To the Divine Charles V, the Mightiest and Most Unvanquished Emperor: Andreas Vesalius' PREFACE to his books On the Fabric of the Human Body

page 2r

However numerous the obstacles to the arts and sciences, hindering exact learning and the successful application of knowledge, most gracious emperor Charles, nevertheless I believe it no moderate loss that in addition there is an excessive scattering of the disciplines that serve the demands of each art. Worse yet, the distribution of professional skills among various practitioners has gone so far that those who have set themselves goals of competency embrace one part of their art to the neglect of others that are closely related and cannot be separated from it, and they never accomplish anything notable; never attaining their proposed goal, they constantly fall short of the true construction of their art.

I will pass over the other arts in silence and direct my words for a while to that which is responsible for the health of mankind; certainly of all the arts that human genius has discovered, this is by far the most useful, indispensible, difficult, and laborious. But nothing more calamitous could have crept in than that at some time, especially after the incursion of the Goths and after Mansor the king of Persia [1] (under whom the Arabs, still rightly familiar to us alongside the Greeks, throve), medicine began to be ravaged by having its primary instrument, the application of the hand's work [2] in healing, so neglected that it seemed to have been handed over to common folk and to persons completely untrained in the disciplines that serve the medical art. For though there were once three medical sects, the Logical, Empiric and Methodist, [3] still it was the entire scope of their craft which their adherents directed toward the preservation of health and the ruination of disease. Applying to this goal everything they considered essential to the art in their respective sects, they employed three means of aid, of which the first was a system of diet, the second medication, the third surgery. [4] The last of these neatly shows even more than the others that medicine is the addition of things that are lacking and the removal of what is superfluous; surgery never fails to aid the treatment of a condition whenever in medicine we encounter means by which time and experience have shown this to be the healthiest procedure for people. This triple approach to

medicine was equally familiar to physicians of every sect, and as they applied their own hands to this treatment according to the nature of the symptoms, they expended no less effort in working with their hands than in establishing a dietary regimen, or knowing and compounding medications. The point is clearly made in a number of the books of the divine Hippocrates, especially in his masterpieces On the Function of the Doctor, On Fractures, On Dislocations of Joints, and books on similar injuries. [5] Moreover, Galen, the first man of medicine after Hippocrates, besides repeatedly boasting that the medical care of the Pergamene gladiators was entrusted to him alone, [6] and even as his age increased was unwilling to have apes skinned for him by slaves prior to dissection, [7] frequently repeats how much he enjoyed working with his hands and how zealously he did so with the other doctors of Asia. [8] Indeed, none of the ancients is seen to have handed on to posterity what treatment is performed by hand less attentively than what is accomplished by diet and medication.

But it was especially after the Gothic devastation, when all of the sciences previously in their prime and fittingly practiced went to ruin, that first in Italy the more fashionable doctors behaved as if they were ancient Romans and scorned working with their hands; they began to order their servants to perform what they thought should be done by hand for the sick, while they only stood by as if they were architects. Soon, when little by little still more practitioners declined the inconveniences of true medicine without refusing any of the profit and prestige, they quickly degenerated from the standard of ancient physicians, abandoning the technique of cooking and food preparation to those attending the sick, the composition of medicine to druggists, and surgery to barbers. And so in the passage of time the science of healing has been so sadly torn asunder that certain doctors, peddling themselves as physicians, have taken for themselves exclusively the prescription of medication and diet for hidden conditions; [9] other branches of medicine they relegated to those whom

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they call surgeons and scarcely respect as servants, disgracefully spurning what is a principal and most ancient branch of medicine, one preeminently reliant (if anything is) upon the investigation of nature: what is today in India the particular work of kings, what the Persians pass along to their children by hereditary right just as the whole art of the Asclepiads was once passed on, and which the Thracians supremely cultivate and revere with many other nations, all but forgetting that portion of the art which the Romans once outlawed from their republic as if it were invented to deceive people and kill them. [10] For without Nature's aid, medication has no deep effect, but instead while eager to help Nature as she is hard pressed to extricate herself from disease, it often destroys her entirely and renders her completely useless. [11] To this we chiefly owe it that so many aspersions are cast on doctors and this most sacred art is mocked, while the branch of medicine which men educated in the liberal disciplines cravenly allow to be torn from their grasp, constantly makes it shine with special praise. When

Homer, the fount of genius, affirms that a medical man is more eminent than many, [12] and with all the poets of Greece celebrates Podalirius and Machaon, these are not called the divine sons of Æsculapius because they removed a small fever and things which Nature alone heals without the aid of a doctor more easily than if he were put to the task, or because they pandered to the palate of men in obscure and hopeless diseases, but because they were primarily responsible for treating dislocations, fractures, wounds, other lesions of continuity, [13] and the flow of blood, and they freed the noblest of Agamemnon's warriors from arrowheads, spears, and other such afflictions (which happen chiefly in war and always demand the careful work of a doctor).

Yet, most august emperor Charles, [14] I have not by any means proposed to prefer one instrument of medicine over the others, since the triple system of healing that I mentioned is all but inseparable and pertains as a whole to a single practitioner, and for its proper attainment all branches of medicine are so equally constituted and provided that each one is more effectively used the better one combines it with the others. Rarely does any disease occur that does not from the start require the threefold application of remedies: an appropriate diet must be established, medications employed, and finally manual work applied; therefore, students of this art must be urged in every way to discount the whispers of those (if it please the gods) physicians, and apply their hands like the Greeks to whatever treatment the nature of their craft thoroughly instructs, lest they in turn direct a mutilated system of medicine to the disadvantage of all human life. They must be the more diligently urged, the more fully trained in medicine the people we see today abstaining from surgery as from the plague, chiefly to avoid having the high priests of the profession [15] libel them before the untutored public as barbers, and lest they receive less gain, honor, or prestige from the ignorant mob [16] than these less-than-half-doctors. [17] It is chiefly this detestable public attitude that hampers us from acquiring the complete art of healing even in our time, and makes us learn only the treatment of internal disorders: we study to be doctors only partially, at great harm (to tell the truth for once) to mankind. As soon as all preparation of medicine was relegated to druggists, doctors soon lost the knowledge of simple medicines that was absolutely essential to them; it is their fault that the workshops of apothecaries teem with barbaric words and indeed false drugs, that we lack so many of the best compounds of the ancients, and that many are still not even known to us. [18] They have brought about endless labor not only for the learned men of our age but also for those who came some years before and applied themselves so tirelessly to the knowledge of simple medications that in trying to restore it to its pristine splendor they are seen to have contributed much; proof of which, among so many otherwise famous men, is a rare example of this age, Gerhard Vueldbik, [19] privy councillor to your majesty, highly distinguished as well for his erudition in a number of disciplines and languages, and the best trained of our people in the study of botany. This utterly perverse distribution of the means of treatment to various specialists has brought on a still more damnable calamity and far more grievous disaster to the particular branch of natural philosophy to which, since it includes the study of mankind and should rightly be considered the firmest foundation of the entire medical profession and its first constituent part, Hippocrates and Plato attached so much importance that they did not doubt the first place

among the parts of medicine should be attributed to it. Although this branch alone was developed by physicians and they strained every nerve in acquiring it, in the end it began to collapse pitifully when those same physicians discarded work of the hands for others to perform and ruined anatomy. For as long as physicians maintained that only the treatment of interior diseases was their concern, they believed that knowledge of the viscera was all they needed, and they neglected the fabric of bones and muscles and the nerves, veins and arteries that run throughout the bones and muscles, as if these were irrelevant to them. Moreover, when all operations were entrusted to barbers, not only did true knowledge of the viscera perish from the medical profession, but the work of dissection

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page 3r

completely died out. Physicians did not undertake surgery, while those to whom the manual craft was entrusted were too uneducated to understand what professors of dissection had written. So far this class of men is from preserving for us the difficult and abstruse art handed down to them, and so far has this pernicious dispersal of the healing art failed to avoid importing the vile ritual in the universities by which some perform dissections of the human body while others recite the anatomical information. While the latter in their egregious conceit squawk like jackdaws from their lofty professorial chairs things they have never done but only memorize from the books of others or see written down, the former are so ignorant of languages that they are unable to explain dissections to an audience and they butcher the things they are meant to demonstrate, following the instructions of a physician who in a haughty manner navigates out of a manual alone matters he has never subjected to dissection by hand. [20]

And as everything is being thus wrongly taught in the universities and as days pass in silly questions, fewer things are placed before the spectators in all that confusion than a butcher in a market could teach a doctor. I pass over any number of schools where dissecting the structure of the human body is scarcely ever considered; so far has the ancient art of medicine fallen from its early glory many years past. But when in the great felicity of this century (which the gods wish to be wisely governed by your genius) medicine had now for some time begun to revive along with all studies and raise its head from the deepest shadows, so that in many academies it seemed without doubt nearly to have regained its ancient radiance, and still required nothing more urgently than the altogether dead science [21] of the parts of the human body, I was challenged by the example of so many outstanding men and decided that aid must be brought on my part to this cause by whatever means I could. Not wishing to be the only one to fall idle while all others are applying themselves with such success to some common topic of interest, or to be unworthy of my ancestors, [22] it was my thought that this branch of natural philosophy should be recalled from the dead so that even if we treated it less perfectly than the ancient professors of anatomy, it should be good enough that no one would ever be ashamed to declare that our science

of anatomy could be compared with the ancient one; and that in this present era nothing so fallen to ruin had been so soon restored to health as Anatomy.

But this project would never have gone forward if when I was studying medicine at Paris I had not personally set my hand to Anatomy at a time when my fellow students and I had to content ourselves with a few internal parts being superficially displayed at one or two public dissections by the most ignorant barbers. So perfunctorily was Anatomy treated in the place where we first saw medicine successfully revive, that I myself, trained in a few dissections of animals under the famous and never sufficiently praised Jacob Sylvius, [23] at the urging of friends and instructors conducted a better than usual public dissection [24] — the third anatomy I ever attended. When I made my second attempt (barbers having been relieved of the task), I tried to demonstrate the muscles of the hand along with a more accurate dissection of the viscera. Except for eight abdominal muscles which had been disgracefully mangled and presented in a perverse sequence, no one (to tell the truth) [25] had ever before demonstrated to me a single muscle or a single bone, much less a correct series of nerves, veins, or arteries. Soon after at Louvain, to which I had had to return because of the disruptions of war, [26] because for the last eighteen years the doctors there had not even dreamt of Anatomy, [27] and in order to do the students at the Academy a good turn and make myself more proficient in a completely unknown subject that was to me of the greatest importance in medicine, I conducted lecture demonstrations of the human fabric—a little more accurately than in Paris—with the result that the younger professors at the Academy are now seen to devote substantial, serious, and diligent work to identifying the parts of the human body, understanding clearly what an extraordinary instrument of philosophy this knowledge provides them.

Later in Padua, at the most famous university in the entire world, because the study of Anatomy pertains also to the profession of surgical medicine (on which, so as not to dissociate myself from the rest of medicine, I give lectures, having been employed for five years under a stipend from the illustrious Senate of Venice, [28] which is by far the most generous in its support of higher learning), I plied this task while inquiring into the structure of man. My hope has been that I might more often practice Anatomy here in Padua and in Bologna, and by rejecting the silly habits of the schools so demonstrate and teach, that by this anatomical method we would be deprived of nothing that comes down to us from the ancients and would not still be trying to find out the construction of any part that exists. [29] But the indolence of doctors has been too eager to prevent the writings of Eudemus, [30] Herophilus, [31] Marinus, [32] Andreas, [33] Lycus, [34] and other luminaries of dissection from being preserved for us, since not even a fragment of a page survives of so many illustrious authors of whom Galen records more than twenty in the second book of his commentary on Hippocrates' book On the Nature of Man — indeed, scarcely half of Galen's anatomical books have been saved from extinction. [35] As for those who followed him, among whom I count Oribasius, [36] Theophilus, [37] the Arabs, [38] and as many of our own authors as it has so far been possible for me to read, if they have passed down anything that is worth reading, [page *3v] they all have borrowed it (if they will forgive me for saying so) from Galen. By Jove, to a serious dissector, there

is nothing they seem less likely ever to have done than dissect a human body; so tenaciously have the most prominent of these writers, trusting in their own foppish style of writing and the careless dissection of others, perversely condensed Galen into overpriced digests, never departing so much as an fingernail's width in their emulation of Galen's views — indeed, they add to the prefaces of their books the claim that their writings are completely patched together out of the opinions of Galen and that everything of theirs is Galen's, even going on to say that if anyone should find fault with their views, he would thereby be judging Galen himself guilty of error. [39]

To this man they have all so entrusted their faith that no doctor has been found who believes he has ever discovered even the slightest error in all the anatomical volumes of Galen, much less that such a discovery is possible: even though (notwithstanding that Galen often corrects himself, that more than once after learning better he points out in some books a careless error he has made in others, and that he often contradicts himself)— even though it is just now known to us from the reborn art of dissection, from the careful reading of Galen's books, and from the welcome restoration of many portions thereof, that he himself never dissected a human body, but in fact was deceived by his monkeys [40] (granted a couple of dried-up human cadavers came his way) [41] and often wrongly disputed ancient doctors who had trained themselves in human dissections. In fact, you will find many things in Galen which he misunderstood even in monkeys, not to mention the most astonishing fact that among the many and infinite differences between the organs of the human body and the monkey Galen noticed only those in the fingers and the flexion of the knee; [42] he would no doubt have missed these as well, had they not been obvious to him without dissecting a human.

But for the present, I have decided not to criticize the false doctrines of Galen, who is easily the greatest of the professors of dissection; much less would I wish at the very beginning to be held impious toward the very author of all good things, and disrespectful of his authority. For I am not ignorant how doctors (quite unlike the followers of Aristotle) tend to become agitated when it comes to their attention nowadays in the course of a single anatomical demonstration [43] that Galen has departed much more than two hundred times from a true description of the harmony, use, and function of the human parts, and they grimly puzzle over the dissected pieces with the utmost determination to defend him. But let even these men gradually soften their position out of a love of truth, and let them trust their not ineffectual eyes and powers of reason more than the writings of Galen; let them carefully write out these unexpected truths which are not cadged from other authors and not verified merely by a collection of authorities, and send them to friends hither and yon, both for their examination and finally for the knowledge of true Anatomy, exhorting them in such an earnest and friendly manner that there will be hope that this kind of Anatomy will soon be cultivated in all the academies just as it was once regularly practiced at Alexandria in the age of Herophilus, Andreas, Marinus, [44] and the other foremost masters of dissection.

To further the success of this hope as much as is in me with the happier auspices of the Muses, I have added to the works in this vein which I have previously published—and which certain plagiarists produced as their own work, thinking I was far from Germany. [45] I have now freshly organized knowledge about the parts of the human body into seven books, in the same order which I am accustomed to use in this city and in the assemblage of learned men at Bologna. [46] Thus, those who were present at one of my dissections will have notes of what was demonstrated, and will demonstrate anatomy to others with little trouble. Yet the books should be far from useless at some other place to those unable to view an anatomy first-hand, since they explain in sufficient detail the number, location, shape, size, makeup, connection to other parts, use, function, and many such features of each part of the human body whose nature we are accustomed to investigate as we dissect. They also describe the technique of dissection and vivisection, and they include pictures of all the parts inserted in the text in such a way that they place the dissected body, as it were, before the eyes of those studying the works of Nature.
In the first book I have described the nature of all the bones and cartilages, which because the other parts are supported and stabilized by them and are described in accordance with them, are the first to be learned by students of Anatomy.

The second book records the ligaments by which bones and cartilages are connected to each other, and then the muscles, producers of voluntary motion.

The third includes the highly complex series of veins which carry familiar blood [47] to the muscles, bones, and other parts for their nourishment, and of the arteries that regulate the mixture of innate heat and vital spirit. [48]

The fourth explains not only the distribution of nerves that go to the muscles, [49] but the branches of the others [50] as well.
The fifth tells about the construction of the organs that assist nutrition, which is accomplished by food and drink. In addition, because of their proximity, it also contains the instruments fashioned by the supreme Maker of things for the succession of the species.

The sixth is devoted to the heart, fomenter [51] of the vital faculty, and to the parts that assist it.

The seventh examines the harmony of the brain and the organs of sense in such a way that the series of nerves taking their origin from the brain, explained in the fourth book, is not repeated.

In arranging the order of these books, I have followed

the opinion of Galen, who believed that after an account of the muscles, the Anatomy of the veins, arteries, nerves, and finally of the inner organs must be explained. [52] Someone will quite rightly maintain that, particularly for the novice in this science, a rough knowledge of the inner organs should accompany the distribution of vessels, just as I have provided in the Epitome, [53] which I prepared as a kind of path through these books and an index of the items shown. It is honored by the radiance and protected by the authority of the most serene Prince Philip, [54] your Majesty's son, a living model of his father's virtues (from whom whatever things can be wished for in the finest ruler in all the world are expected in the greatest abundance). [55]

But at this point there comes to mind the judgement of certain persons who bitterly condemn the practice of putting even the most detailed imaginable illustrations, not just of plants but also of parts of the human body, in front of students of the natural sciences: such things, they say, should be learned not from pictures but by painstaking dissection and observation of the things themselves — as if I had illustrated my narrative with the most authentic anatomical images (never, I hope, destined to be spoiled by the printers), with the intention that students would depend on them and refrain from dissecting cadavers, and as if I had not rather joined Galen in urging medical students by every means possible to take on dissections with their own hands. [56] Assuredly, if the habit of the ancients, who trained their boys at home in the methods of dissection just as they did in writing and reading, had continued to the present day, I should readily dispense with not just the pictures but also all commentaries, just like those ancients who did not begin writing about techniques of dissection until they believed it was honorable to communicate the art not only to their children but also to unrelated adults whom they esteemed for their ability. [57] As soon as the custom ended of training boys in dissection, as an immediate and inevitable consequence they learned less well, since the training they were accustomed to commence in childhood was abolished. Consequently, when the art of medicine left the family of the Asclepiads [58] and declined for many generations, there was a need for books to preserve a view of it intact.

How much pictures aid the understanding of these things and place a subject before the eyes more precisely than the most explicit language, no one knows who has not had this experience in geometry and other branches of mathematics. Our pictures of the body's parts will especially satisfy those who do not always have the opportunity to dissect a human body, or if they do, have a nature so delicate and unsuitable in a doctor that though they are obviously captivated by a knowledge of humankind that is most pleasant to them and attests the wisdom (if anything does) of the infinite Creator of things, they cannot bring themselves actually to attend an occasional dissection. [59] However that may be, I have made every effort for a single purpose: to be of use to as many people as possible in an extremely abstruse and no less arduous enterprise, and to provide as truthful and complete an account as possible of the fabric of the human body, which is made not of ten or twelve different

parts (as it seems to the casual observer), but of some thousand. For the understanding of those books of Galen still preserved for posterity which among the other monuments of this divine man [60] require the assistance of a teacher, I aim also to bring no unwelcome profit to students of medicine.

At the same time it does not escape me how little authority this effort of mine will have on account of my age, as I have not yet passed beyond my twenty-eighth year, and, because of my frequent indications of Galen's untrue beliefs, how unprotected my work will be from the attacks of those who have not attended my anatomy instruction or have not themselves made a serious study of anatomy and at first sight will contrive various theories in defense of Galen, [61] unless it come to light auspiciously, duly approved by the great patronage of some godlike power. Because it can never be more safely protected or more splendidly honored by any immortal name greater than that of the divine Charles, the most invincible, greatest Emperor, I again and again beseech your imperial Majesty with all reverence on bended knee [62] to permit this youthful work of mine, which is answerable for many flaws and deficiencies, to remain in the hands of mankind under your leadership, splendor, and protection until such time as through experience, the judgement that grows with age, and learning, I make this labor of mine worthier of the greatest and best ruler, or until I offer a tribute not to be rejected, another gift on another subject derived from our art.

Yet I surmise that out of the entire Apolline discipline of medicine, and indeed all natural philosophy, nothing could be produced more pleasing or welcome to your Majesty than research in which we recognize the body and the spirit, as well as a certain divinity that issues from a harmony of the two, and finally our own selves (which is the true study of mankind). [63] I gather this for many reasons, chief among them my conjecture that in that crowd of books that were dedicated to your grandfather Maximilian of happy memory, the supreme emperor of the Romans, no book more pleasing ever existed than a little book on the present topic. [64] Nor shall I ever forget with what pleasure you looked at my Tabulae anatomicae, and with what interest you lingered over each table that my father Andreas, chief and most trusted pharmacist to your majesty, would bring to your attention from time to time. I will not dwell on that astonishing love of yours for all learned disciplines, but most especially mathematics, particularly the branch that deals in knowledge of the earth and stars, and an understanding of it that is admirable in so great a hero. [65]

So as it is inescapable that [page *4v] you are uniquely interested in the science of the universe, so you would sometimes be delighted to ponder the construction of the most perfect of all creatures, and take pleasure in considering the lodging place and instrument of the immortal soul—a domicile which, because it admirably resembles the universe in many of its names, was fitly called a microcosm by the ancients. [66]

Though a knowledge of our own bodily structure is most worthy of mankind and extremely commendable for its own sake, and gave such pleasure even to the greatest men of Rome, leaders both in affairs of state and the philosophic disciplines, to expend their efforts upon, I did not think it required my praise here. By the same

token, I am rightly mindful of Alexander the Great, who did not wish to be painted except by Apelles, cast in bronze except by Lysippus, or sculpted except by Pyrgoteles, [67] and I have thought it still less proper for me to enumerate any of your praises here, lest I pour darkness instead of light on them by my meager and unpracticed style—especially since the hackneyed ritual of prefaces is altogether to be condemned in which indiscriminately and with little regard to merit, as if in accordance with some standard formula [68] and for the sake of some cheap gratuity, everyone is routinely credited with admirable learning, singular prudence, remarkable clemency, keen judgement, untiring generosity, remarkable love for men of letters and scholarship, supreme dispatch in the conduct of business, and the entire chorus of virtues, in which everybody knows perfectly well (though the words are not mine) your majesty exceeds all mortals no less than in dignity, success, and triumphant achievements. For this you will be venerated in your own lifetime as if you were the greatest divinity, whom I pray the gods may not begrudge to science and all the world, but most abundantly preserve and protect for mortals unharmed and forever successful.

Padua

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