Images as Arguments: How Vesalius Beat Galen

“I am not accustomed to saying anything with certainty after only one or two observations”

-Andreas Vesalius

Andreas Vesalius was a sixteenth-century Renaissance physician and artist who was regarded as “the father of modern anatomy.” He is most well-known for his influential textbook of the human anatomy *De humani corporis fabrica*, or *On the Fabric of the Human Body* (1543). He was born in Belgium but studied at the University of Padua in Italy, and he eventually became the the Imperial Physician at the court of Emperor Charles V. After spending years traveling and giving guest lectures on surgery and anatomy, Vesalius sat down with Johan van Calcar to publish *On the Fabric*. Perhaps Vesalius’ most innovative contribution was that he utilized reproducible prints in his famous publication *De Humani Corporis Fabrica* to assert that the human body was quite different than the ancient anatomist Aelius Galen (130-210 C.E.) originally described. Vesalius’ unprecedented use of images alongside text shifted the paradigm surrounding medical education and the controversial dissection of human cadavers in lieu of animals. Firstly, Vesalius’ use of images was a revolutionary approach to spreading new anatomical and medical knowledge to a larger audience. Additionally, the inclusion of Vesalius’ detailed images and text in the *Fabrica* utilizes “comparative authority,” a term coined by Trinity College professor Sachiko Kusukawa, to argue that the human anatomy was strikingly different from Galen’s depiction.

For instance, in one illustration of the human musculoskeletal system, Vesalius includes an anatomical structure that is found only in the necks of apes and dogs. However, the
concomitant text in the Fabrica explains that he purposely inserts it there to demonstrate that Galen’s representation of the human body was antiquated. This comparison grants power to Vesalius’ argument because his images present a context in which his anatomical discoveries are theoretically reproducible. Informed by first-hand experience in human dissection, Vesalius’ illustrations provide Renaissance medical students the opportunity to connect their textual studies to a concrete image.

Through Vesalius’ unique use of images in text and his presentation of contemporary medical knowledge in De Humani Corporis Fabrica, his exciting, although controversial, ideas gained authority over Galen’s ancient assertions about the human anatomy and medicine.

**Vesalius’ Use of Images in Text**

Andreas Vesalius (1514-1564) was a Renaissance physician and artist who is most well-known for his publication De Humani Corporis Fabrica, or On the Fabric of the Human Body. Descending from a family of physicians, Vesalius was born in Belgium but received his Doctor of Medicine from the University of Padua in Italy from 1537 to 1542. His first anatomical publication included six plates, now known as the Tabulae Anatomicae Sex (1538). After this work was successful, Vesalius went on to publish a few other works before he published De Humani Corporis Fabrica in 1543. Vesalius engraved his remarkably detailed plates depicting the human anatomy in Venice, and they were published at Basel by the printer Johannes Oporinus. A second edition was published in 1555, and the plates were passed among European publishers after Oporinus died.
Prior to Vesalius’ groundbreaking publication, the main method of teaching anatomy was through reading classical texts, particularly Aelius Galen (126-200 C.E.). A Greek physician, he was the most accomplished medical researcher of antiquity. His understanding of the human body revolved primarily around the four humors: black bile, yellow bile, blood, and phlegm. Galen compiled most of the information for his anatomical treatise *Institutiones Anatomicae* through the dissection of monkeys and pigs, and his theories dominated Western understanding of the body and medicine for more than a millennium.

To counter Galen’s claims, Vesalius utilized a relatively new method for studying anatomy: human dissection. According to John Murray, “From Classical Antiquity onwards, there have been reasoned objections to human anatomy on the grounds that the information it provided could be more easily obtained by means other than deliberately cutting into a dead human body . . . by analogy with dissected animals.”

There were long-standing objections to human dissection based on religious reasons or the idea that human dissection was unnecessary when animals could be used in place of humans. Vesalius scholar Philip Oldfield notes, “Even though religious authorities did not explicitly condemn dissection, there was a general sense that opening a cadaver was a sacrilegious and barbaric act.” The taboo nature of dissection had kept physicians from dissecting human specimens for hundreds of years, however, scholars had started to abandon this convention around the early thirteenth century.

Not only did Vesalius depart from tradition by conducting human dissections but also he performed them in a manner that was extraordinarily unique. In contrast to prevailing medical culture, Vesalius performed the dissections himself; other physicians had menial workers do the cutting as they directed from a pedestal (See *Figure 1*). In this image, it is important to take note
that the physician is seated at the elevated podium, directing workers to perform the surgical cuts. Vesalius would not have practiced in this manner, as he was doing the cuts himself.

In fact, the frontispiece of the Fabrica itself shows him with his hands directly on the cadaver that he is dissecting (See Figure 2). As Sachiko Kusukawa has asserted, “The portrait of [Vesalius] shows [him] dissecting the forearm and the hand with his own hands . . . the piece of paper on the table contains the opening line of the chapter in De fabrica on the muscles of the fingers.” This frontispiece from the first edition of the Fabrica is turbulent with many figures, including government and church representatives, surrounding Vesalius as he dissects a body in an anatomical theater. The image is packed with symbols reflecting Vesalius’ own views of dissection, such as his commitment to surface anatomy represented by the man clinging to the surface of the column on the left side of the frontispiece. Saunders and O’Malley go on to comment in the preface to their English translation of the Fabrica, “[Vesalius] signalizes the break with authority by descending from the chair, dispensing with the ostensors or demonstrators, and relegates the menials who formerly did the dissection to a position beneath the table where they are seen quarreling amongst themselves.” The chair that Saunders and O’Malley refer to is the position in which the physician would seat himself on a pedestal in order to direct workers how to conduct the dissection of the cadaver. Vesalius broke this long-standing tradition by performing the dissection himself, and his plates reflect this because they are often depicted from a surgeon’s viewpoint.

Plate 61 of De Humani Corporis Fabrica is a wonderful example of Vesalius’ use of a surgeon’s viewpoint on a specimen (Figure 3). Because the image is constructed so that the viewer is looking directly into the body cavity, the viewer can picture himself in the shoes of
Vesalius as he is performing the dissection. To accompany the illustration, Vesalius writes exactly how he performed the surgery as well:

*We have removed the skin from the right breast of the present figure so that the nature of the breasts might be exposed to view as far as possible. Then we have cut away the stomach, the mesentery with the intestines, and the spleen, while leaving the rectum as in the immediately preceding figure.*

Vesalius walks the reader through the dissection, describing the steps about how he removed the skin from the breast. His words once again reflect his dedication to surface anatomy, as he describes removing the skin, the outermost surface of the body. His illustration places a unique emphasis on the skin as well in *Figure 3*. The viewer can actually see the surface of the skin as if it were being pulled back from the cadaver because Vesalius includes tremendous visual depth in the skin folds near the lower half of the body. His illustrations show the body being opened as if it were a book, and the skin is its cover.

Vesalius’ use of images in the *Fabrica* also departed from customary use of images in medical texts. Although images had been used in some medical textbooks prior to the *Fabrica*, Vesalius uniquely exerted control over image placement and how the images were used. Saunders and O’Malley note, “Few anatomical works up to this time had been illustrated, and of those that were, the illustrations were little more than symbols or decorations.” However, Vesalius chose to include extremely detailed illustrations in the *Fabrica*, which was an unprecedented tactic in the study of anatomy. The sophisticated use of illustrations are informed by his first-hand experience in human dissection. The human figures included in the publication
provided students the means of connecting their textual studies in the human anatomy and medicine to a concrete image.

Vesalius utilizes images further by cross-referencing them to the accompanying text and other images in the Fabrica. A clear example of his use of textual referencing can be noted in the writing that accompanies Plate 68 of the Fabrica (Figure 4). This plate depicts a cross-section of the skull in which the dissected brain is exposed. Vesalius writes:

> In the fifth figure, since it concerns the portion of the brain left in the skull, differs in no way from the preceding and has only this special significance, that here for the first time we have freed the corpus callosum in its anterior part from the brain.

Vesalius chooses to reference not only the image he is illustrating but also he chooses to compare this image with another image of the brain included in the Fabrica. This represents a unique educational tactic in which Vesalius interacts with both text and image. Calkins and Franciosi present an interesting viewpoint that human anatomy and scientific illustration are not two separate disciplines but rather they emerged together.

According to Calkins and Franciosi, the study of human anatomy relies on scientific illustration. This argument makes an interesting claim because many scholars argue that Vesalius is the father of human anatomical science, and his fame relies on his imagery. However, Calkins and Franciosi overlook the fact that human anatomical science and Western medical practices relied on written text for hundreds of years before Vesalius’ De Humani Corporis Fabrica was published in 1543. Galen’s treatise, although it was not necessarily anatomically correct because it relied on dissection of dogs and apes rather than humans, dominated Western ideas about medicine all the way through Vesalius’ time. Even if the
information included in Galen’s work was not anatomically accurate when applied in the context of humans, Galen’s work still represents a thorough study of anatomical science despite its lack of images. However, there is no doubt that Vesalius’ use of images in the *Fabrica* presented a new way to study anatomy that provided the student with a concrete visual figure to accompany the text.

Additionally, the inclusion of images provides power to Vesalius’ claims about the human anatomy because images provide a context in which his anatomical discoveries are theoretically reproducible. Images, as Sachiko Kusukawa has pointed out, have authority because they make the theoretical tangible, particularly in the case of natural history. She writes, “Pictures enabled scholars to access unobtainable objects, build up knowledge of rare objects over time, and study them long after the live specimens had died away.” Although Kusukawa is referring to the study of nature in general, her words apply to Vesalius’ anatomical studies because prior to his popularization of human dissection, the study of human anatomy was not necessarily obtainable to the average student. Additionally, her thoughts apply to the human anatomy because the images on Vesalius’ plates are reproducible and allow students to learn from the cadaver he was dissecting to build further medical knowledge. In the text accompanying Plate 59 of the *Fabrica* (*Figure 5*), Vesalius describes his dissection sequence of the torso:

*The present figure follows the twentieth in the sequence of dissection. In it the ends of several ribs have been fractured and turned upwards and outwards so that the hump of the liver is here seen in the same way that its hollows are brought into view. . .the pubic bones are seen to have been divided and so separated from one another as to gape open*
markedly. . .However, the fact that in the figure we have stripped the skin entirely from
the right thigh and partially from the left will, I imagine, confuse no one.¹

In the text on Plate 59, Vesalius walks the reader through the sequence of dissection by writing
that he peels back the skin on the right thigh to expose the muscles, and he fractures the ribs and
turns them upwards to expose the body cavity. This provides an explanation for how he
conducted his dissection, and theoretically, how a student could dissect a cadaver in the same
manner.

Kusukawa asserts, “Images, alongside objects and text, were an important means of
studying nature. Naturalists’ images, in turn, became part of a larger visual culture in which
nature was regarded as a beautiful and fascinating object of admiration.”⁹ Vesalius’ use of
images provided grounds and inspiration for further anatomical study that went against the
established taboo against human dissection. Vesalius enables his readers to conduct their own
dissections by providing not only an explanation of how he conducted the dissection, but also the
tools he used.

Vesalius gives additional explanation of the process of his dissection by including a plate
devoted entirely to his tools. Vesalius includes illustrations and descriptions of the functions of
tools on his board in Plate 42 of the Fabrica (Figure 6). He writes:

In the present figure we have placed a board such as we employ in vivisections, resting
on a table. On this board we have arranged almost everything which could be used in the
administration of dissections . . . We illustrate in this figure the instrument with which the
harder bones are perforated with little difficulty.¹
The mere fact that Vesalius chose to include this illustration in his publication demonstrates that his work is reproducible and students are encouraged to perform dissections. By describing the specific tool which he uses to dissect hard bones of the body, likely the femur or hip bones, he provides the information a medical student requires to potentially conduct a dissection himself.

The idea of reproducibility can be further extrapolated in a simpler form to mean that Vesalius’ plates can be made into many print copies to be circulated and sold to students. Susan Dackerman echoed this idea: “What makes prints such effective matrices for the production of knowledge in the early modern period? The simplest answer derives from their materiality . . . Each woodblock or copperplate had the potential to produce multiple impressions.” Vesalius’ plates could create hundreds of impressions that could undoubtedly reach a broader audience studying medicine and human anatomy.

On the other hand, some scholars argue that Vesalius’ use of images to depict the body was not in fact unprecedented because people had been using images to depict nature for thousands of years, dating back to the Egyptians and Native Americans who made diagrams describing what happened to a tribe member who contracted food poisoning from consuming bad fish. Frank Netter presents information on the traditions of human medical illustrations through the centuries and makes the claim that images have been a vital means of transmitting medical knowledge for thousands of years. However, Vesalius’ use of images is unprecedented because he is presenting images as a means of analyzing the body and its functions rather than just describing medical ailments.

In the previous examples from the Fabrica, Andreas Vesalius undoubtedly analyzes the human anatomy through his utilization of both text and image, but his illustrations often
generalized the human body to produce an idealized figure. This leads to the question of how Vesalius’ analysis was affected by his generalizations, and what implications the generalization of human anatomy had on the medical student using his text. When a reader viewed an image from the *Fabrica*, he was not necessarily viewing an anatomically accurate image because Vesalius often left out pieces of information, which created an idealized image. On Plate 63 of the *De Humani Corporis Fabrica*, Vesalius illustrates details of the thoracic cavity (*Figure 7*).

To accompany this figure, Vesalius writes:

> The present figure shows from the left side as great a part of the human body, lying on its back, as we considered sufficient to demonstrate the seat of the thorax . . . Having fractured the ribs (as occurs in the process of dissection) we pulled the cartilages of the ribs upwards towards the right side so that the thoracic cavity and the membrane dividing it, the lung and the rest of the structures might come into view.¹

From looking at the image itself, the average viewer with some medical knowledge can quickly discern that Vesalius has excluded many of the structures of the human body. In his text, Vesalius acknowledges that he has omitted many structures of the body by referring to the positioning of the figure as *sufficient* to demonstrate the thorax. The word *sufficient* implies that Vesalius did not include every organ system in his illustration, including the kidneys and gastrointestinal system.

Perhaps one of the most extreme examples of Vesalius’ idealization of the human anatomy can be noted from his entire third book of *De Humani Corporis Fabrica* which describes the veins and arteries of the human body. On Plate 44, Vesalius illustrates the pathway of the arteries originating from the heart with a focus on the aorta (*Figure 8*). Vesalius describes...
this illustration with the accompanying text: “A complete delineation of the entire great artery freed from all parts. [In their English translation, O’Malley and Saunders interpret the great artery to be the aorta, the main artery originating from the heart muscle that supplies blood to the whole body.]” By depicting the aorta freed from the other organ systems of the body, Vesalius is undoubtedly idealizing the figure. He is showing the pathway which the blood takes to supply oxygen to the muscles following its exit from the aorta, shown in the center of the chest in Figure 8.

However, Vesalius does remedy the lack of detail occasionally in some of his illustrations. In Plate 41 of the Fabrica, Vesalius depicts the larynx and pharynx completely separated from the body in several positions (Figure 9). To accompany this image, Vesalius writes:

The sixth figure illustrates the larynx freed from the rest of the rough artery in such a way that I have left on its posterior aspect no portion of the esophagus nor any part of the common muscle . . . The seventh figure contains the larynx portrayed from the right side so that its operculum together with the muscles connecting the second cartilage to the first have not been resected.

This image is the epitome of anatomical idealization because Vesalius is physically removing a body part and illustrating it separately from the body. In reality, a medical student would never encounter this structure in this manner where it is completely separated from a patient unless he happens to be conducting a dissection. Vesalius acknowledges this omission when he writes that he has left out the esophagus. By recognizing in his writing the portions of the body that he has removed for the purposes of illustration, Vesalius explains his dissection procedure and provides
an anatomical context for the body parts he is depicting. Therefore, the efficacy of his work as a presentation of medical knowledge is preserved because he is acknowledging what he has omitted from his illustrations and provides anatomical position such as his referring to the larynx being portrayed from the right side.

While sacrificing detail, the idealization of the human form has some benefits. For example, the medical student can focus on a single aspect of the human body that is generalized for all patients and master his knowledge of that body part or organ system. On the other hand, the lack of detail can be detrimental; it can pose difficulties for junior physicians to relate an illustration of a body to an actual patient whose organs may not take the same form or be in the exact same location as the model figure. Moreover, the student is not getting a “big picture” look at the human anatomy when the illustration omits other muscles and systems. Vesalius does use his text to remedy this difficulty by acknowledging the anatomical systems he has removed in some cases.

**Asserting his Argument**

Not only did Andreas Vesalius’ *De humani corporis fabrica* utilize images in a revolutionary way, but the publication also incorporated text to assert his argument. By including written passages that were integrated with the illustrations, Vesalius leveraged the authority of his illustrations, and by extension his own expertise, even further. On Plate 29 of the *Fabrica*, Vesalius illustrates the muscles of the human body in a figure that will be referred to as the “Splayed Man.” Vesalius chooses to depict a structure on the human neck that is only found in apes and dogs (*Figures 10 and 11*). Vesalius’ goal may be considered to accurately represent
objective anatomical “truth,” or, reflect nature. Vesalius accomplishes this through the use of comparative authority, a phrase coined by Sachiko Kusukawa to mean that one may enhance the power of his images to assert new knowledge by referencing previously established literature on the subject. Vesalius is leveraging comparative authority by referencing canonical anatomical text in the *Fabrica*. Because he presents the accepted information from Galen alongside the revolutionary ideas that he has showcased through his use of hands-on, human dissection, these images have more persuasive power. Vesalius discusses his inclusion of the structure in the human neck found only in apes and dogs by writing:

*The third muscle occurs only in apes and dogs, but I have included it lest someone who relies too much on the text of Galen without doing any cutting may talk some nonsense about my having overlooked some muscles.*

By including the neck structure in the image, even though it is not necessarily an accurate representation of the human anatomy, Vesalius adds clout to his argument because he is letting his audience know that he is knowledgeable on Galen’s anatomical treatise. In fact, he accomplishes this at a most basic level in choosing the title of his textbook. The title *De humani corporis fabrica* can be traced back to Galenic lineage because it was a title used by Theophilus Protospatharius in the seventh century.

Because Vesalius chooses to present his publication in a manner that acknowledges the authority of Galen, he is more persuasive with the revolutionary information he asserts. On Plate 58 (*Figure 12*) of the *Fabrica* Vesalius illustrates his dissection of the intestines and the stomach, and in the accompanying text, he writes:
In these figures I have attempted to represent the false teaching of physicians on the straining of the urine. In the upper figure I have sketched the kidney dissected from its hump towards the sinus or hollow, but in the lower, only the central portion is seen.¹

Again, Vesalius references the plate with his text to address the previous literature on human anatomy. By calling the previous information on the straining of the urine “false teaching,” he is directly referencing the inaccuracy of previous ideas about anatomy that were based on dissection of animals rather than humans. Through the use of comparative authority, Vesalius addresses the differences between his anatomical illustrations and the previously accepted literature on the human body, and in turn, makes his argument more persuasive to the audience.

**Winning the Battle**

In the sixteenth century, images played a key role in asserting new knowledge. Vesalius’ *De Humani Corporis Fabrica* represents a canonical text that presented revolutionary ideas about the human anatomy made possible by his hands-on dissection of human bodies and the construction of extremely detailed images based on his first hand observation. Through the explanation and visual analysis of several of Vesalius’ plates and text, in addition to a discussion of Leonhard Fuchs, a botanist who utilized similar methods as Vesalius to successfully assert new medical knowledge, this project demonstrates how Vesalius’ *De Humani Corporis Fabrica* overturned Galen’s ancient ideas about human anatomy. By utilizing comparative authority and addressing the established ancient text in his publication, as well as cross-referencing text and image, Vesalius successfully established revolutionary methods of understanding the human anatomy.
Figure 1: View of the Leiden Anatomy Theatre circa 1610. Provenance: Leiden University Library.
Figure 2: Frontispiece to the first edition of *De Humani Corporis Fabrica*, Basel, 1543.
Figure 3: Plate 61, Andreas Vesalius, *De Humani Corporis Fabrica*, Basel: 1543.
Figure 4: Andreas Vesalius. Plate 68, *De Humani Corporis Fabrica*. Basel: 1543
Figure 5: Andreas Vesalius. Plate 59, *De Humani Corporis Fabrica*. Basel: 1543
Figure 6: Andreas Vesalius, Plate 42. *De Humani Corporis Fabrica*. Basel: 1543
Figure 7: Andreas Vesalius. Plate 63, *De Humani Corporis Fabrica*. Basel: 1543.
Figure 8: Plate 45, Vesalius, Andreas, and Valverde, Juan De, Active 1552. *Vivae Imagines Partium Corporis Humani Aereis Formis Expressae*. Antverpiae: Ex Officina Christophori Plantini, 1572.
Figure 9: Andreas Vesalius. Plate 41, *De Humani Corporis Fabrica*. Basel: 1543
Figure 10: Plate 29, Vesalius, Andreas, and Valverde, Juan De, Active 1552. *Vivae Imagines Partium Corporis Humani Aereis Formis Expressae*. Antverpiae: Ex Officina Christophori Plantini, 1572.
Figure 11: Detail of *Figure 10*
Figure 12: Andreas Vesalius, Plate 58, Basel: Ex Officina Joannis Oporini, 1543
Endnotes


