

Medicine in Stamps

Andreas Vesalius (1514-1564): Father of Modern Anatomy

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For some 1500 years, Galen's teachings dominated the practice of medicine. He bequeathed the science of clinical experimentation, but his grip inhibited open discourse for a surprisingly long time. Even as Galen correctly emphasised anatomy as the foundation of human pathology, he drew many incorrect conclusions by extrapolating findings from dissecting animals rather than human cadavers. In the 16th century, courageous minds of the Renaissance openly challenged and finally supplanted Galenic thoughts. Foremost among these was Paracelsus, the irrepressible Swiss physician who publicly burnt Galen's books, and Ambroise Paré, the gentle surgeon of France, who replaced old cruel methods with improved care of surgical wounds. But to Vesalius, the brilliant Belgian anatomist, goes the credit for decisively liberating medicine from the errors of Galenic dogma.

Anatomy Through the Years: Anatomy is an ancient science. A picture of an elephant, with an outline of a heart within it, can be found in a prehistoric cave in Spain. However, the physicians of antiquity, including Hippocrates and his followers, cured without understanding anatomy, and linked disease to patient type, not organ dysfunction. Two ancient Greek physicians, Herophilus (4th Century B.C.) and Erasistratus (3rd Century B.C.), stood out for their special interest in anatomy. Both worked in Alexandria, Egypt where limited human vivisections were allowed for a time. Herophilus came from the Hippocratic School, and described the anatomy of the eye, nervous system, digestive tract and genitalia. Erasistratus, a follower of the competing Cnidian School, described the structure of the heart, liver and brain. Importantly, he recognised that symptoms of diseases could be linked to specific organs. The influence of these two physicians gave Alexandria the reputation as the



ancient centre for anatomical studies. Indeed, Galen himself had travelled there in the 2nd Century A.D., although by that time, human dissection was forbidden, and only human skeletal remains were available for study.

The Legacy of Vesalius: Andreas Vesalius was born on the last day of 1514 into a Belgian family of physicians. At the age of fifteen, he entered the University of Louvain and at eighteen, studied medicine first at the University of Paris and then at Padua in Italy. At age twenty-three, he was appointed professor of surgery and anatomy in Padua. As a youth, Vesalius often carried out dissections on small animals that he caught. The family lived near a wooded stretch of land known as Gallows Hill, where criminals were executed. Their bodies were left out in the open, and Vesalius no doubt had ample opportunity to become accustomed to human remains. At the University, anatomy was taught by a professor sitting in his chair, intoning Galen's text in Latin, while a barber surgeon did the actual dissection, and a demonstrator pointed out the body parts to the bored students. One of Vesalius' professors was Jacques Dubois, who would read the Galenic text as the dissector and demonstrator proceeded with the dissection. However, the text did not always correspond to what the watchful young student observed. For example, Galen's book described the jawbone as being composed of two parts, whereas Vesalius observed that the human jawbone had only one section. The professor in the meantime had not bothered to match physical evidence with text, and had simply assumed that Galen could not be wrong.

Unimpressed by his formal training, Vesalius continued to expand his anatomical knowledge by carrying out dissections on executed criminals. It was this careful dissection of human cadavers that set Vesalius apart

from all who preceded him. In addition to his surgical skills, he was an inspiring lecturer and demonstrator. He would step down from the high chair and personally performed the dissections with such dexterity and skill that students were soon flocking to see the new professor at work. Within four months of his appointment in Padua, in collaboration with a young artist, Jan Stephen van Calcar, he published the *Tabulae Anatomicae Sex*, a series of six beautiful and detailed anatomical plates of the human skeleton and vascular system.

Vesalius dissected to confirm the teachings of Galen. He tried to reconcile discrepancies between his own findings and what was written in Galen's texts. But he found himself increasingly at odds with Galen, whose conclusions were based on animal dissections. Initially deferential to historic Greek teachings, Vesalius grew steadily more confident of his own observations. He identified over two hundred Galenic errors, including the illusion of the *rete mirabile*, a non-existent coil of blood vessels at the base of the brain, so essential to Galen's misplaced theory of "psychic pneuma."

Finally declaring that Galen was "deceived by his monkeys," Vesalius, at the age of twenty-nine, offered to the world his seven-volume magnum opus, entitled *De Humani Corporis Fabrica*. Published in 1543, it was instantly recognised as an artistic and scientific masterpiece. Vesalius believed that the only true text was the human body, and so he called it "the book of the human body that cannot lie." *Fabrica* features 663 folio pages and 300 accurate and exquisite illustrations of the human anatomy. It is the first and only book of its kind, an awe-inspiring treasure of medical knowledge preserving the numerous dissections carried out by Vesalius. The very frontpiece of this work celebrates the author's new way of teaching. It shows Vesalius himself carrying out the dissection of a female cadaver as he simultaneously assumes all three roles of teacher, surgeon, and demonstrator.

Through six short years of intense careful anatomical observations, this extraordinary physician of Brussels had restored the scientific quest for truth. From now on, medical progress will be firmly rooted in precise and verifiable anatomical sites. Anatomy will form the scientific basis for the subsequent contributions in physiology, histology and pathology from the likes of Magendie, Malpighi, and Virchow. And without knowing it, Vesalius had single-handedly discovered the missing piece, the *sine qua non*, for the eventual scientific practice of surgery.

Rejection! Vesalius' was the era of the Renaissance, a time of great turmoil and upheaval in the arts and sciences, when scholars challenged and rejected old

schools of thoughts and ancient traditions in the search for truth. One of his peers was Leonardo da Vinci, who did more than paint the *Mona Lisa* and the *Last Supper*. Leonardo himself studied the human form as an anatomist, and made hundreds of drawings of both its external and internal parts. Another was Copernicus, who startled the world by announcing that the church erred in holding that the earth was the centre of the universe. In fact, it revolved around the sun.

But even the Renaissance was unforgiving of one who contradicted the demigod that was Galen. Although Vesalius had some support from contemporaries such as Michael Servetus and Realdo Columbo, many others assailed his findings. In Bologna, Matteo Corti, a devout Galenist, openly challenged Vesalius on the value of his dissections. Following the publication of *Fabrica*, many more denounced Vesalius as a heretic. The most hurtful criticism came from an unlikely source – his former Parisian teacher, Professor Sylvius – whose attack culminated in the book, "*A Refutation of the Slanders of a Madman Against the Writings of Hippocrates and Galen.*" Vesalius grew impatient and discouraged by the opposition, and eventually burnt his notes and manuscripts. He then resigned from his academic post in Padua and became the personal physician to King Charles V, and later to King Philip II of Spain. But his days as a clinician were far from rosy, as most of the court physicians jealously opposed him.

In 1562, Vesalius left on a pilgrimage to Jerusalem, after apparently performing a premature autopsy on a woman with a beating heart. It was a voyage of no return. Two years later in 1564, his colleagues at Padua beckoned him back to academe, but a furious storm overcame his ship and many on board perished. The great anatomist survived the ordeal, only to be overpowered by illness on shore, where he died in a "vile and impoverished inn in a solitary place, without any human assistance." At the tender age of 50, one of mankind's brightest stars had faded unceremoniously into the annals of medical history. We do not know where he is buried. What we have is his priceless book and the fitting epitaph of *Fabrica's* mourning skeletal figure: "Genius lives on, all else is mortal."

REFERENCES

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