared a series of forty-seven anatomical illustrations with the help of artist Pier Matteo Pini, and they were engraved by Giulio de’ Musi. Only eight engravings were ever published in his lifetime and the remainder seemingly disappeared. The drawings were rediscovered in the early eighteenth century in the possession of a descendant of Pini. They were purchased by Pope Clement XI who presented them to his own physician, Giovanni Maria Lancisi, successor to Eustachius at the Sapienza. Lancisi published the entire series with his own commentary in 1714.19

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**Detail from Title Page: Dissection Scene**

**DISSECTION SCENE**

Engraving
Image size: 4 5/8 x 7 5/8 in.
Plate size: 5 1/4 x 8 in.
Page size: 17 1/8 x 11 1/2 in.

Signed below image: "Giuseppe Pirovani inv. e dis." and "Antonio Fiori incise"
From Pietro Berrettini (Pietro da Cortona), *Tabulae anatomicae ex archetypis egregii pistoris Petri Berrettini Cortonensis...* (Rome: Venantio Monaldi, 1788)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+e.Pr.28

The final title page with an illustration of a dissection is from *Tabulae anatomicae* (first published 1741) by Pietro Berrettini (1596-1669). He was better known as Pietro da Cortona in the art world and celebrated as a painter and architect of the High Baroque.

Pietro produced about twenty anatomical drawings during his formative years in Rome. The drawings were apparently made around 1618 from dissections carried out at the Santo Spirito Hospital in Rome by an unknown anatomist.20 As with Eustachius’s work, Pietro Berrettini’s muscle drawings were not published until long after his death.

Pietro’s drawings were acquired by Sir William Hamilton, the archaeologist and diplomat who was British ambassador to the King of Naples. Hamilton presented the drawings as a gift to Dr. William Hunter (1718-83) and they were included in the anatomist’s bequest to the University of Glasgow. The anatomical drawings were used to prepare engravings first published in 1741, more than a century after they were made.

The title page with dissection in the 1788 edition in the Jefferson collection is different from the original edition of 1741. The later illustration combines elements of
the Vesalius title page with its classical architecture, and of the Eustachius title page with its small numbers of onlookers who wear classical garb. Of the four examples, the Pietro vignette has the clearest articulation of architecture and the most coherent organization of activities: one group of elders observes a dissection and another group of young students draw from a standing skeleton whose anatomy is being demonstrated by a teacher. For good measure a classical sculpture of a nude male figure is depicted in a posture similar to that of the skeleton. The scene was designed by Giuseppe Pirovani, and Antonio Fiori engraved the plate.

Frontispiece: Portrait of Antoni van Leeuwenhoek

ANTONI van LEEUWENHOEK
(1632-1723)
By Abraham de Blois (active 1679-1720) after painting by Johannes Verkolje the Elder (1650-93)

Engraving
Image size: 6 x 5 3/8 in.
Plate size: 7 x 5 5/8 in.
Page size: 7 7/8 x 6 in.

Signed below image: "J. Verkolje pinx." and "A. de Blois fec."
From Antoni van Leeuwenhoek, Arcana naturae detecta... (Delft: Henricum à Krooneveld, 1695), bound with Continuatio arcanorum naturae detectorum... (Delft: Henricum à Krooneveld, 1697)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+e.Pr.15

Another frequent choice of illustration for title pages and frontispieces is a portrait of the author, sometimes accompanied by allegorical, mythological, or historical figures.

A startlingly individualistic portrait is found in the frontispiece of Antoni van Leeuwenhoek’s Arcana naturae detecta and Continuatio arcanorum naturae detectorum (two books bound together). The author is depicted bust length and set into a round, ornately carved frame. The scientist’s stout and fleshy face is crowned by a long, flowing, curly peruke. He looks out confidently above an inscription proudly noting his membership in the Royal Society of London.

The engraver is Abraham de Blois who worked in Delft and Amsterdam. The image is after an original painting of 1686 by Johannes Verkolje the Elder (Rijksmuseum, Amsterdam). Verkolje was a Dutch painter and engraver who settled in Delft in 1672 and served several times as dean of the artists’ guild there between 1678 and 1688.

Van Leeuwenhoek never attended a university and spent his career as a civil servant in Delft. His scientific life
did not begin until his late thirties when he constructed his first simple microscopes or magnifying glasses. He ground most of the lenses himself for his collection of almost 250 microscopes.

Relatively isolated from academic circles, the Dutch naturalist avoided speculation and concentrated on direct observation. He devoted his time to the microscopic investigation of organic and inorganic structures and recognized the true nature of microorganisms. He was the first to describe spermatozoa and the first to see protozoa under the microscope; he gave the first complete account of red blood corpuscles; he discovered the striped character of voluntary muscles, and the structure of the crystalline lens. His thorough work confirmed Marcello Malpighi’s discovery of the capillary circulation of the blood through the arteries and veins.

Many of van Leeuwenhoek’s discoveries were published in the Philosophical Transactions of the Royal Society of London, and he was elected a fellow of that prestigious group in 1680. He was awarded a silver medal from the Louvain College of Professors, and received a pension from the city of Delft which made him special awards upon the publication of his books.

Frontispiece:
Portrait of Giovanni Battista Morgagni

GIOVANNI BATTISTA MORGAGNI
(1682-1771)
By R. Blokhuysem

Engraving, etching
Image size: 9 1/8 x 6 1/2 in.
Plate size: 9 3/8 x 6 7/8 in.
Page size: 9 7/8 x 7 3/4 in.

Signed lower left below image: “R. Blokhuisen Fec.”

From Giovanni Battista Morgagni, Adversaria anatomica prima (Lyons: Johannem Arnoldum Langerak, 1718)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+e.Pr.19

Giovanni Battista Morgagni’s Adversaria anatomica prima features a frontispiece created by R. Blokhuysem with a double portrait and an allegorical figure.

The format is two circular framed images in an architectural setting.
Above is a profile portrait of Morgagni wearing a periwig and fur-collared academic gown. The inscription names him "the primary anatomist of Patavium" (now Padua), and states that the subject was aged thirty-six at the time of the portrait.

Below is the full length figure of Morgagni dressed as above, leading an allegorical female figure holding a knife. They are preceded by an angel with a bone and a book. The physician literally points the way down the path, and the inscription overhead says, "I am first in the country."

Morgagni was an Italian physician who took degrees in medicine and philosophy at the University of Bologna in 1701. He was admitted to the Accademia degli Inquieti in 1699 and became its head in 1704, paving the way for its incorporation into the Istituto delle Scienze in 1714. The modestly titled Adversaria anatomica prima (translated as "notes" or "memorandum" on anatomy) includes several new anatomical discoveries including the glands of the trachea, the male urethra, and the female genitals.

Morgagni assumed the second chair of theoretical medicine at the University of Padua in 1711, and then the first chair of anatomy in 1715, holding the latter post until his death. Recognizing the connection between external signs of diseases and anatomical changes, Morgagni is regarded as the founder of pathological anatomy. He described aortic insufficiency, mitral stenosis, and angina pectoris, and gave a classic description of heart block. At age eighty in 1761 he published his life's work De sedibus et causis morborum, five books concerning the seat and causes of disease anatomically studied.
The title page in Aldrovandi’s *Ornithologiae* (1599) combines the author with historical personages, in three separate vignettes in an architectural setting.

The central scene below shows Aldrovandi in an academic gown kneeling at the feet of Pope Clement VIII and presenting him with a copy of his book, as cardinals look on approvingly. Ancient intellectual predecessors are Aristotle presenting a scroll to Alexander the Great on the left, and Pliny presenting his scroll to Emperor Vespasian on the right. Crowning the scene is a group of putti supporting a coat of arms.

Ulyssis Aldrovandi (1522/24-1605/07) was an Italian physician and naturalist. He received his medical degree at the University of Bologna in 1553 and became professor and chair of the field called natural sciences today, including plants, animals, and minerals. He established a botanical garden and prepared an official pharmacopoeia. Aldrovandi bequeathed to the city his museum, library, and manuscripts of his unpublished works. His complete works on animals were published in thirteen volumes between 1599 and 1648.
The frontispiece of Marcello Malpighi’s *Opera omnia* is a unified but complex scene set in a lush garden and populated by allegorical and mythological figures.

At the center is a Muse-like figure who is dressed in a robe and crown and holds a caduceus. This goddess of creative inspiration is seated at a table sketching or writing in a book. At her side is a sphinx, the repository of arcane wisdom.

Pointing to the author is Apollo, a semidraped figure wearing laurel leaves and carrying his lyre. A sun radiates behind his head. He is the embodiment of the rational side of man’s nature and the patron of the Muses. Several female figures offer up cornucopias of fruits and vegetables to the author. Below a satyr and a river god complete the mythological cast of characters.

Adriaen Schonebeek, the designer and engraver of the scene, was born in Amsterdam about 1658. He was invited to Russia by Czar Peter I and became head of the Engraving Chamber in Moscow. He died in Russia in 1714.

Marcello Malpighi (1628-94) was an Italian physician and naturalist who was considered the founder of histology. He graduated in medicine and philosophy from the University of Bologna in 1653. He taught at universities in Pisa and Messina before returning to teach practical medicine at Bologna in 1666. In 1691 he accepted the appointment as personal physician to Pope Innocent XII.

Malpighi was the first to apply the newly invented microscope to anatomical research, and his early great observations were describing the structure of the pulmonary parenchyma and the importance of capillaries in circulation of the blood. He was famed in biology for his work on the anatomy of the silkworm, the morphology of plants, and the embryology of the chick, and in medicine for the histology and physiology of the glands and viscera, and the sensory receptors of the tongue.
Many practical treatises on health and hygiene were based on ancient and medieval beliefs. The *Regimen sanitatis Salernitanum* was the most popular medical book in Europe for many centuries after it was written about the year 1100.21

Tradition says it was ordered by Robert, Duke of Normandy, a Crusader who stopped at the medical school of Salerno to have an ulcerous wound treated. Arising from a Benedictine monastery, this medical school and hospital had been founded in the Middle Ages, and propounded the ideas of ancient authorities such as Hippocrates and Galen. The early faculty consisted of Christian, Moslem, and Jewish scholars working harmoniously together.

The small treatise went through an extraordinary number of manuscript copies, and after the invention of printing almost three hundred other editions in numerous translations. The first printed edition was made in 1480, and the copy in the Jefferson library dates from 1559. The original text was a didactic poem written in Latin hexameter verse about the general principles and some practical rules of health and hygiene. The lack of one dominant style points to the work of many authors.

The *Regimen* taught that the constitutive elements of the human body were earth, water, air, and fire, closely corresponding to the four humors: melancholy, phlegm, blood, and cholera, respectively. Good health resulted from a balance and equilibrium of the humors, and bad health was the result of a disturbed equilibrium. By means of a proper diet, rest, medicinal herbs, phlebotomy, and a cheerful disposition, equilibrium and good health could be regained.

Arnold of Villanova (1235/40-1311/12) was a Spanish
scholar of medicine, philosophy, physics, astrology, alchemy, and Greek and Arabic. He served Peter III, Alfonso III, and James II as a diplomat for the state of Aragon. He taught and practiced medicine in Montpellier and elsewhere, and is credited with the introduction of tinctures into the pharmacopeia. Arnold’s commentary of corrections and amendments to the Regimen, written about 1290 to 1300 when he was professor of medicine in Montpellier, appears in the edition of 1480 and in the Jefferson copy.

A woodcut illustrating the phlegmatic temperament is found in the section on humors and temperaments. The drawing shows three women gesticulating and arguing among themselves, presumably over the humor of the man lolling under the billowy bedcovers. Relevant verses in an English edition published in 1575 explain the characteristics of the phlegmatic person:

The Flegmatique are most of no great growth,
Inclining to be rather fat and square,
Given much unto their ease, to rest and sloth,
Content in knowledge to take little share,
To put themselves to any paine most loth.
So dead their spirits, so dull their senses are:
Still either sitting, like to folk that dreame,
Or else still spitting, to avoid the flegme:
One qualitie doth yet these harmes repaire,
That for the most part Flegmatique are faire. 22

Hieronymus Mercurialis’s treatise, De arte gymnastica, was the first illustrated work on the fundamentals of medical gymnastics, and was based on the writings of classical authors. Physicians going back to Hippocrates recommended conservative prophylactic methods such as medical gymnastics as beneficial to health.

Hieronymus Mercurialis (1530-1606) was a humanist scholar, translator, and physician who served the papal court in Rome. He also wrote the first systematic treatise on skin diseases, and was among the first to...
publish on diseases of children and on mania.

The woodcut illustrations scattered throughout *De arte gymnastica* depict male (and a few female) figures engaged in strenuous activities: bathing, wrestling, boxing, hurling the discus and javelin, swinging, dancing, playing ball games, running and leaping, lifting weights, and climbing ropes. Some of the scenes have architectural backgrounds.

This illustration of rope climbers is a close-up view of three male figures clad in loincloths hoisting themselves up ropes that are weighted to the ground. The curly-haired athletes display overdeveloped muscles and large heads. In the background are two figures labeled “rope dancers,” negotiating a tight rope with the aid of long balance poles.

**Birthing Scenes and Midwifery**

The occupation of midwifery has existed since ancient times but its reputation has waxed and waned over the centuries. In antiquity childbirth was supervised by midwives whose knowledge and personal character were considered relatively high. Training for midwives was instituted by Hippocrates in the fifth century B.C. In the second century A.D., under Roman domination, Soranus of Ephesos wrote the first treatise on obstetrics, and this work remained the standard for over a millennium. Artifacts show that midwifery was also a recognized female occupation in ancient Egypt, India, and China.

The famous medieval medical schools were silent on midwifery because physicians were excluded from the practice by custom, modesty, and orders of the church. The practice of midwifery sank to the status of a handcraft and fell into unskilled hands, just competent enough to assist a normal birth.

The pregnant woman was then viewed as the bearer of a new life that must be baptized so that the new soul could enter the Christian community. During unsuccessful births the church ordered Caesarian section so that the child’s soul could be saved by baptism, but many midwives balked at the difficult procedure. They fell into greater disrepute and were sometimes considered witches in league with Satan to kill the “fruit,” so that the innocent babe would be robbed of the sacrament.

The first modern manual for midwives, *Der swangern Frawen und Hebammen Rosegarten*, was written by Eucharius Roesslin (died 1526) in 1513 at the behest of the Duchess of Brunswick. Basically a synopsis of earlier writings, especially Soranus, the manual was translated into many foreign languages and was a best-seller for two hundred years.

Conditions changed for the better in the beginning of the sixteenth century when anatomical research began to be conducted, and anatomists and barber-surgeons such as Ambroise Paré rediscovered the ancient use of the “foothold” for difficult deliveries. At the same time some wellborn ladies took up the profession of midwifery, and the birthing chair was gradually abandoned for the labor bed so that the birthing procedure was exposed to view. In the seventeenth century male midwives became the fashion, surgeons known as accoucheurs also gave obstetrical aid, and governmental regulation of midwives became increasingly widespread in western Europe. In the early eighteenth century academic courses of instruction for midwives were instituted at many European medical schools or hospitals. Midwifery has always existed in the United States, and is in particular resurgence today.
The Birth of Antichrist

THE BIRTH OF ANTICHRIST
By unknown artist

Woodcut
Image size: 7 1/2 x 5 in.
Page size: 10 3/4 x 7 1/2 in.

From Seelenwurzgarten (Ulm: Conrad Dinckmut, 1483)
Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+c.Pr.01

The Birth of Antichrist is the oldest book illustration in the Jefferson collection. Though this image of a Caesarian section delivery was probably mistaken by Dr. Pas- cal B. Bland for an illustration from a medical treatise, it is actually a page removed from a German religious tract of 1483, the Seelenwurzgarten ("Souls' Herb Garden"). The rare woodcut is one of the oldest images of Caesarian birth in all of medical art.

There are various etymological explanations for the legend of Julius Caesar's birth by Caesarian section, but scholars today almost uniformly deny that he was born by this process, and the term itself was not used until the end of the sixteenth century. In ancient times abdominal delivery was practiced only on dead or dying parturients and it is known that Caesar's mother survived his birth by many years. When Caesarian section began to be performed on living women in the late sixteenth or early seventeenth century, doctors attended the patients.

The earliest images of the birth of Antichrist by Caesarian section appeared in Germany at the end of the fifteenth century. Antichrist, the enemy of Christ, was believed to take the form of a human being in whom Satan dwelt bodily. Legends vary, but most say that Antichrist was born by Caesarian section of a defiled woman, and some say through incest.

In the woodcut illustration the birth takes place in a small bedchamber. A view out the window shows a palm tree. The mother lies motionless with her eyes closed and her head propped up on pillows. She is undressed except for a headdress. A midwife holds her left arm and draws the bedcovers back, while an attendant lifts the baby by the shoulders out of a slit in the mother's abdomen. In the accompanying text the mother is condemned in harsh terms and her death in childbirth may be seen as punishment for her sins.

The Seelenwurzgarten image of the birth of Antichrist by Caesarian section is an example of the more "obstetrical" version of the procedure. Another type is the "Satanic" version in which devils stand ready to receive the Antichrist at the moment of his birth. Sometimes an angel receives the mother's soul, a tiny figure emerging from her mouth, indicating that she will be saved and was a victim of incest. The mother is usually shown clothed and the Antichrist is pulled out through a cut in her garment over the Caesarian incision.
The Story of Hercules’s Birth

THE STORY OF HERCULES’S BIRTH
By unknown artist
Woodcut
Image size: 3 3/4 x 6 3/8 in.
Page size: 12 x 8 1/2 in.

From Publius Ovidius Naso [Ovid], P. Ovidii metamorphosis...
(Venice: Leonardo Lauredano, 1517)
Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+e.Pr.20

In early images of vaginal birth, it can be seen that modesty was so deep-rooted that not even the midwives could see the actual birth. Illustrations of delivering women show them dressed in full-length skirts seated on the birthing chair. The midwife conducts the delivery by reaching under the folds of the mother’s skirts.

The Story of Hercules’s Birth is an illustration from the Metamorphoses of Ovid (43 B.C.-17/18 A.D.), in an edition published in Venice in 1517. The Roman author’s collection of Greek and Roman stories involving changes of shape is a storehouse of mythology that has inspired poets, dramatists, painters, and sculptors ever since.

The birth of Hercules occurs in book nine of Metamorphoses and features an array of contentious characters. Hercules was the son of a mortal woman, Alcmena, fathered by Jupiter during the absence of Alcmena’s husband Amphitryon. This act aroused the jealousy of Juno, sister and wife of Jupiter and the special protectress of women, who particularly watched over marriage and childbirth. Lucina was a minor deity who made the child see the light of day.

In the illustration Alcmena is identified as the woman seated on the birthing chair, with a midwife reaching under her skirt and assistants offering comfort and prayer. Others identified by name are Lucina who sits on a platform and Juno who peers through the window. On the table are a knife, pitcher, glass, and basin. Other participants in the crowded room prepare the feast and the canopied bed. A cat eyes a mouse in the center foreground and another strolls by the Lucina figure.

Part of the accompanying verse explains the complicated, behind-the-scenes narrative. Alcmena says,

May the gods favor you, and shorten your labor
When the time comes to call on Ilithyia,
Helper of travail, and no friend of mine
Since Juno was my enemy. I remember
When my son’s birth was near, the weight in the womb
So heavy anyone would know the father
Must have been Jove, and even in speaking of it
Today, I feel once more the pangs of labor.
Seven days, seven nights, I suffered, sick and weary,
Raised arms to Heaven, crying for Lucina,
With her two goddess-midwives, to come help me,
And she did come, but with a mind corrupted
By Juno’s hate. She heard my groans, and watched me;
Sitting there by that altar near the doorway,
She crossed her knees, and laced her hands together, 
And spoke constricting charms, I pushed and struggled, 
Cursed Jove's ingratitude, wanted to die, 
Screamed so that even stones were moved to pity, 
And other mothers came to try to help me, 
Prayed, urged me to keep trying. One of them, 
Galanthis, yellow-haired, one of my servants, 
A good devoted girl (I loved her for it) 
Saw there was something wrong, and knew that Juno 
Was working mischief. In and out the doorway 
Galanthis went and came, and saw the goddess 
Sitting there on the altar, the crossed knees, 
The hands laced tight together, and she spoke:

"Whoever you are, congratulate my lady! 
Her son is born, her prayer is heard." The goddess 
Leaped up, at that, and loosed her hands, and I 
Was likewise loosed of my burden, and Galanthis 
Broke out in laughter, but the angry goddess 
Grabbed her, still laughing, yanked her by the hair, 
Made forelegs of her arms, and would not let her 
Rise from the ground. She kept her golden color 
Though now in different shape, the little weasel 
Who haunts my house, still busy in devotion, 
And, so the story goes, since her mouth helped me 
Give birth by telling lies, through her own mouth 
Her young are born.27

Childbirth

By Jost Amman (1539-91)

Woodcut
Image size: 5 x 4 1/4 in.
Page size: 7 5/8 x 5 5/8 in.

From Jakob Rueff, De conceptu et generatione hominis... (Frankfurt: Sigismundi Feyerabendius, 1587)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940.01.e.Pr.21

The woodcuts illustrating Jakob Rueff’s De conceptu et generatione hominis (1587) are the work of Jost Amman. The first edition of Rueff’s famous manual on obstetrical practices was published in 1554 and contained illustrations by a different artist.

Jakob Rueff (ca. 1500-58) was the city physician and professor of medicine at the University of Zurich. Jost Amman (1539-91), a native of Zurich, was a prolific illustrator of medical and other books, primarily for publishing houses in Nuremberg and Frankfurt.

The actual birthing process depicted in Childbirth is typical of sixteenth-century images of this subject. A fully dressed mother grips the sides of her
Moments Following Childbirth

In Jost Amman’s drawing of Moments Following Childbirth in Jakob Rueff’s De conceptu, the new mother lies propped up in a canopied bed as two servants bring her food and drink. In the foreground one attendant bathes the newborn baby in a metal tub and another waits to receive the baby with a towel. Nearby an older child squeezes a doll and rocks the cradle. The domestic scene also includes a dog scampering across the floor with a bone, and revelers at a table enjoying a meal. In the rear room another servant is seen stirring a pot in the smoking fireplace.

An unusual element in this depiction is the addition of two astrologers gazing out the window with their backs to the scene. They are studying the moon and stars in preparation for plotting the newborn’s horoscope. During the Renaissance, even men of science took astrology into account.
Moments Following Childbirth

MOMENTS FOLLOWING CHILDBIRTH
By Johann Stridbeck (active late seventeenth-early eighteenth century)
Engraving, etching, stipple Ca. 1700
Image size: 7 1/4 x 5 1/2 in.
Page size: 7 5/8 x 5 3/4 in.
Signed below image lower left: “I. Stridbeck fec: Argent:”
Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+e.Pr.02

Moments Following Childbirth is an engraved illustration from an unidentified, German medical or religious book, or perhaps from an aristocratic Hausbuch (housekeeping book). A print dealer's note attached to the sheet identifies the work as a German engraving of about 1700.

The work is signed “I. Stridbeck fec: Argent:” and his monogram, “I S,” can be seen on the footboard of the cradle and on the crest of the chest of drawers. If the date of 1700 is
correct, the artist could either be Johann Stridbeck I (1641-1716), a German designer and engraver, or his son and pupil, Johann Stridbeck II (1665-1714).

Judging from the sumptuous contemporary costumes, jewelry, and furniture, this image with its consecutive scenes depicts the home of a patrician family. In the foreground the mother is still seated on her birthing chair grasping the handholds. The chair’s rounded back and pleated skirt resemble the chair illustrated in Rueff’s *De conceptu*. She looks eagerly toward a servant who brings her nourishment. The midwife is about to hand the newborn baby to an assistant who will bathe it. A wooden tub of water rests on a low, carved table.

A large, round table with embroidered cloth is laden with various hooked instruments and scissors, a bowl, and cups. In the middle ground the baby has been swathed in blankets and lies in its cradle. The headboard of the cradle is carved with an angel. In the background the mother rests in her canopied bed and converses with her bewigged husband who is seated in a chair.

Of special interest are the religious symbols in this otherwise conventional, domestic setting. The new mother and two of her caretakers wear necklaces with crosses. Framed pictures on the wall clearly depict scenes of the Visitation and the Temptation. The Temptation had been included in some earlier sixteenth-century obstetrical books including Rueff’s *De conceptu*, which showed an image of Adam and Eve with the tree of knowledge represented as a skeleton. This picture occurs at the beginning of Rueff’s treatise, suggesting deep, Christian, moralistic connotations.

The Visitation is a joyful event in which the youthful Mary who had just conceived, embraces her elderly cousin Elizabeth who had become pregnant after a lifetime of barrenness. In the Temptation Adam and Eve flank the tree of knowledge of good and evil in the Garden of Eden. Eve was persuaded by the serpent to eat of the fruit of the forbidden tree, and having offered it to Adam, they received sexual knowledge and covered themselves. After the Temptation and the Expulsion from Paradise, it was decreed that Adam should earn his bread by the sweat of his brow and Eve should endure painful childbearing and subjection to man. Therefore, conception and childbirth can be associated with seduction, the Fall of Man, and suffering and death during childbirth, due to Eve’s curiosity and disobedience.^[28]

**Anatomy**

During the Renaissance anatomical research resulted in a new understanding of the structure of the human body. Scientists formed partnerships with artists to publish anatomical atlases based on their direct observations and shared concern for conveying their knowledge. The collaboration was mutually beneficial: the anatomist-surgeon who wrote the text did not have the graphic skills to record his findings accurately or artistically; the artist chosen to provide the illustrations did not himself have sufficient training in dissection or understanding of the various anatomical elements and systems. Art scholars have shown that the anatomical illustrations reflected the conventions of contemporary style and iconography.

The following selections do not attempt an exhaustive survey of anatomical illustration, but rather are highlights from the Jefferson library’s extensive collection which includes landmark books from most of the important European medical centers dating from the Renaissance period. It is beyond the scope of this book to critique the accuracy of the texts and illustrations.^[29]
The Bolognese surgeon and anatomist Jacopo Berengario da Carpi (ca. 1460-ca. 1530) was a pioneer in anatomical illustration. His books contained the first illustrations made from nature, rather than from books or descriptions. Berengario earned his degree at the medical school in Bologna in 1489. He also received training from his father, a surgeon in Carpi, and Aldo Manuzio, a Venetian humanist, printer, and publisher. Berengario taught surgery first in Pavia, and then in Bologna from 1502 to 1527.

His Commentaria cum amplissimis additionibus super anatomia Mundini (1521) was a discussion and commentary on Mondino’s dissecting manual, and his Isagogae breves (1522) was a digest of the first book. Both were written to accompany an actual dissection. His knowledge came from dissections of hundreds of cadavers and the study of classical, Arabic, and medieval sources, providing him with the means to declare independence from the authority of Galen and Mondino. Though replete with errors, Berengario’s books advanced contemporary anatomy and exerted some influence on Vesalius, Estienne, Eustachius, and other anatomists who followed. Berengario pointed out that his illustrations of “muscle men” would be useful for both surgeons and artists.

His works further developed certain pictorial conventions of anatomical illustration: heroically muscled écorchés (flayed figures) drawn like living men posing in a landscape, muscle men who pull away flaps of skin, skeletons who display themselves in front of their own tombs, exuberant female figures displaying their reproductive organs, and multiple views of the same anatomical part.

The skeleton in this illustration is seen from the rear, standing with his weight on the right foot and the other foot extended. He has risen from his open tomb, and each hand displays his skull seen from a different angle.
Albrecht Dürer of Nuremberg was both an exemplar of the northern artistic tradition and the first German artist to embrace the Renaissance humanism of Italy. He is probably better known today for his prodigious graphic output and scientific treatises than for his painting.

Dürer learned the art of goldsmithing from his father and studied painting, woodcutting, and copper engraving in the atelier of Michael Wolgemut. As was customary with apprentices in the artist’s guild he went on his Wanderjahre from 1490 to 1494 traveling throughout Germany. He read about the artistic and philosophical rediscoveries of the Italian Renaissance, and travelled to Venice in 1494. He began a serious study of mathematics and art theory from ancient sources as well as from contemporaries such as Leonardo and Alberti. He visited Italy again from 1505 to 1507.

Among Dürer’s panel paintings and altarpieces were portraits and religious and mythological scenes. He also participated in many decorative undertakings while working as court artist for Emperor Maximilian I. He completed many woodcut cycles on religious subjects such as the Apocalypse, Passion, Life of the Virgin, and an allegorical subject, Ship of Fools. Among his most popular single-sheet engravings were the Prodigal Son, Adam and Eve, Knight, Death and the Devil, St. Jerome in his Study, and Melencolia. His silverpoint drawings of landscape and architectural views date from a trip to the Netherlands in 1520-21.

Dürer wrote three technical books: Underweysung der Messung mit dem Zirckel und Richtscheyt (1525), a treatise on linear and solid geometry, astronomy, and typography; Befestigungslehre (1527), a treatise on fortifications and architecture; and Vier Bücher von menschlicher Propor- tion (1528), a treatise of four books on the proportions of human beings. The latter was published posthumously.
by his widow, but the artist had only corrected and revised the first book before his death.

Dürer used the height of the human body as the basic unit of measurement and subdivided it linearly to construct a unified artistic plan both of the figure and of the figure moving in space. His tabulation of proportions was based partly on his own observations and partly on the canons of the Italian theorists, especially Leonardo. Dürer’s work allowed for modifications, and he held that an artist is free to select his own canon. Because he eventually developed multiple canons for different body types, “Dürer himself acknowledged that his studies were basically scientific in nature and of little practical value for the artist.”

The Jefferson edition of Dürer’s book on symmetry and proportion was published in 1532 and contains the first two of the original four books. This illustration shows a female figure seen from the front and the side. The artist has indicated the distance between individual parts and between sections of the body. The length of the head is approximately one-seventh of the total height of the female body.

Muscle Man

MUSCLE MAN
By unknown artist
Woodcut
Image size: 10 5/8 x 7 in.
Page Size: 15 3/8 x 10 in.

From Charles Estienne, De dissectione partium corporis humani libri tres... (Paris: Simonem Colinaeum, 1545)

Given in 1940 by bequest of Pascal Brooke Bland, M.D. who had received it from Arno C. Voigt, M.D. (JMC 1901)
Accession number: 1940+c.Pr.11

Although Charles Estienne’s De dissectione partium corporis humani libri tres was published in 1545, two years after Vesalius’s Fabrica, its preparation dated back to 1550. Therefore, Estienne’s innovative work should be considered another pre-Vesalian effort to
use drawings effectively as illustrations of the text. However, it will be seen that Estienne’s work lacks the intellectual and artistic coherence of Vesalius.

Charles Estienne (1504/05-64) was a member of a famous Parisian family of printers and publishers. He studied classical literature at the University of Padua and became interested in botany, horticulture, and medicine while in Italy (1530-34). Upon his return to Paris he took extracurricular courses in medicine and anatomy at the Collège de Tréguier. In the mid-1530s he published several treatises on natural science, as well as a short *Anatomia* (1536) of which no copies survive.

Estienne received his medical degree from the Faculté de Médecine in Paris in 1542, and taught anatomy there from 1544 to 1547. During this period his *De dissectione* manual was published, and a few years later a treatise on diet and classification of foods. He then gave up medicine to manage the family printing business. Though many books were successful, Estienne was a poor businessman, fell heavily in debt, and was accused of squandering his family’s inheritance. He died in prison where he had spent the last four years of his life.

The earliest woodcut of Estienne’s *De dissectione* is dated 1530, and the text was printed by 1539. However publication was delayed because of professional difficulties with his collaborator, the surgeon Estienne de la Riviere (Stephanus Riverius; died 1569), who had probably done some dissection and helped with the plates. The lawsuit was settled in favor of Estienne de la Riviere and the title page credits both men. The work was published by Simon de Colines, the firm of Charles Estienne’s stepfather, first in Latin (1545) and then in French (1546).

Although the text is still largely dependent on Galen and anatomical errors abound, Estienne is credited with many original anatomical observations. Among his innovative methods are the illustration of dissection in serial progression, description of the total human body (muscles, bones, organs, venous and arterial systems, nerves, glands, and joints), method of illustrating internal organs as cutout sections, directions for mounting a skeleton, setting the figures in a fully developed panoramic landscape, and a comprehensive index. 52

The book’s typography, paper, and presentation exemplify the high standards of sixteenth-century French publishing. The illustrations were once attributed to François (Jean) Jollat (active 1502-50) because his monogram occurs on three drawings, but it is unknown if he was involved with the remainder, or even if he was the designer or engraver. Furthermore, because the illustrations are of inconsistent quality and usefulness, ranging from elegant to crude, some scholars suggest the participation of more than one artist. The best illustrations are superb examples of French Mannerist style. 33

Book One depicts standing male figures in sequential degrees of dissection showing the muscle layers, nerves, and skeletons. The écorché muscle man shown here is a stiff and awkward figure with unconvincing proportions. He holds the handle of a stone tablet with an inscription describing the musculature. The figure stands in a rudimentary landscape next to a plinth with a broken column base. His head is literally in the schematically rendered clouds.
The nerve man skeleton of Book One shows the nerves emanating from a skeleton in a novel combination. The skeleton is shown from the front, displaying his mandible in his right hand. The distal portions of the nerves are decoratively coiled like curling ribbon. The jaunty figure is elevated on a hillock overlooking plants, a river with boats, a village on a hillside, and a cloud-filled sky. The skeleton’s stance and the display of his own body part recall the skeleton of Berengario.

The landscape element behind the skeleton nerve man is much more skillful and developed than that behind the muscle man. The Estienne illustrations show a considerable advance over both the anatomy and rudimentary outdoor settings of Berengario.
Pelvic Organs of the Female

PELVIC ORGANS OF THE FEMALE
By unknown artist
Woodcut
Image size: 10 3/4 x 6 7/8 in.
Page size: 15 3/8 x 10 in.
From Charles Estienne, De dissectione (as above)
Accession number: 1940+c.Pr.12

Book Two of Charles Estienne's De dissectione features series of successive dissections of the brain, the abdomen, and the neck. The depictions of men in contorted, almost writhing postures are typical of the Mannerist style. Book Three deals with the reproductive organs and contains a manual of practical anatomical procedures. Berengario's earlier illustration of a female figure on a chair with the skin pulled back to display her reproductive organs has been transformed by Estienne into a fanciful, almost erotic depiction of excess and suggestion in his illustration of the pelvic organs of the female. Scholars have shown that the exaggerated poses derive from an earlier series of prints called "The Loves of the Gods," engraved after drawings by the Mannerist artists Rosso Fiorentino (1494-1540) and Perino del Vaga (1500/01-47).34

In the example shown here the female anatomical figure braces herself with one extended leg, as she sprawls on a billowing mound of bedclothes. Her other leg is tucked under her body. Her turbaned head rests on pillows and her eyes are closed. The fancy French interior also includes the bed's canopy, a table, footstool, and tiled floor.

One notices the outline of a small square around the dissected female organs and their associated letters. These "plugs" appear in many of the female figures and some of the male figures, and were cut separately and then set into the main block for printing. It is not known if the plugs were intended originally for another publication, or less likely, were to be replaced later with more up-to-date dissections. In the figures with plugs the dissected areas of the illustration are relatively small and indistinct compared with the rest of the nude figure and elaborate settings, whether domestic interiors or outdoor landscapes.
The *De humani corporis fabrica* of Andreas Vesalius (1514-64) was published in Basle in 1543. It was organized into seven books and contained over 250 woodcut illustrations of superb quality. The figures’ astonishingly lifelike poses set into a naturalistic landscape with architectural elements lend the series a mysterious and dramatic narrative that goes beyond the objective depiction of the dissection. The book’s integrated collaboration between physician, designer, woodcutter, and printer/publisher has been a source of admiration and influence for four and one-half centuries.

The most famous figures are the three mourning skeletons of Book One and the fourteen flayed muscle men of Book Two. The illustrations of veins and arteries in Book Three include only two full-length figures. Book Four treats the brain and cerebellum, spinal nerves, and spinal cord; Book Five the abdominal cavity, viscera, and reproductive organs; Book Six the thoracic cavity, heart, and lungs; and Book Seven the cranium, olfactory organs, and eye.
Vesalius provided each illustration with a legend called the index of characters denoting the various structures exposed. In some cases Vesalius made new discoveries and corrected in the text errors that appeared in the illustrations. His last addition was a system of cross references that further integrated the text with the illustrations.

The second edition of *Fabrica* was published in 1555 and was even more sumptuous with larger type and heavier paper. Redundancies in the text were removed and some corrections made. The most valuable addition was an extension of Vesalius’s physiological experiments.

There is no doubt about the illustrators of Vesalius’s prior anatomical work of 1538, *Tabulae sex*: three by Vesalius himself and three by Jan Stephan van Calcar, and it is known that the artist paid for the publication. However, attribution of the designer of *Fabrica*’s illustrations has never been satisfactorily settled, though Calcar has been most consistently named. Some scholars have attributed the work to Titian (1488-90-1576), the great Venetian artist and Calcar’s teacher, and others see the hand of more than one unidentified artist involved. A final issue is the belief of many scholars that the landscape panoramas were drawn by a different artist than the figures: probably Domenico Campagnola (ca.1500-64), a landscape draftsman thought to have been in Titian’s studio.

The three skeleton figures in Book One are dynamic and limber, unlike the previous representations of static, articulated skeletons. Vesalius was the first to join the bones together artificially, strung like beads on long wires bent to set the skeleton in the desired attitude.

Though reduced to bone with no overlying structure, the skeleton men still can retain an upright pose. The first figure is in an anterior view, represented as a grave digger resting the weight of his body on his spade. The second skeleton is turned profile to the right. He stands cross legged with hands placed on a skull on top of a plinth, a vignette often compared to Hamlet soliloquizing on the skull of Yorick.

The third skeleton, shown here in a posterior aspect, is bent over at the waist. His head rests on wringing hands as though mourning or weeping. He overlooks a simple but symbolic landscape: two gnarled trees cut off bluntly at the trunk, with a few slender limbs trying to survive.

Though Vesalius’s plates show some errors of proportion, his skeleton figures are extremely advanced in both science and artistry compared with the full-length skeleton of Berengario da Carpi, produced only twenty years earlier.
Book Two contains a total of fourteen muscle men in two series. The first series has eight figures all in the anterior aspect except the second. Figures in the other series of six are in the posterior aspect. With minor exceptions both series show a continuous progression of dissection from superficial to deeper structures, revealed by the removal of overlaying tissues.

In four plates of Book One the deep fascia is cut away to reveal the superficial arrangement of muscles to physicians. In the text accompanying the first plate, Vesalius commented that these plates “display a total view of the scheme of muscles such as only painters and sculptors are wont to consider.” Most of the muscle men are shown in motion to illustrate the function of the muscles and help to clarify the relationships of parts.

In the seventh plate of muscles in the first series, shown here, the cadaver has been eviscerated and the collapsed figure is displayed with his head pulled back by a noose to better show the deep muscles of...
the neck. His legs are still somewhat self-supporting. His diaphragm hangs on the adjacent wall (as though this imaginary architectural element were really there). This position effectively shows where the diaphragm is pierced by the vena cava, aorta, and esophagus. The figure’s arms are outstretched with flaps of skin hanging down.

Vesalius described his procedure of preparing the muscle men using ropes and pulleys:

Usually when administering the dissection of a man, I draw a strong chord under the lower jaw and through each jugal bone to the vertex of the head, confined as by a noose, and either more toward the forehead or the occiput according as I had it in mind to suspend the cadaver either with the head erect or depressed. I placed the longer end of the noose across a pulley fixed to a beam of the room, and by that I drew the suspended corpse now higher now lower, taking care that it might be turned in every direction according to the requirement of the task.

Ninth Plate of Muscles

MUSCLE MAN
Attributed to Jan Stephan van Calcar

Woodcut
Image size: 13 1/2 x 8 in.
Page size: 16 x 11 in.
From Andreas Vesalius, Fabrica (as above)
Accession number: 1977-e.Pr.06

All six figures in the second series of Book Two stand without support. The écorché figure in the ninth plate of muscles, shown here, is the first illustration of the second series and the first muscle man shown from a posterior aspect. The fleshy membrane has been dissected as in plates one and two. The transverse ligaments of the forearm are dissected as in plate three, because they had already been clearly shown in the first and second plates.

The figure appears to be strolling and gesturing through a naturalistic landscape that has been extended to show a winding river and buildings clinging to the rolling hillside of a nearby village. Additional landscape elements in other plates in this series include Roman ruins and obelisks.

Compared with Estienne’s stiff and flattened écorché set in a rudimentary landscape, Vesalius’s figure is strong, confident, and dynamic and seems at one with the picturesque landscape. Vesalius’s compositions are dramatic and the figures graceful, and he never resorted to interior domestic settings like the cluttered and overstuffed interiors of Estienne.

Scholars have long noted that the landscape backgrounds of the muscle men in Book Two can...
be joined to form two continuous panoramic friezes in the eight figures of the first series and the six figures of the second series. Yet to do this the figures have to be rearranged, roughly in reverse of the expected sequential order: with the most dissected figure first and the least dissected figure last, opposite to their order in the published *Fabrica*.

As a solution to this vexing problem it was recently hypothesized that the backgrounds were made in long drawings separately from the figures; the landscapes were cut into pieces and copied directly onto the plates of the individual figures by the woodcutter, without tracing them on the plates; and that they were, in fact, reversed images of the original drawings, due to the reversal in the printing process. When the plates are photographically reversed as mirror images, then the muscle men traverse the continuous landscape in the same order as the book itself, except that the first and second plates have been reordered. 39

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Muscle Man

**MUSCLE MAN**

Attributed to Gaspar Becerra  
(ca. 1520-70)

Engraving

Image size: 8 1/2 x 6 in.  
Page size: 11 x 7 1/2 in.

From Juan de Valverde, *La anatomia del corpo umano...* (Venice: Giunti, 1586)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.

Accession number: 1940+e.Pr.27

In the century after its publication, Vesalius's *Fabrica* remained the standard in illustrated anatomical texts. However, new requirements in format, costs, language, usage, and specific needs arose, and because it was considered prohibitive to start anew, many authors issued new books based on the Vesalius text and illustrations. Most authors acknowledged their debt to Vesalius, while a few actually plagiarized him. 40

In 1556, thirteen years after the publication of *Fabrica*, a new book on human
anatomy was published in Rome by the Spaniard Juan de Valverde de Amusco (1520/25-87/88). His Historia de la composición del cuerpo humano was smaller in size and length, less costly, and less scholarly than Vesalius's work, and was written in vernacular Spanish. If Valverde’s more succinct account was found wanting, then his readers were referred to the Fabrica, for he had retained the original Vesalian lettering.

The success of the Valverde book was due largely to the copperplate engravings most of which were derived from the original woodcuts in the Vesalius book. His book was translated into Italian, Latin, and Dutch and appeared in almost a dozen editions. Valverde made some significant corrections and additions to the Vesalius text, in particular the nature of the cardiac septum.

Valverde forthrightly acknowledged his debt to Vesalius,

Although it seemed to some of my friends that I should make new illustrations without using those of Vesalius, I did not do so, in order to avoid the confusion that could follow, not knowing clearly in what I agree or in what I disagree with him, and because his illustrations are so well done it would look like envy or malignity not to take advantage of them.41

Although Valverde praised Vesalius, the Italian pathfinder was resentful and critical, saying, “Valverde, who never put his hand to a dissection and is ignorant of medicine as well as of the primary disciples, undertook to expound our art in the Spanish language only for the sake of shameful profit.” Actually, Valverde had considerable education and success, though no medical degree.

He was born about 1525 in Palencia, Spain and graduated in humanities and philosophy from Valladolid University. He received anatomical training in Padua under Vesalius’s successor, Realdo Colombo, and became Colombo’s assistant in Pisa in 1544 and then in Rome in 1548. Valverde became personal physician to Cardinal Juan Alvarez de Toledo, the general inquisitor in Rome to whom he dedicated his anatomy text. Valverde taught anatomy at the hospital of Santo Spirito. His earlier book of hygiene, diet, and behavior, De animi et corporis sanitate tuenda libellus, was issued in 1552.

Most scholars agree that Valverde’s artist for the Anatomia was probably Gaspar Becerra (ca. 1520-70), a Spaniard. The book made numerous changes to the Vesalian images, although the “corrections” were not always accurate. Valverde’s text also used about fifteen illustrations that did not appear in Vesalius, though some appear to be composites derived from the original.

One composite image of an écorché is the illustration shown here. It is an anterior view of a muscle man regarding his own flayed skin which is raised to eye level with his right hand. The distorted image of his bearded face hangs down pathetically. The figure holds a dagger in his lowered left hand, although that instrument could not have been used in a dissection. His weight is on the front foot, and the back foot is poised on toes on a rock.

Gasparo Becerra was born in Baeza, Andalusia about 1520, and was a well known painter, sculptor, and architect. During a visit to Rome he studied under Michelangelo and assisted him at the Vatican. Becerra returned to Spain in 1556 and executed some frescoes for Philip II and became painter to the court in 1563. He was very interested in the study of anatomy and produced two anatomical statues. He died in Madrid in 1570.43

Scholars have noted that the source for Becerra’s image of the flayed man is the figure of St. Bartholomew in Michelangelo’s Last Judgment in the Sistine Chapel, unveiled in 1541. He is shown holding his skin in one hand and the instrument of his martyrdom, the curved knife, in his other hand. The features of the tortured face in the flayed skin are those of Michelangelo himself. Additional sources in classical mythology available to Becerra were images of Apollo flaying the satyr Marsyas and Hercules flaying the lion. Marsyas was a powerful symbol for artists, because he was flayed for daring to compete artistically with Apollo, a god.
Seventeenth-century anatomy illustration took the conventions of previous centuries to new and exaggerated heights, especially details of the figures' poses, hairstyle, action, and landscape. The illustrations in a publication of Adriaan van den Spieghel's complete works embody this new Baroque style: several of the coquettish female figures with elaborate and flowing hairdos are situated out-of-doors; a male figure is shown spread-eagled on his back grasping an improbably bent tree limb.

Adriaan van den Spieghel (1578-1625) was born in Belgium, the son and grandson of surgeons. He studied at the universities in Louvain and Leiden, and later at Padua under Girolamo Fabrici (1533/37-1619) and Giulio Casserio (1552/61-1616), both celebrated teachers of anatomy: Fabrici on embryology and comparative anatomy, and Casserio on the anatomy of the sense organs.
In 1606 Spieghel was appointed ordinary physician to the students at the Natio Germanica in Padua, and assisted Fabrici in his private practice. In 1612 he left Italy for Germany and was appointed medicus primarius of Bohemia. In December 1616 he succeeded his teachers as professor of anatomy at Padua, and by the following January had performed a public dissection in the famous anatomical theater at Padua erected by Fabrici. Spieghel was elected Knight of St. Mark in 1623, two years before his death.

Spieghel's most important manuscript, De humani corporis fabrica, was not published until 1627, two years after his death. In his will he had entrusted the editing of his book to Daniel Rindfleisch (known as Bucretius), a young physician and associate. Since Spieghel had not provided illustrations, Bucretius obtained seventy-seven copper-plates that Casserio had made and added twenty more. It is not known why Casserio had never issued the series of engravings on successive stages of dissection, although he worked on the project for almost two decades.

The fame and success of Spieghel's book were owing largely to these drawings. The authorship of the drawings is under some dispute, most scholars favoring an Italian artist, Odoardo Fialetti (1573-1638), but another ascribing the work to an unidentified northern artist perhaps familiar with engravings by Hendrik Goltzius (1558-1617). In any case, the techniques of both designer and engraver are quite distinctive and show a virtuosity and elegance of line not possible in the woodcut process.

The 1645 edition in Jefferson's collection is two volumes bound in one. In addition to the complete works of Spieghel it also includes works by others including Casserio and William Harvey.

The drawing shown here is one of the Casserio illustrations, and the dissection is unusual for not being along the midline. It features the superficial musculature of the left side of the neck, shoulder, and back, in particular the scapular region.

The partially flayed figure is shown in a twisted pose from the back. His right leg kneels on a flattened section of rock outcropping. Both arms are bent at the elbow, one twisted behind his back and the other over his head. The curving length of material held between his hands representing his flayed skin is depicted like folds of drapery. It serves to accentuate the extreme flexed action of the posture.

The muscle man rises up dramatically over a tranquil landscape. The figure and nearby rock and foliage are shaded from darks to lights, while the distant view of meandering river, village, and faraway mountains is pale. Vignettes of contemporary life on the river include men in a rowboat, sailboats, and ducks. Another rowboat is docked next to a flight of steps leading up to a church.

Whereas the energetic but dignified Vesalius écorché seen from the rear seems at one with the landscape, the Spieghel figure dominates the landscape and his athletic pose seems frivolous in comparison. In contrast to both, in Estienne's illustration of a flattened écorché holding a stone tablet, the stylized landscape elements appear almost like an afterthought.

**Skeleton**

**SKELETON**

By Jan Wandelaar (1690-1759)

Engraving

Plate size: 22 1/2 x 15 1/4 in.
Page size: 27 x 19 1/2 in.

Inscriptions below image: lower left, "J. Wandelaar ad ipsum Seletum delineavit et incidit" and lower right, "Prostat Leidae Batavorum apud J. et H. Verbeek, Bibliop. 1740"

From Bernhard Siegfried Albinus, Tabulae sceleti et musculorum corporis human (Leiden: Joannem & Hermannnum Verbeek, 1747)

Given in 1940 by bequest of Pascal Brooke Bland, M.D.
Accession number: 1940+c.Pr.30
With the publications of Bernard Siegfried Albinus, anatomical illustration reached new heights of scientific and artistic excellence not seen since Vesalius two centuries earlier. So as not to disturb the beauty of his anatomical figures in their lush backgrounds, Albinus provided outline diagrams of each skeleton and muscle man with references on the opposing page.

The professional and personal relationship between Albinus and his artist, Jan Wandelaar, was unusually close, and the artist even lived in Albinus’s house for the last twenty years of his life. In his preface to Tabulae sceleti et musculorum corporis humani Albinus spoke, perhaps with a touch of hubris, about their interdependence:
Bernhard Siegfried Albinus was born in 1697 at Frankfurt an der Oder where his father was a professor of medicine and physician to Elector Friedrich Wilhelm von Brandenburg. The family name, originally Weiss von Weissenlow, had been Latinized into Albinus by a great-grand-uncle.

When Albinus was age five his father was called to the University of Leiden to become professor of theoretical and practical medicine. The boy was considered a prodigy, and at age twelve began to study medicine at the university under Hermann Boerhaave (1668-1738) and the anatomists Govard Bidloo (1649-1713) and Johannes J. Rau (1660-1719). Leiden was then considered a world center for the study of medicine.

Albinus also studied anatomy and botany briefly in Paris before being recalled to Leiden to substitute for the ailing Rau. He received his medical degree in 1719 and two years later at age twenty-four was appointed professor of anatomy and surgery. He remained a resident of Leiden until his death in 1770.

Albinus's life was devoted to scholarship and he amassed a library of two thousand volumes of medical, literary, and philosophical works and a museum of specimens. In 1734 he issued a new edition of James Douglas's bibliography of anatomy. In connection with Boerhaave he edited a number of earlier medical writers including Eustachius, Fabrici, Harvey, and Vesalius and provided them with new engraved plates.

Around 1725 Albinus developed an ambitious plan to publish his own large scale engravings that would surpass any previous illustrations, including those of the celebrated authors he had edited. His methods were so painstaking that the first completed folio volume on muscles and the skeleton did not appear until 1747. Subsequent volumes comprised plates on the pregnant uterus (1748-51), bones (1753), and one plate on the thoracic duct, intercostal arteries, and azygous vein (1757). Projected series on the viscera and vessels never were completed. The whole endeavor was so enormous that in 1745 Albinus asked to be relieved of his main teaching duties. His youngest brother Frederick was appointed professor of anatomy and surgery in his place, while Bernhard became professor of medicine.

Albinus devised an innovative system that would dispense with inaccuracies he observed in other anatomists' drawings which progressed from skin to superficial muscles, to deeper muscles, down to the skeleton. He started with the skeleton as the fixed point of reference and then added the muscles, a plan recommended by Leon Battista Alberti and actually used by Eustachius. He compared the method with architects laying down a foundation.

Albinus strove for continuity among the figures, and in a long preface he described his techniques. In preparing the bones of the skeleton he encountered a problem with damage to cartilage and ligaments which no longer fit as before when rejoined. His solution was to prepare a fresh skeleton for this purpose leaving the ligaments, tendons, and cartilages attached. Since it took three months to prepare the skeleton, he prevented drying out and putrefaction by pouring water into the joints and sprinkling the whole with vinegar. With cords, weights, pulleys, and wedges he meticulously stood the skeleton in a position that was constantly compared with the pose of a thin model of the same size as the skeleton.

His “homo perfectus” was a fully grown male about age twenty-five, well proportioned and of middle stature, with signs of strength and suppleness. This “average man” which he regarded as perfect was computed from a large sample of cadavers. The ideal man was inherent to his natural philosophy that the “structure and function of human, animal, and vegetable individuals were determined by a vital force in accordance with invariable laws.” His ideas about a natural striving for perfection were applied to his goal of depicting the perfect man without distortion.

To ensure accurate, measured drawings of correct proportions, he devised a system of two grids made with small cords. The first one with larger squares was placed directly in front of the skeleton through which the artist could observe the whole figure through a peephole at a distance of forty Rhenish feet. To fill in details a second grid with squares one-tenth the size was positioned four Rhenish feet in front of the first...
grid. When the grids were lined up properly the artist could verify the accuracy of various parts by means of lines and intersections.

The figures were drawn first on large sheets of paper, squared to the same size as the grids directly in front of the skeleton. These drawings were reduced and refined into folio size sheets ruled with proportionately smaller squares. Etched plates for publication were made from the latter.

The atlas contained three skeletal plates and nine plates of muscles. The skeletons are shown standing in posterior and anterior views, and walking from a profile view. Having spent thirteen years illustrating the skeletal figures, Albinus then passed on to the muscle men. He said that he dissected the muscles carefully in order to observe their positions, connection, figure, thickness, and substance. He preserved muscle specimens in a “proper liquor” before adding them to the skeleton.48

The Dutch artist Jan Wandelaar was already experienced in anatomical illustration before joining with Albinus. He was a portrait and landscape painter and engraver who had studied with Jakob Folkema (1692-1767), Gérard de Lairesse (1640-1711), and Willem van der Gouwen. Wandelaar had done some scientific illustrations for the anatomists Friederich Ruysch (1638-1731) and Arent Cant (1695-1723) before moving from Amsterdam to near Leiden in 1723. After Wandelaar’s only son died in childhood, he went to live in Albinus’s house from about 1746. The productive collaboration between Albinus and Wandelaar ended with the artist’s death in 1759.

Wandelaar’s idea of “ornaments” of animals and architecture added into the landscape backgrounds were to fill up the empty spaces in the plates, and to create harmony of light and shade. He said that if an observer looks at the figures through a hollow hand (cupped), they appear to be stepping out of the picture and give the illusion of three dimensions. Albinus explained Wandelaar’s ideas further,

He maintained that...he would preserve the proper light of the pictures, for if the space around the picture and between the parts should be white, the light of the pictures would suffer. He said that this means would insure that nothing would be harsh. The ornaments in the pictures of the skeleton are lighter than in the pictures of the muscles, corresponding to the lightness of the skeleton, the solidity of the muscles—they are lighter directly around the pictures and more conspicuous in the more distant places, as expediency demands.49

Each of the twelve skeleton and muscle man plates were signed by Wandelaar as artist and engraver. There were a total of eighty plates in Tabulae sceleti et musculosorum corporis humani.

The anterior view of the skeleton is the first of three in outdoor settings. His arms are extended away from his body with a gesture that is almost welcoming. The foliage of trees and shrubbery, the river, and the river bank behind the figure are exquisitely rendered in delicate detail. Billowing drapery held by a tousled-hair, winged putto forms a circular cloud behind the skeleton. Perhaps the angelic infant will accompany the skeleton to his tomb, seen in the background of the next skeletal image.
The écorché illustrated here is one of three displaying the most superficial layer of muscles. Each has a different setting.

The figure seems to be meditating on the features of the lush landscape. Trees, rocks, brook, waterfalls, and cliffs envelop him closely with only one small opening at the top for a view of the clouds and distant mountains. Details of foliage and geology are as precisely rendered as the figure. Compared with the mannered, almost tortured figures which dominate the landscapes in Spieghel’s book, Albinus’s serene figures are more effectively integrated into their surroundings.

 accesses number: 1940+e.Pr.05
In the Fourth Order of Muscles the figure is dissected to the deepest muscular layer. The muscles that remain hold the bones together in the neck, upper rib cage, posterior abdominal cavity, and extremities. The figure is in scale to a rhinoceros which stands in front of a stone wall in the background. The presence of this creature seems like an exotic addition to modern eyes.

Actually, there was a substantial history of depictions of the rhinoceros ever since the
famous woodcut published in 1515 by Albrecht Dürer. The German artist had never seen a rhinoceros but based his drawing and woodcut on a sketch and description by a Portuguese artist who had sketched the animal from life. Numerous scientists subsequently published works with images of the rhinoceros based on the Dürer image.\textsuperscript{50}

However, Albinus and Wandelaar supposedly saw an actual specimen in Amsterdam in 1741, and Wandelaar drew this animal \textit{ad vivum}. The artist and physician “immediately proclaimed it to be a symbol of their atlas.”\textsuperscript{51} Drawing it reflected their fascination with recording unusual anatomical details. The rhinoceros appears in two plates of the fourth set of muscles.

Not since Vesalius two centuries earlier had any anatomy illustrations had such a profound influence on subsequent medical anatomical texts. Their appeal stems from Albinus’s quantitative exactitude and tenaciousness and Wandelaar’s ability to render the family of skeletal and écorché figures accurately and harmoniously integrated into an idealized private world. As expressions of the Enlightenment ideal of the perfect man Albinus’s illustrations served as inspiration to countless artists and physicians.
10. Keynes, 11-15, 32-34.
14. Cazort, Kornell, and Roberts, 105-06.
18. Saunders and O’Malley, 42.
28. This interpretation by K. B. Roberts is found in his article, "Illustrations in a Sixteenth-century Book on Obstetrics," *Canadian Bulletin of Medical History* 1 (winter 1964): 80-95.
30. Roberts and Tomlinson, 74-77.
32. Cazort, Kornell, and Roberts, 137-38.
33. Karp, 156; Roberts and Tomlinson, 170-71.
34. Karp, 156.
36. Mayor, 109-10.
37. Saunders and O’Malley, 92.
38. Saunders and O’Malley, 29.
40. Roberts and Tomlinson, 208-10.
41. Roberts and Tomlinson, 211.
42. Roberts and Tomlinson, 211.
44. See Karp, 165; Roberts and Tomlinson, 263; and Cazort, Kornell, and Roberts, 167-68.
48. Roberts and Tomlinson, 325.
49. Choulant, 280.
51. Punt, 53.