



Artistry, iconography, and idea in sixteenth-century pre-Vesalian anatomical illustrations

Gray Lyons

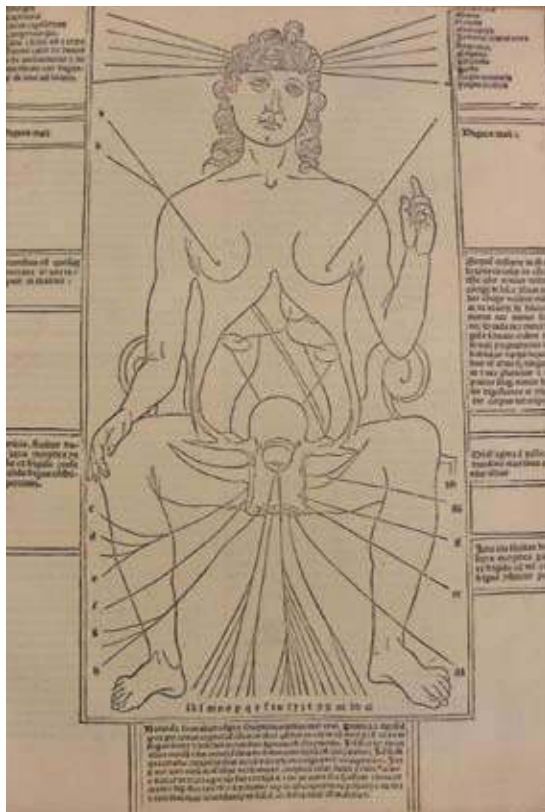
The author is a member of the Class of 2009 at Duke University School of Medicine. This essay won honorable mention in the 2006 Alpha Omega Alpha Helen H. Glaser Student Essay competition. All images are reprinted courtesy of the Duke University Medical Center Library, Trent Collection, History of Medicine Collections, and were photographed by the author with permission.

The natural science of anatomy and the development of a modern conception of the body coincided with the growth of art and ideas during the European Renaissance.^{1p22} The publication of accessible, accurate, and instructive anatomical illustrations directly precipitated the emergence of systematic anatomy based on empirical observation. The utility and precision of anatomical images developed rapidly during the early sixteenth century, culminating in the 1543 publication of the first truly empirical and modern anatomical text, Andreas Vesalius's *De humani corporis fabrica* (*On the fabric of the*

human body, commonly called the *Fabrica*).² These early anatomical illustrations from the half-century preceding Vesalius reflect the stylistic trends in the Renaissance art community and contain elements of iconography that reveal the spiritual and intellectual progression of the art.

Johannes Ketham

Perhaps the specimen most indicative of the status of anatomical knowledge entering the sixteenth century is the *Fasciculus medicinae* (*Medical letters*, 1491) by Johannes Ketham.³ Primarily a collection of medieval essays on medicine, the illustrations reflect the time's primitive understanding of human physiology. The reprint edition in 1500 contains five illustrations, only one of which involves a perspective of internal anatomy. Other illustrations include a “Zodiac Man,” common in the medieval period as a diagnostic tool, and a “Venesection Man,” indicating recommended locations on the body for phlebotomy corresponding to specific ailments.



The dissected female image, “Gravida figure,” appears on first impression to be more of a crude schematic than an inspired artwork: the illustration is devoid of shading and lacking

in texture. The gravida figure’s pose is chosen for both stylistic and anatomical purposes: the upper extremities are displayed with dramatic artistry, but the lower extremities are spread to expose the reproductive anatomy.^{4p36} The anatomy is confused, and scholars speculate that the left-sided liver and elevated right kidney are indications that the woodcarver reversed the original print.^{5p42} The uterus itself has strange horn-like protrusions similar to an earlier unpublished sketch by Leonardo da Vinci, who may have influenced this drawing.^{6p96}

The instructive advancement of “Gravida figure” over earlier anatomical illustrations is the presence of heretofore unused indicator lines.^{7p66} For the first time, caption notes were connected visually by lines to specific structures, making the illustration more instructive.

Despite the simple schematic drawings and gross inaccuracies, the presence of illustrations in this book is an advancement in itself. The *Fasciculus medicinae* is the earliest medical publication in which text is accompanied by printed illustrations rather than hand-drawn renderings.^{6p95} These prints were made by woodblock printing, then a relatively new technique, which streamlined the production of illustrations and allowed for publications with more illustrations in greater complexity.

Hans von Gersdorff

From the rudimentary achromatic line drawings of Ketham’s work, even the most untrained observer of art or anatomy can recognize the significant advances in the next major publication, Hans von Gersdorff’s *Feldtbuch der Wundartzney* (*Field Book of Wound Doctoring*, 1517).⁸ Although intended to be a surgical manual and containing some archaic illustrations such as a “Venesection Man,” the book includes one especially notable figure. “Anatomia corporis humanis” was originally designed by the German Renaissance master Hans Baldung Grien as a stand-alone broadsheet for surgical use, but the image was hastily incorporated as a fold-out leaflet into von Gersdorff’s book before publication.^{5p45}

The composition incorporates numerous artistic advances over previous woodcut illustrations. The artist used *chiaroscuro*—light and dark gradations that enhance texture—to transcend schematic illustration and develop a three-dimensional appearance of the subject. Shading along the cadaver’s right side, as well as the use of light and dark spaces in the visceral cavity, gracefully illuminate the intended anatomical specimens.

The artist also took stylistic liberties with the subject. Notice the free-flowing hair, the vivid depiction of facial features, and delicate cloth covering the lap, all reminiscent of classical Grecian and Roman sculpture. While a covering of any sort may seem malapropos for an instructive anatomical image, it serves as a stylistic tribute to classical art and therefore subtly reflects the revival of classical learning as understood during the Renaissance.^{9p57}

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Anatomically, the work is also far superior to previously printed figures. The central figure boldly displays many recognizable anatomical features, including visceral cavities separated by a central diaphragm, a thorax containing heart and lungs, and an abdomen featuring various organs as they would appear *in situ* after displacing the intestine. There are also errors propagated from earlier texts, including insufficiently sized intestine and kidneys, incorrectly linked urogenital vessels, and a five-lobed, palmate liver.^{5p45,7p65}

The largest contribution of this work to anatomy, however, are the six ordered dissection images surrounding the central cadaver. This was the first time a dissection sequence had been rendered graphically, demonstrating a new method for teaching anatomy. During the sixteenth century, the paradigm of anatomical instruction shifted from uninspired text or static images to dynamic dissections carried out in sequence, allowing the students to learn by demonstration. This image seems to encourage such investigation—its creation was inspired by a public dissection of a hanged man in Strasburg.^{5p45}

Berengario da Carpi

The next major publication of anatomical illustrations, *Isagogae breues* (*A short treatise*, 1523) by Berengario da Carpi, drew on both the surgical traditions of von Gersdorff and natural traditions of the medieval philosopher Mondino dei Luzzi.^{10,11p20} Originally trained in the craft of surgery before being educated as a physician in Carpi and appointed to the University of Bologna, da Carpi's self-proclaimed goal in authoring anatomical textbooks was to "draw together . . . what I have seen by long experience in dissecting the bodies of both the living and the dead, and what I have sought in long reading."^{9p75}

His attempt to synthesize the philosophical and empirical

branches of anatomy may have been ill-fated, but the twenty illustrated panels of *Isagogae breues* are worth noting. This manuscript is the first to present visual aids corresponding directly with the text.^{6p97} The combination of text and illustration was an advance in anatomical pedagogy that enhanced the conceptual understanding of the work. For example, a series of five heart images contains many detailed features, including the auricles of both atria, the left recurrent laryngeal nerve, and the various valves containing either two or three distinct cusps. Each of these figures is referenced specifically in the text of a discussion on the anatomy of the heart, providing the reader with both textual and visual resources to aid in the understanding of anatomy. Prior medical texts had never been so perspicuous.

The majority of the figures in *Isagogae breues* are a series of "Muscle men" showing only superficial musculature. Although anatomically unremarkable, they attest to the growing artistic influence in medical illustration. Each panel is framed by a decorative foliate border, indicating that it is both art and an anatomical diagram. The unacknowledged woodblock artist, possibly the Italian engraver Ugo da Carpi,^{5p77} created in these muscle figures a fabulous study of surface musculature that might have been useful for physicians and artists alike.

The second muscle diagram from the "Ventricis Inferioris"



chapter is foremost a glorification of the human form, and secondarily a study of the abdominal muscles. The entire figure is accented with a starburst design that creates a worshipful, almost votive aura about the subject. The artist's *horror vacui*—fear of blank space—in this work produced a design reminiscent of medieval illuminated religious figures, while rebelliously substituting a secular anatomical figure for the religious icon. The growing influence of Renaissance Humanism was pervading the study of anatomy, the illustrations of which would reflect the human body with increasing anthropocentrism.^{12p85}

Curiously, the specimen is shown standing, holding back his own skin with his right hand to expose the internal oblique muscles. His left hand reaches across his body to display the surface veins, and his lower extremities are in deep flexion to highlight the various thigh and leg muscles. Portraying dynamic cadaveric images was a stylistic trend that continued for many centuries, allowing artists more creative leeway to illustrate static dead bodies.^{4p27} Vesalius himself copied this pattern only two decades later: his *Fabrica* includes fourteen “Muscle man” images, all in vibrant poses set against a rich country landscape.²

Isagogae breues was the first book that expanded the tech-



nique of *mise-en-scène*—arranging characters within a physical environment—for anatomical specimens. For example, the second illustration from the “Extremorum” chapter exhibits a male nude seated in what is apparently the Italian countryside. Rocks, trees, clouds, and even a small waterside village support



By and about Gray Lyons

Originally from Alabama, I was educated at Davidson College in North Carolina and studied at universities in France and Mexico. After graduation I traveled as a fellow of the Thomas J. Watson Foundation, then returned to North Carolina to attend Duke University School of Medicine. My interest in the history of medicine stems from a first-year workshop at Duke at which students were introduced to the library’s rare book collections. I look forward to a career of research and practice as a surgeon, a profession forever indebted to the early anatomists who first published their illustrations and opened the human body for all to see.

the central figure. He is drawn in a difficult-to-render twisted position to demonstrate the muscles of torsion. Although some features—such as the forearms and shoulders—are disproportionately executed, the figure itself serves nicely as an artistic study of the male form.^{13p22} If this image had not been included in an anatomy textbook, one might never know that it was intended for that purpose.

Hieronymus Brunschwig

Not all medical publications were illustrated as artfully or usefully as *Isagogae Breues*. Consider the *Noble Experience* (1525) of Hieronymus Brunschwig, published in London only two years after Berengario da Carpi’s book was issued in Bologna.¹⁴ The *Noble Experience* was intended to serve as a surgical field manual and, like other contemporary surgical texts, was published in the vernacular. Of the three illustrations in the book, the only true anatomical figure, a skeleton, is artistically unremarkable and anatomically inaccurate. More interesting, however, are the pictorial examples of surgical procedures of the head.

The two panels display human heads undergoing surgical repair of depressed skull fractures. The faces, though realistic, appear monstrous and oddly contorted. Although the facial features may have been thus rendered to signify the illnesses—presumably neurological—of the patients, the woodcuts appear to have been inspired by the gruesome rather than the procedural aspects of surgery. Even the crude drilling machines fill half of each panel, sharing equal importance with the human subjects.

Had the illustration been drawn more precisely or included written labels, the figures might be assumed to have served an instructive purpose. In the absence of these features, however,



one is forced to consider the grotesqueness of the faces, which elicit a robust visceral response engendering both revulsion and curiosity. The drawing was apparently inserted primarily to testify to the fantastic nature of the surgical profession.

Dryander

To emphasize the spiritual nature of anatomy without evoking revulsion, other artists used spiritual and



philosophical images and symbols to complement their illustrations. “*Humani capitis, figura undecima*” from the 1537 publication of *Anatomiae* by Dryander exemplifies the use of iconography in anatomical illustrations to communicate philosophical ideas.¹⁵

The rendering of the skull itself is adequate. Pertinent bones and sutures are drawn appropriately. Labels are present, and the replacement of indicator lines with characters unclutters the drawing somewhat. Anatomical errors include the connections of the pterion, shape and number of teeth, and the size and connectivity of the coronoid and condylar processes. Regardless, the skull serves its instructive purpose sufficiently; it serves a symbolic purpose—*memento mori*, reminder of death—much more notably.

In *Anatomiae*, Dryander exploited an osteological study to introduce a symbolic theme. The skull, framed by land and sky, rests on a sundial supported by an hourglass and a pediment bearing the inscription, “*Inevitable Fatum.*” The skull, timepieces, and inscription remind the observer of the transience of human life—a fitting theme for an anatomist. As the viewer is overtly reminded to reflect on “*inevitable fate,*” the skull itself exceeds its anatomical purpose and assumes iconic significance.

Giovanni Battista Canani

Until this point in the sixteenth century, all anatomical illustrations were composed either by woodblock printing or hand drawing; both limited the level of detail the artist could employ.^{5pxvii} But during the early 1500s, a new method of graphic printing, copperplate engraving, was being developed to allow illustrators to create much more refined prints. Although technically similar to woodblock printing, copperplate engraving allowed for much more detail in the printed product. The first medical illustrator to use this innovative technique was Girolamo da Carpi, artist of all twenty-seven prints published in Giovanni Battista Canani’s *Musculorum humani corporis* (*Musculature of the human body*, 1541).^{7p85,16}

This study of upper limb myology was based on human dissection rather than on that of animals or on antiquated texts. The anatomy is thus fundamentally accurate. By coupling anatomical knowledge with refined printing, Canani produced a work vastly superior to his predecessors.

Compared to previous texts, the copperplate engravings in *Musculorum humani corporis* are obviously superior: the prints show distinct muscles and their precise insertions connected by fine tendons; each is labeled individually. Other drawings in the series present individual muscles and their points of origin and insertion on the bones. This is the first time in anatomical illustration that a single tissue or organ had been illustrated *in situ*,^{6p102} elucidating for students both the form and function of the depicted muscle. These



illustrations are so clearly and delicately rendered that they are strikingly similar to those in some modern medical school textbooks.

Consider the study of the muscles of the forearm. Shading enables the viewer to see three-dimensional structure and discern the paths of the sinuous tendons as they cross the wrist. These are the first anatomical illustrations to use *penumbra*—the intermediate shadow between brightest and darkest areas—to enhance the details. For example, note the shading around the label “A,” along the flexor carpi ulnaris. Since this area is neither as bright as the location of the letter “B” or as dark as the outer edge of the figure, the penumbra provides visual clues about the muscle’s three-dimensional orientation. Since understanding anatomy of the musculature confers understanding of muscle action, Canani has successfully communicated many ideas in each meticulous illustration.

Some artistic elements from earlier anatomical illustrations have been eliminated. Canani does not use *mise-en-scène* or iconography to supplement the images. All of the specimens are disembodied and posed only to demonstrate the anatomy. In fact, the images are remarkably devoid of clutter and deny the viewer any distractions. Canani is bold: the quality and accuracy of the drawings are sufficient to make this work a masterpiece.

Canani’s innovative work was the first anatomical text to allot more than half of the total page area to illustration or negative space (the remainder is mostly dotted with

explanatory captions). Although his short volume covers only upper limb musculature, Canani was the first anatomist with the confidence to rely on illustrations to communicate the anatomy. The *Musculorum humani corporis*, so strikingly modern to the contemporary reader, preceded the 1543 publication of Vesalius’s *Fabrica* by a full two years.

Andreas Vesalius

Vesalius’s book, which met with both support and opposition at the time, is widely recognized today as one of the most significant medical texts ever published. Just as the publication of Copernicus’s *De revolutionibus orbium coelestium* revolutionized the astronomical sciences that year, so too did the *Fabrica* revolutionize the anatomical sciences. Vesalius, like Copernicus, began a shift in epistemology by emphasizing empirical observation over theory and tradition. The captivating illustrations of the *Fabrica* must partially be credited with starting this transformation in the natural sciences. Vesalius’s artists are unattributed, but the woodcuts were most likely produced by Jan Stephan van Calcar and others in the workshop of the Renaissance master Titian.^{13p24}

Although Vesalius’s artists introduced some new concepts in their illustrations, many artistic and instructional features of previous works were retained. Elements preserved from earlier texts include the anatomical pose used to illustrate the reproductive organs as originally attempted by Johannes Ketham, a sequenced dissection of the brain similar to the fold-out leaflet in *Feldtbuch der Wundartzney*, a series of muscle men reminiscent of Berengario da Carpi’s *Isagogae breues*, skeletons brooding over their fate in the same iconographic manner as Dryander’s *Anatomiae*, and a general reliance on illustration characteristic of Canani. Vesalius’s publication clearly was not an isolated event in time, but rather a half-century evolution that was furthered by many innovative artists and anatomists.

Vesalius acknowledged some of his predecessors when, after decrying most of his contemporaries, he admitted, “In the bliss of this century . . . medicine, along with all studies, began to awaken and raise its head from profound darkness to regain the illumination of the ancients.”^{2p3} Vesalius’s anatomical illustrations were created from a synthesis of both original and supplied ideas. The suppliers of these ideas—the illustrators preceding Vesalius—deserve credit for developing creative and didactic publications that spawned both the science of anatomy and the remarkable artistry of anatomical illustrations.

Acknowledgments

Special thanks to Ms. Suzanne Porter, Curator of the History of Medicine Collections at Duke University Medical Center Library, for her invaluable assistance and patience during my research.

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Erica Altken

PINNACLE MAN #3

Pinnacle Man holds a shining obelisk,
drawing eyes
to inspire hearts
to feel goodness.

The symbolic obelisk of thoughts exists
in every city and will never die.

Wisdom passes from axons and dendrites
to other neurons at the speed of light
from brain to brain.

Earth's skies and winds, dusts, and pollution
never affect its brilliance.

It represents the rebirth of human vision
and the growth of great skills in
human perception and
communication.

Karen S. Park

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