Andreas Vesalius (1514-1564)
Vesalius's work, in particular *De Humani Corporis Fabrica* and *Epitome*, marks a starting point in scientific research and observation as we understand it today. Vesalius was born into a family who had a long-standing interest in medicine and science. Indeed, it would appear that his parents encouraged his interest in medicine from an early age.

In 1528 Vesalius entered the University of Louvain. Here, he was given tuition in Latin, Greek and Hebrew and continued his studies of scientific/medical writings. We know from his own writings that he often dissected small animals including weasels – from which the family name was derived and were represented on the family crest. At this time he also became friends with Gisbertus Carbo – later Bishop of Granvelle and Anthony Pervenot – later Imperial Chancellor[1].

In 1533 Vesalius left Louvain and set out to Paris, possibly with introductions from Nicolaus Florenas, an imperial physician and friend to his father. The University of Paris at this time was very conservative in its approach and this included the medical school. In terms of anatomy, even after an appeal in 1526 from the medical faculty to the French Parlement for a better supply of dissection material for anatomical demonstrations, it is doubtful that Vesalius saw more than 3-4 dissections during his entire 3 year stay in Paris.

While modern medicine and science can be characterised by a sense of the advancement of knowledge and understanding through observation and experimentation, this did not hold true during Vesalius's time in Paris. Instead, the present was perceived as in every way inferior to the knowledge and achievements of the past…particularly Galen[2]. So, for reasons of the paucity of cadavers and a reverential attitude towards ancient knowledge students, hoping to obtain their bachelor degrees, gained their anatomical knowledge through the study of disarticulated bones and textbooks. Accurate study was further hampered by errors in the texts themselves. Textbooks were often Latin translations of Arabic translations of Syriac translations of Greek texts, such as the works of Galen. Inevitably this accumulation of translation meant that errors piled up in works that were, in and of themselves, not necessarily completely accurate in the first place.

In 1514 Nicolo Leniceno translated Galen's works directly from the Greek to Latin and, while this cleared up the translation errors, it caused the reverence for all things ancient to ascend to new heights. Scholars and physicians were able to feel that they were re-entering the Golden Age of Classical Antiquity. In fact, one of Vesalius's teachers commented that if there was a discrepancy between Galen's description and the structures found in contemporary man, it was due to the degenerate state at which humanity had now arrived, rather than any mistake on Galen's part!

In this climate, Vesalius was forced to rely on his own initiative in his attempts to improve his knowledge of human anatomy via direct observation. This led to frequent after dark visits to the gallows and charnel house at Montfaucon and the Cemetery of the Innocents. This desire to learn anatomy via direct observation necessarily meant Vesalius's attitude towards Galen and the authorities of antiquity was not quite so reverential as that of his contemporaries. Instead, he used his own anatomical observations to revise and challenge Galen's work.

In 1536 with the outbreak of war and the invasion by Charles V of Provence, Vesalius left Paris, without graduating and returned to Louvain. Back where he had started, Vesalius continued to pursue his anatomical studies:

> "While out walking, looking for bones in the place where on the country highways eventually, to the great convenience of students, all those who have been executed are customarily placed, I happened upon a dried cadaver…The bones were entirely bare, held together by the

[1] For Charles V Holy Roman Emperor
[2] Galen (129-210AD) Greek Physician renowned for his discourses on physiology and anatomy. However, it is likely that he rarely, if ever, dissected human bodies. Instead, he used different animals including apes. He proposed a new theory of disease and bodily function that influenced western science and medicine for next 1500 years. Based on Hippocrates's suggestion that the human body functions on the basis of four humours – blood, phlegm, yellow bile and black bile – and that disease resulted from an imbalance – Galen's system prescribed purges and blood-lettings to re-establish the balance.

> ligaments alone, and the only origin and insertion of the muscles were preserved…With the help of Gemma[3], I climbed the stake and pulled off the femur from the hip bone. While tugging at the specimen, the scapulae together with the arms and hands also followed, although the fingers of one hand, both patellae and one foot were missing. After I had brought the legs and arms home in secret and successive trips (leaving the head behind with the entire trunk of the body). I allowed myself to be shut out of the city in the evening in order to obtain the thorax, which was firmly held by a chain. I was burning with so great a desire that I was not afraid to snatch in the middle of the night what I so longed for… The next day I transported the bones home piecemeal through another gate of the city…and constructed that skeleton which is preserved at Louvain in the home of my very dear old friend Gisbertus Carbo."

Later, the burgomaster of the city allowed Vesalius and other students to have whichever bodies they asked of him and regularly attended the anatomy demonstrations himself. Then, in 1537 Vesalius was given permission by the magistrates to carry out dissections before fellow students – the first in 18 years.

However, despite these successes, Vesalius was caught up in medical debate that had been raging for centuries: the issue of bloodletting or venesection. Briefly put, the argument revolved around two opposing traditions. On the one hand the Arabic tradition held that it was better to incise a vein on the opposite side of the body to that affected by disease, on the other, the Hippocratic tradition held it was better to incise the vein on the affected side of the body. Vesalius, coming from a humanist background, favoured the Hippocratic tradition. This led to a fierce and bitter dispute with Jeremiah Drivère, the Professor of Public Medicine and a well-respected physician in Louvain and ultimately to Vesalius's departure for Padua and the development of the Venesection Letter of 1539.

1537-1542. At this period Padua was subject to the state of Venice, which was only a few hours away, and it was a leading centre in the arts, philosophy, literature and scientific research. It is also possible at this time that Vesalius met his fellow countryman, Jan Stefan de Kalkar who had just enrolled in the school of Titian. In December of 1537 Vesalius was awarded the degree Doctor of Medicine with the highest distinction. On the next day, following a dissection, the Senate of Venice nominated him as Professor of Surgery, Vesalius was only 23.

In his new position, Vesalius made a great impression on his students and fellow physicians and often descended from his professorial chair to carry out dissections and demonstrations himself. In addition, to the dissections, Vesalius also used charts in his demonstrations to help illustrate the points he was making. This lead, in 1538, to the publication of *Tabulae Sex* – three views of the vascular system and three views of the skeleton – while his students loved it, this publication of illustrations was something new. Previous anatomical works were generally not illustrated, partly because it was not "the done thing", partly because printing techniques were not sophisticated enough to ensure the necessary level of detail and accuracy. However where Vesalius led, the printers and publishers were soon to follow. In 1538 Vesalius published *Institutiones*. This was a synopsis of the anatomico-physiological view of Galen, originally composed by Johann Guinther, one of Vesalius's teachers in Paris. In 1539 the *Venesection Letter* was published. This was not only an attack on the views of Jeremiah Drivère, but also marked a development in the ongoing dispute. Vesalius did argue his case with reference to classical texts, but he augmented it with descriptions of his observations of the venous system during dissection. This marked a significant shift in the way scientific hypotheses were tested. It was no longer enough to appeal to the likes of Galen, from hereon in it was necessary to validate one's argument by direct observation and dissection.

In 1543 Vesalius published *De Humani Corporis Fabrica* (*Fabrica)* and *Epitome*. The illustrations and typography has marked *Fabrica* out as a work of art as much as a work of science. In his previous writings, Vesalius appears to refer to a "magnum opus" that he is working on, the problem of obtaining bodies and also of working with Jan Stefan van Kalkar. However, it is not necessarily easy to assume that the illustrations are all the work of one man.

It may be that Vesalius himself made some of the preliminary sketches as he worked, drawings were then modified as more details were discovered in the process of dissection, while sometimes the basic

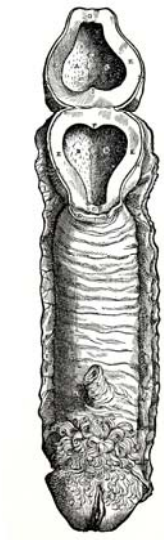
[3] Regnier Gemma (1508-1555) mathematician, astronomer and physician

arrangement was based on the dissection of different forms, hence the appearance of animal anatomy in Vesalius's man. In addition, it is possible that rather than working with one artist – such as Jan Stefan van Kalkar - Vesalius may have worked with a variety of artists from the school of Titian in Venice, who were, perhaps, guided by the master himself.

In early 1543 Vesalius went to Basel to oversee the final stages of publication. The *Fabrica* and *Eptiome* were finally ready for publication in August 1543 and Vesalius went to Speyer to present them to Charles V, to whom he had dedicated these works. It is at this point that Vesalius sought the position of court physician. It may seem strange that a man at the zenith of his academic career should quit to become, in essence, a courtier. However there may have been sound reasons. Vesalius may well have wanted or needed the protection of Charles V in anticipation of public and religious outcry to the publication of his extremely thorough work on human anatomy, a subject that was a cultural taboo despite the progress of humanism in universities. He may well have needed to re-coup the costs of preparing *Fabrica* and *Epitome*, a task he was better placed to do as a court physician than university professor. Finally, in accordance with his old professor in Padua – J.B Montanius – Vesalius may well have felt to continue his journey as a physician, he needed to take his medical skills out into the world and treat people.

Vesalius continued to enjoy Charles V's favour as Chief Physician until the latter's abdication in 1555, the year in which the second edition of *Fabrica* was published including augmentations and corrections presumably garnered during Vesalius's time as a physician. With Philip II as Holy Roman Emperor, Vesalius found his position at court increasingly untenable and in 1564 went on a pilgrimage to the Holy Lands. He died on 15th October 1564 on his way back from Jerusalem aged 50.

Vesalius's Representation of Female Reproductive Organs



What is extraordinary, given Vesalius's insistence and partiality for direct observation to validate scientific and medical knowledge, is his representation of the human reproductive organs. In *Fabrica* the representation of the vagina is startling (left). While we might infer a possible reason for the distinctly phallic representation from Vesalius's method of acquiring bodies for dissection, he was often forced to snatch body parts after dark with the authorities in hot pursuit, and therefore perhaps dissection material might become distorted. However, this does not explain the persistence of his representation of the vagina as penis in other works such as the *Tabulae Sex.* (below)

Rep of Male Repro

Rep of Female Repro

by Rachel McNally

The vagina as penis?
(adapted from The Story of V by Catherine Blackledge)
One of the most astonishing visual renderings of the vagina as a penis is by Vesalius and features in his text De Humani Corporis Fabrica (1541), the founding work of modern anatomy. Vesalius was not alone in viewing the vagina as an internal penis.
The roots of the belief are in antiquity: according to Aristotle how much heat a person possessed was the factor determining whether an individual was female or male. And men, it was decided arbitrarily had more heat. In tandem with this, ancient thinking held that there was only one sex, with women seen as a kind of inferior, colder, version of men. Women, it was supposed, did not possess the necessary heat to unfurl, and push out their phalluses.
One result of this way of thinking was that men's genitals were used as the yardstick with which to grade women's genitalia. In this strange one-sex scenario, the uterus was a scrotum, ovaries were testicles, and the clitoris, well, that was a penis too. Another notion was that it was possible for women to turn into men: indulging in inappropriate unladylike behaviour could shake out their internal genitalia. Hence women were warned not to stretch their legs too wide for fear of becoming male.

Catherine Blackledge

The Vesalius of the Play

In the play we chose to highlight several aspects of Vesalius's work through imagined conversations with an artist (Vincenzo) and a priest (Father Perutti): his use of illustrations, his adherence to dissection as the best way to study anatomy, his showman-like qualities, his phallic view of the vagina and the uneasy position that Vesalius found himself in regard to the work he was doing and the moral/religious standards of his day. Our grave robbers, Will & Bill are inspired by the illustrations of the skeleton in *Fabrica* and an acknowledgement of the moral and religious obstacles that Vesalius overcame in order to acquire bodies for dissection and thereby advance medical understanding of human anatomy.

Rachel McNally