On the innovative genius of Andreas Vesalius

Brinkman, R.J.C.

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Chapter 12

Discussion
It has been shown in the previous chapters that Vesalius was the first to publicly and commercially record the anatomy and physiology of the upper extremity and shoulder girdle muscles, the superficial fascial and mammary suspensory systems, and the respiratory and voice producing systems. His observations on animal cognition have been argued to have been instrumental in breaking with two millennia of dominance of the various concepts of lack of animal cognition. These innovating observations and the way Vesalius presented them, have revolutionized anatomical and physiological knowledge and research.

Genius does not accept authority
Because of his De Fabrica, Andreas Vesalius is generally considered a genius [1]. Such was the genius of De Fabrica that Giambattista Caneno from Ferrara stopped the publication of his own multi-volumed book entitled Musculorum Humani Corporis Picturata Dissectio [2]. Only its first section on the muscles of the upper limb was published, as Canano aborted the project after he met with Vesalius and saw the proofs of Vesalius’ De Fabrica that he assessed as far superior, in 1542 [3, 4]. Vesalius knew, or at least had the arrogance to regard De Fabrica to be a work of genius as he had the pedestal of one of his Tabulaes inscribed with “Vivitur ingenio, caetera mortis erunt” (quote on p. 164) [5], or “Genius lives on, all else is mortal” (Figure 12.1) [6]. He felt he was not “unaware of the steps in which I have learned the fabric of the human body by teaching others and by writing” and continued: “in this regard I acknowledge no preceptor whatever” (quotes on p. 208) [7, 8].

Genius, in general, does not accept authority. The true genius is well informed on what authority proclaims, but does not unquestioningly accept these proclamations as dogmas or, even, for granted. Only when acceptable to their own independent intelligence and deduction, do geniuses accept a thesis or a way of reasoning. Thus, Vesalius felt that “everyone who has not surrendered to the authorities but believes in the truth will agree with me” (quote on p. 191) [7].

This implicit doubt of all that is generally accepted as truth is obvious from Vesalius’ texts. Even when addressing Emperor Charles V, Vesalius at age 27 did not shun from fulminating against the strict separation of internal medicine, surgery, and pharmacy customary in his era. Likewise, he eventually parted from the Galenic and Aristotellean traditions of his training because his observations no longer supported it (see also chapter 10).

Hence, Vesalius motto was “that no one should accept what this book or any other says, however much it has been approved by age or authority, without first, and more than once, testing what it says by means of careful dissection” (quote on p. 373) [9]. In a more negative spirit, he noted that “the crowd of philosophers (and, I might add, theologians) of our time [...] care not at all (shame on them!) to what depths of impiety they condemn the tender minds that they are instructing; for at a later date these students, no longer enrolled
FIGURE 12.1: Tabula on page 164 of the 1543 edition of De Fabrica. The motto ‘Vivitur ingenio, caetera mortis erunt’ has been borrowed from the Elegia in Maecenatem I, verse 38 and should be dated about 50-75 AD. Only as late as the first quarter of the 16th century this verse line emerges as a subscript under the portrait of Willibald Pirckenheimer (1470-1530), made as a copper plate by Albrecht Durer (1471-1528). It is unknown who drew Vesalius’ attention to this Latin verse, but it may have been the befriended Occo family from Augsburg [18].
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in the sects of the teachers but burning with zeal to learn and know about the works of Nature, will undertake with their own hands to examine and bring ever more strictly to the test the knowledge that has been handed down to them concerning man and the other animals’’ (p. 163-164) [10]. Therefore, he urged “students of medicine by every means at my command to undertake dissections with their own hands” (quote on p. lvi) [11]. During his anatomical demonstrations, Vesalius reportedly did so: “all this, he said, each one of you, Domini, can see. Buy yourself a larynx of an ox and you will see it al” (quote on p. 287) [12]. Likewise, at the closure of his De Fabrica he noted that “all that remains for me to do here is to urge students who have not attended my dissections in the last two years to examine all this with their own eyes (or, as the Greeks say, by autopsy): keeping what I have said in mind, they should carefully compare Galen’s description with mine and then examine the actual fabric of the human body and be less ready in future to trust anatomy textbooks” (quote on p. 218) [10].

Authority does not accept genius
Genius, and original thought in general, is often met with sceptis or outright rejection by those considered to be the authorities. Usually, this negative attitude comes from fear to lose authority and, with that, respect. Vesalius’ De Fabrica, and particularly his overthrowing Galenic authority, led to fierce criticism. As such, the clash between the older authoritarian Curtius and the young brazen Vesalius that was minutely recorded by Heseler (see also chapter 10) [12]. Vesalius’ former teacher Jacques Sylvius likewise rejected his innovations and his former trainee and colleague Realdo Colombo turned against him in order to emphasise his own importance (see also chapter 1). In the preface to De Fabrica, Vesalius remarked that he was “not unaware that, because of my age (I am not yet twenty-eight years old), my undertaking will wield little authority” (quote on p. lvii) [11]. He admitted to be “well aware how upset the practitioners invariably become nowadays, when they discover in the course of a single dissection that Galen has departed on two hundred or more occasions from the true description of the harmony, function, and action of the human parts, and how grimly they examine the dissected portions as they strive with all the zeal at their command to defend him” (quote on p. liv) [11]. He felt he would “not be safe from the attacks of those who […]. will leap unthinkingly to Galen’s defence with a variety of notions” (quote on p. lvii) [11].
Additionally, it is clear from the restraint and circumspect style that Vesalius often used in De Fabrica that he was well aware of his potentially (and even probably) calling the wrath of the Roman Catholic clerical authorities over himself. His work left Vesalius open to the criticism that he was only describing the anatomical parts and not learning the cause for that part; that is, he was simply recording his observations and not revealing the usus-utilitas or knowledge propter quid [1]. In other words, by not determining the use of, or purpose for, the anatomical part Vesalius was not determining the final cause. By stopping at this first stage of Aristotelian analysis, he was also deemphasizing an important point of the Church – revealing the glory of God’s work through the sheer complexity of the anatomical structure [1]. In the paragraph ‘On examining the functioning of the brain’ in the very last chapter of De Fabrica titled ‘Some remarks on vivisection’, furthermore, Vesalius remarked that “in examining the brain and its parts there is nothing to be gained by vivisection, since here, whether we like it or not, we are required by the theologians of our own day to deny that dumb animals have memory, reason or thought, even though the construction of their brain is the same as that of the human one. Hence the anatomy student who is well versed in dissection of the dead and not infected by any heresy well understands what a mess I should find myself in if I were to say anything about vivisection of the brain, much as I should like to do so” (quote on p. 269-270) [13].

All this criticism by the authorities and jealous or sincere colleagues made Vesalius bitterly remark that “they ought to be grateful to me as the first who has dared to attack man’s [Galen’s] false opinions, to lay bare the extraordinary frauds of the Greeks, and to provide our contemporaries with an unusual opportunity for searching out the truth. Such, however, is not the case, and because of Galen’s authority you will find many who, having glanced at my efforts only superficially and without investigation of the cadaver, still maintain what Galen wrote is wholly correct” (quote on p. 218) [6].

In frustration and depression, he burned his notes on the preparation of medicines, his paraphrases on Rhazes’ ten books and the notes he had inscribed over the years in the margins of his copies of Galen’s printed books, in 1544. He had just obtained the high profile appointment as physician to Emperor Charles V and felt “quite happy that no desire to publish [...] is likely to come over me [...] since I could easily predict how hostile [this] would have made everyone to me” (quote on p. 229) [7, 14]. Rather, Vesalius prevented further intellectual abuse by contemporary authorities he disparagingly referred to as “medical Rabbis” (quote on p. li) [11]. His friends had tried to dissuade him from this rash course that he later came to regret, at least as far as his non-Galenic notes were concerned (p. 229) [7, 14].

**The risk of genius to become an authoritarian**
Vesalius had urged “that no one should accept what this book or any other says, however much it has been approved by age or authority” (quote on p. 373) [9]. In the Chyna root Letter he, even, “spurred” his critics “to the study of truth” by dissecting the relevant anatomy and to, thereby, counter his opinions on Galen by warning him “if I have
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not made sufficient observations” (quote on p. 51) [7]. As the years passed after the publication of De Fabrica, however, Vesalius behaved more and more like an authoritarian himself. As such, he denied and ridiculed the corrections of his work and the innovative anatomical observations that others presented. For example, in the 1555 edition of his De Fabrica, Vesalius contradicted the observations on venous valves that Giovanni Battista Canano (1515–1578) shared with him in 1545 (see also chapter 2) [15-17]. In doing so, Vesalius missed the opportunity to have discovered the vascular circulatory system, some 80 years before William Harvey (1578-1657) did. His few additional writings become more polemic and personal over these years. It seems that Vesalius, having reached the position of authority, indeed felt threatened to lose that authority himself.

Still, Vesalius’ genius has been instrumental in breaking with two millennia of dominance of Aristotelean theory and 1350 years of dominance of Galenist dogmas of human anatomy and physiology. Further research of the text of De Fabrica would very likely discover even more innovations than those presented in this thesis. On the shoulder of this giant, generations after Vesalius have been able to see further.
References