

## Vesalius and the Languages of Anatomy

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Some years are pivotal in the history of publishing. Take, for instance, 1543. This was the year that Nicolaus Copernicus's *De revolutionibus orbium coelestium* (*On the Revolutions of the Heavenly Spheres*) transformed the way man understood his place in the macrocosm; likewise, this was the year that Andreas Vesalius's *De humani corporis fabrica libri septem* (*On the Fabric of the Human Body*) excavated man's microcosm to see what makes a human being "tick."<sup>1</sup> In the medical world, knowledge was no longer to be gained by pouring over the books of revered past physicians, Vesalius claimed, but by uncovering with one's hands, layer after layer, the unexplored mysteries of the human body. Dissection became a performative act that required a large audience and a theater. Such performances turned out to be so successful that they had to be repeated, and an array of books came out, whose frontispieces visualized a splayed male or female cadaver, revealing its cavities to a voyeuristic assembly of male onlookers. In the process of peeling away identities, eager anatomists opened, for all to see, the new human continent that once proclaimed only God's handiwork.

These decades were also the times of discoveries of new regions, different people, novel ways of life. As Columbus and European navigators rushed to locate, conquer, and name new lands—or to rename them for the kings, princes, and noblemen sponsoring their navigations—so the rush to get hold of bodies to dissect legitimized the desire of the new anatomists—the Columbuses of the fleshly *terra firma*—to see, check, finger, cut, discover, and then name or rename flesh, bones, muscles, organs, nerves, and tissues that knew no boundaries.

The question that tantalized Vesalius as a newly minted professor of surgery and anatomy at the University of Padua (his title was *explicator chirurgiae*) was staged in the title-page image of his watershed opus, the *Fabrica*: how to understand and master the human body, starting from the

beginning of life itself (see fig. 1). In this detailed illustration, the anatomist's head turns toward the spectator scrutinizing it, while his right finger points toward what he deems to be the empty uterus of the female cadaver he is dissecting. These two gestures forcefully proclaim that Vesalius now knows how to detect the chemistry of life, that "germinal stage" that only women bring to fruition. And he can teach about it too, as his left finger visually asserts by pointing up toward a capacity audience of students, university colleagues, onlookers, medical practitioners, religious figures, a naked man, a veiled woman, and, yes, putti too, crowding the fictional amphitheater where this performance is executed.

If the title page of the *Fabrica* was spectacular in its robust recreation of a scene of medical learning and knowing, the content of the volume was even more revolutionary in its precise, if awkward, Latin (the text has more than 700 folio pages and almost 400,000 words); in its punctilious anatomical explanations; and stunningly, in its pioneering realistic drawings.<sup>2</sup> Fully committed to the use of imagery in print to convey the meaning of his meticulous dissections, Vesalius contracted for the illustrations with the most skilled draftsmen in Titian's studio, and he even moved to Basel during the long printing process to be on site to key the body parts that he was analyzing to the woodcut illustrations by creatively using a combination of the Roman alphabet, Greek letters, and Arabic numerals. The *Fabrica* turned out to be a collector's item right away, no matter how expensive, as the visualized human *corpus* inaugurated a radical shift away from the rambling and imprecise written *corpus* that had then defined medical knowledge. In due time, it paved the way for a stunning series of advances and laboratory breakthroughs that followed in physiology, cell biology, biochemistry, epidemiology, immunology, and genetics. It also paved the way for the advent of x-rays, which offered a multiplicity of representations—such as 3D imaging, ultrasonography, thermography, color-coded x-ray, and gamma ray—each presenting new, sometimes exceptional, ways to see and understand the human body.

Yet, no matter the fortune and the reverence that immediately distinguished the written text of the *Fabrica*, it was Vesalius's announced displacement of the "book"—of Aristotle, of Galen, of Arabic medieval doctors—in favor of what can be seen or touched that made anatomy a necessary discipline to teach and its practitioners highly paid specialists. To sum it up in the words of the French physician Jean François Fernel (1497–1558), "Anatomy is to physiology what geography is to history: it describes the theater of events," and thus it is vital to the medical profession.<sup>3</sup> That seeing,



Figure 1.  
Title page of Andreas Vesalius, *De humani corporis fabrica libri septem* (Basel: Joannes Oporini, 1543), classmark alc fQM21.V588. Reproduced by permission of the Special Collections Research Center, University of Chicago Library.

touching, and learning go hand in hand is evident in Vesalius's insistence that the anatomist should unite in himself the three offices held by anatomy instructors in medical schools until then: that of the *magister* (professor sitting *ex cathedra*), *demonstrator* (surgeon, cutting the body, but more often a barber or even a butcher), and *ostensor* (the assistant pointing out the part being examined). These offices can be seen in the well-known illustration of the method in Mondino de' Luzzi's first modern how-to dissection manual, which was printed in Johannes de Ketham's *Fasciculus medicine*.<sup>4</sup>

Vesalius intentionally defined the work of the anatomist as *manuum munus*, that is, the anatomist has hands that have a task, a purpose.<sup>5</sup> The hand guided him to touch what he was studying, so that the "animal spirit," as Galen called it, the brain, could make sense of this new knowledge. The hands were the true instruments of the Vesalian "revolution," the foundation of anatomy as the study of structures of the body that can be seen and handled. The hand can substitute for the book, for touch has the power to contest written authority. And indeed, touch may have proven to be Vesalius's most lasting gift to today's medical practitioners. With the advent of the Internet in the 1990s, some medical schools in the United States briefly chose to deemphasize the importance of what can be learned through touch by substituting what 3D imaging offers on the screen. In a sense, they made a return to the still image and the written page. They found out quickly how insufficient a learning tool that was and sent their apprentices back to the dissecting room with the scalpel.

For those students who were unable to observe an anatomist at work, Vesalius also invented a new genre of illustration, the flapbook, in which a male and a female manikin were each supplied on a folio with a diagram of organs.<sup>6</sup> Students were encouraged to cut out the various body parts and paste them back onto the figures in a sequence of steps, correctly superimposing each anatomical system, as if they were visually reconstituting a tactile, tri-dimensional human being.<sup>7</sup> Thus, touch could be aided by the eye in re-forming man, and man alone—no longer the Barbary apes, monkeys, dogs, pigs, cows, goats, and cocks of Galen, acting as surrogates for humans—became the touchstone of accuracy in anatomy, as Vesalius repeatedly pointed out in correcting his illustrious predecessor. This did not necessarily mean that the new anatomists perfectly understood what they saw, including Vesalius, or that they trusted what they saw, if it was patently different from what could be seen in animals, but the urgency to study the geography of the human body had grown to a stampede.

Five hundred years have passed since Vesalius's birth in Louvain, a

Flemish/Netherlandish city, and the occasion is ripe for taking a second look at his legacy. In fall 2015, I organized an exhibit on the topic at the newly opened David M. Rubenstein Rare Book and Manuscript Library at Duke University, followed by a symposium entitled “The Languages of Anatomy: From Vesalius to the Digital Age.”<sup>8</sup> I also cooperated on a parallel symposium with my friend and colleague Maurizio Rippa Bonati, a doctor and historian of medicine at the University of Padua (our earlier work together was on Renaissance costume books and on flap anatomies).<sup>9</sup> He was involved at that time with the establishment of the Museum of the History of Medicine in Padua and in organizing a symposium there entitled “Andrea Vesalius, *Patavinus Professor: Una nuova anatomia per la medicina moderna.*” In this special issue of *JMEMS* that we are jointly editing, we are showcasing some of the new research presented in both symposia by historians, cultural historians, and humanists.

This issue starts with naming: Jonathan Sawday’s essay is concerned with the geographically and anatomically layered history of accepted nomenclature, an enterprise very much at the center of the politics of knowledge production in the Renaissance. In mapping the natural environment and man’s anatomy at a time when many geographers were trained as physicians, Sawday shows that what is in a name is always more complex and more subject to variations and revisions than appears on the surface. Given the uncertain and imprecise terminology used by Galen and his followers, naming things properly was a necessary enterprise to ensure the success of bodily explorations, Sawday argues, and thus anatomists set out to diligently designate all the various “ducts, membranes, valves, spaces, canals, ligaments, triangles, loops, nodes, cords, and bundles out of which ‘we’ are, in some corporeal sense, composed.”

Vivian Nutton’s examination of Vesalius’s earlier works, *Tabulae anatomicae sex* and *Institutiones anatomicae secundum Galeni sententiam*, comes next. Both books were published in 1538, a watershed year for the young surgeon, who was negotiating the knowledge provided by his training in Paris with his drive to learn more through his scalpel directly on cadavers, a drive that had motivated him to enroll at the University of Padua one year earlier. Both books announced in different ways how Vesalius’s ideas about the body were evolving through study and experimentation. In examining newly discovered annotations made by Vesalius to his own copy of the *Institutiones anatomicae*, the notes of one of his students in Padua, as well as the first and second (corrected) editions of the *Fabrica*, Nutton follows the Vesalian project of bringing the professionalism and exactitude of his public

and private dissections onto the printed page. The anatomist was known for being always willing to correct himself, if his knife had uncovered novelties that challenged his understanding.

Michael Stolberg's article, too, examines notes in manuscripts of the sixteenth century in order to bring to light what kind of hands-on anatomical instruction students were receiving at the medical school in Padua. By concentrating on previously unstudied German students' accounts of how anatomy was taught, Stolberg shows that Vesalius was not a lone genius, as the lore that followed his rapid ascension to the Olympus of medical scientists seems to attest (perhaps because of his personality). Rather, he worked in an environment that was conducive to or even actively facilitated the work of anatomists. In fact, Stolberg points out, Vesalius was not even the most skillful with the scalpel at the university and discovered relatively little aside from pointing out a number of errors in Galen. Posterity facilitated his fortune because, unlike his successors in Padua, Realdo Colombo, Gabriele Falloppia, and Girolamo Fabrici d'Acquapendente, Vesalius published his work during his own lifetime with outstanding accompanying illustrations.

Jennifer Kosmin studies the female cadaver anatomized on the *Fabrica*'s title page to reconstruct the skirmishes between university doctors and midwives regarding who can properly read—and understand—the female body. That woman, splayed transversally Mantegna-like on the table, and purposely drawn to be large and monstrous with degraded facial features, had claimed to be pregnant in order to avoid execution. The midwives had already certified that she was not, but they had no university degree and no forum to present their expertise. It was left to Vesalius to confirm their finding. Kosmin reconstructs the use of anatomical texts in midwifery manuals; addresses the requirement that midwives be formally educated and attend anatomical classes, even though their own experience at the bedside of pregnant women was often more productive; and follows the legislation that limited their autonomy in order to be licensed. It was the paying public in the end that resisted the masculinization of midwifery in Italy, Kosmin asserts, because in practice many patients trusted the experience of midwives over the medicalization offered in obstetrics courses reserved for male students.

In the next essay, Pablo Maurette spotlights the hand, that most intricate organ with complex structural characteristics and mechanisms, and one so indispensable to the work of the surgeon, as much as his mind. In a celebrated portrait of Vesalius in the *Fabrica*, the only one in fact that accurately preserved his facial features for posterity, Vesalius shows himself engaged with examining and understanding the superficial and deep flexor

tendons of an arm, and thus the mechanics of the hand's operation, pairing his own dissecting hand to the intricate composition of the hand he is dissecting. This validation of tactility represents for Maurette the broader epistemological shift from authority to skill that took place in the Renaissance, as the hand now fully embodies the weight of human agency at the same time that it testifies to its benevolent Creator.

Extending further the examination of Vesalius's impact on medical treatments, Cynthia Klestinec shows how significant were his illustrations of skeletons and detailed body parts in the *Fabrica* for connecting the two disciplines of anatomy and surgery, which were at the time quite separate. Surgeons dedicated themselves to restoring the body after injuries, and thus cared for wounds, fractures, and dislocated joints. Thanks to the rapid diffusion of Vesalius's skeletons, especially those from his *Tabulae anatomicae sex*, by the middle of the sixteenth century surgeons started to give more importance to images as they worked their way through operating techniques in books. Thus, in the diffusion of texts on surgery concentrating on legs and bones, printers, editors, and translators were united in providing what Klestinec calls "a visual or virtual archive of the body," linking anatomy to the functional repair of an injured body.

Finally, allying physiology and literature, Amanda Taylor connects Vesalius to book II of *The Faerie Queene*, where Edmund Spenser allegorizes the body in relation to the issue of temperance. By the time he first published this epic romance in 1590, the enthusiasm for anatomical knowledge that Vesalius had spearheaded in the medical world had spread to literature, even in England, as in Spenser's book II. Taylor argues that both the anatomist and literary allegorist, drawing on Galenic theory about the changeability of the body within its environment under various influences, treat the body as a site of knowledge production. The body as represented in Vesalius's musculen and bonemen, sketched from the lifeless cadavers of criminals and other abject persons, is evoked in turn in Spenser's treatment of the body as a castle under siege whose virtue is mortally threatened. Yet both Vesalius and Spenser demonstrate that the body can be reconstituted, thus potentially turning an act of violence into one of restoration and regeneration.

One of the most provocative and well-known illustrations in the *Fabrica* is that of a melancholic skeleton contemplating a skull, which he holds in his right hand. The figure is set in a graveyard and the background is vaguely reminiscent of the Euganean Hills just outside Padua. This iconic image has given food for thought not only to philosophers examining the *vanitas* of life, but also to physicians and researchers studying the physiology and psychology

of mental activity through the centuries. For Vesalius, often referred to as the father of modern anatomy, life and death come together in this figure as he, the dissector of humans for the sake of knowledge, ponders the meaning of man's existence on earth. However, it is the inscription on the pedestal over which the skeleton is leaning that I would like to highlight here. It states, "Vivitur ingenio, caetera mortis erunt," that is, "Genius lives on, all else is mortal." Vesalius died at fifty in 1564 on the Greek island of Zakyinthos following a shipwreck as he was returning to Venice from a pilgrimage to the Holy Land. Where his body was put to rest is unknown.<sup>10</sup> But it is his genius, that is, his talent and capacity to theorize from observation, that still captivates us today and inspires rereadings of his legacy, as the essays in this volume amply testify.



## Notes

- 1 Nicolaus Copernicus (1473–1543), *De revolutionibus orbium coelestium* (Nuremberg: Johannes Petreius, 1543); *On the Revolutions of the Heavenly Spheres*, trans. and ed. A. M. Duncan (Newton Abbott, Devon: David and Charles; New York: Barnes and Noble, 1976); Andreas Vesalius, *De humani corporis fabrica libri septem* (Basel: Joannes Oporini, 1543; 2nd ed. 1555). In English, see *The Fabric of the Human Body: An Annotated Translation of the 1543 and 1555 Editions*, trans. Daniel H. Garrison and Malcolm H. Hast, 2 vols. (Basel: Karger, 2013).
- 2 For the number of words, see Charles O'Malley, *Andreas Vesalius of Brussels, 1514–1564* (Berkeley: University of California Press, 1964).
- 3 Jean François Fernel, *On the Natural Part of Medicine* (1542), cited in Charles Sherrington, *The Endeavour of Jean Fernel* (Cambridge: Cambridge University Press, 1946), 64.
- 4 The illustration appears in Johannes de Ketham (active in the fifteenth century), *Fasciculus medicine* (Venice: Joannes and Gregorius de Gregoriis fratres, 1500), sig. D3v. The first edition of 1491 was the first printed book to contain anatomical illustrations.
- 5 Vesalius, *De humani corporis fabrica* (1543), fol. 3r.
- 6 See folio 12v for the female and 13v for the male in Vesalius's *Epitome*, which was published as a companion piece to the *Fabrica*. Andreas Vesalius, *De humani corporis fabrica librorum epitome* (Basel: Joannes Oporinus, 1543).
- 7 Many broadsides or fugitive sheets, as they are called, showing the body in various stages of dissection, were subsequently produced and collected both by medical practitioners and a curious public at large. For a list, see Andrea Carlino, *Paper Bodies: A Catalogue of Anatomical Fugitive Sheets, 1538–1687*, trans. Noga Arikha (London: Wellcome Institute for the History of Medicine, 1999). See also K. B. Roberts and J. D. W. Tomlinson, *The Fabric of the Body: European Traditions of Anatomical Illustration* (Oxford: Clarendon Press, 1992).



- 8 For the exhibit at Duke University, I would like to thank Rachel Ingold, curator of the History of Medicine Collections in the Rubenstein Rare Book and Manuscript Library, and Meg Brown, the exhibit coordinator at Perkins Library, for their work, insights, and cheerfulness in helping to put it together. The exhibit ran from August through November 2015.
- 9 For our earlier exhibition at Duke University on anatomical books with movable flaps, which opened in spring 2011, see Meg Brown, “Flip, Flap, and Crack: The Conservation and Exhibition of 400+ Years of Flap Anatomies,” *The Paper and Group Annual* 43 (2013): 6–14. The videos related to how these movable images function, from the earliest ones to the ones in color of the nineteenth century, can be found at Duke University Libraries, “Videos of Flap Books,” *Animated Anatomies* (2011), <http://exhibits.library.duke.edu/exhibits/show/anatomy/video>. I would like to thank once again Rachel Ingold and Meg Brown for their assistance on this project.
- 10 “Our fate destined for us an un-mournd grave,” the poet Ugo Foscolo wrote in “A Zacinto” (“To Zakinthos,” 1802–3), a poem familiar to every Italian school child.

