ANDREAS VESALIUS 1514–1564*

IN MEMORIAM†

by

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THERE are few great names in the history of medicine more widely known than that of Andreas Vesalius. Both factual and legendary accounts of his exploits began to appear even during his lifetime, and both sorts have continued through the course of the four hundred years that have passed since his death in October 1564. Some writers have magnified his accomplishments beyond their true value, and in a natural revulsion others have granted him less than his merits deserve. Much visual energy has been expended on study of the illustrations of the *Fabrica* and considerably less on its text. Some have disputed learnedly over the question of which portraits of Vesalius are genuine, even though all have the shakiest of provenances or are obvious copies of the woodcut portrait in the *Fabrica*. Some have contrived to make Vesalius a man of explosive temper, which in turn led to the decision that he must have had red hair. One writer, by accepting the legend that Vesalius the anatomist as a child dissected small animals, discovered indications of sadism, and by mistranslating the word 'lend' as 'borrow' in a German text, this same person also contrived in a somewhat tortuous fashion to make poor Vesalius a manic-depressive. All these things have their amusing side, but are also to be regretted since once such distortions have reached print, it is always very difficult, if not impossible, to expunge them completely. I shall do my best to present to you a brief account of Vesalius the man and his achievements devoid of fictions, since even in this restricted form his life was, I think, sufficiently dramatic.

From a horoscope cast years later by Girolamo Cardano, it appears that Andreas Vesalius was most likely born at a quarter to six in the morning of 31 December 1514. His father, another Andreas and an apothecary of the Emperor Charles V, was the illegitimate son of Everard van Wesele, or Vesalius, and as such a humble member of a family already distinguished for several generations in medical circles. The maiden name of our Vesalius's mother was Isabel Crabbe, and this resemblance to the name of the English poet has given rise to the legend that she was an Englishwoman; by this same reasoning, however, if one consults the telephone directory of Brussels he will be convinced that George Crabbe was a Belgian poet.

The young Vesalius received his elementary education in Brussels and then he matriculated at the University of Louvain in February 1530 to pursue the arts course, the necessary prerequisite for entrance into any professional school.

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We do not know when Vesalius decided to study medicine, but such a decision could have been related to the Emperor's legitimization of the young man's father in 1531, which may have encouraged him to carry on his family's traditional profession and, as in the past, even in exalted imperial service.

At this time the medical school of Louvain had little repute so that young Andreas chose to carry on his medical studies in the more illustrious faculty of the University of Paris, matriculating there probably in September 1533. There he studied with Jean Fernel, Guinter of Andernach, Jean Tagault, and possibly for only a brief time with Jacobus Sylvius—despite the bitterness later developed between them which has caused many to believe in a previously long period of amicable relations.

From this time onwards a large part of our knowledge of Vesalius's life is based upon his own words which, because of the occasional strong criticism of his teachers and assertions of what he accomplished through his own efforts, some have declared to be the words of a braggart. A few years ago, however, the late Ruben Eriksson, then Librarian of the Karolinska Institute in Stockholm, discovered and published the notebook of a German student who attended some extra-mural anatomical demonstrations that Vesalius presented in Bologna in 1540. Comparison of this student's remarks with Vesalius's own account of his Bolognese demonstrations indicates that the Vesalian narrative is a simple statement of fact nowhere inflated by the writer's ego, and it seems wholly likely that his remarks about other incidents in his life are similarly true and devoid of inflation. Vesalius remained in Paris studying for the degree of Bachelor of Medicine until the summer of 1536 when, owing to the outbreak of war between France and the Empire, he became an enemy alien and was compelled to return to Brussels without a medical degree.

It was only natural that when Vesalius was composing the *Fabrica* he recalled his studies in Paris, among which the anatomy course loomed largest in his memory. He recalled its presentation as medieval, with an unlearned barber or surgeon dissecting while the professor, not deigning to approach the cadaver, lectured from his high chair or *cathedra*, reciting in Latin, which the barber did not understand, a Galenic description of animal anatomy which had no relevance to the human body being dissected or, as Vesalius wrote, 'mangled'. It seems beyond dispute that the students learned little, and even though the militantly impatient Vesalius was on several occasions allowed to participate in the actual dissection, it does not appear that, except for dissection technique, he gained more than a Galenic appreciation of anatomy, seeing animal structures where human ones actually existed. It must have been very confusing. Such confusion was worse confounded by the course offered by Jacobus Sylvius. Sylvius lectured to the students from Galen's book entitled the *Use of parts*, in which anatomical description was drawn from animals and projected to the human; then to illustrate this presumed human anatomy Sylvius dissected the dog. It is difficult not to agree with Vesalius's later statement that he learned little or nothing in Paris that had application to the human structure.

Returned to the Netherlands, Vesalius enrolled in the medical school of the University of Louvain where, owing to recognition of his medical studies in

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Paris, he was able to obtain the degree of Bachelor of Medicine, probably in the late spring of 1537. By this time the fever of anatomical study possessed him. It was the most challenging area, where the mysteries were greatest and research might best be rewarded. One afternoon, walking outside Louvain with his friend Gemma Frisius, the later celebrated mathematician, Vesalius came upon the gibbeted body of a malefactor picked clean by birds so that an almost intact skeleton was exposed. He decided he must have it and, since he was unable to smuggle all the bones into the city before sundown, he allowed himself to be shut outside the gates in order to collect the remainder which he brought in surreptitiously during the following morning and thus was able to articulate his first human skeleton.

Later Vesalius learned that such caution had been unnecessary, since thanks to the interest of the burgomaster he was thereafter to obtain several human bodies which he dissected before interested members of the university's faculty, no doubt demonstrating and discussing anatomy according to the canon of Galen, his only guide. Somehow he must have convinced himself, therefore, that he could see a multilobed liver, a duct running from the gall bladder to the lower stomach, a right kidney higher than the left; or perhaps he thought that in these few bodies the structures that did not agree with the Galenic description were anomalies. There had not been a human dissection at Louvain for eighteen years, which provides us with some idea of the quality of medical instruction there; nor was Vesalius impressed, and he decided to go to Padua for the degree of Doctor of Medicine.

There is no precise further information about Vesalius until December 1537 when he successfully passed his examinations at Padua and received the degree of Doctor of Medicine with what we may call 'highest honours'. It may have been at least partly because of the quality of his examination that on the next day he was given the then relatively unimportant chair of surgery, which carried with it the duty of lecturing on anatomy.

Hitherto the anatomy course had been little different from that offered in Paris. Vesalius's predecessor at Padua had sat apart from the cadaver, reading from the anatomical text of Mondino, written two hundred years earlier, while a surgeon brought from Venice performed the annual dissection, but all that was now to be changed. The authorities of the university were wise enough to permit alterations in teaching procedures if there was likelihood that such alterations were beneficial, and Vesalius immediately took advantage of this unusual flexibility.

For obvious reasons, the course in anatomy was held during the cold of winter, and soon after his appointment the new teacher personally undertook the two roles of dissector and lecturer, even though to many it appeared unseemly for a physician to place his hand upon the cadaver. There was no precedent for such action, and it represented the first of the many teaching novelties that Vesalius was to introduce and that made his course a major attraction for both university students and townsmen.

Fortunately the notebook of an attending student has been preserved so that we know something of this dissection which was carried on from the 6th to the

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24th of December. Vesalius was still fitting the animal anatomy of Galen to the human cadaver, but the fact of dissecting and lecturing meant that sooner or later he would find it impossible to reconcile what he observed in the human body with what he read in Galen's text. The young teacher, now completing his twenty-fourth year, also introduced another novelty in the form of very large charts on which he depicted in minute detail the anatomy and physiology of the body, so detailed that one may readily observe his errors. Study of the charts, also roughly copied in the student's notebook, indicates a predominance of Galenic or animal anatomy, although also a few instances of independent observation and consequent portrayal of human structures.

The novelty and attraction of these charts was such that they were immediately and, in some cases, skilfully plagiarized so that Vesalius, to protect himself, caused them to be published in 1538 with three figures of the skeleton drawn by an artist named Johannes Stephanus from Calcar in the Netherlands and at that time a student in Titian's studio in Venice.

In that same year, in need of a dissection manual for his students, Vesalius published a revised and extended version of such a manual originally produced in 1536 by Guinter of Andernach, his former professor of anatomy in Paris. Although the text was Galenically orientated, and Vesalius himself was yet within that camp, at least one of his revisions in this work was a proposal that the pulse was synchronous with the heart's systole, obviously the result of independent observation during vivisection.

1539 was the year of illumination. Until then, no matter what suspicions Vesalius may have developed about the validity of current ideas on anatomy, that is essentially the doctrines of Galen, research, whether to confirm or to deny, was limited to the cadavers supplied him, two annually, and whatever bodies might be obtained illegally—few and requiring very hasty dissection. During the year a new *podestà*, that is judge of the criminal court, was appointed for Padua. This new official, Marcantonio Contarini, was personally interested in Vesalius's work and greatly increased the supply of dissection material—executed criminals whose execution he was even willing to postpone to such time as was most convenient for the anatomist.

With increased opportunity for observation, and, unlike his predecessors, dissecting as well as lecturing, Vesalius found it more and more difficult to present to his students what Galen had written while directly before him in the cadaver was a different anatomy. Furthermore, as opportunities for dissection increased, it was no longer possible to explain all discrepancy from the Galenic description as anomaly. Finally, as Vesalius informs us, in the winter of 1539 he summoned sufficient courage to denounce Galen. We do not know how this first declaration of heresy was received, but probably the more conservative members of the faculty were shocked and dismayed, while the students cheered. The university documents which record a five hundred per cent increase in Vesalius's salary between 1537 and 1542 refer to his enthusiastic endorsement by the students as a major reason for this increase.

It should be no cause for astonishment that news of the rebellion in Padua took the fancy of the medical students at the University of Bologna, who

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promptly invited Vesalius to give a series of demonstrations there in January 1540, and we have record at that time of his declaration of Galen's fallibility. He proved it dramatically by articulating side by side the skeletons of a man and of an ape and demonstrating that Galen's osteology agreed with the simian skeleton but not the human.

Back in Padua Vesalius had already begun to compose the *Fabrica*, as we learn from the autobiography of John Caius who was living with him at the time, and if Vesalius had had any hesitation about the new and independent course he had charted, it was settled during his brief visit to Bologna. From now until the summer of 1542 he concentrated his efforts upon his vast anatomical treatise which he realized would have epochal significance and was worthy of the utmost expenditure of energy and material resources. The draughtsmen for the illustrations came from Titian's studio, the finest Venetian block cutters were employed, and the best printer, Joannes Oporinus of Basel, even though this last meant a dangerous trans-Alpine shipment of the precious wood blocks and Vesalius's own journey there to oversee the proof-reading and any final changes. It was, incidentally, during this sojourn in Basel, as the result of a bigamous husband's efforts to solve his problem by killing his first wife, then being caught and executed, that Vesalius was enabled to dissect the criminal's body and articulate the skeleton, which is still preserved in the Anatomical Institute of the University as its most noteworthy anatomical relic.

Printing of the great work was finished, as the colophon informs us, in June 1543, although it was not until the beginning of August that Vesalius was able to obtain bound copies. Despite having previously seen it, he must immediately have turned to the title-page with its factually dramatic depiction of one of his Paduan anatomies. No doubt, too, he looked at his own portrait, the only authentic one, with its curiously dwarfed body and the accompanying giant female figure. He must surely have looked at the 'Hamlet skeleton' and at some of the other osteological illustrations such as that notable example of comparative anatomy, the human skull resting on that of the dog, the correct and anti-Galenic depiction of the sternum, and the illustration of the foot displaying the Os Vesalianum. Among the myological figures he would naturally have turned to the 'muscle men', perhaps the first, included for the instruction of artists; certainly the fifth with its portrayal of an exaggerated rectus abdominis muscle to indicate an error of Galen, but so frequently criticized by those who have not read the accompanying text; the seventh 'muscle man' which recalled to Vesalius how he had hung the cadavers so that they might be drawn by the artists in the precise pose the anatomist wanted. Probably he also looked with pride at the 'arterial man' and the 'venous man' because he himself had drawn them, although he did not realize the errors they displayed, such as the continuous vena cava, which would be revealed only in later times. He was no doubt proud, too, of the artful and artistic arrangement of the abdominal organs in classical torsos, and the remarkable series of brain dissections which, as he was surely aware, far surpassed all other such contemporary representations.

The detailed descriptive texts to accompany the illustrations, the elaborate marginal references from one page to another, to illustrations or even to details

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within illustrations, had required much concentrated effort and must have been a source of great satisfaction. Such interrelation of the whole structure had never been attempted before and certainly was not to be equalled again until much later times.

It is to be feared, however, that even in Vesalius's day the *Fabrica* had the dubious distinction of classic status and hence was not widely read, if we may judge by the number of well-preserved copies that still exist. It was far easier to refer to the author's partial digest called the *Epitome*, actually a very slight work intended for beginners and of little significance except that its wide use and consequent wear and tear have made it a costly bibliographical rarity today. It in no way enhances Vesalius's reputation, and as a simplification omitting complexities and qualifications provides a somewhat false picture of his achievement. Of course anatomists read the *Fabrica*, quoted from it, and a generous few even acknowledged the source of their quotations. Some modern critics have sought to lessen the stature of Vesalius by referring to the achievements of Colombo, Eustachi and Fallopio, but apparently without realizing that these men produced their results approximately a generation after the appearance of the *Fabrica*, and so based their accomplishments upon its strong foundation. It has also been said on several occasions that Vesalius owed a debt to Jacobus Sylvius, one of his teachers in Paris, and reference has been made in this regard to Sylvius's anatomical text entitled *In Hippocratis et Galeni physiologiae partem anatomicam isagoge* without realizing that Sylvius wrote this work after the *Fabrica* had been completed and, in fact, did not publish it until 1555. Vesalius's accomplishments have suffered from this sort of chronological confusion.

When one examines the text of the *Fabrica*, it is immediately apparent why this book is one of the great classics of medicine. Never before had the structure of the human body been so thoroughly discussed with such care for anatomical minutiae and with such effort to integrate the various parts of the structure. In the course of the description hundreds of long-held, erroneous Galenic and medieval doctrines were shattered simply because Vesalius ignored earlier authorities and relied upon his own researches, observations and reason. There are errors, naturally, and from time to time Vesalius failed to follow his own principles of investigation, but the correctness of descriptions, especially of bones, muscles and brain, were an outstanding achievement, and in fact there are contributions to anatomical knowledge in all seven books of the *Fabrica*.

The Vesalian accomplishment was based upon what is today recognized as a standard principle of research for which, let it be emphasized, we are first indebted to Vesalius. Since he had proved, at least to himself, that Galen's anatomy was based upon the study of animals, it could in consequence have no application to the human; hence there was no reliable authority, and the only way to gain knowledge of the human structure was by its independent study. Moreover, as human structures tended sometimes to vary, one must study the same structure in a number of bodies before making a pronouncement, that is, the experiment must be repeated a number of times for verification. Vesalius believed so strongly in these principles, which he reiterated throughout the *Fabrica*, that he described his own method of dissecting each system or part in

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order that the reader might repeat his investigations and see for himself. Hence not even Vesalius's words were to be accepted without proof through research.

These things seem very commonplace today so that it is difficult for us to understand the tremendous furore which they aroused four hundred years ago when Vesalius first proposed them as a consistent procedure, and if anyone doubts that they were Vesalius's contributions let it be recalled that he and no one else was the target of conservative attack. The fact that his principles of investigation—his most fundamental contribution—have become commonplace is, of course, the greatest possible praise.

With the publication of the *Fabrica*, Vesalius, in his twenty-ninth year and perhaps as yet somewhat youthfully impetuous, decided that his days as an anatomist were over. It was his belief that physicians by ignoring anatomy were physicians only in part. He felt that he had now done what he could to overcome this lamentable situation and that as he himself was a physician he would now undertake the practice of medicine. Furthermore, as there was a long tradition of imperial service in his family, he applied to the emperor and received the post of physician to the imperial household. It was an unfortunate decision since much of his time henceforth was to be devoted to the complaints of the gluttonous emperor or, as he wrote, 'with the Gallic disease, obstructions of the bowel, and long lasting weaknesses, which are the usual complaints of my patients', and the imperial service once entered could not be abandoned until the emperor's abdication thirteen years later. Furthermore, the imperial medical staff was made up for the most part of conservatives, hostile to Vesalius's modern views, so much so that in a moment of irritation and frustration against these courtly critics he burned the manuscripts of three unpublished works and vowed never again to undertake research or publication. One of his statements at the time reveals to us something of the zeal with which he had previously devoted himself to his anatomical studies:

> No longer should I willingly spend long hours in the Cemetery of the Innocents in Paris turning over bones, nor go to Montfaucon to look at bones—where once with a companion I was gravely imperilled by the many savage dogs. Nor should I care to be locked out of Louvain so that, alone in the middle of the night, I might take away bones from the gibbet to prepare a skeleton. I shall no longer bother to petition the judges to delay an execution to a time suitable for dissection, nor shall I advise the students to observe where someone has been buried or urge them to make note of the diseases of their teachers' patients so that they might later secure the bodies. I shall not keep in my bedroom for several weeks bodies taken from graves or given me after public execution.

Despite renunciation of anatomical studies, it was inevitable that Vesalius would soon return to this first interest. In fact, in January 1544 he travelled to Pisa for a series of demonstrations at the invitation of Cosimo I, Duke of Tuscany, and thereafter never failed to visit any near-by medical school, to participate in post-mortem examinations, and to take advantage of whatever opportunities offered while acting as a military surgeon during the emperor's numerous wars.

It was during such service with the army that Vesalius was able to apply his unrivalled anatomical knowledge to surgery. He learned the correct treatment

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of gunshot wounds from the Italians, and although at first his surgery was apparently burdened by an academic quality not required or even desirable on the battlefield for such things as amputations, he quickly learned surgical techniques and went on to devise still further ones. His most notable contribution in this area of medicine was the introduction, as early as 1547, of surgically induced drainage of empyema, and in time his employment of this procedure became such that with the hazards reduced to a minimum he was sufficiently confident of the outcome to recommend it to other surgeons. His account of this operation written in 1562 was for its time an outstanding contribution to surgical literature. Such became Vesalius's reputation in surgery that when in 1559 Henry II of France was injured in a tournament and received what turned out to be a fatal head wound, despite the presence of Ambroise Paré, it was Vesalius, summoned from Brussels, who was placed in charge of the case and who wrote the report of it after the fatal termination.

The very qualities of mind which had been responsible for the *Fabrica* were in time to make Vesalius one of the great physicians of his age so that his opinion was widely sought in grave medical problems. In 1551 Roger Ascham, then in Germany as secretary to the English ambassador, referred to Vesalius as 'that noble physician' and 'the best physician in the world', and as an instance of what Vesalius considered the proper relationship of anatomy to medicine there was his remarkable diagnosis in 1555 of an internal aneurysm in a living patient and correct prognostication of the outcome of the case.

With the succeeding years, as his experience became greater, as he realized the errors of fact and the qualities of composition that required emendation, Vesalius gave more and more thought to a new edition of his *Fabrica*. It is not known when an agreement was reached with the printer for such a costly enterprise, but it must have been at some time after 1547 since we are aware that in that year the first edition was still available for sale. Certainly the agreement must have been arrived at within the next several years, however, since it seems most likely that the revised text was written by Vesalius during a long sojourn with the emperor in Augsburg from August 1550 to October 1551. We do know that the first five books of this revised edition were ready in the spring of 1552 since Oporinus the printer advertised them for sale in May of that year, but was persuaded, apparently by Vesalius, to withhold them until the full seven books, after considerable delay, were finally ready in August 1555.

It has sometimes been thought that this second edition was little more than a reissue of the first. Such is far from the case, and in almost every way the second edition is superior. One notable exception is the title-page, which was apparently copied in some haste in Basel, owing to damage to the original wood block. It has an unpleasant stiffness, no doubt the result of copying, and the unknown artist, relying on Vesalius's portrait and never having seen the author, provided him incorrectly with that peculiar disproportion of head to body which is so puzzlingly apparent in the portrait.

The illustrations were more tastefully arranged in relation to the text, and although most of them were the same ones used for the first edition, a few new ones were added or replaced incorrect representations.

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The most striking alteration was the replacement of the foetal figures which Vesalius, lacking sufficient foetal material for study, had used in the first edition even though aware that they were incorrect. The new and correct figures, based upon his later studies when he had been able to acquire proper specimens, were the first satisfactory ones ever to be published.

As far as concerns the text, there is not a page without revisions, at least of style, and in a few cases chapters were added or transferred from one place to another. Some notable case studies were included dealing with matters from hydrocephalus to heart-block. A description of the venous valves was added, although the function of the valves remained a mystery, and there is a remarkable statement of dissatisfaction with the then current Galenic views on cardiovascular physiology. It is readily apparent from the revised *Fabrica* that Vesalius's early and impetuously declared determination to give up further anatomical study had been quickly forgotten.

With the abdication of Charles V in the following year, 1556, Vesalius, for what reason is unknown, took service with his son Philip II, King of Spain, as physician to the Netherlanders at the Spanish court, but, it appears, from time to time serving the king himself. This required a transfer to Spain, whither Vesalius went with his wife and daughter in 1559 and promptly found himself with a large practice among the foreign embassies in Madrid. He seems to have been especially close to Sir Thomas Chaloner, the English ambassador, who referred to him in one dispatch as 'Dr. Vesalius, not unknown for his excellent skill . . . whose better learning the Spanish [physicians] make not account of according to his worthiness.'

As it had been a mistake to take service with the emperor in 1543, so it was even more of a mistake to have gone to Spain with his son, and in his reply to Gabriele Fallopio's critical examination of the *Fabrica*, Vesalius remarked on the difficulty in Spain of obtaining so little as a human skull.

The unscientific atmosphere of Spain, at least in the judgment of Vesalius, was clearly apparent in the case of the head injury of Don Carlos. In 1562 this son and heir of Philip II 'in hasty following of a wench', according to the rather abrupt report of the English ambassador, tumbled down a flight of stairs and struck his head against a door at their bottom. This was in the royal quarters at Alcalá. The young prince's injury, viewed as a national catastrophe, required several months' treatment before recovery was assured. Almost every notable Spanish physician and surgeon shared in the case, and at the order of the king, Vesalius, too, participated, although it appears that some at least of his Spanish colleagues considered him an unwelcome foreigner. Most galling of all, however, was the attribution of the recovery to the Blessed Diego of Alcalá, a Franciscan friar already dead for a hundred years, whose mummified remains had been laid beside the injured prince for divine intercession. As that same somewhat acid English ambassador wrote to Queen Elizabeth, 'If God send the Prince to escape, that friar is not unlike to be canonized for his labour', and true enough, after several unsuccessful petitions, Philip did gain the friar's sanctification in 1588.

Spain was clearly not the place for Vesalius to whom the memory of his years

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in Padua became an ever more pleasant recollection. Moreover, the present holder of the Paduan chair of anatomy, Gabriele Fallopio, was in the final stages of pulmonary tuberculosis and died in 1562. It is not known if Vesalius attempted unsuccessfully to leave Spain sooner, but in any event early in 1564 he did gain royal permission for this purpose. Of the many legends and stories, the most plausible relates his departure to illness, real or feigned, and the announced intention of making a pilgrimage to the Holy Land. Such a journey required embarkation in Venice, but before that Vesalius gained reappointment to his old chair of anatomy, to be assumed with the opening of the new academic year in the autumn. Obvously he had no intention of returning to Spain, whatever the conditions of his departure from it.

At some time in March Vesalius embarked for the voyage to Jaffa, the port at which pilgrims usually landed to continue their journey overland to Jerusalem. There is no information about the pilgrimage except for one brief glimpse of Vesalius on the plain of Jericho in company with the Franciscan Bonifacio Stefano da Ragusa, both men seemingly more concerned with local botany than with the pious activities one would expect of pilgrims.

Nor do we know when Vesalius began the return voyage to Venice, although it appears to have been on one of the pilgrims' ships operated by a class of rascals, complaints of whose swindling tactics were a constant accompaniment to returned pilgrims. Ships' stores were never adequate and accommodation never matched promises. If such a ship were long delayed on its voyage there was always danger of exhaustion of food and water, and this seems to be what happened on this particular ill-fated return. Tossed about for days in a storm, the ship, some of its passengers already dead and thrown overboard, finally made the island of Zante. There, completely exhausted, Vesalius managed to get ashore where he, too, died, although from precisely what cause is unknown: nor do we know where on the island the ship made land nor where Vesalius was buried—according to one story, by a friendly Venetian who had just arrived. There seems little doubt, however, that this was in the month of October.

It was a miserable ending for a man of international distinction; indeed, almost every ambassador thought the news of Vesalius's death to be of sufficient importance for dispatch to his court. We, too, are memorializing his death, although four hundred years later, and from this distant viewpoint paying homage as well to Vesalius's remarkable achievements throughout his life as physician, surgeon, and especially as the man who laid the foundation for the development of the modern, scientific study of the human body.

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