

Padua and blood circulation

Padua y la circulación de la sangre

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1. THE ANATOMICAL THEATER OF PADUA

It was at the University of Padua where the idea on blood circulation germinated in William Harvey, a disciple of Fabrizio d'Acquapendente, when he became aware of the venous valves.

Alessandro Benedetti (Verona, circa 1450-1525), a clinician and anatomist was the first to propose an Anatomical Theater in his work "*Anatomice sive historia corporis humani*" (1502), a system for the anatomical demonstration on the corpse to be useful to a significant number of spectators with good viewing. According to his idea, the anatomical theater should have good lighting, ventilation and space for dissection.

Before Padua, previous anatomical theaters go back to Pavia and Pisa in 1522, and to the complete description that Estienne makes in his work "*De dissectione*" of the one built in Montpellier in 1556, which has now disappeared. The anatomical theater of Padua is the first to have survived to this day. Completed at the end of 1594, it was opened in January 1595 and operated until 1872. Its geometric shape is reminiscent of the Colosseum in Rome and the Arena in Verona. The structure is made of wood; it has a platform with a raised table with good lighting and six levels of connected benches. Its construction was due to the interest shown in the subject by Fabrizio d'Acquapendente. The table with the body ready for dissection rose from the basement through two doors that opened mechanically.

As a final reference to this topic, we want to reach history with the same words of Alessandro Benedetti, whose idea made possible the realization of these structures. He himself said "*I advise everyone, be they apprentices, doctors or surgeons who visit this theater, to come solemnly, at least once a year, because in it we see things naturally, and they appear open in such a way that the work of nature is presented as if it were alive*".

2. WILLIAM HARVEY'S OBSERVATION THAT LED TO HIS UNDERSTANDING OF BLOOD CIRCULATION

One of the precursors in the observation that strongly influenced Harvey when considering blood circulation, corresponds to Girolamo Fabrizio d'Acquapendente (1537-1619), his professor of Anatomy in Padua. Effectively, in 1574, d'Acquapendente wrote "*De venarum ostiis* (On the vein valves)", which was published in Padua in 1603 with good copper illustrations. It contains a complete description of the venous valves, an anatomical structure that other authors had dealt with. Despite this description, Fabrizio, still imbued with the Galenic spirit, ignored its real meaning, its true function. He thought they were meant to prevent excessive flow to the periphery. His words were: "*... I think that nature formed them to delay the blood to a certain extent, so that, like a river, it does not flood either the feet or all the fingers of the hand, becomes stagnant in them thus causing disorders: that while the upper parts of the limbs would work with scant nourishment, the hands and feet would be oppressed by perpetual swelling*". The teaching that Harvey received from his teacher regarding the venous valves was a fundamental observational contribution to the idea of blood circulation. Robert Boyle (1626-1691), referring to the event, wrote: "*... I remember asking our famous Harvey, shortly before his death, what were the reasons that had suggested the idea of blood circulation. He replied that this idea arose in his mind when he recognized that the venous valves in many parts of the body are placed in such a way as to give free passage of blood to the heart, preventing its flow in the opposite direction. This fact led him to think that the foresighted nature would not have placed so many valves in the veins without a certain purpose. Since the blood cannot move in the veins towards the extremities after being released through the arteries, because of the interposed valves, their purpose seemed to return the blood through the veins, whose valves do not oppose this direction in their course...*"