THE BEGINNINGS OF WESTERN SCIENTIFIC ANATOMY: NEW EVIDENCE AND A REVISION IN INTERPRETATION OF MONDEVILLE'S ROLE

by

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AN eminent French historian of medicine, Dr. Ernest Wickersheimer, once concluded a survey of 'L'Anatomie au Moyen-Age' (*Progrès Médical*, 30 June 1928, no. 26, 1–16) with the opinion that if ever there was an actual renaissance of anatomy in Western Europe, it was at the beginning of the fourteenth century when Mondino dei Luzzi of Bologna, in his dissection handbook, inaugurated a new phase in the study of the human body. Some may quibble over Dr. Wickersheimer's suggestion of a renaissance before da Vinci and Vesalius. Others may resent Bologna eclipsing Salerno as the responsible agent for starting any noteworthy medical achievement. More fundamental is the question: Was there ever an anatomical renaissance? If we must have a sudden birth or rebirth, the so-called 'Copho', twelfth-century, Salernitan pig dissections make the best case. But Western anatomical study did not spring full-fledged from the slit torso of a pig. About a century after the first pig dissections, dissection of humans was advanced by Mondino's handbook. But human dissection, like pig dissection, was more evolutionary than explosive in its impact on contemporaries. From the late thirteenth century onward, Westerners were advocating and practising dissection of humans. But this was far from universal. Although the oft-cited Bull of Pope Boniface VIII did not prohibit human dissections, they were unpopular and sometimes discouraged by clerical authorities. Furthermore, medical men, such as Guido de Vigevano, writing in France shortly before 1350, reported that 'making an anatomy on a human body is prohibited by the Church' (perhaps only locally, in France). But he added, apropos of his book,

> I demonstrate dissection . . . by figures accurately drawn, just as the organs actually are. . . . The pictures show them better than in a human body, because when we make an anatomy on a man it is necessary to hasten on account of the stench.

It is obvious, then, that the evolution of modern anatomy depended on other factors than dissection of animals and of humans; namely on pictures. Medical historians such as Sudhoff and Wickersheimer have made us cognizant of the prevalence of anatomical illustrations long before Vesalius; for example, in the medieval *fünfbilderserie* and in the manuscripts of Mondeville and Vigevano. It

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is our purpose in the present paper to consider in detail an unpublicized and misunderstood phase in the evolution of Mondeville's anatomical illustrations, and to point out its importance as an example of evolution, rather than renaissance, in medieval anatomical progress.

Henri de Mondeville was born in the mid thirteenth century, studied medicine at Bologna and Montpellier, and began practice in Paris under the direction of Jean Pitart through whose influence he became one of the royal surgeons of Philip IV. His importance in anatomical history is usually considered to have been the lecture demonstration which he gave in 1304 before the Faculty of the University of Montpellier. This event, it is thought, was the one referred to by his famous successor, Guy de Chauliac, when he wrote that Mondeville 'demonstrated anatomy with 13 illustrations'.

About a century ago Ludwig Choulant quoted Chauliac's words and cited the event in his monumental *Geschichte und Bibliographie der anatomischen Abbildung*. Mondeville manuscripts which Choulant had not seen were publicized during the next half-century in Cherau's edition of the *Surgery* (1862), in Pagel's editions of the *Anatomy* (1889) and of the *Surgery* (1892), and in Nicaise's French edition of the *Surgery* (1893). The *illustrations* in two Mondeville manuscripts were publicized in Fritz Weindler's *Geschichte der gynäkologisch-anatomischen Abbildung* (1908), and in greater detail in Karl Sudhoff's amply illustrated contributions to the *Archiv* and the *Studien zur Geschichte der Medizin* (1907ff.).

The illustrations published by Weindler and Sudhoff are of two types; separate-organ sketches (from Berlin MS. Lat. 219 and Erfurt MS. Q 210), and full-length human figures (from Paris BN, MS. Fr. 2030). Ever since the publication of these pictures it has been assumed that the full-length Paris miniatures (in colour), fourteen in number, including an unnumbered dissection picture, are manuscript copies of the '13 illustrations' mentioned by Chauliac, and that they were copied from larger pictures which Mondeville had used in his 1304 Montpellier demonstration. This event has been lauded as a milestone in the evolution of anatomical illustration, marking its emergence from medieval schematic primitivism into modern Vesalian naturalism. Dr. Mortimer Frank in an explanatory chapter in his 1920 translation of Choulant's *Geschichte* . . . stated the generally accepted scholarly opinion as follows (p. 58):

> With the beginning of the fourteenth century, the anatomic (*fünfbilder*) series of entire figures of the post-antique period experienced several transformations. The first [was] by Henri de Mondeville, who had made ENTIRELY NEW FULL-LENGTH ANATOMIC PICTURES FOR HIS LECTURES IN MONTPELLIER. These small figures, probably drawn from de Mondeville's original illustrations for anatomic instruction, are contained in a MS. (2030) . . . at Paris.

(There follow optimistic comments on the ample detail that the originals must have shown, their freedom from tradition and their probable influence on Vesalius, Noteworthy is the citation of Sudhoff to the effect that the power of tradition was 'destroyed' by de Mondeville.) On certain points of detailed fact and on the optimistic conclusions, we take issue. We base this on a careful examination of the writings of Sudhoff and his contemporaries, and

on the manuscripts they used: also on two additional fourteenth-century manuscripts (unknown to them) which we found in the libraries of the Royal College of Physicians in London (09.61.227a) and of Trinity College in Cambridge (1148; 0.2.44). The first of these, and also the Mondeville manuscripts at Berlin and Erfurt, introduce themselves as '. . . the *Anatomy* . . . as presented at Montpellier . . . at the instance of certain venerable medical scholars, demonstrated and prosecuted clearly and publicly in their presence in the year of our Lord 1304'. These three illustrated manuscripts prove conclusively that at Montpellier in 1304 Mondeville used the separate-organ type of sketches (which are found in all three manuscripts) and not 'new full-length pictures' (such as appear in the Paris MS.). The sketches in the three 1304 manuscripts when viewed for comparison show marked similarities. The Berlin and Erfurt sketches are almost exact duplicates so far as the thirteen organs and members are concerned. The London manuscript has sketches, of somewhat different character, for the head, heart, liver, gall bladder, spleen, kidneys, bladder, uterus, and omentum. It also has double sketches of the stomach-liver, and additional sketches (not found in Berlin and Erfurt) of a breast, a stomach, and a lung-heart combination. Furthermore, one of four head illustrations is a rather naturalistic profile with hair accentuated. They may be an effort to represent the 'artificial cranium . . . embellished on the outside with substitutes for hair, skin, . . .' which Mondeville mentioned in his accompanying text, viz: 'Whoever wishes to demonstrate the anatomy of the head . . . should have either a genuine human head or an artificial cranium . . . embellished on the outside with hair . . .' Can the variants and additions in the London sketches be explained? It is a manuscript of somewhat later date than Berlin and Erfurt (late fourteenth century), therefore possibly was subjected to later influences. More significant, we believe, is its similarity to *pre-Mondeville*, thirteenth-century separate-organ sketches; especially the stomach and the lung-heart combination. Our conclusions are based on the sketches of organs, sometimes crowded together a dozen to a page, in manuscripts at Cambridge (Gonville-Caius 190), Oxford (Bodley, Ashmole, 399), and Pisa (University, 735 formerly Ronc. 99). It is noteworthy that these thirteenth-century sketches are more precisely detailed than those in the three Mondeville manuscripts. Furthermore, the Oxford manuscript has a famous autopsy scene which depicts in a dramatic setting a number of rather naturalistic organs. Inside the woman's body are shown the diaphragm, spinal column, and two small round ovaries; scattered about outside are kidneys, intestines (?), digestive tract, stomach (or uterus?), combined lungs and heart, and (in the surgeon's hand) a three-lobed liver. (In *Speculum*, 1960, **35**, 254, I present details concerning this and companion miniatures.) We are forced to conclude that Mondeville's 1304 illustrations (if they are fairly represented in our three manuscripts) were little or no improvement over their thirteenth-century predecessors, which indeed they might well have emulated in some respects. The explanation sometimes given, that the Mondeville sketches were hasty student lecture-copies of the more adequately large and detailed demonstration pictures, begs the question. We doubt that these three precisely-written

manuscripts were hasty student copies even though sometimes the quality of the sketches suggests careless juvenile haste. Even immature scholars taking notes on this subject would not emerge with careless sketches alongside a neatly copied text. It occurs to me that our three manuscript TEXTS might have been done by professionals, leaving it to the purchasers to fill in the marginal sketches (there are actually several Mondeville manuscripts with unillustrated blank spaces). This interpretation also would account for the variants in the later London manuscript.

Whatever our uncertainties as to the exact method by which the three 1304 manuscripts were made, the Montpellier lecture-demonstration seems to have been a success. Two years later, in Paris, Mondeville was using his *Anatomy* as the introductory part of a projected five-book *Surgery*. This we learn from a hitherto unrecognized manuscript, the aforementioned fourteenth-century manuscript at Trinity College, Cambridge (1148; 0.2.44) which is the only known illustrated Latin manuscript of the 1306 version of Mondeville. It opens with a prologue similar to that in its 1314 French translation (Paris, BN, MS. Fr. 2030), viz.:

> . . . The practice and theory [of surgery] for every usage, inaugurated at Paris in the year 1306. . . . At this time I propose briefly to write and expound publicly and clearly in classes, so far as I am able, the entire manual operation of surgery, in five treatises.

The first of the five treatises, Book I on *Anatomy*, after a prologue (which was an expansion of that in the 1304 version) opened with a full-length picture captioned as follows:

> This is the figure of a surgeon standing with a knife in hand about to make incisions in various members of a nude man standing before him: [these include] the various members already mentioned and those [to be] dealt with in the succeeding *Anatomy*.

Thirteen additional figures, all full-length humans, numbered from one to thirteen, follow. The first two, two folios later, at the beginning of the description of bones, have the following detailed captions:

> The first of 13 figures by which alone the entire anatomy and inquiry into the human body can be demonstrated clearly; in both males and females, whole and dissected, from front and rear, . . . internally and externally, separately and integrally, in every way in which it is possible to be shown to human view. The first picture, depicts only the bones, from the front. . . . The second figure is a man from the rear . . . [faintly illustrated.]

Similar full-length figures illustrate the descriptive text concerning the blood-vessels (but none too clearly), also the skin, membranes, and marrow, the internal organs (from cranium to crotch in both *front* and rear views), and the internal organs of the abdomen (including generative organs) in male and female figures. In addition, however, several separate-organ sketches (somewhat like those in the 1304 version) were used. To be specific, a profile sketch of the head (with hair accentuated) illustrates the text concerning hair, nails, and beard; cranial bones and sutures are illustrated by front and rear sketches of heads. The sketch of an eye is unique in early medieval anatomical illustra-

tions; the lung-heart combination resembles earlier types, except that here the lungs are deflated.

It is obvious that Mondeville's 1306 version of the *Anatomy* and *Surgery* was illustrated in a new fashion, but it was a combination of five of his former separate-organ sketches with eleven full-length figures that were supposed to show 'the human body . . . whole and dissected, from front and rear, . . . internally and externally', etc. The question arises: were the illustrations in this manuscript, actual copies of large-sized pictures used in Paris classes to 'expound publicly and clearly the manual operation of surgery'? If so was the introductory picture of 'a surgeon standing with a knife in hand about to make incisions' a sketch of Mondeville actually dissecting in his Paris classes? Our answers are yes and no, respectively. If the sketches in the manuscripts of the 1304 version signify skulls and pictures used in the 1304 lecture-demonstration, the illustrations in this manuscript, of the 1306 version, can be taken as evidence that both separate-organ sketches and full-length figures were used in Paris 'to show publicly and clearly in classes the entire manual operation of surgery'. Apropos of the second question, despite the introductory dissection picture, I am inclined to doubt that 'a surgeon standing with a knife in hand' actually made an incision in the head, and dissected cadavers in Mondeville's class meetings. As we have already noted, about forty years after his 1306 version, Guido de Vigevano wrote 'I demonstrate dissection by figures. . . .' Mondeville, also, used pictures, of cadavers standing upright, showing the internal organs more clearly than in a horizontal position. As to his use of both types of illustration (separate-organs and full-length figures), this seems to have been an experiment, and apparently he finally decided in favour of full-length figures (which dominate the 1314 French translation of the 1306 version) even though this was a sacrifice of precise anatomical detail to the full-body comprehensive view.

I trust that the evidence presented justifies revising the traditional opinion (as expressed so emphatically by Dr. Frank) that Mondeville 'made entirely new full-length anatomic pictures FOR HIS LECTURES IN MONTPELLIER' and that these 'ARE CONTAINED IN MS. (2030) . . . AT PARIS'. His first full-length pictures were FOR LECTURES IN PARIS in 1306, and they appear first IN MS. 1148; 0.2.44, NOW AT TRINITY COLLEGE IN CAMBRIDGE. Later they were copied in colour for use in the 1314 French MS. 2030 at Paris. I am also inclined to object to the traditional enthusiasm over the gracefulness of these figures and their possible inspiration of Vesalian anatomical poses. From the standpoint of anatomical progress Mondeville would have done better to retain his earlier separate-organ sketches, making them more accurately detailed, employing one or two full-length pictures for the full-body comprehensive view. But he made his decision.

Now, one more problem, concerning his full-length figures. Were they a notable 'transformation' of 'post-antique' anatomical illustration? Yes, in one respect. They mark a naturalization of the squatting, frog-like posture of earlier anatomical illustrations, which were publicized by Karl Sudhoff as the *fünf-bilderserie*.[1] Extant manuscript examples from the twelfth, thirteenth, fourteenth,

and fifteenth centuries show a marked increase of realism and naturalness of posture, especially in the fifteenth-century examples. The most important of these is London, Wellcome Library, MS. 5000, dated 1410.[2] It contains not only the traditional five figures (vein, artery, bone, nerve, and muscle systems), but additional full-length figures, gynaecological as well as anatomical. All of these, in contrast to earlier *fünfbilderserie* illustrations, manifest more natural human postures and realistic external features. There is only a slight hint of the early squatting posture. On the other hand, there is no trace of Mondeville's nonchalantly graceful posture, but instead a rugged realism unposed in stance.

The same can be said concerning other fifteenth-century anatomical figures, some of which are not actually a part of the five-figure series. One of these, another Wellcome manuscript (2348, in English, folios 51–2), presents bone and nerve systems that are stiffly realistic in posture but more impressive in internal anatomical detail than any of Mondeville's graceful figures. Likewise a famous Stockholm scroll of a surgical treatise by John Arderne,[3] has five figures, all ruggedly realistic and impressively detailed in internal anatomy. Other individual illustrations could be cited to show the universal fourteenth-fifteenth-century trend towards non-Mondeville types of anatomical figures, figures with legs slightly spread, reminiscent of the early squatting posture.

Therefore, we are forced to the conclusion that Mondeville's 'transformation' of the 'post-antique' figures had little or no influence during the two succeeding centuries. More influential was another collateral tradition from the 'post-antique' period. This is best exemplified in a pre-Mondeville, thirteenth-century manuscript (Basel University, MS. D.2.11) which has five figures that are more impressive than Mondeville's except in gracefulness of pose. They are a *fünfbilderserie* with modifications; three squatting figures illustrate the bone, vein, and artery systems, two others the male and female reproductive organs (substitutes for the usual nerve and muscle systems). One of these figures (the female) was posed standing erect, with no hint of the traditionally squatting posture of the *fünfbilderserie*. More important than this as an evidence of non-Mondeville 'transformation', is the internal anatomical detail of the figures, especially those of the bone, vein, and artery systems. Although crudely inaccurate in certain points, they surpass the Mondeville illustrations in both quantity and quality of internal anatomical detail. From these or similar non-Mondeville figures, it would seem, evolved the prevailing anatomical figures described above, with their non-squatting but sturdy postures and their detailed precision of internal anatomy. The rugged peasant types seen in da Carpi's anatomical figures seem more closely related to these than to Mondeville's creations. It remained for Vesalius to transform the crude medieval anatomical figures into scientifically reliable systems and to clothe these with a natural gracefulness that is faintly reminiscent of Mondeville.

REFERENCES

1. *Sudhoffs Studien zur Geschichte der Medizin* (1908), Leipzig, **4**; *Sudhoffs Archiv für Geschichte der Medizin* (1910), **3**; (1914), **7**.

2. This composite manuscript was overlooked by Sudhoff in his visit to the Wellcome Library, doubtless because of its title, *Apocalypsis*, descriptive of the first section. It was brought to my attention in 1954 by Dr. F. N. L. Poynter and described in detail by the Curator of Manuscripts, Mr. S. A. Moorat. Microfilms thereof enabled Mr. Boyd H. Hill, Jr., of the University of North Carolina to complete a Master's thesis under my direction, and an article entitled 'Another Member of the Sudhoff *Fünfbilderserie*—Wellcome MS. 5000' (*Sudhoffs Archiv*, 1959, **43**, 13–19).
3. Stockholm, Royal Library, MS. 10, 118, translated by D'Arcy Power, *De Arte Phisicali et de Cirurgia of Master John Arderne, Surgeon of Newark*, No. 1 of 'Wellcome Museum Research Studies in Medical History'. London, 1922.