Vesalius and His Manikin: An Enduring Influence on Modern Anatomic Teaching

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This work was presented in part at the 90th American Association of Neurological Surgeons Annual Scientific Meeting; Philadelphia, Pennsylvania, April 29–May 2, 2022.

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Received, April 23, 2024; **Accepted,** July 23, 2024; **Published Online,** October 17, 2024.

Neurosurgery 00:1–16, 2024 https://doi.org/10.1227/neu.0000000000003187

Anatomic teaching has long informed surgical knowledge, experience, and skills. One tool for teaching that emerged during the Renaissance was the fugitive anatomic sheet, which used flap layers to reveal different levels of anatomy. In 1538, Vogtherr introduced the first fugitive sheets, which included illustrations of male and female figures with a torso paper flap that, when lifted, revealed the internal organs in a cartoonish style. The popularity of these anatomic fugitive sheets spurred an increase in small print-and-sale workshops. In 1543, Vesalius included fugitive anatomic sheets in his books *Fabrica* and *Epitome*, containing large paper flapped models that could be created by cutting out and gluing images of human internal anatomy onto a base layer. Students could tack these manikins up to a nearby wall during dissection. Significant collaboration between Vesalius and his publisher occurred to coordinate the integration of large foldable sheets featuring the cutout models into his works. Vesalius's groundbreaking discoveries, his use of the most advanced printing techniques, and his innovative teaching style are fundamental aspects of the legacy of medical education. This article shows these remarkable fugitive anatomic sheets from the original publications of *Fabrica* and *Epitome* together for the first time. It explores the innovative concepts and applications of Vesalius's unique printings.

KEY WORDS: Anatomic flap illustrations, Anatomic manikin, Anatomic teaching, Andreas Vesalius, *Epitome*, *Fabrica*, Fugitive anatomy sheets

Neurosurgeons have prioritized visual anatomic education based on spatial constructions that aid trainees in dissection and understanding complex structures.[1,2] Significant advancements in anatomic science and medical education occurred in the 16th century with the relaxation of restrictions on human anatomic dissection by the church and the advent of the printing press in Europe, which enabled the production of detailed and realistic illustrated anatomic drawings.[3] Andreas Vesalius, the most prominent anatomist of this era, advocated for personally performing dissections to learn the structure of the body rather than relying on Galenic doctrine. "[I]n knowledge of the body no one could produce anything of value who did not perform dissection with his own hands…."[4,5] He seized upon the recent availability of the opportunity to perform human dissection and advanced printing techniques to create his two eminent works: *De humani corporis fabrica libri septem*, or *Fabrica* and, its distinctive although less widely preserved companion, *Epitome*.[4,6,7]

Epitome and *Fabrica* included several broadside sheets, or fugitive sheets, designed to be cut out and constructed into paper anatomic manikins, with multiple layers illustrating anatomic structures of the vessels, nerves, and organs. These manikins would become significant tools, aiding Vesalius's novel method of teaching, in which he insisted that students learn anatomy through personal experience. Using the manikins, students could fold back layers of anatomic structure parallel to their dissection work, enabling independent learning. Curiously, although numerous publications describe the *Epitome* and *Fabrica* illustrations and several address the fugitive sheets, none graphically show the complete set of these sheets, the constructed manikins, and their variations during the original years of publication. Our article shows these incredible fugitive sheets together for the first time and explores the applications of Vesalius's unique printings.

FUGITIVE ANATOMIC SHEETS

Fugitive anatomic sheets were a significant attraction for the revival of anatomy during the Renaissance.[8] These sheets traditionally consisted of paper prints with flaps that the reader could lift back to reveal, stepwise, illustrations of the organs and bony anatomy of the human body. In some well-developed cases, these sheets resembled a virtual dissection. The earliest fugitive sheets appeared in Germany, with Heinrich Vogtherr's 1538 *Anathomia oder abconterfettung eynes* (Figure 1).[9,10] Vogtherr, a well-known printer and medical illustrator, sought to disseminate then-current knowledge of anatomy to a general audience. His anatomic illustrations deliberately used a stylized, simplified aesthetic lacking intricate detail, and he published his book in Latin and German.[11]

The commercial and popular success of Vogtherr's sheets was unprecedented. In 1538, Jost de Negker, known for his high-quality woodcuts, republished Vogtherr's female figure in Augsburg.[8] In 1539, Hans Guldenmundt[12] published a pair of anatomic sheets in Nuremberg that were similar in quality to Vogtherr's printed sheets. Rather than having a series of liftable flaps, the male and female figures, labeled as Adam and Eve, each had a single liftable flap on the trunk. In the same year, Jean Ruelle,[10] a French physician and botanist, published a modified version of Vogtherr's female figure and Guldenmundt's male figure in Paris.

Decentralization of printing during the mid-16th century played a crucial role in the dispersion of later fugitive anatomic sheets, which flourished in the ensuing years.[8] Recognizing the potential of these sheets, Vesalius capitalized on advancements in printing technology to produce his own version of anatomic illustrations using paper flaps revealing detailed organ systems to augment his teaching of human anatomy.

VESALIUS BEGINS LARGE-FORMAT ILLUSTRATIONS WITH *TABULAE ANATOMICAE SEX*

Vesalius's artistic talent and penchant for graphic communication made his dissections popular and influential among medical students. Vitus Tritonius Athesinus, a student and friend of Vesalius, documented the first of Vesalius's dissections (December 6 to 24, 1537) at the University of Padua in his notebook, which spanned 20 pages and included basic sketches of the anatomic illustrations Vesalius made as he dissected. In his notes, Vitus remarked upon the students' desire for Vesalius to publish his anatomic drawings: "It is to be hoped that we shall be aided by those illustrations which may perhaps be published, containing depictions of the nerves, veins and arteries of the whole body."[13,14] Such drawings by Vesalius were met with considerable praise from the students. They were welcome graphical aids that made it unnecessary for the students to rely on written recordings of the dissections. During Vesalius's 1540 winter sojourn to teach medical students at the University of Bologna, one of the students recorded Vesalius's disputations and anatomic demonstrations. Vesalius drew his concepts and anatomic structural relationships on the dissection

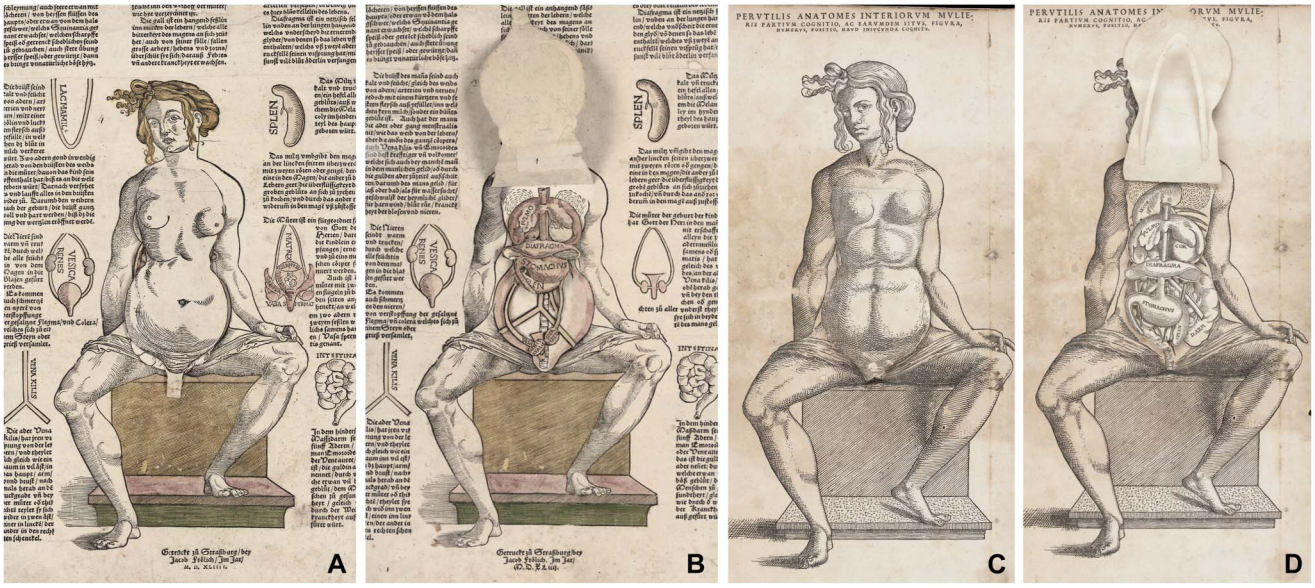


FIGURE 1. *Anatomic fugitive sheets depicting a woman with an abdominal flap that, when lifted, reveals the internal organs in a stylized, cartoonish manner.* **A** *and* **B**, *Anatomic illustration from Vogtherr's Anathomia oder abconterfettung eynes,*[9] *showing the flap* **A**, *closed and* **B**, *open.* **C** *and* **D**, *Plagiarized version of Vogtherr's work created by Ruelle*[10] *and published in Paris, showing the flap* **C**, *closed and* **D**, *open. Figures are in the public domain. Retrieved from Wellcome Collection. Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).*

table: "With many illustrations he [Vesalius] showed us the form and shape of the muscles, sketching with a bit of charcoal on the anatomy table…. And certainly, it was very beautiful to see."[15]

In 1538, the same year as the first appearance of fugitive anatomic sheets, Vesalius created and published exquisite, graphically accurate anatomic illustrations with the *Tabulae anatomicae sex*.[16-19] The book included six 66-cm (25.9-inch) tall loose sheets with large anatomic woodcuts and surrounding text describing the structures' physiology. The substantial leaf height of the *Tabulae* allowed for better integration of visual and written elements for teaching anatomy and for use as dissection guides. The *Tabulae* likely served as a reference for Vesalius in shaping the structure, physical dimensions, and goals of his future works. However, he would not publish larger images than those of the *Tabulae*.

Many woodcutters and anatomists all over Europe, including Negker, Aeigidius Macrolios, Chretien Wechel, Johann Dryander, and Walter Ryff, copied text and illustrations from the *Tabulae*.[8,19,20] In a letter to his publisher and friend Johannes Oporinus regarding the publication of *Fabrica* and *Epitome*, Vesalius vented his anger toward the copying and imitation that befell his work, which he believed compromised the intended vision for the *Tabulae*.[7] Vesalius wrote in the dedicatory letter of *Epitome* that he was somewhat loathe even to distribute the book to physicians because "while I strive to be useful to them at the same time I am anxious to snatch opportunity from the hands of certain rascally printers who may later seize in possession upon the labors of another to reduce them ineptly into small space and publish them under their own names (creatures born for the destruction of letters!)…."[4,5] The unauthorized copying of *Epitome* and *Fabrica* by independent printers inadvertently played a role in disseminating Vesalius's anatomic insights to a broader European audience.

Vesalius allowed Ambroise Paré to adapt his original woodblocks for illustrations in Paré's 1575 *Oeuvres*, for which Paré personally paid.[21] Many anatomic images used by Paré with permission from Vesalius are also featured in his earlier 1561 *Anatomie universelle* and 1564 *Instrumenta chyrurgiae et icons anathomicae*.[22,23] Paré credited his practical advances in surgical technique to Vesalius's important anatomic contributions. Unfortunately, publishers would also subvert Paré's noteworthy works, substituting with lower-quality images that resembled those of Vesalius, beginning with the 1634 English edition of Paré's *Workes*.[24]

ILLUSTRATION FORMAT OF *FABRICA* AND *EPITOME*

Only five years after the release of *Tabulae*, Vesalius published *De humani corporis fabrica* in June 1543,[7] a comprehensive text comprising seven books on organ systems, including bones and cartilage, ligaments and muscles, veins and arteries, nerves, organs, and the brain. With a leaf height of 43 cm (16.9 inches), this work included more than 700 pages containing detailed woodcuts and accompanying anatomic text. *Fabrica* represented Vesalius's extensive observations from human dissections at the University of Padua and corrected numerous inaccuracies in Galen's animal-based anatomic theories.[18]

Aware of the technical improvements in printing, Vesalius personally supervised the cutting of the woodblocks in Venice (which he recorded as being highly frustrating), arranged for their chaperoned transport to Basel, and continuously led project communication with Oporinus, an eminent scholar and dedicated printer in Basel using advanced methods. Vesalius went so far as to provide the printer exact instructions in *Fabrica* for producing, locating, and labeling anatomic structures. In his letter to Oporinus, Vesalius carefully outlines preparations he made for his works: "You will soon receive with this letter, by way of Milanese merchants, the Danoni, the wood blocks engraved for my books *De humani corporis fabrica* and their *Epitome*. I hope they will be delivered to Basel as safe and sound as when I packed them lest they be damaged in any way, or their transport cause any harm."[7] This portion of the letter indicates Vesalius's intention from the outset to release both a comprehensive version, *Fabrica*, and a more concise version, *Epitome*.

De humani corporis fabrica librorum epitome,[4] translating to "an abridgment of the books on the structure of the human body," was completed in August 1542, a few weeks after the finalization of *Fabrica*.[5,7] Although the title has a connotation of abridgment, in his note "To the Reader" of *Epitome*, Vesalius implies that *Epitome* is an equal half of his "compendium of the fabric of the human body" and that the reader should choose whether to begin with "my ordering of the material […] from the description of the parts [*Fabrica*]" or "their designation and index of their distinctive features [*Epitome*]."[4,5] In his dedicatory letter to Prince Philip, Vesalius called *Epitome* "a footpath" and "an appendix" in its relationship to *Fabrica*; referring to its exquisite layout and beauty, however, Vesalius proudly declared that the Prince "will not utterly cast it from [his] sight."[4,5]

Similar to *Fabrica*, the Latin *Epitome* was published in June 1543.[4,5] With a leaf height of 55 cm (21.7 inches) and containing woodcuts of the bones, muscles, nerves, arteries, and organs, it was supposed to act as a shorter version of *Fabrica* and serve as an anatomic dissection manual (Figure 2).[4,25-27] Two months after the Latin *Epitome* was made available, Oporinus issued a German version in August 1543, translated by Albanus Torinus, to make the work more accessible to a broader audience.[26]

In 1555, Vesalius (41 years old, officially still physician to Charles V, but likely living in Brussels) and Oporinus released a more mature second edition of *Fabrica* with stylistic updates to the Latin text and revisions to the plates to correct original errors.[6] Although *Epitome* is believed to have been published only in 1543, a rare copy with a colophon leaf dated 1555 has been found. It is suspected that this page was added to a few remaining unsold copies of the 1543 *Epitome* in lieu of publishing a second edition.[28] Despite its illustrative significance, *Epitome* remains less

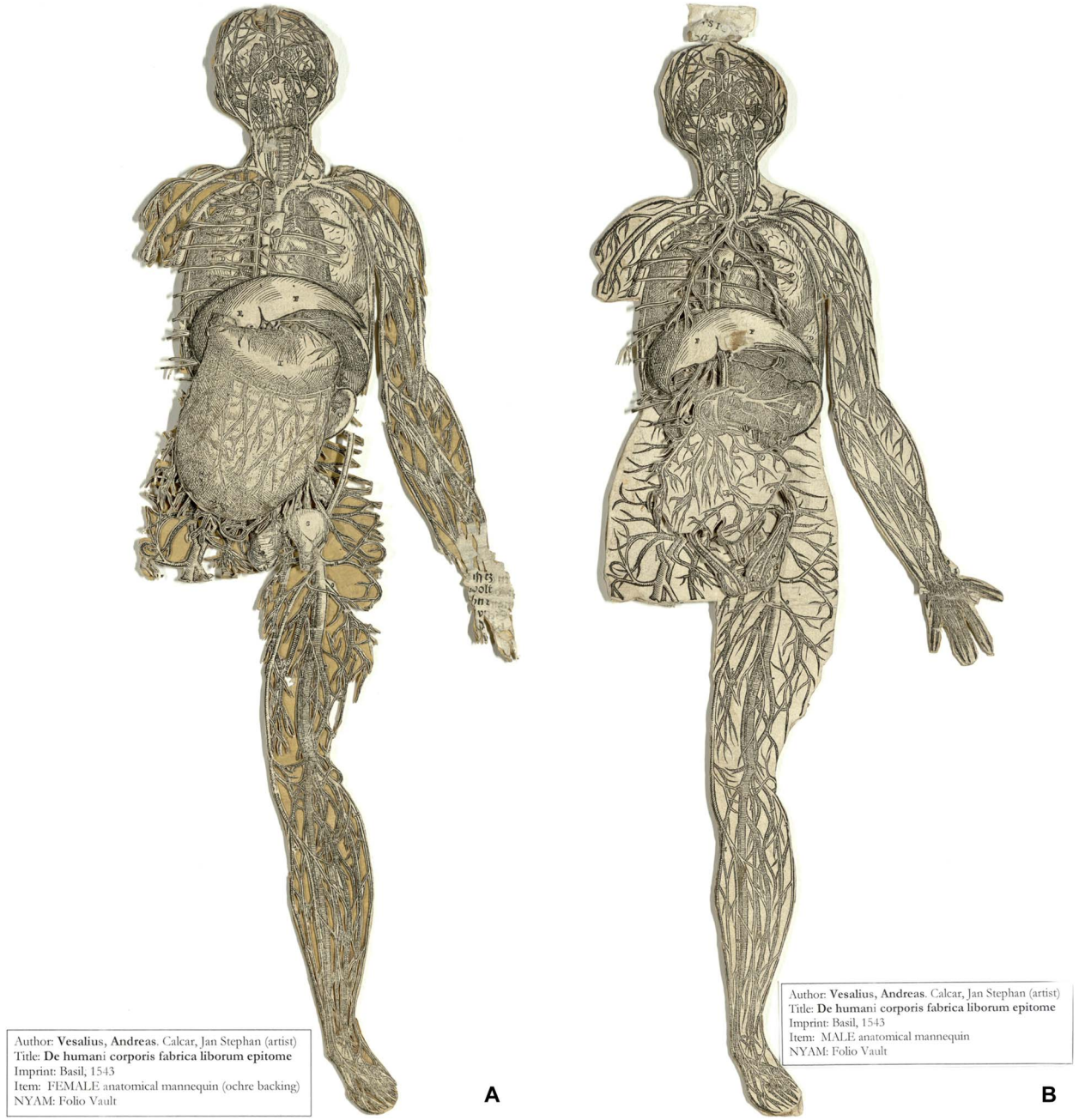


FIGURE 2. *Different existing copies of the paper manikin, with noticeable parchment tabs at the top of the head that might have been affixed to specific pages in Epitome.*[4,25] *These manikins measure 42 cm (16.5 inches) tall from the foot to the head and 15 cm (6 inches) wide from the pelvis to the wrist. The consistent size and details across the different manikins indicate that the same woodblock was likely used for printing.* **A**, *Female paper manikin held by the NYAM that contains the vascular system and organs assembled and pasted from the Latin Epitome.* **B**, *Male paper manikin held by the NYAM that contains the vascular system and organs assembled and pasted from the Latin Epitome. Figures A and B are used with courtesy of the New York Academy of Medicine Library.* **C**, *Female paper manikin from the German Epitome held at the Huntington Library, assembled with the vascular system and organs atop the base page, which contained a drawing of the anterior skeleton. This rare copy of the German version of Epitome shows a manikin assembled according to Vesalius's instructions. Figure C is public domain, sourced from The Huntington Library.* **D**, *Female paper manikin assembled with the vascular system and organs placed onto the page depicting the nervous system from the colored Latin Epitome held at the Cambridge Digital Library (University of Cambridge).*[4,26] *The layers were backed with a fourteenth-century legal text, possibly of French origin, which had been found as part of the bindings of incunable books.*[4,27] *Figure D is used with permission from Cambridge University Library. NYAM, New York Academy of Medicine.*

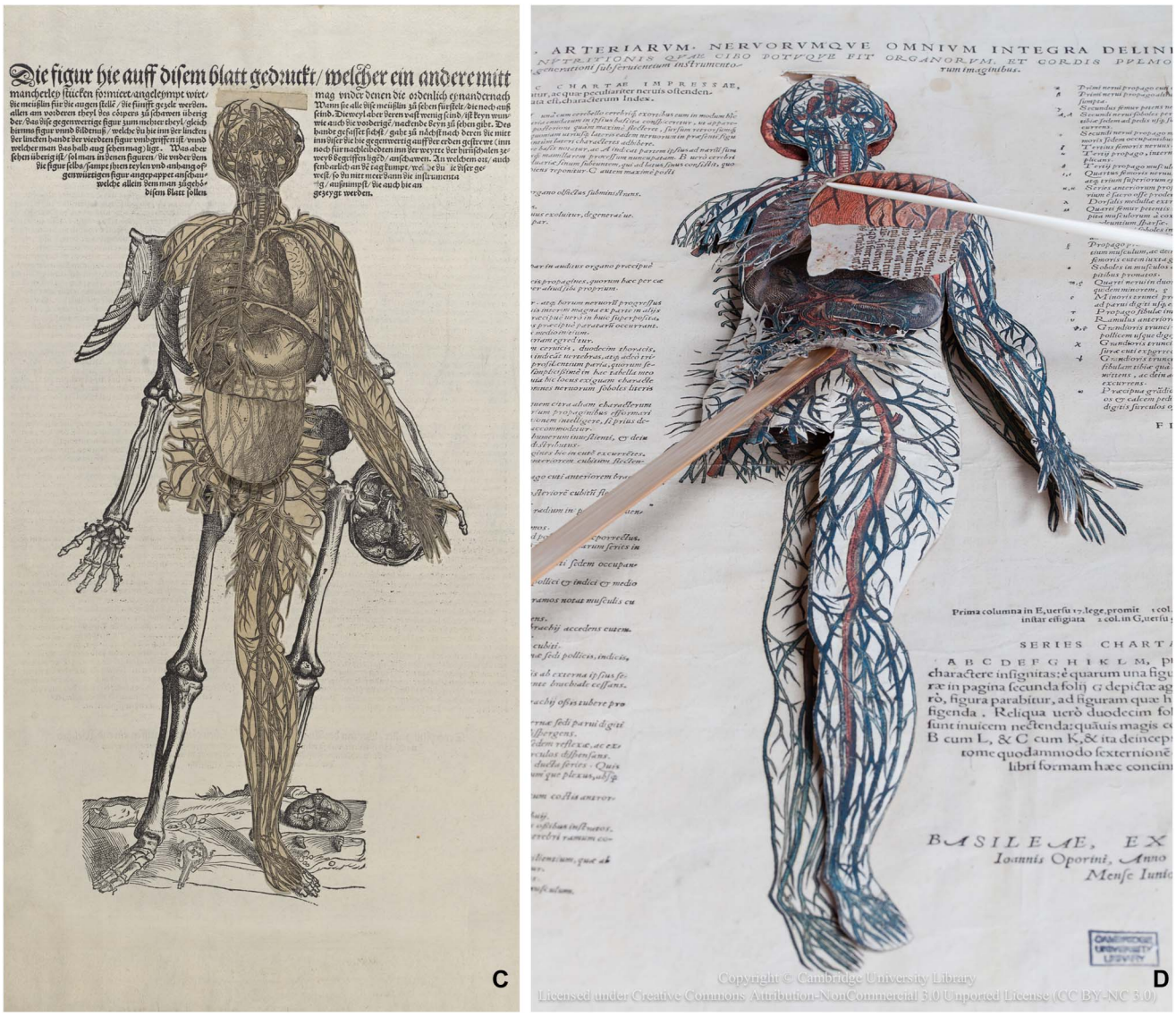


FIGURE 2. *Continued.*

well-known than *Fabrica*, with a compelling explanation being that the necessity of disassembling the illustrations in the *Epitome* to construct the manikin has resulted in few extant intact copies.

Vesalius chose an oversized format for *Epitome*, with its large illustrations of anatomic structures and accompanying legends, to serve as a visual guide to students performing dissection. The Latin *Epitome* opens with an anterior view of the skeleton and then shows a man's arteries, veins, and organs. It proceeds to the muscles, presenting deeper and superficial layers from front and back, followed by a lateral view of the skeleton. Illustrations of a man and woman, referred to as Adam and Eve, are shown next, with the last pages depicting a woman's arteries, veins, and organs, as well as a drawing of the nervous system.[4]

Despite being structured similarly and printed on the same type and size of paper as the Latin edition, the German *Epitome* differs significantly, using a Gothic typeface larger than the roman characters used in the Latin version. The translation process proved to be exceptionally challenging because of the German language's lack of specific anatomic terms. The larger font size, combined with the extra words required for translation, meant that nearly all the legends for the illustrations were printed on separate pages rather than in the margins around the illustrations, as in the Latin *Epitome*.[4,26,29] Consequently, the length of the work increased to 19 sheets from the original 14 sheets. To use the additional space created by moving the

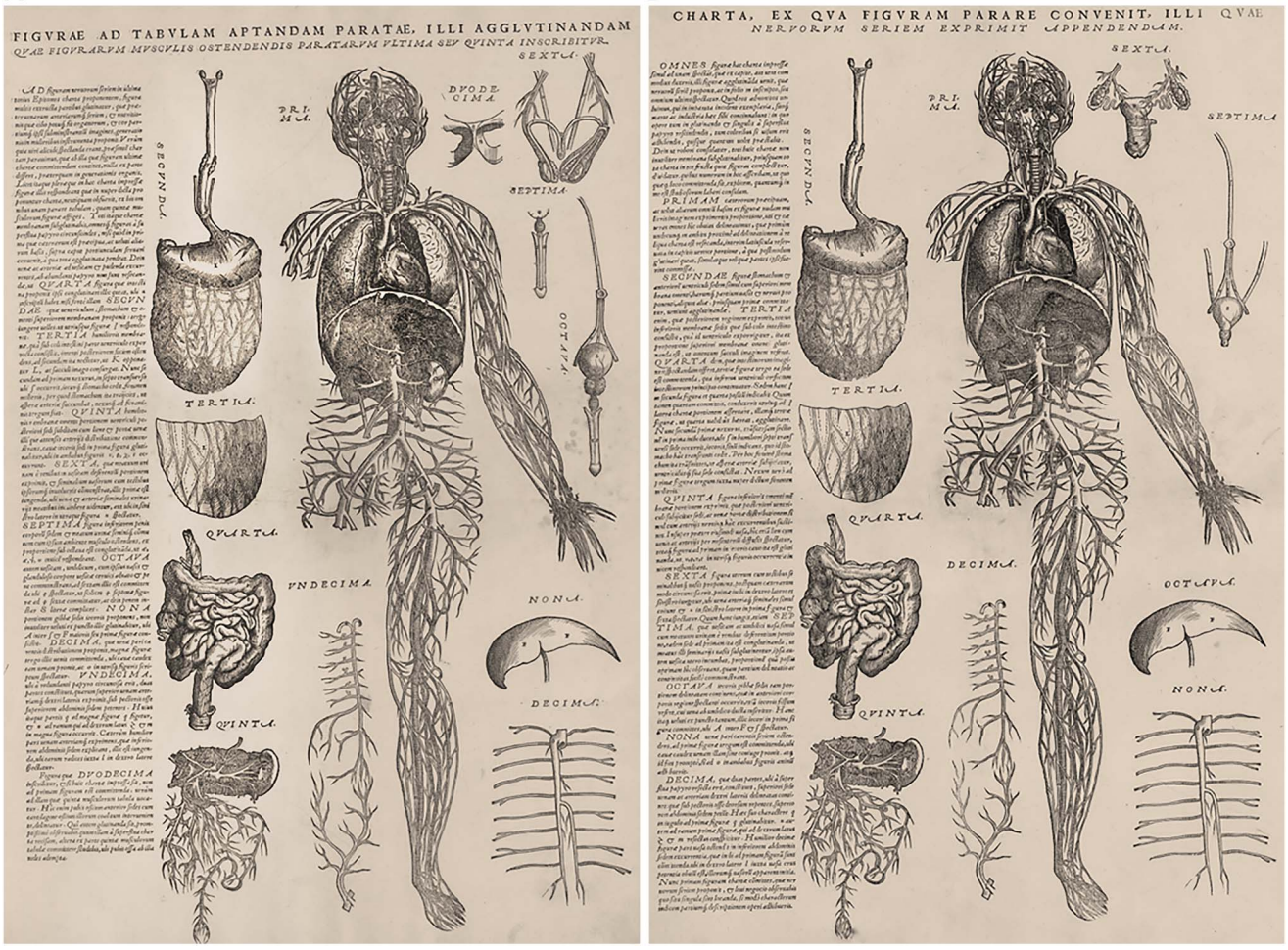


FIGURE 3. *Pages of the Latin Epitome with a leaf height of 55 cm (21.7 inches) used to construct the paper manikin.*[4,27] *In the letter from Vesalius to Oporinus regarding his thoughts for publication, which Oporinus cleverly included in Fabrica, Vesalius describes the elaborate system (noted on the illustrations) that he used for labeling anatomic illustrations within Fabrica and Epitome: "For makers to locate anatomical parts in a particular illustration, we engraved on our blocks characters in constant use in printing shops, usually beginning with capital letters, then the other (lower-case) roman letters, then small Greek letters, followed by Greek capitals which are not cognate with the roman; when all these were not enough, we used numerical figures; when all these were not enough, we used numerical figures and whatever other signs occur in ordinary type sets. In the description of these identifiers, it has been my practice to place an identifying letter by itself in the margin when it has a single, separate legend. If a description does not apply to a single item and is written for another letter as well, I put a period after the letter in the margin to make it clear to the reader that it is together in a series."*[7] **A**, *Drawing of the female vascular system and organs.* **B**, *Drawing of the male vascular system and organs.* **C**, *Drawing of the nervous system.* **D**, *Drawing of the human skeleton. Figures are public domain, sourced from the Library of Congress, Rare Book and Special Collections Division.*

legends, the German edition included 13 extra figures from *Fabrica*, such as 2 illustrations of a dissected abdomen and 4 figures of the heart.[26]

VESALIUS'S ANATOMIC MANIKINS

One of the aspects that made *Epitome*, and to a lesser extent *Fabrica*, innovative was the inclusion of several pages designed explicitly for creating anatomic paper manikins (Figure 3).[4,27] The term manikin derives from the mid-16th century Dutch word "manneken," meaning "little man." The term manikin referred to a "model of the human body, commonly in detachable pieces, for exhibiting the parts and organs, their positions, and relations."[30] Although historians often describe Vesalius's anatomic model as a manikin, Vesalius referred to the drawings as "figures [for the construction of] a single illustration which is to be attached at the head."[4,25]

These manikins could be expanded to be larger than the printed page and were designed to help students appreciate the spatial arrangement of human anatomy using retractable layers corresponding to cross-sectional organ layers. The pages displaying the

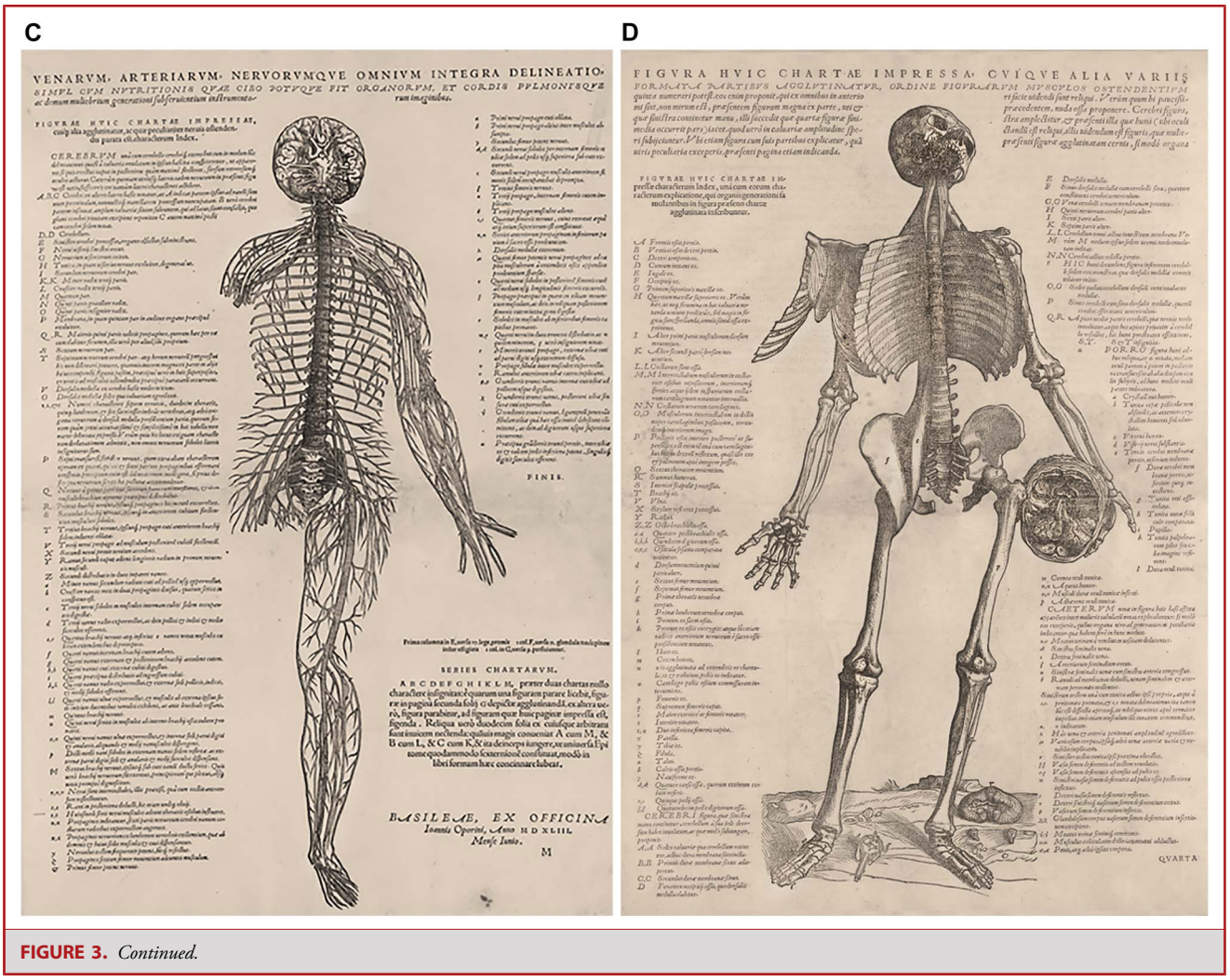


FIGURE 3. *Continued.*

organs, arteries, nerves, and veins of a man or woman were designed to be cut out and pasted atop the page showing the bones.[4] The fugitive sheets in *Fabrica* might have originated from the layout plans for *Epitome* because both works were related and in preparation simultaneously. Regardless, within 5 years of the first printing of fugitive anatomic sheets, Vesalius and Oporinus printed the most technologically advanced, realistic, and useable flap anatomy in the form of paper manikins in the *Fabrica* and especially in the *Epitome*.[31]

The first step in constructing the paper manikin was to carefully cut out the organ and vessel illustrations from the designated sheets for the man or woman according to specific instructions. These cutouts were then layered onto the base page. Vesalius wrote in *Epitome*: "The figure printed on this sheet [Skeleton], to which others composed of various parts maybe glued, is to be numbered the fifth…."[4,25] "[T]he female organs of generation, and likewise the male organs occur in a picture to be cut out and pasted to the fifth muscle figure" (Figure 3).[4,5] To provide more durability to these flimsy paper components, students would typically back them with sturdier material, often using recycled manuscripts.[4,27] Vesalius offered detailed instructions on how to prepare these anatomic figures, stating, "Therefore, glue a piece of parchment under the entire sheet and cut out all the figures from the superfluous paper, except in the case of the first, which is distinguished from the rest as a base for the others, where it is convenient to preserve a small portion above the head from which it may hang when the whole is pasted on."[4,25] The completed manikin in sectional layers then served as both a study aid and a reference for the organ systems during dissections, during which it could be tacked up to a wall or table nearby. Some existing manikins still have parchment tabs on their heads.

Interestingly, the pages for creating the manikin in *Epitome* are nearly identical to pages found in *Fabrica*, suggesting that the vascular insert was "primarily intended for *Epitome* but included in *Fabrica* as an afterthought."[32,33] Advancements in printmaking technology allowed for the integration of foldable pages within

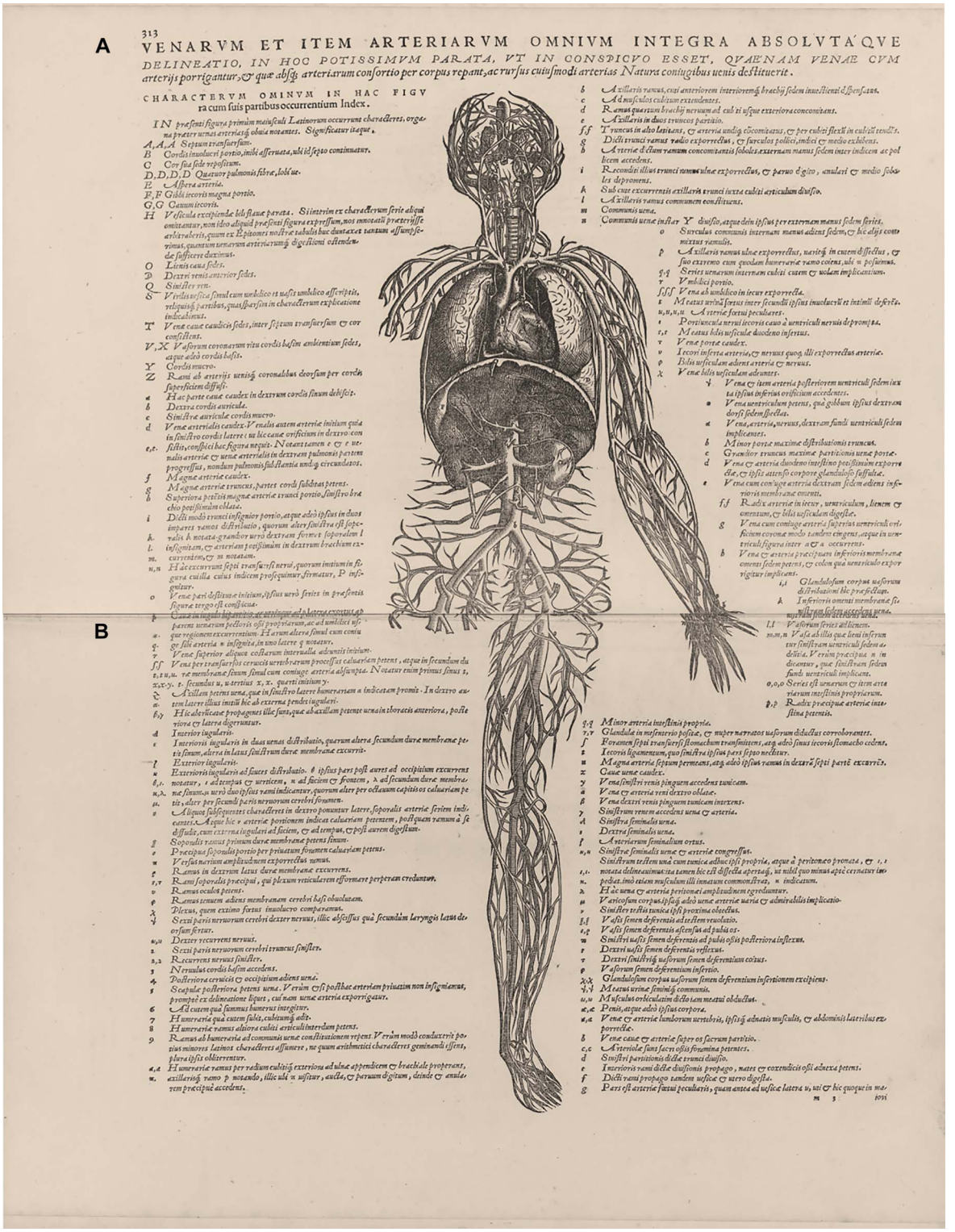


FIGURE 4. *Pages of a 1543 Fabrica edition held at the University of Basel Library with a leaf height of 43 cm (16.9 inches). Multiple standard-size pages were used to construct the paper manikin:* **A** *and* **B**, *the vascular system,* **C**, *the female genitalia, and* **D** *and* **E**, *the nervous system. Finally,* **F**, *the organs and male genitalia were printed on a separate single page. Figures are in the public domain. Sourced from the Basel University Library.*

FIGURE 4. *Continued.*

Fabrica, which were significantly larger than the book's standard page dimensions. However, because of the extra work this entailed, some publishers opted to print the pages containing the vessels and nerves horizontally as 2 separate pages (Figures 4-6).[6,7]

Colored and preassembled manikins were available for purchase at a more expensive price.[27] A bookseller would acquire *Epitome* uncolored and then engage an artist to painstakingly color in all the fine details of Vesalius's illustrations. Today, only a few of these colored *Epitome* manikins remain; hand-colored editions of *Fabrica* are more common. *Epitome's* novelty, fame, and usefulness were essentially attributable to its disassembled illustrations and manikin; however, this essentially destroyed the book, thus paradoxically contributing to the rarity of extant intact copies.

LEARNING WITH THE MANIKIN

Before Vesalius, Galenic orthodoxy firmly established that anatomy should be learned primarily through text-based study rather than practical experience, partly because of the constraints of a time when human dissection was largely prohibited.[18] Until Vesalius, anatomy teaching involved using assistants and barber surgeons to perform anatomic dissections for traveling students, physicians, and wealthy onlookers. At the same time, an instructor read Galen's texts out loud.[18] The opening of *Fabrica* includes text in which Vesalius[7] criticizes the impersonal conventions of Galenic anatomic teaching, especially concerning dissection. Instead, Vesalius encouraged his pupils to perform anatomic dissection and learn through their own observations. His students not only were partners in dissection but even enthusiastically assisted Vesalius in acquiring (and, in at least a few cases, stealing) fresh corpses to supply their learning.[15,34,35]

Although the actual performance of dissection was crucial in moving away from considering Galen as the ultimate authority, the publication of *Epitome* and the paper manikin within it were conceived by Vesalius as part of this transition, aiding students in their hands-on anatomic learning. Each layer image of the manikin could be removed or flipped up or down to reveal the underlying or overlying structures, mirroring the actual process of dissecting a human cadaver.[36] By acquiring a copy of *Epitome*, students gained access to a resource that offered the most accurate representation of the human body for the period, enabling them to conduct dissections independently without requiring an instructor's direct guidance.

The manikins served as an invaluable resource for anatomic study when real dissections were not feasible. Although public dissections were usually performed in the winter months, as recorded by the students of Bologna and Padua, there remained limited time before putrefaction because the bodies were acquired on short notice, quickly washed, and not preserved.[14,15] "Unlike real organs, however, the flaps could be glued back together, or extraneous parts properly removed. Anatomy flap prints were vastly more accessible and less perishable than real specimens."[37] Thus, the manikin was indispensable for students' learning, whether used as a dissection guide or as an alternative to actual dissection.

At one time, *Fabrica* and *Epitome* were in the hands of nearly every European physician, but they are now rarely encountered beyond the walls of great medical libraries. The use of anatomic flap illustrations persisted in the years following Vesalius's publication of *Epitome*. The change in anatomic teaching and learning evolved over a century and was mainly the product of personal dissection experience. Many flap anatomies were not helpful or even intended to be dissection or anatomy review guides because of their inaccuracies and stylized representation.

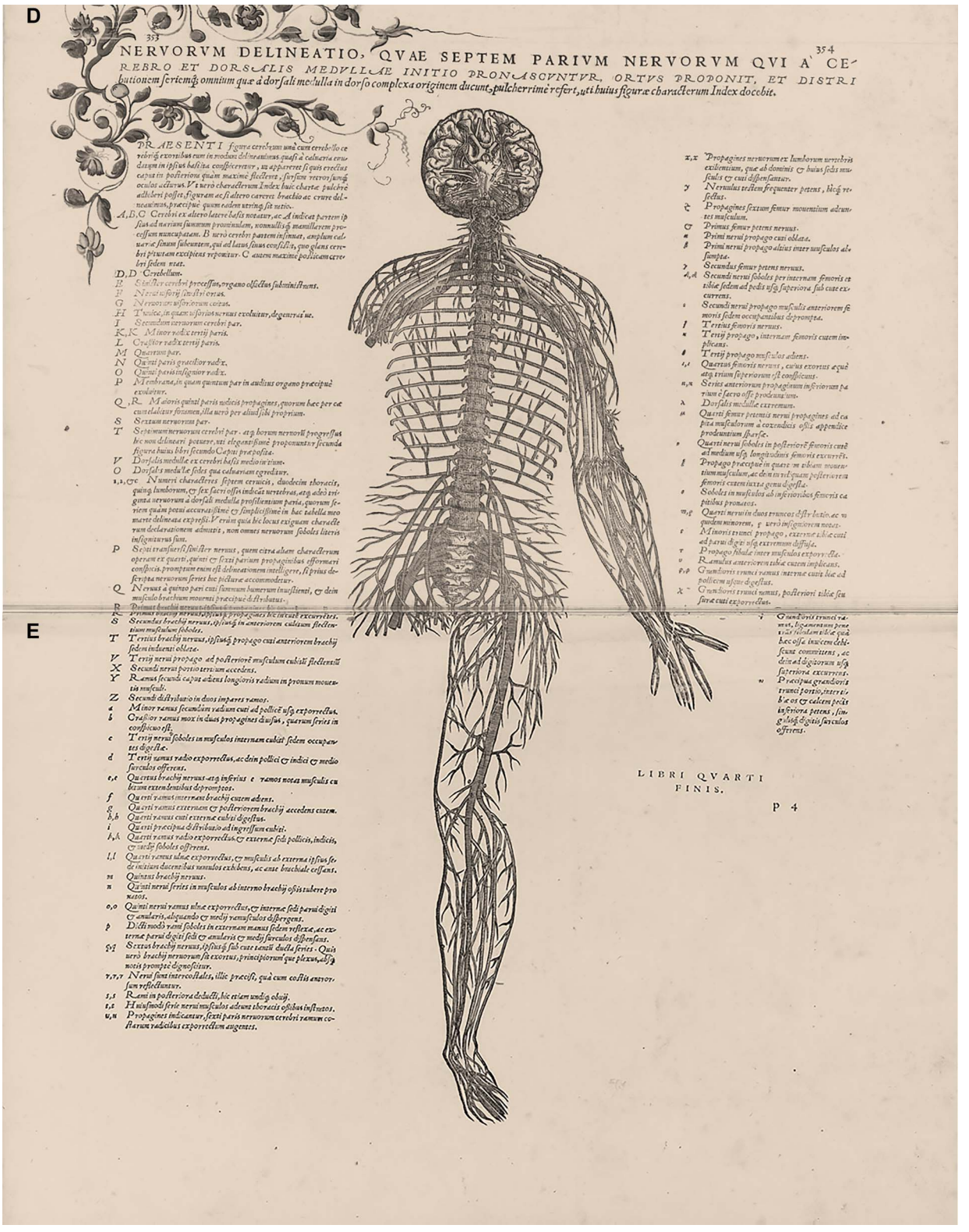
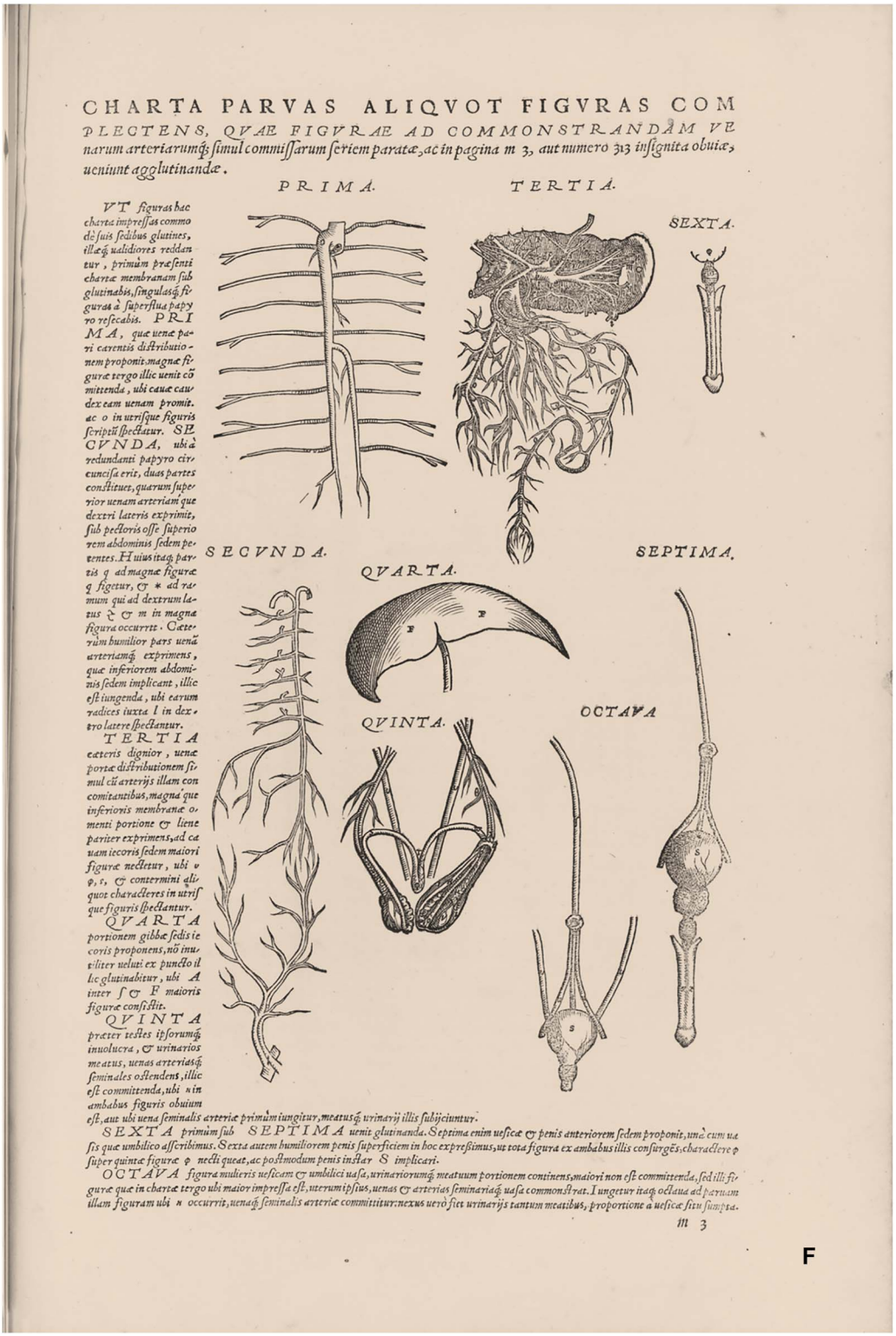


FIGURE 4. *Continued.*



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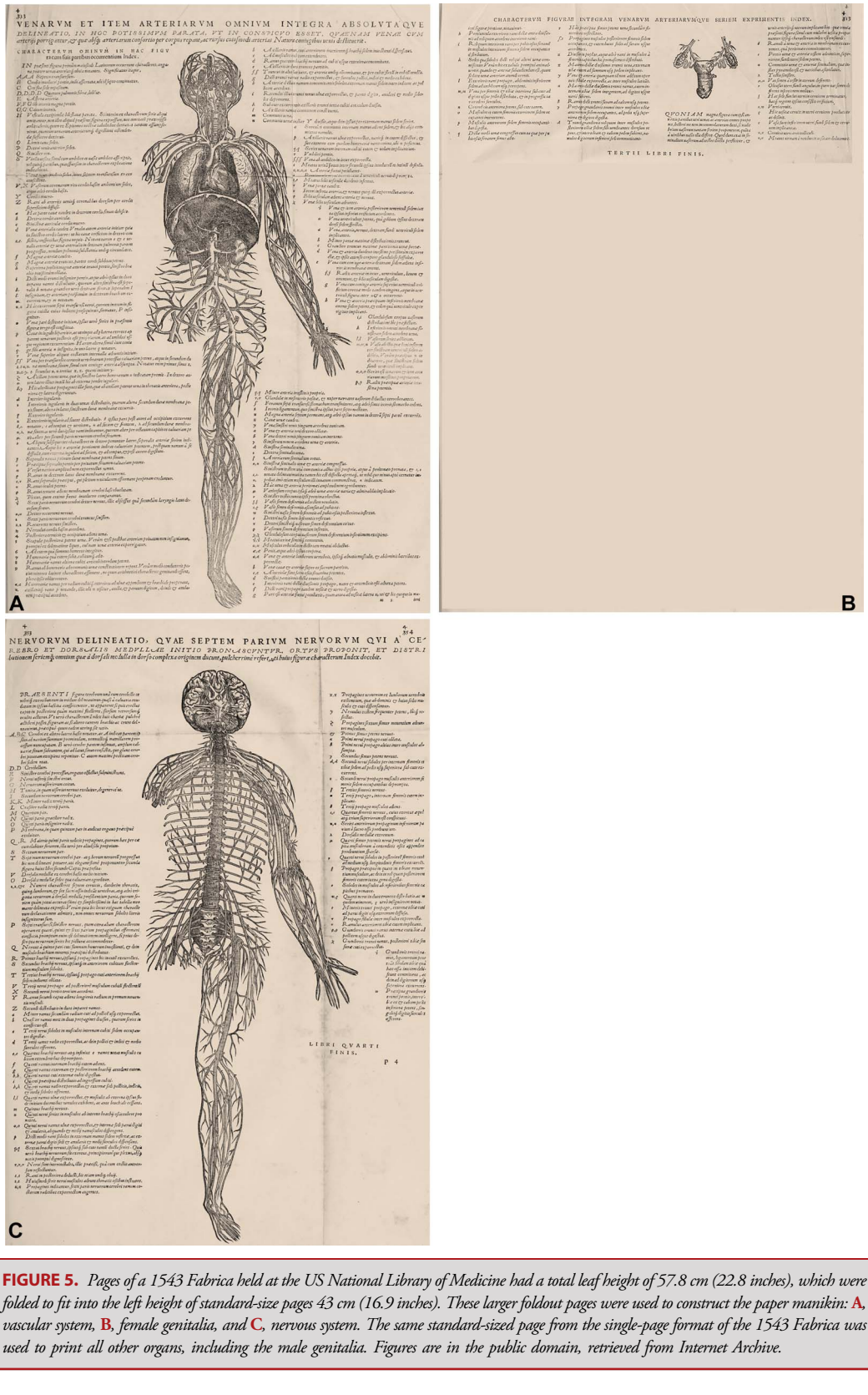

FIGURE 5. *Pages of a 1543 Fabrica held at the US National Library of Medicine had a total leaf height of 57.8 cm (22.8 inches), which were folded to fit into the left height of standard-size pages 43 cm (16.9 inches). These larger foldout pages were used to construct the paper manikin:* **A**, *vascular system,* **B**, *female genitalia, and* **C**, *nervous system. The same standard-sized page from the single-page format of the 1543 Fabrica was used to print all other organs, including the male genitalia. Figures are in the public domain, retrieved from Internet Archive.*

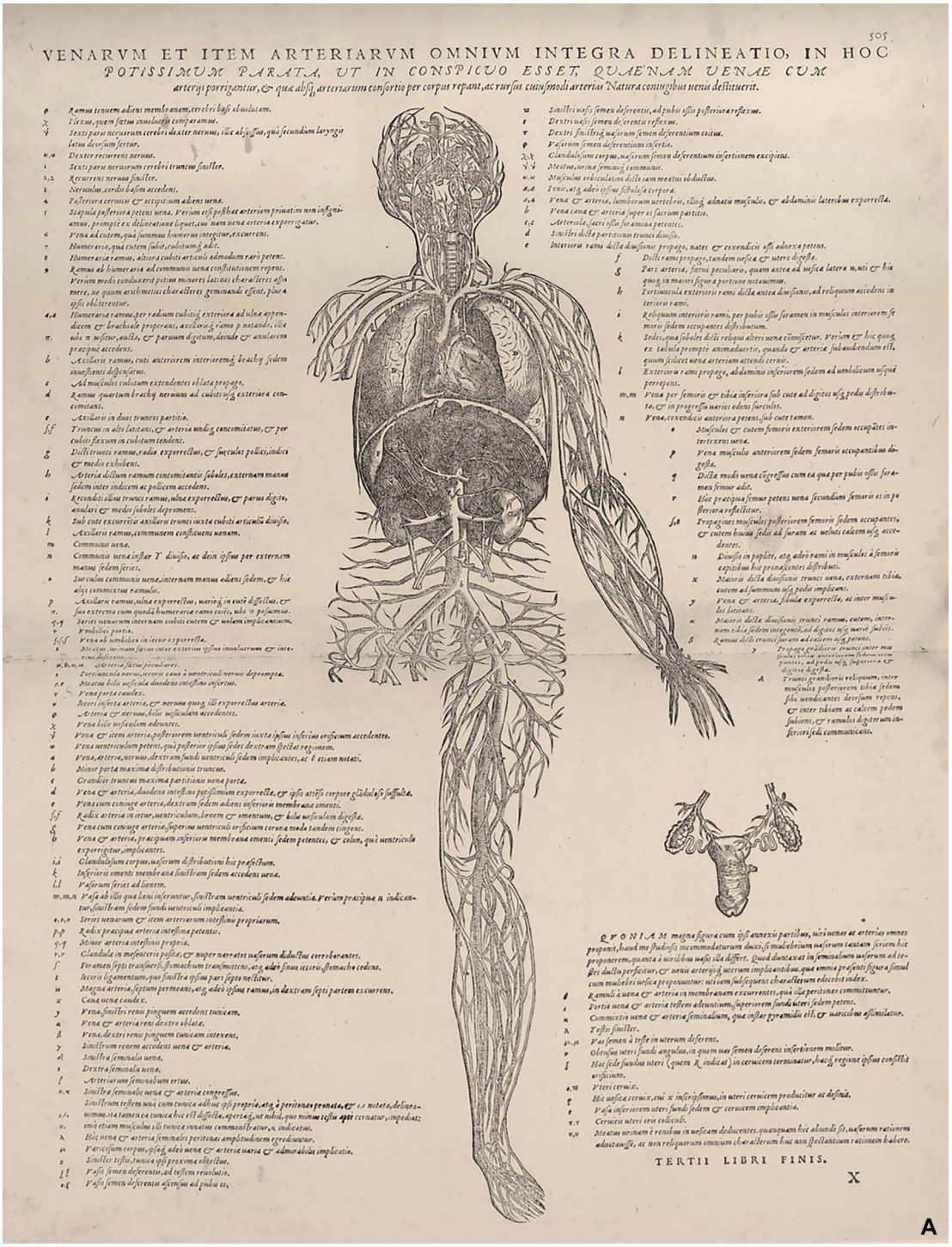

FIGURE 6. *Pages from the 1555 Fabrica held at the City of Boston Public Library used to construct the manikin. The manikin was printed horizontally on 2 combined pages. The leaf height of these pages was 53.3 cm (21 inches). These horizontally printed pages had to be folded in half to fit inside the book. These larger pages were used to print the* **A**, *vascular system and* **B**, *nervous system of the manikin. The illustration of the female genitalia was moved to the front of the vascular system page to avoid overlap with the head, as seen in the 1543 editions. A third standard-sized page, identical to those from the 1543 editions, was used to print the organs and male genitalia.*[6,7] *Figures are in the public domain, retrieved from Internet Archive.*

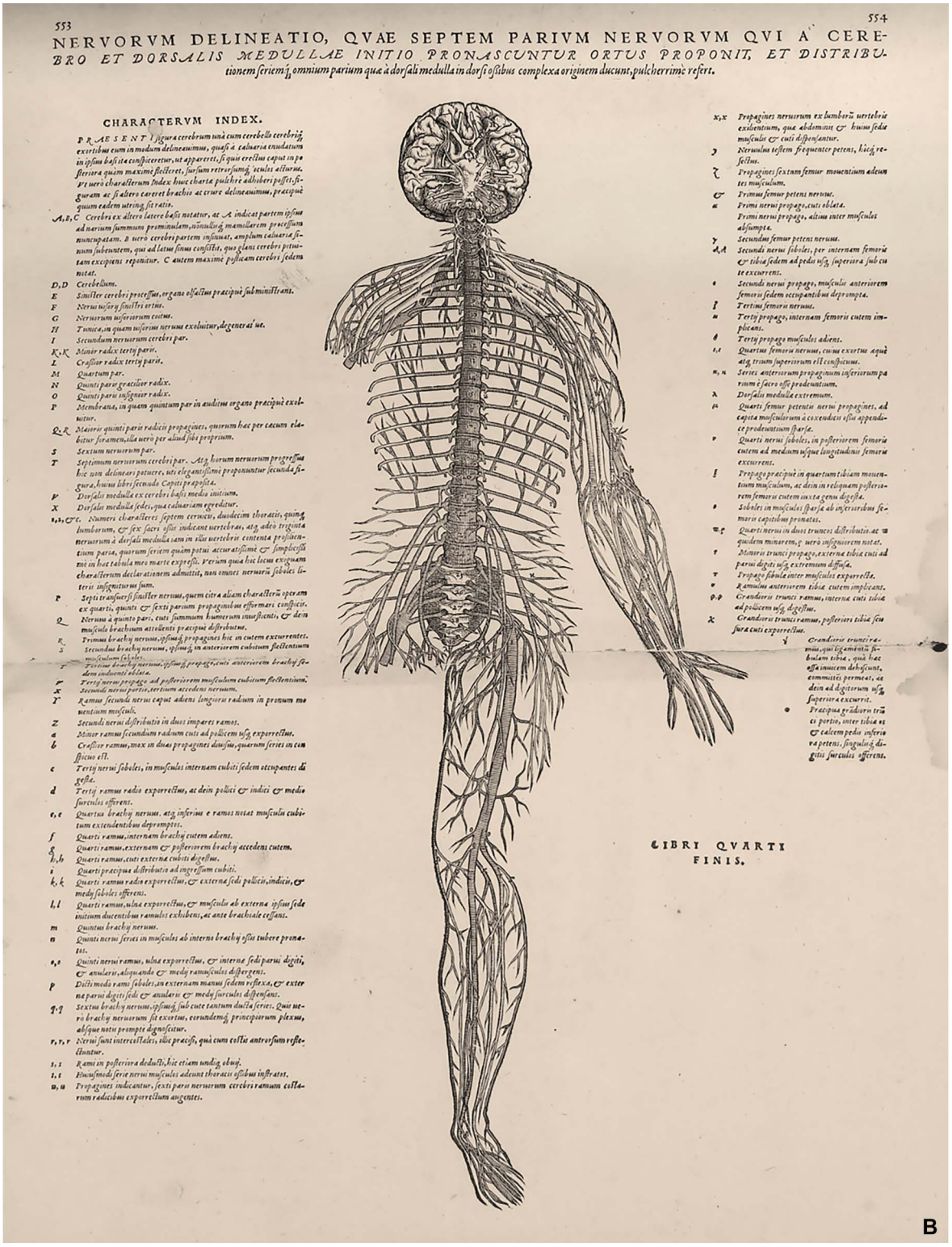

FIGURE 6. *Continued.*

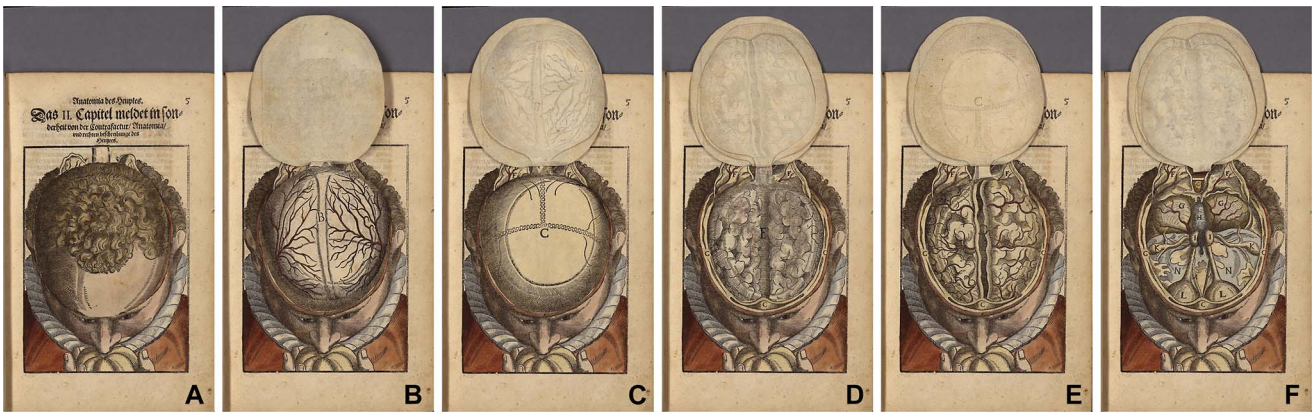

FIGURE 7. A-F, *Anatomic fugitive sheet from Ophthalmodouleia by Georg Bartisch, 1583, featuring flaps that reveal layers from the head to the skull and brain, all depicted in a stylized, cartoonish manner.*[38] *Figures are in the public domain, retrieved from Internet Archive.*

However, Vesalius's manikins were accurate and valuable, and they were conceived to support his learning methods. In 1583, Georg Bartisch[38] published *Ophthalmodouleia* in Dresden. Although the primary focus of that text was on the eyes, it also featured intriguing flap illustrations of the brain (Figure 7). Although these likely did not serve as an anatomic guide, they were an attractive and unique application of the technology to show brain anatomy. Johann Remmelin's 1619 *Catoptrum microcosmicum* also featured flap illustrations of the brain, yet this element constituted a minor part of the illustrations, primarily focusing on the body, with detailed engraving and scientifically complex parts.[39] Copies of *Catoptrum* were printed into the mid-18th century, demonstrating the continuous popularity of anatomic flap sheets.

CONCLUSION

Vesalius's *Epitome* and *Fabrica* manikins provide some of the earliest examples of a teaching tool designed to help students consider anatomy in spatial relationships. Although he has been hailed for destroying ancient dogma by correctly illustrating dissections and his anatomic discoveries, Vesalius created a unique, accurate, applicable, and carefully planned anatomic artistic concept and tool that took advantage of developments in printing and communication technology to guide students, instigated by his belief that effective learning must be in the hands of the dissector. "[W]hatever our sloth in the thorough Mastery of Anatomy as the foundation of the medical art, I have assumed that no demonstration is required of how necessary the knowledge of human parts is for us who have enlisted under the banner of medicine, since the conscience of each and all will bear full testimony to the fact that in the cure of illness the knowledge of those parts lays rightful claim to first, second, and third place…."[4,5]

Funding

This study was supported by funds from the Newsome Chair in Neurosurgery Research held by Mark C. Preul and by the Barrow Neurological Foundation.

Disclosures

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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Acknowledgments

We are grateful for the expertise and project guidance of Joel A. Klein, PhD, Curator in The Huntington Library, San Marino, California, and Arlene Shaner, MA, MLS, Historical Collections Reference Librarian at the New York Academy of Medicine. We thank the staff of Neuroscience Publications at Barrow Neurological Institute for assistance with manuscript preparation. Author Contributions: Conception and design: TJO, YX, JHJ, MCP. Acquisition of data: all authors. Analysis and interpretation of data: all authors. Drafting the article: TJO, YX, MCP, JHJ. Critically revising the article: TJO, TFD, MCP. Reviewed final version of the manuscript and approved it for submission: MCP.

COMMENTS

The digital era has engendered much interest and activity in the creation of new ways to learn, including human anatomy. While dissection of human cadavers is a critical part of medical student education, all the way through to experienced surgeons planning new techniques, the benefits and the beauty of computerized models cannot be denied. Who would argue against all of this new technology?

In fact, as this article illustrates, the notion of 3-D anatomic education is hardly new. While the history of Vesalius's Fabrica is well-known and much has been written about its composition, the Epitome is less so. The use of "manikins" that were constructed based on the relevant sheets from the latter book is most interesting, especially in light of the contemporary digital methods, which are still evolving, of teaching anatomy in three dimensions.

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