

A Surgeon in the Field Ambroise Pare

I will here show the readers the places where I have had means to learn the art of surgery, for the better instructing of the young surgeon. And first in the year 1536 the great King Francis sent a great army to Turin to recover the cities and castles which the Marquis of., Guast, lieutenant general of the emperor, had taken, where the High Constable of France, the great master, was lieutenant general of the army and Monsieur de Montejan colonel general of the foot, of which I was then surgeon. A great part of the army arrived in country of Suze; we found the enemy that stopped passage, and had made certain forts and trenches, insomuch that to hunt them out and make them leave place we were forced to fight, where there were diverse hurt and slain, as well of the one side as of the other. But the enemies were constrained to retire and get into the castle, which was caused partly by one Captain Ratt, who climbed with divers of the soldiers of his company upon a little mountain. There where he shot directly upon the enemies he received a shot upon the ankle of his right foot, wherewith he fell to ground, and said then, "Now is the Rat taken." I dressed him and God healed him.

We entered the throng in the city and passed over the dead bodies, and some which were not yet dead we heard cry under our horses' feet, which made my heart relent to hear them. And truly I repented to have forsaken Paris to see so pitiful a spectacle. Being in the city, I entered into a stable, thinking to lodge my own and my man's horse, where I found four dead soldiers, and three which were leaning against the wall, their wholly disfigured and neither saw, nor heard, nor spoke; and their clothes did yet flame with the gun-powder which had burned them. Beholding them with pity, there happened to come an old soldier who asked if there were any possible means to cure them; I told him no. He presently approached them and gently cut their throats without choler. Seeing this great cruelty, I told him he was a wicked man; he answered me that he prayed to God that whensoever he should be in such a case, that he might find someone that would do as much to him, to the end that he might not miserably languish.

And to return to our former discourse, the enemy was summoned to surrender, which they did and went out, their lives only saved, with a white staff in their hands. The greatest part whereof went and got to the Castle of Villane, where there was about two hundred Spaniards. Monsieur the Constable would not leave them behind, to the end that the way might be made free. This castle is seated upon a little mountain which gave great assurance to them within, that one could not plant the ordnance to beat upon it, and were summoned to surrender or that they should be cut in pieces; which they flatly refused, making answer that they were as I good and faithful servants to the emperor as Monsieur the Constable could be to the king his master. Their answer heard, we made by force of arm two great can-nons to be mounted in the night with cords and ropes by the Swiss and Lansquenets [German Landsknechts], when as the ill luck would have it, the two cannons being seated, a gunner by great negligence set on fire a great bag of gunpowder, wherewith he was burned together with ten or twelve soldiers. And, moreover, the flame of the powder was a cause of discovering the artillery, which made them so that all night they of the castle did nothing but shoot at that place where they discovered the two pieces of ordnance, wherewith they killed and hurt a great number of our people.

The next day early in the morning a battery was made which in a few hours made a breach, which being made they demanded to parley with us but 'twas too late for them. For in the meantime our French foot, seeing them amazed, mounted to the breach and cut them all in pieces, except a fair young lusty maid of Piedmont which a great lord would have kept and preserved for him to keep him company in the night for fear of the greedy wolf. The captain and ensign were taken alive but soon after were hanged upon gate of the city, to the end they might give example and fear to the Imperial soldiers not to be so rash foolish as to be willing to hold such places against great an army. Now all the said soldiers of the castle, seeing our people coming with a most violent fury, did all endeavour to defend themselves; they killed hurt a great company of our soldiers with pikes, muskets, and stones, where the surgeons had good store of work cut out.

Now at that time I was a freshwater soldier; I had not yet seen wounds made by gunshot at the first dressing. It is true I had read in John de Vigo, in the first book of wounds in general, the eighth chapter, that wounds made by fire did participate of venomosity, by reason of the powder, and for their cure commands cauterize them with oil of elders scalding hot, in which should be mingled a little treacle. And not to fail before I would apply of the said oil, knowing that such a thing might bring to the patient great pain, I was willing to know first, before I applied it, how the other surgeons did for the first dressing, which was to apply the said oil the hottest that was possible into the wounds, with tents and setons; insomuch that I took courage to do as they did. At last I wanted oil and was constrained instead thereof to apply a digestive of yolks of eggs, oil of roses, and turpentine. In the night I could not sleep in quiet, fearing some default in not cauterizing, that I should find those to whom I had not used the burning oil dead poisoned; which made me rise very early to visit them, where beyond my expectation I found those to whom I had applied my digestive medicine, to feel little pain, and their wounds without inflammation or tumor, having rested reasonably well in the night. The others, to whom was used the said burning oil, I found feverish, with great pain and tumor about the edges of their wounds. And then I resolved with myself never so cruelly to burn poor men wounded with gunshot.

Being at Turin, I found a surgeon who had fame above all others for the curing of wounds of gunshot, into whose favour I found means to insinuate myself, to have receipt of his balm, as he called it, wherewith he dressed wounds of that kind; and he held me off the space of two years before I could possibly draw the receipt from him. In the end by gifts and presents he gave it me, which was this, to boil young whelps, new pupped, in oil of lilies, with earthworms prepared with turpentine of Venice. Then was I joyful and my heart made glad, that I had understood his remedy, which was like to that which I had obtained by great chance. See then how I have learned to dress wounds made with gunshot, not by books.

My Lord Marshal of Montejan remained lieutenant general for the king in Piedmont, having ten or twelve thousand men in garrison through the cities and castles, who often combatted with swords and other weapons, as also with muskets; and if there were four hurt, I had always three of them, and if there was a question of cutting off an arm or leg, or to trepan, or to reduce a fracture or dislocation, I brought it well to pass. The said Lord Marshal sent me one while this way, another while that way, to dress the appointed soldiers which were beaten as well in other cities as that of Turin,

insomuch that I was always in the country one way or other. Monsieur the Marshal sent for a physician to Milan, who had no less reputation in the medicinal art (than the deceased Monsieur le Grand), to take him in hand for an hepatical flux whereof at last he died. This physician was a certain while at Turin to deal with him, and was often called to visit the hurt people, where he always found me, and I consulted with him and some other surgeons. And when we had resolved to do any serious work of surgery, 'twas Ambroise Pare that put his hand thereto, where I did it promptly and with dex-terity, and with a great assurance, insomuch that the said physician admired me, to see me so ready in the operation of surgery, seeing the small age which I had. One day discoursing with the said Lord Marshal, he said to him, "Thou hast a young surgeon of age, but he is old in knowledge and experience; preserve him well, for he will do thee service and honour." But the old man knew not that I had dwelt three years in the Hospital of Paris, there to dress the diseased. In the end Monsieur Marshal died with his hepatical flux. Being dead, the king sent Monsieur the Marshal of Annehaut to be in his place, who did me this honour to pray me to dwell with him, and that he would use me as well or better than Monsieur the Marshal Montejan; which I would not do for the grief I had for the loss of my master who loved me intimately, and I him in the like manner. And so I came back to Paris.

From *The Apologie and Treatise*, translated out of Latin and compared with the French by Thomas Johnson (1634).

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Anatomy and the Art of Medicine

ANDREAS VESALIUS

Those engaged in the arts and sciences, most gra-cious Emperor Charles, find many serious obstacles to the exact study and successful application of them. In the first place, no slight inconvenience results from too great separation between branches of study which serve for the perfection of one art. But much worse is the mischievous distribution among different practitioners of the practical applications of the art. This has been carried so far that those who have set before themselves the attainment of an art embrace one part of it to the neglect of the rest, although they are in-timately bound up with it and can by no means be separated from it. Such never achieve any notable re-sult; they never attain their goal, or succeed in basing their art upon a proper foundation.

I shall pass over all the other arts in silence and confine myself to a few remarks on that which presides over the health of mankind. This, of all the arts which the mind of man has discovered, is by far the most beneficial, necessary, abstruse, and laborious. But in bygone times, that is to say, [in the West] after the Gothic deluge and [in the East] after the reign of Mansor at Bochara in Persia, under whom, as we know, the Arabs still lived as was right on terms of familiarity with the Greeks, medicine began to be sore distem-pered. Its primary instrument, the employment of the hand in healing, was so neglected that it was relegated to vulgar fellows with no instruction whatsoever in the branches of knowledge that subserve the art of medi-cine. ...

The triple art of healing, as it is called, cannot at all be disunited and wrenched asunder, but belongs in its entirety to the same practitioner; and for the due attainment of this triple art, all the parts of medicine have been established and prepared on an equal footing, so that the individual parts are brought into use with a success proportioned to the degree in which one combines the cumulative force of all. How rarely indeed a disease occurs which does not at once require the triple manner of treatment: that is to say, a proper diet must be prescribed, some service must be rendered by medicine, and some by the hand. Therefore the tyros in this art must by every means be exhorted to follow the Greeks in despising the whisperings of those physicians (save the mark!), and, as the fundamental nature and rational basis of the art prescribes, to apply their hands also to the treatment, lest they should rend the body of medicine and make of it a force destructive of the common life of man.

And they must be urged to this with all the greater earnestness because men today who have had an irreproachable training in the art are seen to abstain from the use of the hand as from the plague, and for this very reason, lest they should be slandered by the masters of the profession as barbers before the ignorant mob, and should henceforth lack equal gain and honour with those less than half-doctors, losing their standing both with the uneducated commonalty and with princes. For it is indeed above all other things the wide prevalence of this hateful error that prevents us even in our age from taking up the healing art as a whole, makes us confine ourselves merely to the treatment of internal complaints, and, if I may utter the blunt truth once for all, causes us, to the great detriment of mankind, to study to be healers only in a very limited degree. . . .

But when medicine in the great blessedness of this age, which the gods will to entrust to the wise guidance of your divine power, had, together with all studies, begun to live again and to lift its head up from its utter darkness (so much so, indeed, that it might without fear of contradiction be regarded in some academies as having well nigh recovered its ancient brilliance); and when there was nothing of which the need was now so urgently felt as the resurrection of the science of anatomy, then I, challenged by the example of so many eminent men, insofar as I could and with what means I could command, thought I should lend my aid. And lest, when all others for the sake of our common studies were engaged in some attempt and with such great success, I alone should be idle, or lest I should fall below the level of my forebears, doctors to be sure not unknown to fame, I thought that this branch of natural philosophy should be recalled from the dead, so that if it did not achieve with us a greater perfection than at any other place or time among the old teachers of anatomy, it might at least reach such a point that one could with confidence assert that our modern science of anatomy was equal to that of old, and that in this age anatomy was unique both in the level to which it had sunk and in the completeness of its subsequent restoration.

But this effort could by no manner of means have succeeded, if, when I was studying medicine at Paris, I had not myself applied my hand to this business, but had acquiesced in the casual and superficial display to me and my fellow students by certain barbers of a few organs at one or two public dissections. For in such a perfunctory manner was anatomy then treated in the place where we have lived to see medicine happily re-born, that I myself, having trained myself without guidance in the dissection of brute creatures, at the third dissection at which it was my fortune

ever to be present (this, as was the custom there, was concerned exclusively or principally with the viscera), led on by the encouragement of my fellow students and teachers, performed in public a more thorough dissection than was wont to be done. Later I attempted a second dis-section, my purpose being to exhibit the muscles of the hand together with a more accurate dissection of the viscera. For except for eight muscles of the abdo-men, disgracefully mangled and in the wrong order, no one (I speak the simple truth) ever demonstrated to me any single muscles, or, any single bone, much less the network of nerves, veins, and arteries.

Subsequently at Louvain, where I had to return on account of the disturbance of war, because during eighteen years the doctors there had not even dreamed of anatomy, and in order that I might help the students of that academy, and that I myself might acquire greater skill in a matter both obscure and in my judg-ment of prime importance for the whole of medicine, I did somewhat more accurately than at Paris expound the whole structure of the human body in the course of dissecting, with the result that the younger teachers of that academy now appear to spend great and very serious study in acquiring a knowledge of the parts of man, clearly understanding what invaluable material for philosophizing is presented to them from this knowl-edge. Furthermore at Padua, in the most famous gym-nasium of the whole world, I had been charged with the teaching of surgical medicine five years by the illustrious Senate of Venice, which is far the most liberal in the endowment of the higher branches of learning. And since the carrying out of anatomical in-quiry is of importance for surgical medicine, I devoted much effort to the investigation of the structure of man, and so directed my inquiries, and, exploding the ridicu-lous fashion of the schools, so taught the subject that we could not find in my procedure anything that fell short of the tradition of the ancients. . . .

And that the Muses might the more smile upon this hope, I have, so far as in me lay, and in addition to my other publications on this subject which certain plagiarists, thinking me far away from Germany, have put out there as their own made a completely fresh arrangement in seven books of my information about the parts of the human body in the order in which I am wont to lay the same before that learned assembly in this city, as well as at Bologna, and at Pisa. Thus those present at the dissections will have a record of what was there demonstrated, and will be able to ex-pound anatomy to others with less trouble. And also the books will be by no means useless to those who have no opportunity for personal examination, for they relate with sufficient fullness the number, position, shape, sub-stance, connection with other parts, use, and function of each part of the human body, together with many similar facts which we are wont to unravel during dis-section concerning the nature of the parts, and also the method of dissection applicable to dead and living animals. Moreover, the books contain representations of all the parts inserted in the text of the discourse, in such a way that they place before the eyes of the student of nature's works, as it were, a dissected corpse. Thus in the first book I have described the nature of all bones and cartilages, which, since the other parts are supported by them, and must be described in ac-cordance with them, are the first to be known by students of anatomy. The second book treats of the liga-ments by which the bones and cartilages are linked one with another, and then the muscles that affect the movements that depend upon our will. The third com-prises the close network of veins which carry to the muscles and bones and the other parts the ordinary blood by which they are nourished, and of arteries which control the mixture of Innate Heat and Vital

Spirit. The fourth treats of the branches not only of the nerves which convey the Animal Spirit to the muscles, but of all the other nerves as well. The fifth explains the structure of the organs that subserve nutrition effected through food and drink; and furthermore, on account of the proximity of their position, it contains also the instruments designed by the Most High Creator for the propagation of the species. The sixth is devoted to the heart, the fomes of the vital faculty, and the parts that subserve it. The seventh describes the harmony between the structure of brain and the organs of sense, without, however, repeating from the fourth book the description of network of nerves arising from the brain.

Now in arranging the order of these books I have followed the opinion of Galen, who, after the account of the muscles, considered that the anatomy of the veins, arteries, nerves, and then of the viscera should be handled. But with very great reason it will be urged, and especially in the case of a beginner in this science, that the study of the viscera ought to be combined with that of the distribution of the vessels, a course I have followed in the Epitome. This latter I have made to be as it were a footpath beside the highway of the larger book, and an index of what is set forth in it; and it is honoured with the splendid patronage of his serene Highness Philip, your Majesty's son, and a living em-bodiment of his father's virtues.

But here there comes into my mind the judgment of certain men who vehemently condemn the practice of setting before the eyes of students, as we do with the parts of plants, delineations, be they never so accurate, of the parts of the human body. These, they say, ought to be learned, not by pictures, but by careful dissection and examination of the things themselves. As if, forsooth, my object in adding to the text of my discourse images of the parts, which are most faithful, and which I wish could be free from the risk of being spoiled by the printers, was that students should rely upon them and refrain from dissecting bodies; whereas my practice has rather been to encourage students of medicine, in every way I could, to perform dissections with their own hands. . . .

Dissection of dead bodies gives accurate instruction in the number, position, and shape of each part, and its particular substance and composition; vivisection sometimes plainly shows the function itself, and some-times supplies helpful arguments leading to its discovery. Wherefore it is proper that students should first come for training on dead animals, in order that when they afterwards proceed to investigate the action and use of the parts, they may be prompt in their approach to the living animal. And as there are many parts of the body assigned to different actions and uses, nobody ought to be in doubt of the fact that there are manifold ways of dissecting the living animal. . . .

To proceed: the vivisection I promised a little while ago to describe, you should perform on a pregnant sow or bitch. It is better to choose a sow on account of the voice. For a dog, after being bound for some time, no matter what you may do to it, finally neither barks nor howls, and so you are sometimes unable to observe the loss or weakening of the voice. First, then, you must fasten the animal to the operating table as firmly as your patience and your resources allow, in such a way that it lies upon its back and presents unimpeded the front of its neck and the trunk of its body. It is not a difficult matter to get a plank with holes in it suited for fastening the legs; or if there are no holes in it, it is easy to put two sticks beneath the plank and bind the legs

to them. Among other details, special attention must be given to the upper jaw, so that it may be firmly fastened to the plank. Do this with a chain or a strong cord fixed in front of the canine teeth, and then tied to a ring in the plank, or a hole, or any other you find convenient, but so that the neck may be tended and the head motionless, and the animal at the same time free to breathe and cry.

Before the animal is bound in this way my custom to pass in review for the audience, already well in the dissection of dead bodies, the precise points are to be observed in the present dissection, lest a wordy account in the middle of the operation should hinder the progress of the work, or the work even be broken off by the necessity for speech. Then I make a long incision in the throat with a sharp razor, cutting through the skin and the muscles under it right down to the trachea, taking care lest the incision should be deflected and injure some important vein. Then I grasp the trachea in my hand, and, freeing it merely with the aid of my fingers from the muscles that lie upon it, I search out the soporal [i.e., carotid] arteries at its sides and the sixth pair [i.e., the vagus and spinal accessory nerves] of cerebral nerves stretched along it. Then I also examine the recurrent nerves attached to the sides of the trachea, and some-times I ligature them, sometimes sever them. And this I do first on one side, in order that when the nerve is here tied or cut it may be clearly seen how the middle voice perishes, and how it altogether disappears when both nerves are affected, and how, if I slacken the knot, it again returns. You can quickly examine with-out much loss of blood, and very nicely hear, what a powerful outward blast the animal produces without voice when the recurrent nerves have been cut with a knife.

Then I pass to the abdomen, and with a sharp strong knife, below the cartilages of the spurious ribs and at the pointed site [i.e., xiphisternum] of the breastbone, I make a single semicircular cut right down to the cavity of the peritoneum; and from the middle of this incision right to the pubis I attempt another, which comes off readily if I insert the knife or razor into the cavity of the peritoneum. In this way, by these two in-cisions, we shall expose the intestines and the uterus distended with the fetuses. But we must take particular care that one of the audience put his thumb on the vessels which descend below the breastbone and make for the abdomen. For these are the only vessels up to now from which much blood flows.

From *De fabrica corporis humani*. Trans. B. Farrington.