

The Period after Vesalius. The Emergence of Physiology

La época posterior a Vesalio. Aparición de la fisiología

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As Andreas Vesalius appeared in the scientific firmament and his work developed (Chair of Padua and “*De Humanis Corporis Fábrica*”), Galenism began its collapse. Although the “*Fábrica*” was not free from errors, its research procedure based on human dissection left the necessary mark for a permanent revision, in the continuous search for the reality of nature, the Presocratics “*physis*”. With Vesalius, in the field of Anatomy, an age clearly ends, the Middle Ages, and the Modern Age begins, but, after almost fourteen centuries of hegemony, Galen’s concepts were not easily banished.

However, the seed had been sown. And as a result, a host of anatomists spread from the University of Padua, founded by Frederick II in 1222, to the rest of Europe, seeking precise knowledge from the dissection of the human body. The “*new corpse explorers*” in Padua were Realdo Matteo Colombo (1516-1559) (eye, ear), Gabriele Falloppio (1523-1562) (uterine tube, ear, eye), Fabrizio d’Acquapendente (1533-1619) (venous valves), Giulio Casserio (circa 1552-1616) (Harvey’s teacher) and Adrian van den Spieghel (1578-1625) (liver lobe). In Bologna Costanzo Varolio (1543-1575) (annular pons) and Giulio Cesare Aranzio (1530-1589) (“*ductus arteriosus*”, fourth ventricle). In Pisa Guido Guidi (died 1559) (brain, skull bones). In Rome Bartolomeo Eustacchio (1520-1574) (ear, kidney, teeth, the Eustachian tube, named after him) and Arcangelo Piccolomini (1525-1568) (fetal anatomy, abdominal muscles, brain). And in Naples Giambattista Carcano (1536-1606) (“*foramen ovale*”, “*ductus arteriosus*”) and Giovanni Filippo Ingrassia (1510-1580) (sphenoidal process known as the Ingrassia process).

Bartolomeo Eustacchio, who practiced in Rome, deserves special mention. He was the author of the book “*De vena azygos*”, where he refers to the thoracic duct and mentions the valve located at the mouth of the inferior vena cava that bears his name (“*valvula venae cavae inferioris*”). He had an advanced concept of the heart structure.

The most prominent Spanish doctors were: Pedro Jimeno (circa 1515-circa 1551) and Luis Collado (circa 1555)

(both described the ear bone called stirrup, “*stapeda*”); Juan Calvo (circa 1580) (treatise writer), Juan Valverde (circa 1515-?) (wrote an excellent anatomical treatise); Alonso Rodríguez de Guevara (circa 1559); Francisco Díaz (circa 1588) (urology); and Bernardino Montaña de Monserrate (circa 1480) (first Spanish anatomical work).

Félix Platter (1536-1614) (excelled in dissection) and Gaspar Bauhín (1550-1624) (ileocecal valve) must be mentioned in Switzerland. Guillaume Rondelet (1507-1566) in Montpellier dissected the body of his eldest son, who died in infancy. In that place and date, this attitude motivated furious criticism, since people had a horror of anatomy. He also built the first anatomical theater in France, now extinct.

Leonard Fuchs (1501-1556) promoted anatomy in Germany, where Salomón Alberti (1540-1600) (venous valves) and Volcher Coitier (1534-1600) (osteogenesis) also excelled.

In Prague Johan Jessen (1566-1621) tried to describe the anatomy of phonetics. In England John Banister (1540-1610) (treatise writer) stood out, while in Leiden we must mention Pieter Paaw “*Pavivius*” (1564-1617) (osteology, vomer bone).

But the change was even more important. Anatomy did not remain still, in its purely morphological status, but after the contribution of Jean Francois Fernel (1497-1558) with his “*Universa Medicina*” (1554), the human machinery was set in motion. The term physiology will no longer designate the concept of the Presocratics’ “*physiologia*”, but will be the study of the function and movement of living beings. Thus, this new development would have to include figures such as Fabrizio d’Acquapendente (circa 1533-1619) and Santorio Santorio (1561-1636). The latter, born in Capo d’Istria, Italy, was a professor in Padua. In addition to being the initiator of clinical thermometry, he is responsible for the construction of the “*pulsilogium*”, a device to measure the pulse. In his work “*Commentaria in primam fen primi libri canonis Avicennae*” (Venice, 1625), he mentions seventy-three pulse varieties.

The foundations expressed above define that al-



though Vesalius did not modify the concepts on circulatory physiology emanating from Galen, except for the previously mentioned fact of denying the existence of pores in the interventricular septum in his second edition of the *"Fabrica"* (1555), his study methodology allowed his followers to develop fundamental guidelines. Thus, the Spanish Juan Valverde de Amusco (born circa 1515), and the Italians Realdo Colombo (born circa 1516-1559), Andrea Cesalpino (1519-1603) and Fabrizio d'Acquapendente were in charge of carrying the torch of knowledge to the talent of William Harvey, the definitive discoverer of blood circulation.

Francisco de la Reyna also deserves to be named, more for the controversy than because of his real

knowledge of circulation. Some authors tried to find in the text of this veterinarian born in Zamora (Spain), called *"Libro de Albeytería"*, a description of the circulation in the paragraph *"by way that the blood goes in turnstile and wheel"*, which he describes in the horse's limbs. No copy of the first edition corresponding to 1546 has survived, but there has been a copy of the second published in Mondoñedo in 1552. There was also a third edition carried out later in Burgos in 1564. Galenist in his conceptions, Francisco de la Reyna places in the liver the origin of the vena cava venous system. Researchers of the stature of Lain Entralgo and Barón Fernández have concluded that no formal idea of blood circulation should be inferred from the Zamoran text.