IJAE
Vol. 118, n. 3: 267-276, 2013
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Research Article: History of Anatomy and Embryology

The History and the Art of Anatomy: a source of inspiration even nowadays

Alexandra Mavrodi, George Paraskevas*, Panagiotis Kitsoulis

Department of Anatomy, Medical Faculty, Aristotle University of Thessaloniki, Thessaloniki, Greece

Submitted December 7, 2012; accepted revised April 5, 2013

Summary

Ever since man started to study systematically medicine for the first time he recognized the value of the knowledge of Anatomy in order to safely cut and treat the human body. However, over the centuries it has been proved that Anatomy is more than just a scientific field of medicine. The fact that Anatomy requires the use of human cadavers as an object to study brought to the surface many moral issues, which adumbrated its turbulent past. Additionally, Anatomy and its inextricable element, illustration, has many times been a source of inspiration for both the anatomists and the artists. This paper aims on the one hand to provide a condensed overview of the history of Anatomy and on the other hand to investigate the way Anatomy penetrates Art and, conversely, Art penetrates Anatomy.

Key words

Anatomy; art; dissection; history; illustration.

Rotating always around an anthropocentric axis, medicine has been repeatedly linked to philosophy. According to Hippocrates, who was the first to successfully combine medicine with philosophical way of thinking, a doctor has the duty to preserve intact not only his morality and his sagacity but also his philosophical thought. More specifically, he indicated that "godlike is the physician who is also a philosopher" (Hippocrates, 1992b). Even more daringly, Aristotle claimed: "One might begin with philosophy but would end with medicine or start with medicine and find oneself in philosophy" (Hajar, 2011). For this reason, it would be not only interesting but also useful for anyone who practices medicine keeping in mind his/her dual role as a servant of public health and as a scientist, to look, now and then, for this path which joins medicine to philosophy. In other words, it would be a worthwile experience for him to approach his science more philosophically and to provide his mind with more space and freedom so as to link elements of medicine with human mental constitution and, why not, with other fields of human activity, too. A branch of medical science which certainly offers fertile land for such an effort is Anatomy with its eventful history and its multidimensional character.

According to John Charles Boileau Grant, there are few words with a longer history than the word Anatomy (Basmajian, 1971). Anatomy has become a field of study,

* Corresponding author. E-mail: g_paraskevas@yahoo.gr.

a corpus of observations, dependent upon technique but with rational correlation among themselves and with other biological studies (Williams and Warwick, 1980). It could be said that Anatomy is the "spelling book" of all doctors because, according to Hippocrates, "It is impossible to know medicine for whoever doesn't know exactly what human is" (Hippocrates, 1992a). Aristotle (384-322 BC) was the first to use the term "anatome" and the first to make an approach to accurate knowledge of the subject, although it was derived from dissections of lower animals only (Basmajian, 1971; Moore and Dalley, 1999). The word "Anatomy", wisely chosen, derives from the Greek word "τομή", which in turn derives from the Greek as well word "τέμνω". The Latin word "dissecare" has also a similar meaning to the Greek word "τέμνω", that means "cutting up" or "taking apart" (Moore and Dalley, 1999). Hence Anatomy literally denotes the act of cutting the human body in pieces in order to reveal how it is structured, what anatomical elements it is constituted of and how these elements with their relation to each other facilitate the function of the organism (Basmajian, 1971; Lippert et al., 2006). In this way, by definition Anatomy is fundamentally an active science, namely it involves the act of cutting the human and due to this it requires cadavers as an object for studies. So, the anatomist, even before starting his work, comes up against two primary problems. Firstly, he has to face his instinctive abhorrence for the dead human body and, maybe, his intimate, and probably carefully hidden, fear which might be provoked to him by the view of the cadaver. And secondly, he has to deal with an even more serious dilemma, moral this time. Does he have the right to "bother" the dead, violate his personal world without his permission and exploit him so as to produce knowledge, even if humanity can benefit from this?

This basic requirement of Anatomy, the use of human cadavers and whether or not it is allowed, from time to time made it difficult for this scientific field to evolve. In the antiquity it was believed that the human body "houses" the soul and consequently its sanctuary should not be violated (Hajar, 2011). According to many ancient Greek laws, the human cadaver constituted a source of infection for all people who in any way got in touch with it. Consequently, dissection was thought to be not only an act of hubris towards the dead, but it also rendered the violator of the law both infected and infectious (Staden, 1992). Because of this, while other scientific fields developed exponentially, Anatomy, even in the hands of major personalities in the history of medicine, remained an unexplored field in which assumption predominated over scientific demonstration. The dissection of the human body was officially allowed for the first time in history in Alexandria in the 3rd century B.C. Herophilus and his adolescent Erasistratus were the first in history to practice systematical dissection, giving Anatomy the opportunity to advance at a significant rate. Due to the fact that their contribution broadened the horizons of Anatomy in such a degree, the scientific community honoured Herophilus with the title of the "Father of Anatomy" and Erasistratus with the title of the "Father of Physiology". However, both of them were accused by many researchers of dissecting, with Pharaoh's permission, live prisoners condemned to death. Aulus Cornelius Celsus mentioned in his writings that criminals were dissected by Herophilus "alive and while they were still breathing", whereas Quintus Septimius Florens Tertullian calls him a "butcher" (Dobson, 1925; Bay and Bay, 2010).

After Herophilus' and Erasistratus' death, dissection on human cadavers was stopped until the 14th century. In the meantime, Claudius Galen based his anatom-

ical knowledge on the dissection of monkeys and the treatment of wounded gladiators (Hajar, 2011). The first dissection on a human cadaver after Herophilus and Erasistratus is attributed to Mondino de Luzzi, who was a professor in the University of Bologna. 1315 is recorded as the year when he performed his first dissection on a female cadaver in front of his students and the public (Pilcher, 1906). Using the experience he gained from his dissections, Mondino wrote his "Anathomia" which became extremely popular in his era owning to the fact that it was the first book to describe a method of dissection (Crivellato and Ribatti, 2006). A significant figure was also Leonardo da Vinci, the embodiment of "homo universalis". He carried out about 30 dissections and he turned up to be one of the most nimble-witted anatomists of his time and the first to study Functional Anatomy (Netter, 1957). Soon after, Andreas Vesalius, who used for his studies cadavers of executed criminals, redefined the level of the anatomical knowledge and rectified Galen's mistakes (Hajar, 2011). It is also worth mentioning that Vesalius and other anatomists such as Giacomo Berengario da Carpi, Gabriel Fallopius, Bartolomeo Eustachi and Thomas Bartholin had been accused of executing dissections on alive human beings. However, this belief may have been just a misinterpretation of the truth, since as the aforementioned anatomists were simultaneously surgeons, operations on humans were easy to be considered as dissections on alive individuals (Castiglioni, 1961). In addition, an important event in the history of Anatomy was an Act of the Parliament of Great Britain in 1752. The so called Murder Act allowed surgeons to dissect in place of a public display cadavers of criminals who were condemned to death, while they were still hanged on a gibbet (Bay and Bay, 2010). Despite this adjustment of the law, a few years later human cadavers were still difficult to be found and consequently even grave robbing was a practical solution. A famous British anatomist, Robert Knox, was accused of buying 16 cadavers from two criminals, Burke and Hare, who killed for this reason homeless people who had no family to look for them (Neher, 2011). But even today, too, as everyone who practices systematically anatomical studies knows, it is hard to find cadavers and there are still moral and legal issues concerning dissection. In the 17th and 18th century Anatomical Science continued to develop rapidly and also discovered new, unexplored fields, such as Microscopic Anatomy, whose founder is Marcello Malpighi, and Anatomical Pathology, whose father is considered to be Giovanni Battista Morgagni (Gigis and Paraskevas, 2002).

It is undoubtedly true that without cadavers Anatomy or more specifically anatomical research doesn't exist or at least isn't meaningful and effective, because it isn't based on experiment and scientific demonstration. In the same way, Anatomy or even teaching of Anatomy isn't substantive without full exploitation of the strength of an image. A picture, a drawing or a coloured and even more artistic image is an extremely efficient tool in the hands of the anatomists, sometimes even more useful than the scalpel itself. And that happens because an image is the only way to lively represent the inner morphology of the human body even to whom has never attended a real dissection. For this reason, enviable is the strength of the image in Anatomy as a means of understanding, a means of teaching and a "storehouse" of knowledge. Because, as Frank Netter (1957) supports, illustration in an anatomical book has a triple purpose. First of all, it can assist the student or even the physician who is studying a specific object to clarify it in his mind and to place it in its right position. Secondly, illustration can be used by the teacher when he is trying to impart

his knowledge to the inexperienced student. And finally, it is a perfectly convenient means of preservation of the anatomical knowledge for the next generations (Netter, 1957). Instead of the Chinese well-known adage "a picture is worth a thousand words", Frank Netter, medicine's Michelangelo as he has been called, stated in an effort to link Anatomy with picture: "Draw what can't be seen, watch what's never been done, and tell thousands about it without saying a word" (Hajar, 2011). Having produced almost 4,000 illustrations, mostly for "The Ciba Collection of Medical Illustrations" and for "Clinical Symposia", Netter also refers to the fragile balance between complexity and simplification in the attempt to create an anatomical image. He indicates the importance of drawing pictures that are neither too complex, and therefore unhelpful to read, nor too simplified, and consequently inadequately clear and accurate or even misleading (Netter, 1989). For this reason, a good anatomical book should be equipped with the appropriate illustrations, because in Anatomy the text is never adequate, however detailed, descriptive or accurate it is. The words and the sentences play in fact the role of the "director" who decides how he will distribute his actors, namely the anatomical elements, to convey the meaning and handle the message to the viewer. Anatomy and picture, therefore, are indissolubly bonded together. One resembles the other, just like twins. Anatomy is in fact if not one, definitely many pictures, while every picture has its own structure, in other words its own Anatomy, which has been decided by its creator.

Consequently, it is clearly justified why illustration is itself a distinguishable and a vital part of Anatomy. Although it appeared and established itself relatively lately in history, maybe owing to the fact that only recently technology permitted image replication, medical illustrators raised anatomical illustrating to Art. The first attempt to enrich an anatomical text with figures is attributed to Aristotle, who refers to anatomic illustrations, which have never been found, in his history of the animal world (Choulant et al., 1962). Nonetheless, the first human anatomical figures known in history are believed to have been drawn by the anatomists of the Alexandrian schools where human dissection was allowed. In the middle ages, anatomic illustrations had the form of simple diagrams used to convey an idea of number or relationship but not of shape or relative size (Roberts and Tomilson, 1992). The first full-scale illustrated anatomy book was written by Giacomo Berengario da Carpi. Berengario's dead bodies are portrayed as protagonists of the moods and morals, a fact that can be perfectly understood in one of his most famous illustrations that depicts a muscle-man in the pose of an Apollo surrounded by an aureole of light (Rifkin et al., 2006). At the same time, Leonardo da Vinci was studying the function of the human body in his attempt to perfectly depict the human figure. His earliest pictures were based on the outer morphology of the human body, the skeleton and the body of animals, whereas his more recent pictures were based on the direct observation of the dissected human body. In his work da Vinci included a large number of anatomical subjects, such as bones, muscles and organic systems (Zollner, 2007).

Da Vinci was followed by Andreas Vesalius who collaborated with young artists to illustrate his book "De Humani Corporis Fabrica". One of his innovations was to combine his explicit and elaborate drawings with words, labeling anatomical elements with tiny letters so as to be able to describe them more effectively in his verbal accounts (Fara, 2011). This great anatomist's inborn talent for Art and restive spirit are easily noticeable for anyone willing to watch carefully some of his most well-

known illustrations. There, Vesalius, except for representing explicitly the Anatomy of the body, tries to display each of his drawings as a work of Art. In order to fulfill his wish, he employed a number of artists to create drawings of his dissections, most of which belong to a pupil of the famous painter Tiziano Vecelli or Tiziano Vecellio, known as Titian, namely Jan Stephan Calcar. Calcar and the other artists created charming and artistic illustrations with graceful figures and beautiful landscapes and backgrounds (Calkins et al., 1999). It has also been supported that presumably even Vesalius himself contributed some illustrations in the "Fabrica". Moreover, the high quality of some figures renders it not impossible that Titian (1485-1576) himself actually drew some figures (Roberts and Tomilson, 1992). Even more interesting is the frontispiece of his book, which is full of allegory. In this picture Vesalius is shown to dissect himself a woman's body. According to the writer, the woman was a criminal condemned to death and she tried to postpone her execution by claiming that she was pregnant. In front of the crowd observing Vesalius two major personalities from the past are shown, Galen (at the left bottom of the picture) and Aristotle (at the right bottom of the picture), while over the cadaver is hanging a skeleton aiming not only to teach but to remind the brevity of life as well (Fara, 2011; see: http://ihm.nlm.nih.gov/luna/servlet/detail/NLMNLM~1~1~101437384~153761 [Vesalius performing dissection]). Later in history, Bartolommeo Eustachi, also known as Eustachius, was the first to discover several important anatomical structures. In cooperation with his assistant Pier Matteo Pini, he illustrated human and animal Anatomy using copper plate engravings, which remained unpublished until Giovanni Maria Lancisi and Bernard Siegfried Albinus discovered them. Eustachius and Pini created anatomical illustrations of high quality, whose diagrammatic clarity and accuracy render them useful to surgeons while understanding, memorizing, teaching or even planning new or unfamiliar surgical operations (Simpson, 2011; see: http://ihm.nlm.nih.gov/luna/servlet/detail/NLMNLM~1~1~101435432~174815 [Dissection of a cadaver]).

Next step in the history of anatomical illustration is Baroque Anatomy. Baroque Anatomy flourished especially in the Netherlands of the 17th to 18th century, with the contribution of Frederick Ruysch, Govaert Bidloo and Bernard Siegfried Albinus. Ruysch maintained in his house in Amsterdam an anatomy museum, where he preserved body parts and embryos in jars of alcohol, which created an atmosphere of a perfect necropolis (Rifkin et al., 2006). Bidloo, on the other hand, in his most eccentric illustrations, attempted to convey the scenery of a real dissection room by adding naturalistic details such as sheets that cover the body or even a fly perched on a cadaver (Roberts and Tomilson, 1992; see: http://ihm.nlm.nih.gov/luna/servlet/detail/NLMNLM~1~1~101531707~218161 [Musculature and bones of the forearm and hand]). The last of the three Baroque anatomists, Siegfried Albinus, influenced by philosophy and inspired by the idea of a "homo perfectus", aimed at constructing the figure of the ideal man. This was why he insisted on the symmetry, the vitality and the correctness of his anatomical figures (Hildebrant, 2005). Soon after, in Germany, Albrecht von Haller created the "Icons Anatomicae", a collection of copper engravings of anatomical features, which were considered to be helpful both for teaching and for studying (Bay, 1960). Round the end of the 18th century, in Italy, Paolo Mascagni hired Antonio Serantoni (draftsman, engraver and modeler in wax) with the intention to produce sets of plates in huge folios, three for each complete figure, which were carefully coloured and showed the skeleton and the various organs. Although Mascagni's

ambition was to create a magnificent anatomical book, which would give him worldwide fame, his figures were proven to be impractical and unusable (Kemp, 2010). At the same time, in Great Britain many great anatomists illustrated their works. James Douglas is known for his complete but unfortunately unpublished work in osteology. He was planning to include in his "Osteographia" not only figures (he numbered over sixty figures) but also a history of osteology, a history of osteological drawings, an account of the structure of the bones and their diseases and finally a lexicon of the Greek terms of osteology (Brock, 1974). Alexander Monro was interested in osteology, too. His skeletons are very elegant and remind of the past, owning to the fact that they stand against an elaborate background (Roberts and Tomilson, 1992). A few years later, John Bell adopted his own style in creating anatomical illustrations. He is well-known for his naturalistic, dramatic and even striking figures, which exhale the scent of the dissecting room. Although not giving the impression of alive, his illustrations are direct and realistic (Kemp, 2010).

One of the most outstanding works on human Anatomy published in the 19th century was the "Complete treatise of human anatomy" by Jean-Baptiste Marc Bourgery and Nicolas-Henri Jacob published in Paris between 1831 and 1854. In total there are 709 plates bringing together 3604 figures, most of them original. Nicolas Henry Jacob appears to be the sole master of the illustrations of the "Treatise". Jacob took up the new technique of lithography in order to design the whole collection of the plates, whereas the figures incorporated into the textbook were hand-coloured drawings (Bourgery, 2005). At the same period and precisely in 1828 Jones Quain published a very popular anatomical textbook entitled "Elements of Descriptive and Practical Anatomy" and illustrated by some wood engravings. That edition later was empowered by additional figures drawn from nature such as dried bones and actual dissections (Sharpey, 1867). A few years later, Joseph Maclise produced a book for surgeons, which was a portrait gallery of figures inspired by the Victorian past (Rifkin et al., 2006). His figures seem natural and vivid, shown as torsos or busts or as full or half-length figures, many of which appear god-like (Roberts and Tomilson, 1992). Thereafter, Henry Gray shared with Henry Vandyke Carter the idea for a new anatomical book, which would be affordable, practical and readable, designed especially for students to help them pass exams and assist them as young surgeons. Carter created 395 illustrations for the first edition of their book, "Anatomy: Descriptive and Surgical", all of which became popular among medical students because of their size, outstanding for their day, and diagrammatic clarity (Standring, 2005). More recently, the figures of Atlases of Human Anatomy have a more lifelike appearance. Characteristic examples are Johannes Sobotta's "Atlas of Human Anatomy" and Eduard Pernkopf's "Topographische Anatomie des Menschen". Sobotta's aim was to produce an atlas that would serve the needs of not only the medical students but the practitioners, too. It could also be said that Sobotta achieved his aim, since his "Atlas of Human Anatomy" is still one of the finest and more useful atlases ever produced. What makes his illustrations unique is their artistic beauty and their three-dimensional perspective that Sobotta managed to integrate in his two-dimensional pictures (Burr, 1929; Benjamin, 1991). Edward Pernkopf, on the other hand, is known for his elaborate illustrations in his "Topographische Anatomie" that is considered to be a standard by which the quality of all other anatomy books is measured. However, Pernkopf is also known for having joined the Nazi Party in 1933 and has been accused for hav-

ing used for his illustrations almost 1,400 bodies attained from the Gestapo execution Champer of the Vienna Regional Court. Indeed, each illustration of his atlas was accompanied by the artist's signature together with a swastika attached (Cohen, 2010). An undoubtedly important event in the history of Anatomy was also the establishment of the first school of medical illustrators by Max Brödel in 1911. Brödel aimed at providing young students with a combination of scientific background and artistic education, which was really rare among doctors (Hajar, 2011).

Nonetheless, the anatomists weren't the only ones who tried to benefit from the potentials provided to them by Art and more specifically painting, in order to give more force and accuracy to their writings. The artists, from their side, too, attempted to build their works on the precision and the fidelity given by Anatomy. From the 14th to the 17th century artists of Renaissance, trying to make their Art more realistic, studied Anatomy and used the knowledge that they attained for accurate representation of the inner and outer morphology of the human body. Additionally, it is thought that great artists, like Michelangelo or Raphael, may have practiced dissections themselves (Hajar, 2011). The interest of the artists for Anatomy is alive even today, since a basic background of anatomical education allows the artist to "build" the human figure from the inside out step by step, so that the outer picture is a function of the inner picture. By using the bone skeleton as a scaffolding and by covering it with the muscular system, the artist not only attains the right proportions, but is also assisted in selecting the appropriate tone for each colour and in simulating the shade, which both give his work the impression of being real and three-dimensional.

At first glance we can understand, then, that Anatomy penetrates constantly into the world of Art and Art into the world of Anatomy, but if we think more philosophically, we discover that Anatomy and Art are interlaced and share a fundamental relationship. Although doctors and artists share only a little common vocabulary, they both have two identical targets: firstly to observe the body and secondly to invest their time in the "celebration" of the human form (Regenbogen, 2011). Specifically, the doctor makes every effort to find the cause which disrupts in the human body the sense of beauty, using the word "beauty" with the meaning of both aesthetic and health, and then he tries to redress this disrupted balance. The eyes of the artist, on the other hand, look for what is beautiful and when the artist traces it, he extols what he sees by reproducing it. However, the anthropocentric character is not the only common element between Anatomy and Art. There is no doubt that in order to "produce" anatomical knowledge and in order to create a work of art, too, both the anatomist and the artist have to practice observation constantly. Namely, the power of observation is what will guide the anatomist to discover anything abnormal in the human body and observation will also inspire the artist for creation. Furthermore, the same power of observation is necessary for both the anatomist and the artist so as to study the shapes and the relative position of each part of the body.

In addition, a fundamental principle of Art, the perspective, finds application in Anatomy, as well. By using the laws of perspective the artist draws objects in a way that reveals their position, in other words, which of them is closer to the eye of the observer and which is far away. In this way he manages to give his two-dimensional painting a sense of three-dimensionality (Reed, 1986).The same technique of perspective is used subliminally by the anatomist to place in his mind the anatomical elements in their right position and build in this way the picture of the body.

Therefore, Anatomy and Art share so many common features that it wouldn't be an overstatement if somebody supported the belief that a good anatomist needs Art. The ability to draw is an irreplaceable qualification for him owing to the fact that when he attempts to depict the relations among the anatomical elements and overcome the trouble he faces in his effort, he is not only forced to understand even more deeply his science, but he also finds out important points that should be clarified and explained in detail when taught or be kept in mind in clinical practice. Exactly the same way as the study of Anatomy disciplines the eyes of the artist, the creation of anatomical models disciplines the doctor's hand and especially the surgeon's (Berkowitz, 2011). But even the ability of the anatomist to draw what he wants to explain doesn't seem to be enough. Additionally, he should have the ability to view things the way an artist would. A valuable qualification for him is the power of observation, the penetrating glance and the constant exploratory mood. Every dissection brings him face to face with a different world, which, of course, obeys the basic principles of Anatomy, but constitutes an individual existence and therefore might hide secrets and require a specialized approach. For this reason, the anatomist has to observe, orientate himself even with eyes closed inside the human body and think using the principles of perspective. In other words, he has to face the picture of the body not as a surface but as a space, in order to understand which he must imaginarily walk through the anatomic elements and see what lies behind them. In fact, he has to reproduce from scratch the structure of the body in his mind and draw it three-dimensional in his thought. Anatomy is Art. And maybe the anatomist is somehow an artist, a painter or a sculptor. And as the artist uses his instinct to create, the anatomist sometimes uses his intuition, which he has attained during years of experience and practice, so as to guide himself inside the human body and to discover it.

For medicine, Anatomy is the "Kingdom of the Images". Like a painting, the human body, even when it has stood the barbarity of the scalpel, gathers all the features which make Art beloved and attractive: symmetry, balance and even musicality. In the human body everything lies harmonically within its surroundings, in a position that is wisely chosen so as to facilitate the function of the organism. And the physician who is used to watch every day the disruption of this harmony by illness, is definitely the most appropriate person to recognize in a healthy human body the beauty, the perfection, and even the "music" that is exhaled.

References

Basmajian J.V. (1971) Grant's Method of Anatomy. 8th ed. Williams and Wilkins Co, Baltimore. P. ix.

Bay J.C. (1960) Albrecht von Haller Medical Encyclopedist. Bull. Med. Libr. Assoc. 48: 393-403.

Bay N.S.Y, Bay B.H. (2010) Greek Anatomist Herophilus: the father of anatomy. Anat. Cell. Biol. 43: 280-283.

Benjamin M. (1991) Sobotta Atlas of Human Anatomy. J. Anat. 177: 214.

Berkowitz C. (2011) The Beauty of Anatomy: Visual Displays and Surgical Education in Early-Nineteenth-Century London. Bull. Hist. Med. 85: 248-278.

Bourgery J.M., Jacob N.H. (2005) Atlas of Human Anatomy and Surgery. The complete coloured plates of 1831-1854. Taschen, Koln. P. 20-25.
Brock H. (1974) James Douglas of the Pouch. Med. Hist. 18: 162-172.
Burr H.S. (1929) Atlas of Human Anatomy. Yale J. Biol. Med. 1: 183.
Calkins C.M., Franciosi J.P., Kofesari G.L. (1999) Human anatomical science and illustration: the origin of two inseparable disciplines. Clin. Anat. 12: 120-129.
Castiglioni A. (1961) [History of Medicine, translation: N. Papaspyrou. vol. A. Minotavros publ., Athens]. P. 400.
Choulant L., Frank M., Garrison F.H., Streeter E.C., Singer C. (1962) History and Bibliography of Anatomic Illustration. Hafner Publishing Co, New York.
Cohen M.M.J. (2010) Overview of German, Nazi and Holocaust medicine. Am. J. Med. Genet. 152: 687-707.
Crivellato E., Ribatti D. (2006) Mondino de' Liuzzi and his Anathomia: A Milestone in the Development of Modern Anatomy. Clin. Anat. 19: 581-587.
Dobson J.F. (1925) Herophilus of Alexandria. Proc. R. Soc. Med. 18(Sect Hist Med): 19-32.
Fara P. (2011) Versions of Vesalius. Endeavour 35: 5-6.
Gigis P., Paraskevas G. (2002) [Introduction in the anatomy of the Human. University Studio Press, Thessaloniki]. P. 18.
Hajar R. (2011) Medical Illustration: art in medical education. Heart views 12: 83-91.
Hildebrand R. (2005) Attic perfection in anatomy: Bernhard Siegfried Albinus (1697-1770) and Samuel Thomas Soemmering (1755-1830). Ann. Anat. 187: 555-573.
Hippocrates. (1992a) [About ancient medicine. In: Hippocrates. Collected Writings. 1st vol. Cactus, Athens]. P. 100.
Hippocrates. (1992b) [About morality. In: Hippocrates. Collected Writings. 1st vol. Cactus, Athens]. P. 178.
Kemp M. (2010) Style and non-style in anatomical illustration. J. Anat. 216: 393-403.
Lippert H., Herbold D., Lippert-Burmester. (2006) Anatomie, text und atlas. Urban und Fischer, 8 Auflage. P. 2.
Moore K.L., Dalley A.F. (1999) Clinically oriented Anatomy. 4th ed. Williams and Wilkins, Lippincott. P. 2.
Neher A. (2011) Robert Knox and the anatomy of beauty, Med. Humanit. 37: 46-50.
Netter F.H. (1957) Medical Illustration. Its History, Significance and Practice. Bull. N. Y. Acad. Med. 33: 357-368.
Netter F.H. (1989) Atlas of Human Anatomy. Ciba-Geigy Ltd, Basle.
Pilcher L.S. (1906) The Mondino Myth. Med. Library Hist. J. 4: 311-331.
Reed H. (1986) [Dictionary of visual arts. Ypodomi, Athens]. P. 274.
Regenbogen A. (2011) Artist's Statement: The Rape of the Sabine Women-Sketch detail. Acad. Med. 86: 876.
Rifkin B.A., Ackerman M.J., Folkenberg J. (2006) Human Anatomy: Depicting the body from the Renaissance to today. Thames and Hudson, London.
Roberts K.B., Tomilson J.D.W. (1992) The Fabric of the Body: European Traditions of Anatomical Illustration. Clarendon Press, Oxford.
Sharpey W., Thomson A., Cleland J. (1867) Quain's Elements of Anatomy. vol. 1. James Walton, London. Pp. v-vi.
Simpson D. (2011) The papal anatomist: Eustachius in Renaissance Rome. ANZ Journal of Surgery 81: 905-910.

Staden V.H. (1992) The discovery of the body: human dissection and its cultural contexts in ancient Greece. Yale J. Biol. Med. 65: 223-241.

Standring S., editor. (2005) Gray's Anatomy, The Anatomical Basis of Clinical Practice. 39th ed. Elsevier Churchill Livingstone, Edinburgh.

Williams P.L., Warwick R., editors. (1980) Gray's Anatomy.36th ed. Churchill Livingstone, Edinburgh. P. xv.

Zollner F. (2007) Leonardo da Vinci: Collected drawings and paintings. Taschen ed. [Translation in Greek: A. Deloucas-A. Galanou., ed. Gnosis, Athens. Pp. 400-402].

The history of anatomy extends from the earliest examinations of sacrificial victims to the sophisticated analyses of the body performed by modern scientists. The study of human anatomy can be traced back thousands of years, at least to the Egyptians, but the science of anatomy, as we know it today, did not develop until far later. The development of the study of anatomy gradually built upon concepts that were understood during the time of Galen and slowly became a part of the traditional medical curriculum.[1] It has been characterized, over time, by a continually developing understanding of