

Vesalius' Fabrica: The Marriage of Art and Anatomy

THE GREEK physician Galen (129-200 AD) is one of the most influential figures in the history of medicine. His teachings regarding anatomy and physiology were considered medical dogma for more than 1000 years. He showed that nerves arise from the central nervous system, that veins connect to the heart, and that arteries contain blood and not air. He described the nerves to the larynx, the anatomy of the spinal cord, and the skeletal and muscular systems. However, since dissection of the human body was forbidden during the time of Galen, his knowledge was derived from animal dissection, principally the Barbary ape. Despite Galen's shortcomings, one is astonished at the wealth of accurate detail in his writings.

The teachings of Galen were unquestioned for nearly 1500 years, until the appearance of a young Flemish anatomist by the name of Andreas Vesalius (1514-1564). Vesalius was born in Brussels, Belgium, and educated in Paris, France. During the height of the Renaissance, he moved to Italy to finish his medical education. Upon receiving his medical degree, at the age of 23, he was appointed professor of anatomy and surgery at the University of Padua, in Italy. Unlike Galen, Vesalius based his anatomical dissections on human cadavers and found fault with the classic teachings of antiquity. In 1543, when Vesalius was a mere 29 years old, he published his magnum opus, *De Humani Corporis Fabrica*.

The Renaissance also brought about the emergence of a new focus in the realm of art. Aesthetic theory now dictated that a work of art should be a faithful representation of nature. This assumption required artists to

acquaint themselves with the structure and physical properties of natural phenomena. Art had gone scientific! By the 15th and 16th centuries, artists such as Leonardo da Vinci, Michelangelo, and Raphael turned with enthusiasm to the detailed study of the human body.

De Humani Corporis Fabrica is without doubt one of the greatest contributions to medical science. However, it is also an exquisite piece of creative art, with the perfect blend of format, typography, and illustration. The text is not only one of the most remarkable known to the science of anatomy, but also one of the most magnificent volumes in the history of printing. Artists and physicians were undergoing parallel development, and Vesalius marked a new era in anatomical illustration and collaboration between artist and physician.

Vesalius was strongly convinced that knowledge of both skeletal and soft tissue structure was essential to the study of anatomy. Figure 1 illustrates, from the lateral point of view, the skeleton in an almost Hamlet-like pose, soliloquizing beside a tomb. Although the figure does exhibit some errors in proportion, the quality of the illustration, from both an artistic and an anatomical viewpoint, are astonishing. On the left of the skull is the hyoid bone and on the right lie the malleus and incus. The tomb not only gives us a sense of death and mourning but also provides composition to the piece by adding stability to the skeletal figure. The magnificent representation of the muscular system (Figure 2), in the classic semicontrapposto pose, is characteristic of vesalian figures. The significance of the background and the dissected body truly depict the harmony of artistic and anatomical

illustration in style.

Owing to the influence of Galen and the dependence on animal dissection, the question as to whether the panniculus carnosus was to be found in man was a subject of great controversy. Vesalius clearly recognized that such a panniculus, except for the platysma muscle, was absent in man. However, he did use the term fleshy membrane to describe the deep fascia that infiltrated muscle tissue in the regions of the platysma, facial muscles, and superficial muscles of the scalp. Clearly, this is the first scientific description of the superficial musculoaponeurotic system.

There is much contention as to the identity of the artist who prepared the vesalian illustrations. Much of this controversy has been fueled by the question of who is more important: the artist or the anatomist. Too much anatomical information was included for Vesalius not to have been involved in the preparation of the drawings. However, it is equally obvious that the degree of artistic sophistication was too great for Vesalius alone to have been responsible for their preparation.

In previous works, Vesalius does identify himself and a young Flemish artist, Jan Stephan van Kalker (1499-1550), as the illustrators. However, in the *Fabrica*, there is no mention as to who the artist was. The illustrations of the *Fabrica* have been attributed at different times to a number of different artists. For a long period, the woodcuts were accepted as the work of Titian (Tiziano Veellio, 1488-1576). This attribution was further reinforced by the proximity of Padua to Venice and the knowledge that, although the work was published in Basel, Switzerland, the wood blocks were cut in



Figure 1. Woodcut plate 22. lateral view of skeleton,



Figure 2. Woodcut, plate 26, anterior view of muscular system.

Venice. It was not until the late 19th century that opinion shifted in the art community and attributed Jan Stephan van Kalkar as the artist. It was the late Harvey Cushing who identified what are believed to be Kalkar's initials in an obscure location on the title page of the *Fabrica*. Kalkar was a pupil of Titian and may have given Vesalius access to Titian's studio. It is unlikely that Titian himself would have undertaken such a commission: rather, he would have turned

it over to one of his assistants.

In conclusion, the evidence indicates that the illustrations from the *Fabrica* emanated from the atelier of Titian. Whether Kalkar, who had drawn earlier figures for Vesalius, or another student was the original artist remains controversial. Nevertheless, a solution to the quest for the means of pictorial expression of natural phenomena had been found. The woodcuts created a new standard in biological illustration as well as in the graphic arts. The

Fabrica is a classic representation of the marriage of beauty and science in the art that we call medicine.

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