Andreas Vesalius: father of modern anatomy

This year marks the 500th anniversary of the birth of Andreas Vesalius, rightly regarded as the 'father' of anatomy as we know it today.

Throughout the Middle Ages, the corpus of medical writings of Galen (?AD131–201), physician to the Roman Emperor Marcus Aurelius, were regarded as sacred; his teachings remained almost unchallenged for the next 1500 years. In anatomy and physiology, there was much that was sound in Galen's didactic texts. He gave good descriptions of the skeleton and muscular system, worked out the physiology of the spinal cord by dividing it at various levels in the pig and described the cranial nerves. However, he made mistakes. For example, his description of the circulation of the blood was pure speculation; he taught that blood ebbed through invisible pores between the right and left ventricles. Most of his work was based on animal dissections, so he wrote that the kidney is lobulated and that the liver possesses five lobes.

Over the centuries, human dissection was frowned upon. When it was performed, it was carried out by the porter, while the Professor would read from his cathedra – his professorial chair – when the obvious findings displaced in the opened body might disagree with the all but sacred words of Galen.

An exception to the rule of a porter doing the dissection was Mondino de Luzzi (?1275–1326), better known by his Latin name of Mundinus, Professor of Surgery and Anatomy in Bologna. He personally carried out human dissections and published his 'Anathomia' in 1316, which was circulated in manuscript and was printed in 1478. It remained in print until replaced by the 'Fabrica' of Vesalius. However, in spite of his personal experience, Mundinus remained firmly of the opinion that the writings of Galen were infallible – including the 'five lobes of the liver'.

Professor Harold Ellis *is Emeritus Professor of Surgery, Guy's, King's and St Thomas' School of Biomedical Sciences, London SE1 1UL*

Andreas Vesalius was born in Brussels in 1514, the son of the apothecary to the Emperor Charles V (Belgium was then part of the Spanish Netherlands).

He studied medicine first in Louvain, then in Paris and then travelled to Padua, where he took his degree of doctor of medicine with highest distinction in 1537 and was immediately appointed, at the age of 23 years to the chair of anatomy and surgery. In the footsteps of Mundinus, but unlike his predecessors at Padua, Vesalius taught directly from his own dissections – human if possible; if not, from a whole range of animals. His demonstrations attracted crowds from all over Europe.

'Vesalius taught directly from his own dissections – human if possible; if not, from a whole range of animals.'

Within a year, Vesalius published his 'Tabulae Anatomicae' (Tabulae Sex) – six large, beautifully drawn and printed, drawings of the dissected body. The artist was the distinguished painter Jan of Calcar, a fellow Netherlander; they were an instant success.

Vesalius went on to publish his masterpiece 'De Humani Corporis Fabrica' ('The structure of the human body') in 1543, having gone personally to Basel, Switzerland, to supervise its printing and production. He was now 28 years old. The wood-cut illustrations are highly accurate and were obviously made from the dissected body and the articulated skeleton. They are works of art that can be, and indeed are, used to illustrate textbooks and lectures today.

The 'Fabrica' appeared in seven massive volumes, written, of course, in Renaissance Latin – and without paragraphs! A second edition appeared in 1555. Interestingly, Vesalius gives no mention as to the name of the artist, and this remains the subject of research and discussion among art experts to this day; the favourite is Jan Calcar, undoubtedly the artist of the 'Tabulae Sex'.

Although an instant success, the 'Fabrica' (it is so well known today that its shortened title is usually used) also aroused envy and attack, since Vesalius had no hesitation in pointing out errors in the standard classical works, including those of the great Galen himself. For this he was attacked by a number of authorities, including his old teacher, Sylvius.

Vesalius realized that many of the errors in the writings of Galen and others were the result of the observations being made on animal rather than human dissections – for example, the lobulations present in the liver and kidney of the pig but not in man. Other classical errors were simply nonsense. For example, men do not have a rib missing (Adam's rib), but have the same number as the female. Galen had postulated that there were pores between the right and left ventricles of the heart, enabling blood to ebb and flow across the interventricular septum. However, Vesalius wrote in the Fabrica:

> **'Not long ago I would not have dared to diverge a hair's breadth from Galen's opinion. But the septum is thick, dense and compact as the rest of the heart. I do not therefore see how the smallest particle could be transferred from the right to the left ventricle through it'.**

In total, Vesalius corrected 200 Galenical errors, but not all... He agreed with Galen, that the thyroid gland, the 'glandulae laryngis', as it was called, functions to lubricate the larynx.

A year after publishing his magnum opus Vesalius retired from his chair and, at the age of 29 years, entered the service of the King of Spain, Phillip II, as surgeon. In 1563 he set off on a long pilgrimage to the Holy Land. On his return voyage, in his 49th year, he was shipwrecked on the small island of Zante in the Peloponessian Sea and died of hunger and exposure. A tragic end to the world's greatest anatomist. **BJHM**

Conflict of interest: none.