

SOME REMARKS ON THE SIGNIFICANCE
OF ANDREAS VESALIUS*
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Among the great figures in the history of medicine few have evoked an interest equal to that which has been shown in the career of Andreas Vesalius. Several accounts of his activities were written even during his lifetime, and one need only consult Harvey Cushing's *Bio-Bibliography* (1) to discover how that interest has continued on through the centuries. Estimates of Vesalius's achievements have varied considerably, however, and from the earliest accounts onwards he has been both praised and criticized. Sometimes these evaluations have been somewhat extreme. Moritz Roth, (2) for example, did Vesalius's memory a disservice by an almost unrestricted praise, and, perhaps as a reaction, others have been unfairly critical or even hostile. (3) Such praise or criticism has usually been concerned with the body of anatomical knowledge which was collected in the *Fabrica*, and represents attempts either to demonstrate the greatness of this contribution or to deny credit by assertions that the *Fabrica* contains little that was original with its author and that in fact he had been preceded in his anatomical knowledge by others.

Vesalius would have agreed that certain anatomical structures had been noted by others before he wrote his account of them, but he would also have asserted that he was not interested in isolated bits of information presented briefly and as curiosities. Rather his concern was with the whole system of which the particular structure was merely one of many components; he would have added that as there was, significance only in the fullest knowledge of each part and relative to the other parts within its complex, so it was also necessary to understand how the complex operated. In short, his interest lay not only in the

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1. Harvey Cushing. *A Bio-Bibliography of Andreas Vesalius*. 2d. ed. Hamden, Connecticut, 1962.
2. Moritz Roth. *Andreas Vesalius Bruxellensis*. Berlin, 1892.
3. As an extreme example, W. M. Ivins, Jr. «What about the „Fabrica“ of Vesalius?» *Three Vesalian essays to accompany the Icones anatomicæ of 1534*. New York, 1952. pp. 43-99.

fullest understanding of the body's anatomical relationships, but also in the body's physiology. In these respects he had no serious rivals among his predecessors and his contemporaries, and here it is important that the meaning of the word « contemporaries » be understood.

Hostile critics have pointed to the accomplishments of certain anatomists of the second half of the sixteenth century who, they declare, were Vesalius's contemporaries and as such in some way surpassed his achievement. From time to time reference has been made to the accomplishments of Colombo, Fallopio, and Eustachi but with complete failure to realize that, whatever they accomplished, these men did not produce their results until respectively sixteen, eighteen and twenty years after the publication of the *Fabrica*, to which they were all indebted. Fallopio was the only one of them generous enough to admit that what he had accomplished was built upon a Vesalian foundation. Much criticism of Vesalius has been characterized by this sort of failure to pay heed to chronology.

Despite the praise or criticism which has been heaped upon Vesalius's contributions to the body of anatomical knowledge, it may be said that his greatest contribution was of another sort, but to understand how this was achieved we must give credence to his own statements about his activities in Padua since there is very little other information available about them. Some critics have been loathe to accept these autobiographical statements, considering them the utterances of a braggart if not worse, but it is now possible to display the falsity of such suspicions by reference to the recently published notebook of a German student who attended Vesalius's anatomical demonstrations in Bologna in 1540. (4) This account of Baldasar Heseler, important for several reasons, is especially significant because it demonstrates through comparison with Vesalius's own writings the veracity of his remarks about himself and his activities; sufficiently so that we need have no hesitation in accepting his further autobiographical statements in the *Fabrica* or elsewhere. It seems clear that he was neither braggart nor liar but merely a hard-working scientist concerned with facts.

It is well known that immediately upon receiving his M.D. at Padua in December 1537, Vesalius was invited to accept the then rather unimportant chair of surgery, which also entailed an anatomical demonstration during the colder season of De-

4. **Andreas Vesalius' first public anatomy at Bologna 1540. An eyewitness report** by Baldasar Heseler. Ed. with an introduction, translation into English and notes by Ruben Eriksson. Uppsala and Stockholm, 1959.

cember or January. The statutes of the University of Padua indicate that the anatomical demonstrations were carried out according to the medieval pattern of an annual dissection performed by a surgeon while the professor, distant from the body, lectured from the fourteenth century text of Mondino. (5) It was greatly to the credit of the university that it permitted the faculty to introduce desirable changes in methods of teaching, and it was, of course, greatly to the credit of Vesalius that he immediately dispensed with the surgeon and performed the dissection himself, thus suiting his action to his belief — later expressed in the *Fabrica* — that the anatomy course had little value unless the professor actually put his hand to the cadaver. This was a distinct pedagogical novelty since, although professors had themselves dissected in the past, it appears that they did this only in private. Although Berengario da Carpi, for example, had dissected many bodies, it would appear from the illustration on the title page of his *Commentaria* (1521) and his *Isagoge* (1523), published during his active years and so subject to such design as he wished, that in formal presentation of anatomy he adhered to the older procedure. Vesalius was well aware that his newer method was a departure from tradition, and he emphasized it as the central theme in the great anatomical illustration on the title page of his *Fabrica*.

Although this new pedagogical procedure had great potential value, insofar as the reform of anatomy was concerned at first it contributed little. The notebook of a student, Vitus Tritonius, who was present at the demonstrations of December 1537, indicates that Vesalius offered his students nothing but Galenic anatomy, and the *Tabulae anatomicae* and revised version of Guinter of Andernach's *Institutiones anatomicae* of 1538 remained essentially under the shadow of Galen's authority. Nevertheless, a good observer of scientific integrity, with a spark of genius, dissecting and lecturing to the students, might sooner or later realize that his observations did not agree with Galen's descriptions. Such troublesome discrepancies may even have intruded as early as 1535 or 1536 when Vesalius was studying osteology in the Parisian cemeteries and possibly noted that the human mandible seemed to differ from Galen's description of it as formed from two bones. At first such puzzles must have been explained as owing to defects in the Galenic texts, and in one instance Vesalius does refer to his unavailing efforts to consult a Greek manuscript of Galen's treatise *On*

5. *Statuta alma universitatis d. artistarum et medicorum patavini gymnasii*. Venice, 1589, fol. 42r-v.

the bones for this very reason. (6) Perhaps gradually he came to the conclusion that Galen was capable of committing single errors, but as yet there was no indication that Vesalius had any thoughts of challenging Galenic anatomy as a whole.

The realization that Galen's anatomy was fundamentally fallacious, and therefore that there was no authority which could be relied upon except one's own observation and reason, was reached in the course of the year 1539 and as the result of several factors. Vesalius was becoming more and more puzzled by his failure to find anatomical structures in agreement with Galen's descriptions of them. Up to 1539, however, the bodies available to him were limited in number — legally two per year — so that the discrepancies were perhaps explained as anomalies, and in his resort to animals he was frequently able to confirm Galen's account. Thus, as he tells us, when he was unable to find the *rete mirabile* in the human head, he could always locate it in the head of a sheep, (7) so suggesting that the fault lay not with Galen but in some error of dissection or observation committed by Vesalius. Naturally this was very puzzling and remained so until a larger supply of human dissection material could be examined.

In 1539 Padua received a new *podestà*. This official, by name Marcantonio Contarini, had among his duties that of presiding over the criminal court in Padua, and since he was also interested in anatomy he was somehow persuaded to make a larger supply of human bodies available by turning over those of executed criminals. (8) Then for the first time Vesalius was in a position to dissect a relatively large number of human specimens within a given period of time. Thus able to compare Galen's descriptions with the results of his own multiple human dissections, it became even more difficult to ignore the consequent discrepancies in his findings. Referring back to this period in his *Letter on the china root* (1546), Vesalius declared that he had lectured three times on Galen's treatise *On the bones* before he gained the courage to oppose its author. (9) This meant that his opposition to Galen was first announced at the end of 1539 in conjunction with the winter lectures on anatomy, an opposition that certainly took courage and was based upon the eviden-

6. *De humani corporis fabrica*. Basel, 1543, p. 42.

7. *Ibid.*, p. 642.

8. C. D. O'Malley. *Andreas Vesalius of Brussels 1514-1564*.

Berkeley and Los Angeles, 1964, pp. 112-113, 430.

9. *Epistola rationem modumque propinandi radicis chynae decocti*. Basel, 1546, p. 196.

ce of an expanded program of dissection. Here we may verify Vesalius's remark by reference to the notebook of Baldasar Heseler which informs us that during the anatomist's demonstrations in Bologna in January 1540 he strongly opposed Galen's authority, so much so that on one occasion some of the conservative Bolognese physicians felt impelled to display their displeasure by marching out of the room. It was also during this visit to Bologna that Vesalius articulated two skeletons, a man's and an ape's, and through this spectacular illustration of comparative anatomy was able to prove, at least to his own satisfaction, that Galen's descriptions were in fact drawn from the structure of the animal and not the human. (10)

A man of courage and honesty could arrive at only one conclusion. Since Galenic anatomy had an animal origin, it had no application to the human. Henceforth it must be ignored and all knowledge of the human body acquired solely from independent investigation of that body. This was the great principle announced in the *Fabrica*, constantly reiterated therein, and the basis of Vesalius's own researches. In fact he believed so strongly in this principle that despite those contributions which he made to anatomical knowledge by following it, he carefully explained his procedures in the *Fabrica* so that the reader could make both his own dissections and his own judgments. In other words, even what Vesalius wrote must be subjected to the test.

The pronouncement of this principle of consistently independent research divorced from all authority was the greatest of Vesalius's contributions, but today it is so commonplace that it is difficult to realize its novelty, its impact and the furious opposition it aroused in earlier times. Ironically, this principle had been understood by Galen, but was wholly lost in later centuries and replaced by a stultifying Galenic authoritarianism which would have astonished that ancient physician.

It is true that from time to time a few others had pointed to individual Galenic errors, but hitherto no one had proposed a consistent policy of denying the authority of Galen or any other authority until the true source of knowledge had been tested — in the case of anatomy, completely independent dissection and observation of the human structure. It is true that Vesalius himself occasionally violated his own principle, but the important fact is that he consistently enunciated it and indicated a sufficiently large number of errors where it had not been followed to prove his case and so make this fundamental contribution to science, uniquely Vesalian and of as great value now as in his own day.

10. *Fabrica*, p. 76.

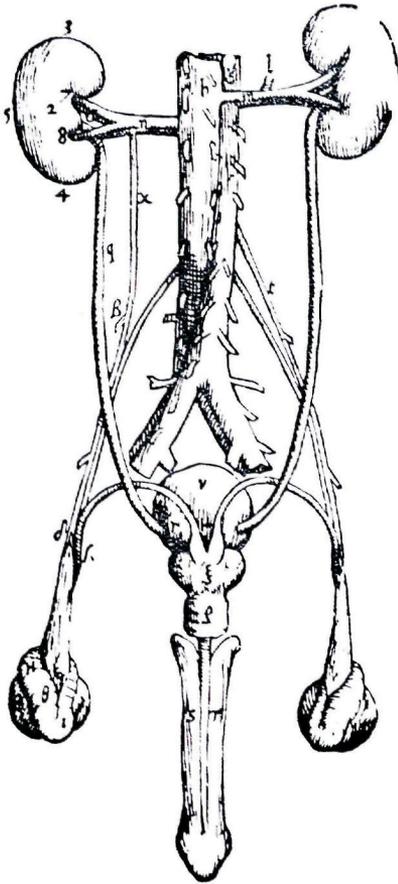


Abb. 1

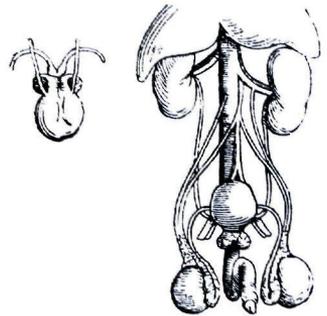


Abb. 2

Abb. 1 Ausschnitt aus fig. 23 des V. Buches von Vesal's «Fabrica»
 Abb. 2 Ausschnitt aus Tab. 1 der sechs anatomischen Lehrtafeln Vesal's von 1538