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The 2018 Sir Richard Owen Lecture

Francis Wells and The Heart of Leonardo by Bryan Rhodes

'How could you describe this heart without filling a whole book' – Leonardo da Vinci *c.* 1513

Wednesday October 17th was the date for this year's lecture, the first to take place mid-week due to Mr. Wells' commitments in the operating theatre. Consultant cardiothoracic surgeon at Papworth since 1986 and widely regarded as one of the world's leading cardiac surgeons, our speaker also has a passion for the history of anatomy that really illuminated a fabulous lecture.

Filled with anecdotes (did you know Samuel Pepys had designed the first bookshelf?) and insight and detail, the lecture also highlighted the research Mr Wells had performed to confirm Leonardo's original theories on cardiac function. Although, Leonardo only completed a small number of paintings and sculptures he was prolific in his scientific research into subjects such as hydrodynamics, optics and human anatomy. Fortunately, the bulk of his anatomical sketches survive and reside in the Queen's collection at Windsor. Many of these feature the famous mirror writing used by Leonardo. Mr Wells explained that 10% of left handed people had the ability to write easily in mirror mode so this may not have been an attempt to hide his discoveries.

Mr Wells outlined the 3 periods of Leonardo's anatomical research. Firstly, in the late 1480's/early 1490's when he lived in Milan and he includes a number of Galenic principles. Secondly, in the period from 1507 to 1511 which included his last year in Florence and his return to Milan and Paris. One of the intriguing events of this period is his dissection of an old man of over a 100 years of age at the hospital of Santa Maria Nuova in Florence. Leonardo speaks to him 'a few hours before his death' and then dissects him soon afterwards. Leonardo identifies coronary atherosclerosis, suggests this is the cause of death and also concludes that the heart and not the liver is the central organ of the circulatory system. This



period should have been the culmination of his anatomical work but the death (due to bubonic plague) of anatomist and collaborator Marcantonio Della Torre scuppers plans for an anatomical textbook for artists and Leonardo moves to Rome in 1513. Here in 1514/15 he completes his final anatomical studies but experiences further frustration: a German (ironically a mirror maker) denounces his work to the Pope and he is 'hindered' in his research.

Leonardo substituted ox hearts to continue his research on the heart and in one respect this was helpful – the aortic sinuses of Valsalva are more pronounced in the ox and Leonardo used his knowledge of vortices to identify the mechanism of closure of the aortic valve. Using video technology Mr Wells showed how Leonardo had been correct.

In the questions after the lecture, Mr Wells revealed his theory about why Leonardo studied anatomy in such detail. Leonardo was a natural philosopher and this meant he always wanted to understand the relationship between structure and function in nature. In addition he was unencumbered by traditional theories and could use his incredible observational and artistic skills. Although Leonardo had a poor opinion of contemporary Italian physicians, if his scientific work had been published he would clearly have had a great influence on the development of medical science.

The morning after the lecture I gave Mr Wells and his wife Lada a short medical history tour of Lancaster. We swapped stories about castles; I told him about the Lancaster castle surgeons and how a young Richard Owen had become so interested in phrenology that he had stolen a head from the castle. He told me about his first visit to the archive at Windsor Castle to view the Leonardo drawings. The archivist said they had 40000 works by the grand masters and that there were an equal number of Michelangelo anatomical sketches in the collection as well!

Further reading:

The Heart of Leonardo. Francis. C. Wells. Springer 2013.
Leonardo da Vinci The flights of the mind. Charles Nicholl. Penguin 2004.