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The Body between Life and Death: Berengario da Carpi and the Anatomical Image of the Sixteenth Century

Introduction

Jacopo Berengario da Carpi is among the most famous anatomists of the so-called "Pre-Vesalian" era. His rise to fame tells the tale of a careful cultivation of powerful patrons accompanied by a lifelong curiosity surrounding the inner workings of the human body. As a protagonist of the 'anatomical Renaissance' that unfolded over the course of the sixteenth century, Berengario advocated for the primacy of touch and sight in medical education and clinical practice as described extensively in his printed works. It is impossible to understand the novelty of sixteenth-century anatomy in any other way than looking at the diversity of visual, cultural, and intellectual stimuli that leant themselves to a new, varied, dynamic, and innovative approach to the human body. Berengario's figure and work stand precisely at the crossroads of the history of medicine, the history of art, and a visual and material history of death and religious ritual. This essay looks at Berengario's life to understand the social, political, cultural, and visual contexts of Renaissance anatomy. It is precisely for these reasons that this figure serves as an important case study for understanding the medical humanities.

This chapter explores how the son of a barber-surgeon entered one of the most prestigious universities of the Renaissance, rising up the ranks to become a professor of surgery at Bologna, a position that he would go on to hold for twenty-five years. Straddling these two diverse paths of surgical training, we show how Berengario absorbed and thought critically about medical authorities of the recent and ancient past by translating the knowledge he gained through private dissections and clinical practice into commentaries and manuals that were widely circulated throughout Europe. After providing a sketch of the surgeon's prolific career in order to situate Berengario in the broader landscape of medical education in and out of the university as well as in the vast world of private dissections performed by the teacher with select students, we will go on to consider Berengario's texts and how he utilized personal anecdotes and artisanal analogies to style himself as an expert. Finally, we will analyze the woodcuts across the texts to reconsider the role and development of

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medical illustration two decades before the publication of Vesalius's *Fabrica* (1543) while also looking at the myriad technical, cultural, and religious practices that were used to depict life, death, and the human body. We argue that the opening of human bodies in a medical context – as well as the visual representation of thereof – must be seen in continuity with a series of religious, ritual, and legal practices that account for a certain ease in handling dead bodies. Such ease is not equal to indifference, but on the contrary signals a complex system of honor that concerned the criminal and the saint, the illustrious and the vile body. The existence of a specific skillset tied to medical centers on the Italian peninsula and ways of handling dead bodies in their crude materiality allowed for particular changes to occur and subsequently be disseminated across Europe over the course of the sixteenth century through the proliferation of printed manuals.

Through an exploration of cultures of medical practice and empirical discernment surrounding one of the most celebrated moments in the history of Western medicine, this chapter presents a rich case study the humanities.

Surgeon, Teacher, and Celebrity Doctor

Jacopo Barigazzi, later to be known as Jacopo Berengario da Carpi, was born around 1460 in the small, but culturally vibrant court city of Carpi, near Modena.[1] His father Faustino, a relatively well-known and well-esteemed barber-surgeon, was Jacopo's first teacher, apprenticed to his father from the time he was a young boy. Faustino had a successful practice and was known to intervene in difficult cases including that of one Bernardino of Vicenza, who was impaled in the forehead by a billhook.[2] The barber-surgeon's career was not confined to just Carpi, but Faustino was seconded throughout the Emilia to perform similarly technically difficult and delicate operations. Berengario helped him treat patients from a formative age.[3] His early education was entirely practical, and it was in his father's workshop that Berengario began to familiarize himself with tools, flesh, and bones.

This was a common for surgeons in the late-fifteenth century. Training could follow one of two paths: either that of a university education with a strictly mandated curriculum or the apprenticeship system which eventually qualified the prac-

1 For a discussion of Berengario's name see Putti 1937: 7–11. This early work on Berengario written by the famous Bolognese surgeon and collector Vittorio Putti is itself a monument to the medical humanities.

2 Savoia 2018 and 2019: 27–54.

3 Berengario da Carpi 1522: 2r (English trans. Lind 1959: 35); Putti 1937: 12–13.

titioner as a barber-surgeon.[4] It was only from the late Middle Ages onwards that surgery became an academic discipline taught in the most important medical schools on the Italian peninsula, namely: Bologna and Padua. In these two cities, university educated surgeons could sit on the elite Colleges of Medicine which had, among other mandates, the task of examining and granting licenses to barber-surgeons to perform certain surgical procedures such as bloodletting.

In Bologna, the first written record of a professor of surgery appeared in 1388, but it was not until 1405 that there was a consistent holder of the position. Even at that, it is clear that the barber-surgeon trajectory remained far more common, where, of the 65 medical degrees granted between 1419 and 1435 only one was in surgery. This persisted into the sixteenth century as indicated by an annotation on the Bolognese *rotulus* of 1512 where one of the *Riformatori dello Studio*, the body responsible for appointing professors, notes that despite surgery not being an honorable discipline, due to its vast popularity especially among foreign students they had to find a replacement for Berengario while he was on secondment.[5]

This constitutes the background necessary to understand what was at play in the development of a distinct branch of Italian anatomy conducted somewhere between the "workshop" and classroom. Renaissance surgeons formed a complex and composite spectrum of professions ranging from the barber-surgeon to the licensed practitioner, from the itinerant seller of remedies and the bonesetter or lithotomist to the university-graduate physician specialized in surgery. In European cities the typical sixteenth-century institutional arrangement could take three forms: the first was a division between a College of Physicians, a College of Surgeons (graduate or otherwise Latin-reading surgeons) and a guild of barber-surgeons (this was the case of Venice and some northern European cities); in the second one, learned surgeons were part of the College of Physicians, and non-graduate surgical practitioners were part of the barbers' guild or independently licensed by the College (the case of Bologna and Padua); and the third model, most widespread north of the Alps, was a division between a guild of barber-surgeons and a College of Physicians, with surgeons sharing their practice with barbers.[6]

Berengario himself, towed this line between action and learning, the hand and the mind. The surgeon fondly recalled his friendship with Alberto Pio, *signore* of Carpi, to whom he dedicated his *Isagoge Breves* of 1522. The court of Carpi was the site of great erudition and intellectual exchange with perhaps the most famous

4 For an ample discussion of these two paths to becoming a surgeon in Italy see: Siraisi 1990: 48–77 and 153–186; Pesenti 1978: 1–38; Palmer 1979: 451–60; Gentilcore 2006: 182–87; Conforti 2008: 323–340; Bartolini 2015: 83–100.

5 Siraisi 1990: 63; Ferrari 1987: 50–106.

6 On the institutional settings of surgery in England see Pelling 1998: 203–229; Chamberland 2009: 300–332. For Edinburgh, see Dingwall 1995: 34–98. For Paris, see Gelfand 1980: 21–27; Guerrini 2015: 25–30. For the Netherlands, see de Moulin 1988: 46–94.

courtier being Aldus Manutius, the prolific printer, who served as a tutor to the young prince in 1479. Berengario recalls the Muses he and Alberto pursued together under the tutelage of Aldus and notes an episode where the two dissected a pig.[7] However, his style, command of Latin (or lack thereof), and that neither Aldus nor Alberto ever mention Berengario in their writings betrays this aspect of his biography. Nevertheless, Berengario's inclusion of these details in his dedicatory letter is noteworthy as part of his program of self-fashioning aimed at endearing himself to, and legitimizing himself within humanistic circles at Bologna.[8]

In 1480 Berengario moved to Bologna to pursue a degree in arts and medicine at the University, from which he graduated on August 4, 1489. The medical curriculum there, as in other major universities at the time, was not exactly forward looking, and medical teaching was still based on a few texts, including a collection of Galenic writings and Avicenna's *Canon*.[9] From the early fourteenth century, however, human dissections were becoming more commonplace in medical pedagogy as Mondino de' Liuzzi describes in his *Anatomia* of 1316. However, it was not until almost a century later that dissections actually came to be institutionalized at Bologna. The statutes of 1405 and 1442 detail the acquisition of cadavers and stipulate that at least one anatomical demonstration was to take place each year. Initially, the professor was supposed to obtain the cadaver and the students were to pay for it, but by 1442 civic authorities were charged with procuring corpses and a new rule was added that bodies for dissections had to come from criminal executions and must be foreigners, meaning at least thirty miles from Bologna. After the dissection took place the cadavers had to be given a proper burial at the expense of the professors and their students. Between 1490 and 1543 a new wave of printed texts, often illustrated with detailed images rendered in close collaboration with artists also came into being, pushed forward by the humanistic enterprise of the publication of the complete works of Galen in a new translation.[10] Finally, the importance of dissection was definitively sanctioned by the building of permanent, elaborate anatomical theaters which crystalized the practice of public dissection's intellectual and spectacular importance.[11]

After graduating, Berengario left Bologna and spent the 1490s in Carpi, practicing with his father. Berengario accrued modest fame during this period, above all for the use of mercury as a cure for syphilis, the terribly painful and disfiguring

7 Berengario da Carpi 1522: 2r (Engl. transl. Lind 1959: 35).

8 Putti 1937: 14. Putti among others think that the timeline is implausible because Berengario would have been far too old; however, French speculates that given the apprenticeship, the date at which he would have received Latin education could have been later. French 1985: 44–45.

9 On the evolution of the teaching of medicine in Italian universities and the medical curricula of the time see Siraisi 2001: 1–10; Agrimi and Crisciani 1988.

10 Fortuna 2019: 437–452.

11 See Carlino 1999: 170–188; Ferrari 1987: 50–106; Park 1993: 1–33; Siraisi 1990: 78–114.

disease that gripped the Italian peninsula from 1494 onwards.[12] It is in the 1502 *rotulus* that the first surviving reference is made to Berengario as lecturer in surgery, a remarkable achievement for a non-Bolognese graduate given the strict hierarchy and communal control governing teaching appointments.[13] Soon after obtaining his professorship, Berengario married a Bolognese noblewoman, and in 1506 was conferred Bolognese citizenship by Pope Julius II. As already noted, Berengario's teaching attracted a large number of students from across Europe who flocked to the city to watch the professor perform dissections.[14]

Between 1508 and 1512 Berengario was put in charge of a special commission that served to enforce public health measures during a plague outbreak in the city. Berengario's rise to fame continued throughout central Italy thanks to both his popularizing of a treatment for cranial fractures that his father had pioneered called the '*cerotto umano*' – a special powder made with human bones – alongside his continued care for patients stricken with the French pox. His reputation as more or less a celebrity doctor took him to Milan, Florence, and Rome in the service of some of the most important aristocratic families on the Italian peninsula.[15]

In 1517 war broke out between the Medici and the Della Rovere families over possession of the Duchy of Urbino. Lorenzo de' Medici endured a critical head wound at the battle of Fossombrone and was subsequently transported to Ancona for medical treatment. The pope sent an entourage of the best physicians which included Berengario. It is unclear whether Berengario was directly involved in the trepanation of Lorenzo's skull, but he was most certainly took part in the postoperative care, a delicate matter, and clearly effective, with Lorenzo having made a full recovery only one month later.

Berengario once again returned to Rome and was there between the end of 1525 and the beginning of 1526 for a duration of four or five months. It was this stay in the Eternal City that both Vasari in his "Life of Raphael" and Benvenuto Cellini in his autobiography recalled. The surgeon was famously summoned by the pope in order to treat an outbreak of syphilis among the cardinals, which he did, once again, using mercury. Cellini wrote that the treatment did more harm than good, but that Berengario had the good sense to leave before any of the adverse effects started to manifest.[16] Even more bitingly, the 17th-century physician Bernardino Ramazzini stated that: "He most certainly had a much better knowledge of potion making than alchemists, with the real

12 See Arrizabalaga, Henderson and French 1997.

13 On the professional structures of guilds and medical academic associations see Naso 1983; Park 1985. For the make up of the Bolognese professorate see Grendler 1999: 475–485.

14 Ferrari 1987: 50–106.

15 Putti 1937: 39.

16 Cellini 1728: 33 (Cellini 1980: 117–118): "Egli era persona molto astuta, e saviamente fece andarsene di Roma; perché non molti mesi a presso tutti quelli che aveva medicati si condusson tanto male, che l'un cento eran peggio, che prima sarebbe stato amazzato, se fermato si fussi."

transformation being that he turned mercury into gold, with such rare propensity and entirely unseen in our own time."[17]

In 1527, Berengario lost his university post which he had held for 25 years. In all likelihood he did not leave the post voluntarily. The abrupt suspension of his salary points to some kind of condemnation or perhaps even threat of exile.[18] After leaving his chair and shortly before his death in 1530, Berengario became court surgeon to the Este in Ferrara. A document dated November 25, 1530 states: "and for 24 *lire* 1, 14 *soldi* for the funeral rites of master Berengario da Carpi, physician, and he had been buried in San Francesco."[19] On that day the last wishes of Jacopo Berengario da Carpi were observed and he was buried in the Franciscan monastery.[20]

In this rich and varied biography, we have seen how the deft maneuvering among intellectual and courtly circles coupled with a vibrant and successful clinical practice allowed Berengario to cultivate a storied career and garner immense fame in his own lifetime as a Renaissance physician.

The Author

Most of the information about Berengario and his life's work comes directly from the surgeon himself and his printed body of writings. As a prolific author, his medical manuals, commentaries, and treatises are littered with autobiographical details and both personal and familial anecdotes that serve as testimony to his innovative medical practices. Berengario's first printed work dating to 1514 was an edition of Mondino de Liuzzi's *Anatomia* which served as the nucleus for his most ambitious project to be published seven years later in 1521, a comprehensive commentary on the text.[21]

Prior to his magnum opus, however, in 1518, Berengario published a treatise on cranial fractures. Riding on the coattails of the fame he had recently garnered from his high-profile treatment of Lorenzo de' Medici's head wound, the book provides a practical and expansive guide to the treatment of head injuries.[22] The text walks the

17 Ramazzini 1745: 28 (first edition 1700).

18 Tiziano Ascari and Mario Crespi reported that some believed that in 1527 Berengario was charged of heresy and exiled from Bologna by the Inquisition on the account of his naturalistic treatment of the watery substance flowing from the crucified body of Jesus Christ (see pages 30–31 below), but they do not provide any source: see Ascari and Crespi 1964. On this point see Arieti 1999: 428.

19 Di Pietro 1971: 41–42: "e de avere adi 24 lire 1, soldi 14 per le esequie de maistro Iacomo da Carpi medicho e fu sepulto a San Francesco la Compagnia."

20 Martinotti 1923: 1–11.

21 Berengario da Carpi 1514.

22 The success of the *Tractatus de fractura calvae sive cranei* is attested to in its seven reprintings between 1518 to 1728; see Lippi 2017: 1–5.

reader through the whole process from initial diagnosis to surgical and non-surgical interventions to postoperative care, which included suggested changes to diet and perspective adjustments to sleep and exercise. There are also eight woodcuts towards the end of the treatise which were integral to his guide to the tools of cranial surgery and their appropriate usage.

As with all of Berengario's writings, he engages with and comments upon ancient sources such as Galen and Avicenna, but ultimately what gave his works their authority and led to their long afterlives was his evocation of dynamic communities of medical practitioners who sought to create proprietary technologies and treatments to elevate their status and renown. We gain an appreciation of the importance of the training he was afforded in his father's workshop. In particular, the knowledge and skill he needed to employ and popularize the "*cerotto umano*," a technology for which his father was offered a large sum of money, but instead chose to leave to his sons as "precious inheritance."[23]

The book also provides fascinating insight into the interfaith dialogue that was possible in the medical discipline in a way that in other parts of daily life was much more limited. There was a strong community of Jewish doctors practicing in the Emilia as we know from the abundance of luxurious Hebrew medical manuscripts produced in the region at this time as well as documentary sources recording the presence of and treatment by Jewish physicians. In Berengario's case he refers to a certain Jacob, a Jewish doctor in Ferrara who treated many noblemen including Ercole d'Este himself. Berengario characterizes this man as a "dear friend" of his father and writes that he created highly effective pharmaceutical cures to treat certain head traumas. He did this, however, under the cover of secrecy and Berengario, in need of these recipes, one day followed the doctor into a field in order to spy on him and see which herbs he would collect.[24] This anecdote not only reveals the interfaith exchange that could occur in medical practice, but also demonstrates the competition and secrecy that surrounded the propriety and inherited knowledge of these practitioners.

After this treatise, having likely met the polymath reformer Ulrich von Hutten during his visits to Bologna between 1512 and 1517, Berengario became intimately involved in the publication of von Hutten's first-person account of the French disease, *De Guaiaci medicina et morbo gallico*. The work, which was first published by Girolamo Benedetti, received Berengario's editorial support through the subsequent editions printed into the 1520s.

23 Berengario da Carpi 1518: 88: "isto cerato vidi patri meo offerri magnam pecuniae quatiatem: et ille totaliter renuit dicens hoc ceratum non esse dandum alicui nisi propriis filiis tamquem si esset haeretditas praeciosa."

24 Berengario da Carpi, *Tractatus* 1518: 58: ". . . Iacob haebraeum cui pater meus erat amiccissimus . . . ."

It was then in 1521 that Berengario published his tour de force *Commentaria super Anatomia Mundini*.[25] Dedicated to Cardinal Giuliano de' Medici, later Pope Clement VII, and printed by Girolamo Benedetti, the towering tome of 1056 pages superficially follows the traditional structure of the scholastic *commentarium* with an exposition of the content of each chapter that then proceeds to introduce the *questiones* and *dubia*. Berengario wrote in this conservative format," but his commentary on Mondino's anatomical treatise, as with many other works written in this genre in this period, are full of digressions, experimental reports, and true departures from the Aristotelian-Galenic orthodoxy that was supposed to have ruled the Medieval and early modern universities.[26] The text is indeed much more than simply an Aristotelian exercise, where in addition to these stalwarts of the genre Berengario included *digressiones*, which allowed the surgeon to depart from certain conventions by way of clinical case studies and experimental reports. In order to resolve age old spats, Berengario performed a series of experiments, among the most famous of which was the one he conducted on fetal bladders in order to better understand secretion in utero.[27]

While this investigational approach to anatomy was revolutionary in many respects, the book was unwieldy in its heft, and likely for that reason was not a commercial success. The following year on December 30, 1522, with a different printer, Benedetto Faelli, Berengario published a much-condensed dissection manual, the *Isagoge Breves*.[28]Although no explicit reasons have been found to account for the change in printer, Faelli's biography would imply that he brought a certain business acumen to the condensing and repackaging of Berengario's work as a book that was consciously and explicitly didactic, an essential for any student of anatomy. Faelli began his career not as a printer, but as a book seller with close ties to the Benedetti family, where he had a formal agreement to sell books printed by Francesco 'Platone' Benedetti, Girolamo's uncle, throughout the 1480s.[29] It was only in the 1490s that Faelli set up a press of his own and surviving documentation demonstrates that commercial success was of paramount concern. For instance, a contract dated May 22, 1499 between Faelli and Filippo Beroaldo the Elder, a professor of rhetoric and poetry at Bologna, stipulates that Beroaldo was to lecture on Apuleius's *Golden Ass* to coincide with the publication of his commentary on the

25 Berengario da Carpi 1521. The book contains 21 figures: 6 figures of the abdominal muscles; 3 of the vessels of the members; 3 of the female genitals; 1 of the vertebrae; 5 of the muscles of the whole body; 2 of the whole skeleton; 1 of the bones of the hand and the foot.

26 Siraisi 2007; Nutton 2019: 472–486.

27 French 1985: 49–52. See also Agrimi and Crisciani 1990; Park 1999: 347–368; Crisciani 2005: 297–324.

28 *Isagoge breves* was the most successful book by Berengario and was reprinted five times: 1522, 1523, 1535, 1660 (published in London and translated into English), 1664 (reprint of the English version).

29 Sorbelli 1929: 47.

text in order to maximize the number of copies sold. The contract also specifies that 1,200 copies of the book were to be printed, a strikingly high number for the time.[30] From this archival evidence, we gain an appreciation of Faelli as a printer concerned with effective marketing strategies to promote sales.

It was this business savvy that the printer likely brought to the production of the *Isagoge* as well. Instead of being a burdensome commentary, the reader is presented with a clear, 144-page dissection manual that moves through the human anatomy in the order in which a dissection would be performed, giving tips on how to cut and best see certain anatomical features along the way. The book was handy and easy to use, something that Berengario saw as central to his task as author in order to compensate for other cumbersome works that were not practically arranged, noting of such precedents that: "The authors seem to have borrowed fables from other volumes instead of writing a genuine anatomy."[31] The success of this approach is evident given that less than one year later a second edition of the *Isagoge* was published on July 15, 1523.

In the year before his death, Berengario edited an important new translation of a collection of anatomical writings by Galen published in Bologna and accorded privileges by both Pope Clement VII and Emperor Charles V.[32] This volume is a testament to Berengario's ability to align himself with some of the most powerful patrons on the Italian peninsula, where beyond the imperial and papal privileges, Ercole Gonzaga, to whom the book is dedicated, also sponsored its printing. In his dedicatory letter, the surgeon recalls a conversation on anatomy that took place in the company of the philosophers and philologists Pietro Pomponazzi and Leonardo Bonamici. This kind of prefatory letter once again confirms Berengario's courtly and intellectual ambitions and his ability to maneuver among a wide range of social circles in his capacity as surgeon and professor.

These printed works, in particular the *Treatise on Cranial Fractures* and the *Isagoge*, enjoyed long afterlives and reprinting in some of the larger printing centers. The *Treatise on Cranial Fractures* was reprinted at least two more times, once in Venice in 1535 and again over a century after its initial publication, in Leiden in 1629. The *Isagoge* enjoyed similarly enduring success, where a smaller and more economic edition was printed in Strasbourg in 1530, and an English translation was made in 1660 in London and reprinted again in 1664.

30 Archivio notarile di Bologna, atti del notaio Agostino Landi, 22 Maggio 1499, transcribed by Sorbelli 1929: 61.

31 Berengario da Carpi 1522: 2r (English trans. Lind 1959: 35): "quos eorum authores ad alia transferentes volumina fabulas potius quam Anatomiam scribere videbantur."

32 Galen 1529.

The Artifex

Three questions to follow up on this overview of Berengario's printed output are: where did Berengario accumulate this knowledge? How did he understand his task as an author? And how did he establish his authority as an expert qualified to write on such subjects? The answers to these questions are intimately intertwined. Berengario sees and styles himself as an expert precisely by way of his manual, experiential, and experimental practice of medicine and surgery, not yet couched in the university and sometimes even at odds with the institution. It was through his training and the skills that he acquired by way of his apprenticeship with his father, Faustino, as well as his numerous private dissections that allowed him to write such remarkable, even revolutionary works. The surgeon referred to his practice as "*anatomia sensibilis*", an anatomy guided by the senses, and his role as that of the "*artifex*," craftsman.[33] In this framework, manual dexterity and judgement sit comfortably next to knowledge of ancient authorities. This also meant that the act of writing was an act of translation from embodied knowledge and artisanal epistemologies to words on a page.[34] Berengario makes this explicit in the preface to his *Treatise on Cranial Fractures* where he writes that because of the nature of the discipline most of medicine cannot be translated into writing nor expressed in words, instead practice is cumulative and comes from years of training and first-hand experience.[35] This point is reiterated in the section of the treatise that deals with the detection of symptoms in order to diagnose a range of injuries. In concluding this chapter dedicated to distinguishing one trauma from another when there are overlapping symptoms, Berengario writes:

> I deem, however, that the differentiation of such symptoms is very difficult and is only known by experts. They are symptoms that cannot be described in writing and can only be understood by he who possesses ingenuity, introspective, analytical, and synthetic capabilities as well as lots of experience. There are many things that the doctor knows that are not possible to put into writing as is seen every day.[36]

In concert with his view of writing as translation, Berengario was a strong proponent of sight and touch as the guide of the surgeon, anatomist, and physician, chiding his predecessors for blindly following medical authorities without using their own cultivated skills. He is so adamant about this point that in the introduction of his commentary on Mondino's *Anatomia* he thrice reiterates it over the course of

33 See French 1985: 57.

34 The literature on artisanal epistemologies is ever expanding; however, for the most cogent definition see Smith 2004: 3–30. See also Long 2015: 840–847; Gooday 2008: 783–795; Struhal 2017: 501–513.

35 Berengario da Carpi 1518: 3v: "Magnifico ego in medico lucidem nec calamo scribi nec lingua proferri potest . . . ."

36 Translations are our own unless otherwise stated. Berengario da Carpi 1518: 36r.

three pages. The first time he tells the readers that they should not believe everything that they hear or read, but that they should be verifying older assertions through sight and touch.[37] The second proclamation of the primacy of the senses instead goes on to codify this form of empiricism as its own epistemology whereby understanding human anatomy is something that is to be accomplished through manual acts and demonstrations of individual members with dissection described as a "science of understanding the members."[38] In the final appeal, Berengario argues for the use of sensory perception specifically cultivated through experience, a recurring topos throughout his works.[39]

To accomplish this empirical task, Berengario was a strong proponent of the private anatomy, markedly different from the annual public dissection. While the public dissection was very often a performance that could be misleading and did not fully allow students to see everything that was happening, the private dissections took place in teachers' houses or in hospitals among a small group of students who actively took part in the procedure and would discuss specific points about organs and structures.[40] For Berengario it was important that the students knew how to handle a cadaver themselves rather than leaving it to the *sector* who at this time would be the one performing the public dissection as directed by the *lector*.

Berengario advises that students dissect as many bodies as possible, viewing anatomy as a composite. In the introduction to the *Commentaria* he uses this point to rail against the public anatomy. He also notes that it is important to see a variety of types of bodies, as every body is unique and must be treated accordingly.[41] The surgeon later reminds his reader that anatomy is not only to be performed on the dead, but should also be observed while undertaking clinical observations of patients with a range of ailments.[42] There are also repeated references to cemeteries, especially in the *Isagoge*, as a place where one should go to best see the bones of the body on fully decomposed corpses. For instance, while discussing the cranial plates he wrote that they "can best be seen in cemeteries, as also other parts of the cranium and all the bones of the body may be seen."[43]

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37 Berengario da Carpi 1521: 6r: "Et non credat aliquis per solam vivam vocem aut per scripturam posse habere hanc disciplinam: quia hic requiritur visus & tactus."

38 Berengario da Carpi 1521: 6v.: "Alio modo capitur anatomia pro scientia cognotionis membrorum ubi etiam traditur modus operandi cum manu actu & demonstrandi ipsa membra."

39 Berengario da Carpi 1521: 7r.: "Non credat ergo aliquis sibi soli sed communicat doctorum auctoritates & sui ipsius opinionem cum peritis in anatomia si potest & simul sit sensus & experientia super eod quo sit ferm ut quae forte non distinguit unus distinguant forte alii." On touch in early modern medical culture see Maurette 218: 105–124; Pogliano 2015.

40 Martinotti 1911: 30–47; Klestinec 2011: 142–166.

41 Berengario da Carpi 1521: 5v.

42 Berengario da Carpi 1521: 5r.:

43 Berengario da Carpi 1522: 52v53r (English trans. Lind 1959: 139): "quod potest optime videri in cimiteriis, sicut & aliae cranii partes: & etiam omnia totius corporis ossa."

This insistence on touch and the emphasis on the hand is consistent with Berengario's repeated appeal to the authority of the senses as the ultimate proof in moments of discord regarding the structure of certain parts of the body. Here, the subculture of private dissection was directly linked to epistemological innovation. Well before Vesalius, Berengario was indicative of a medical and scientific culture that was ready to embrace sensory evidence.

The *Commentaria*'s audience was predominantly academics. In maintaining the conservative language of the commentary, *demonstratio* meant conclusion; however, Berengario's conclusions often spoke directly to the senses rather than in the resolution of a syllogism, thus undermining the formulaic and familiar. In Berengario's anatomy, to prove was to expose the structure of the organ to sight and touch.[44] Experimental dissection had the potential to solve problems: one example of this was when the anatomist worked to resolve how a fetus secretes in utero. He set out to conduct a "particular" anatomy, taking a fetus and filling its bladder with water from a syringe. In doing so, he noticed that the water seemed to flow through the umbilical cord to the point where it reached the embryonic membranes. In another attempt, Berengario compressed the bladder of a nine-month fetus with his own hands to see if any urine emerged. Finally, he filled up the bladder with water using a syringe inserted through the penis, allowing him to conclude that the fetus expelled urine through the penis, not the umbilical cord.[45]

Berengario's texts, in particular the *Isagoge Breves* were also sure to reiterate the importance of the manual component of anatomy and surgery. The surgeon, and in turn, a dissection or surgery could only be as good as the skill of the hand performing it. The surgeon and anatomist were expected to be familiar with and skilled in working with a range of tools each of which selected for their suitability in excavating the human body. In several points throughout the *Isagoge Breves* Berengario is sure to caution his reader that a 'skilled' or 'practiced' hand is required for the sake of precision, so as to not obscure or destroy any element of the body intended for study.[46] Not to mention, the cutting open of bodies was a cumulative skill. The more experienced the hand, the more an anatomist was able to understand about the body. Berengario is explicit on these points with respect to the dissection of the eye, where he concludes the passage on the delicate nature of this component of dissection by noting that: "A skilled hand seeks ever more difficult things."[47]

The skilled hand was accompanied by judgement, another critical component of good practice as characterized by Berengario. It was discernment that allowed a physician to swiftly and accurately assess the symptoms of his patient, make a

44 French 1985: 52–53.

45 French 1999: 110–111.

46 Berengario da Carpi 1522: 38v (English trans. Lind 1959: 109): "docta manu."

47 Berengario da Carpi 1522: 59r.

proper diagnosis, and prescribe a suitable course of treatment. The face was the first point of reference, Berengario elucidates this both in the *Treatise on Cranial Fractures* and the *Isagoge Breves,* where he writes in the latter:

> Knowledge of the face is much prized by the physiognomist. It is also prized by the physician, since you will make the first prognostication primarily from the face of the sick man; for this is helpful in the recognition of many diseases, such as leprosy, consumption, yellow jaundice, cachexia, and the time of menstruation in a woman. In the face are also recognized those who pretend illness, but not always.[48]

Already in his *Treatise on Cranial Fractures* Berengario made a similar point when he wrote that: "It is advisable for a physician to train himself to know these colors so that he knows how to distinguish them otherwise he won't be able to make the assessment. It is only when he is experienced and trained in similar situations in the same way that experts are able to distinguish real gems from fakes and those of low quality."[49] This is not the only time he used this simile, but it gets recycled in the *Commentaria* with slight modifications: the first change is an emphasis on the duration involved in the cultivation of such experience and the second is the addition of the verb to judge (*iudicant*) so as to specify the way in which good gems are distinguished from the bad or even fake.[50]

That such discernment was a shared capacity of both the surgeon and the goldsmith reappears from the perspective of the goldsmith in Benvenuto Cellini's autobiography. Cellini recalls that while Berengario was in Rome, he stumbled upon the goldsmith's workshop. Entering the shop, the surgeon goes onto inspect the works and is taken by "several sketches of little fanciful vases which [Cellini] had drawn by way of amusement." Berengario goes on to commission the vases from Cellini since they were "very different from any that he had seen before." In this short exchange, before Cellini goes on to cast his doubts regarding the efficacy of Berengario's mercury treatments, the goldsmith acknowledges the surgeon as having "great intelligence for *disegno*" and as such a unique appreciation for his craft, actively

48 Berengario da Carpi 1522: 40r (English trans. Lind 1959:113): "notitia faciei multum consideratur a physionomo. Consideratur etiam a medico: ut primo prognosticorum:in primis aegri faciem considerabis. Iuvat in cognoscendis multis morbis sicut lepram, pleripleumoniam, icteritiam, cacesiam aliam cachexiam, & tempus menstruorum in foemina. In ipsa etiam cognoscuntur simulantes aegritudinem, sed non semper."

49 Berengario da Carpi 1518: 28r: "Et oportet qui delectur medicus in cognoscendo istos colores: quia quidlibet non cognoscit: sed tantum ille qui ex expertus & excercitatus: similbus sicut experti cognoscunt gemmas bonas a fraudatis & a non bonis."

50 Berengario da Carpi 1521: 5v: "Qui color non cognoscitur in mortius nec a quodcunque: sed a bona extimatiua Medici et longa ipsius experientia hoc etiam cognosci potest: sicut experti circa gemmas iudicant bonas a falsis et illas cognoscunt: similiter experti Medici praenarrata cognoscunt."

situating the surgeon's and the artisan's practice of judgement or discernment in the same realm.[51]

That manual dexterity and good judgement are requirements of both surgical and artisanal practice reappears in how Berengario chooses to translate certain aspects of practical knowledge. Since Berengario perceived these writings as acts of translation, he had to find ways of using language in order to represent his lived experience to his reader. In doing so, at points Berengario chooses to employ artisanal analogies to clarify certain techniques and better describe anatomical structures.

The first time Berengario does this is when talking about trepanation and which size drill is most appropriate to drill the hole that will first pierce the cranium. He outlines the vigorous debates surrounding the topic and the various pros and cons of a thinner or thicker drill to do the job. Ultimately, he concludes that it is the former because it is the same as any other occasion that a hard material – be it wood or stone or bone – is punctured for the first time, reasoning that "it is better to start with a thinner tool to penetrate the bone as is evident from the experience of any other mechanical skill whether working in wood or stone or any other solid body: any artisan always uses a finer and smaller drill first and then a larger one . . . because it does a better job . . . ."[52] Berengario realized that surgeons and sculptors needed to rely on similar skillsets and tools, and thus the solution to a centuries long disagreement was solved by looking across such disciplinary boundaries, where bones were just one of many hard materials that required a similar technique.

In the *Commentaria,* Berengario again returns to the artisan's workshop, but this time in order to explain certain phenomena that would have been difficult to see in either living bodies or by dissection alone, and next to impossible to articulate in words. There are two instances where Berengario refers his reader to a carpenter's workshop. The first time is in reference to how cranial plates are conjoined, where he says that if one would like to better understand this feature of the human skull, they would be best to visit a carpenter and observe dove tail joints which are fused accord-

51 Cellini 1728: 32–33 (Cellini 1980: 117–118): "Aveva questo valente uomo molta intelligenzia del disegno; passando un giorno a caso dalla mia bottega, vide a sorta certi disegni che io avevo innanzi, infra' quali era parechi bizzarri vasetti, che per mio piacere avevo disegnati: questi tali vasi erano molto diversi et varj da tutti quelli che mai s'erano veduti insino a quella età; volle il ditto Maestro Jacomo che io gnene facessi di argento; i quali io feci oltra modo volentieri, per essere secondo il mio capriccio."

52 Berengario da Carpi 1518: 97r: "Quod etiam hoc sit verum .f. quod melius sit incipiendum a subtili quem alato ferramento dum totum os intendimus penetrare patet experientia in omni alio artificio mechanico sive operetur in ligno sine in lapide vel in alio corpore solido: quia semper artifices utuntur terebro subtili & parvo prius deinde lato & deinde latiori: quia etiam sic operando melius & citius perficiunt quicquid intendunt."

ing to a similar principal as the aforementioned plates.[53] Later in the text, while still discussing the skeletal system, he once again evokes the carpenter. This time, Berengario is attempting to explain the opening of the pubic bones during labor. While it is impossible to see this happen in real time, it would be possible to go, once again, to a carpenter's workshop and look at window hinges which approximated this opening and closing as a way to a better understanding of the birthing process.[54]

The intertwining and sometimes collision of language and experience forced Berengario in his writings to think about how he wanted to position his expertise in order to both legitimize himself to his reader as well as best explain certain physiological phenomena. In mobilizing language intended to recall artisanal epistemologies and the world of craft, the surgeon was making a profound statement on the nature of expertise and the role it should assume in a formal university education.

The Illustrator

Not only were Berengario's texts rich with information, they were beautiful objects that exploited the possibilities offered to publishers, authors, and audiences by the woodcut. The *Commentary* of 1521 contains 22 woodcuts. The prints are found in groupings related to the text and commentary in the section prior. Each woodcut is accompanied by a caption describing what the viewer was intended to observe in the image. Most of the images depict either écorché or skeletal figures in classicizing poses. The attribution of these woodcuts is the topic of speculation and debate, with suggestions spanning the range of artists working in Bologna during these years. The most compelling of the names that have been put forth are Amico Aspertini and Giacomo Francia, two protagonists of Bolognese art in the sixteenth century, who were the heads of large and varied workshop that each had a printmaking component.[55] Another hypothesis is that Berengario himself was responsible for the design of certain prints, especially those depicting anatomical particulars.[56] This proposal as of yet cannot be substantiated, but should not be ruled out entirely. In any event, all

53 French 1985: 57. Berengario da Carpi 1521: 417r: "ut faciunt capentarii iugendo ut firma maneant licet etiam in capite ossa aliqua sint non coniunctura setatili: sed cum alia iunctura quae dicitur supra apodiata."

54 Berengario da Carpi 1521: 493r: "sed debent ire tales medici ad carpentarios & querere qualiter potest aperiri ostium seu fenestra composita partibus & que de tribus suis iunaturis non aperiatur . . . ."

55 There has been little to substantiate the various attributions; however, Marzia Faietti has made a compelling case for the attribution of at least one of the woodcuts to Amico Aspertini on 520v of the *Commentaria*: Faietti and Scaglietti Kelescian 1995: 339–341.

56 Lind has specifically hypothesized that the spine in its various iterations was based on a design by the author himself. See Lind 1959: 26; Putti 1937: 196.

woodcutting involves a collaborative process that requires the convergence of disparate skillsets. It was exceptionally rare at this time that from start to finish a woodcut was the responsibility of a single individual. First a design had to be conceived of by an artist, then the design was passed to the woodcutter who had to have the strength and control to cut into the dense woodblock, and then it would go to the printer who would ink the matrix and make the impressions running the paper through the printing press so that there was enough pressure to ensure that the ink would properly adhere to a slightly dampened piece of paper. As such, singular authorship when it comes to prints is somewhat misleading. In the case of the woodcuts for the *Commentaria* it was certainly a large, collaborative undertaking between multiple artists, woodcutters, the printers, Girolamo Benedetti, and Berengario himself. Whether or not any woodcut can be fully assigned to Berengario, he certainly had a great deal of oversight in many aspects of their design and is directly implicated in guiding the viewing experience through the captions. In the woodcuts for the *Commentaria,* it is possible to identify at least four different designers of the prints on stylistic grounds.

In the following year with the publication of the *Isagoge Breves*, despite a new printer, Benedetto Faielli, the same plates, with few exceptions, are used: two woodcuts are removed, while illustrations of a man with a walking stick and a uterus are added, and a replacement is made for the 1521 woodcut of the spine. In maintaining the same number of woodcuts in a volume one fifth of the size, the outcome became much more densely visual with the concentration of images increasing from only two percent in the *Commentary* to fifteen percent in the *Isagoge*. In both the *Commentary* and first edition of the *Isagoge* only five and six woodcuts respectively do not feature the entire human form, representing an aesthetic break from the broader illustrative strategy of the text. These full-page woodcuts distill the body into its constituent parts without a compositional framework that relies upon artistic conventions of situating bodies in articulated spaces that give context to the human forms. Instead, labels identify veins in the arms and legs, bones in the hands and feet, and numbering of the vertebrae. The overlay of text and image invites the reader to use the image in a different way.

After the evident success of the first edition, it is likely more capital could be invested in the production of the second edition, published less than one year later in July 1523. As a result, about one third of the woodcuts were entirely replaced and the quality of the prints increased with the employment of finer lines and hatching that lend to more volumetric forms. There is also a shift in the visual landscape of the dissection manual with a newfound prioritization of anatomical particulars over schematic écorchés, where the number of prints taking this approach to medical illustration jumps from six to eleven, comprising half the woodcuts in the book.

Berengario's approach to anatomical illustration must be read in its historical context. At the beginning of the sixteenth century the function and worthiness of anatomical images were not the object of unanimous consensus. Even Berengario himself

had his doubts. The field of early-sixteenth-century anatomists was divided between those who praised images, and those who were skeptical. For example, Alessandro Benedetti, author of an important anatomical treatise published in 1502 without any illustrations, believed that images betrayed the senses, that nature could only be represented by words, and that discourse was the unique vehicle for "*evidentia*" and "*vivacitas*."[57] In direct criticism of Berengario's woodcuts, Jacques Dubois, a staunch Galenist at the University of Paris wrote in the introduction to his 1539 *Ordo et ratio in legendis Hippocratis et Galeni* that the prints were 'sumptuous, but useless' and that they would only ever help in the treatment of 'picture-people.'[58]

Confronting such doubts surrounding the utility of images, Berengario had a massive undertaking in determining the role of prints in his medical texts. Given that there were few printed, Berengario and his collaborators had to rely on an array of different visual strategies ranging from the technical illustration to devotional imagery to classical sculpture in order to find compositional solutions to overcome the challenges presented by illustration.[59]

The changes between the two editions of the *Isagoge* reflect a certain rethinking as to how images were to function epistemologically and with the text. The playful manipulation of the human body in the *Commentaria* and the first edition of the *Isagoge* was intended to serve as an aide-de-memoire fusing classical and Christian iconographic conventions with physiological systems to help students with information retention. This use of images is by no means new and pre-dates the advent of printing in the West. In printed works themselves we see this as a popular strategy that was likely borrowed from popular printed devotional texts which made use of similar memory aides in relation to the scriptures.[60]

Such illustrations also cohere with Berengario's dynamic instructions for human dissection presented in the *Isagoge*. Berengario saw the corpse as if it was a living body, thus making clear that this science of dissections was in the service of the living. For instance, while discussing the spleen, Berengario gives detailed instructions on how to move the cadaver:

57 Ferrari 1996: 155–156.

58 Dubois 1539: 13: "sumptuosa quidem sed nullam in rem utilis.,,nisi sortu pictos homines curatum?" For a broader discussion surrounding the ongoing debates on the utility of images in medical books see: Kusukawa 2011: 188–196.

59 Prior to Berengario's illustrations the so-called Wound Man and the Zodiac Man were the two most prevalent image types to appear in printed medical texts, which came from a long manuscript tradition. The earliest printed example of this being the *Fasciulus Medicina* published in Venice in 1491 by Giovanni and Gregorio de Gregori. For further discussion of anatomical illustration prior to Berengario see: Laurenza 2003: 50, 75–80.

60 For the relationship between image and memory, Lina Bolzoni and Mary Carruthers provide comprehensive assessments of the medieval culture that allowed such tools to flourish. See Bolzoni 2002 and Carruthers 2008. Also Nutton 1999: 61–80.

> You will raise the cadaver, and, when it is in a sitting position, you may better see the location of the spleen under the diaphragm immediately in the hypochondrium, as in a living body. But in a dead body as it lies, the spleen is seen under the ribs because its weight drives the diaphragm readily to the upper region, the lung easily yielding, since it is empty and of a loose texture.[61]

For students to actually gain an appreciation of what this would look like in a patient, they needed to reposition the cadaver in order to approximate a living body. In terms of the illustrations, we see similar techniques employed especially in the final grouping of images which show different muscle groups. This is apparent on page 69r of the 1522 *Isagoge* where an écorché man is depicted in a ruinous, overgrown landscape with a walking stick [Figure 1], his left arm and right leg fully extended allowing the viewer the clearest view of the lateral muscles made possible by way of an artistic composition.

In the images' function as memory tools, the designer of the prints chose to make visual witticisms in alluding to the cadavers used in public dissections, namely those belonging to condemned criminals. These criminals were mostly executed by hanging, the majority were men charged for crimes against property, and had intact bodies, while others were decapitated. Two images refer precisely two these practices, and are included in each of the three anatomical texts. The first woodcut is indented to represent the anterior muscles.

A virile man standing in contrapposto [Figure 2], gazing into the distance, his face portrayed in profile holds a rope alluding to his condemned end, the rope clearly being a noose. In the second image [Figure 3], depicting the posterior muscles, the figure leans against an axe, indicting the other mode of execution.[62]

However, this witty, memorable role of the image takes a back seat in 1523, where instead greater emphasis is placed on singular organs and bone structures, better reflecting the intense investigation and excavation of the human body that occurred during the process of dissection. In tracing the changes made to the illustration of the spine, some conclusions about why this might have been can be deduced and Berengario's ambivalence towards the former strategy revealed.

In the 1521 *Commentaria* the spine is rendered as a flattened schematic form and conveys certain pertinent information that is supplemented by the caption on the left-hand side. Notably, this text also contains a warning that the image is not a "true likeness" neither in number nor appearance of the vertebrae, as such the surgeon goes so far as to direct the reader away from the image and towards a cemetery if they wish to

61 Berengario da Carpi 1522: 13v (English trans. Lind 1959: 59): "Elevabis tamen cadaver: ac si sederet: ut melius videas eius situm qui est infra diaphragma imediate in hypochondrio: maxime in vivo: in mortuo vero iacente videtur esse sub costis: quia sua gravitas impellit diaphragma de facili ad superiora: quia pulmo est vacuus et Rarus."

62 Park 1993: 23–26.

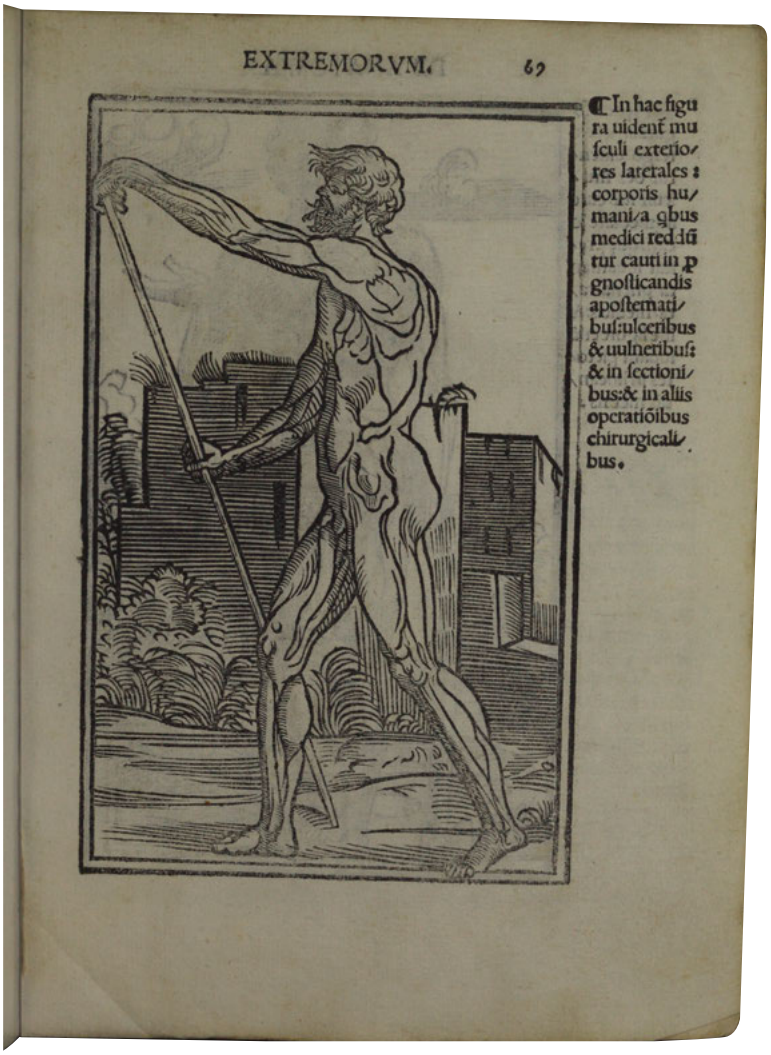

Figure 1: Ecorché showing the lateral muscles. Jacopo Berengario da Carpi, *Isagogae breves perlucide ac uberime in Anatomiam humani Corporis.* Bologna: Benedictus Hectoris, December 30, 1522, fol. 69r. Bologna, 1522.
Photo: Isagoge breves prelucide ac uberime in anatomiam humani corporis. A communi medicorum academia usitatam. / [Jacopo Berengarius da Carpi]. Wellcome Collection. Public Domain Mark, EPB/B/782
https://wellcomecollection.org/works/ujm5ynjj

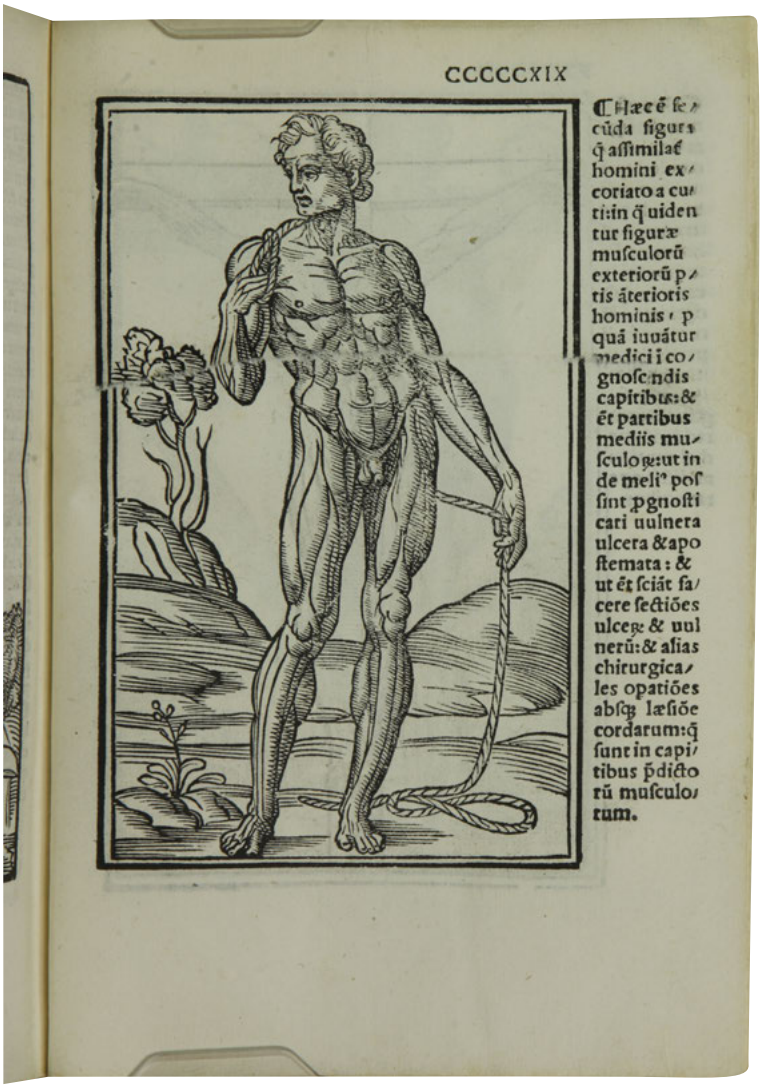

Figure 2: Ecorché showing the exterior muscles of the front. Jacopo Berengario da Carpi, *Commentaria cum amplissimis additionibus super anatomia Mundini una cum textu eiusdem in pristinum et verum nitorem redacto*, fol.591r.
Bologna: Hieronymus de Benedictis, 1521.
Photo: Biblioteca Nazionale Centrale di Firenze, CFMAGL. 1.6.542

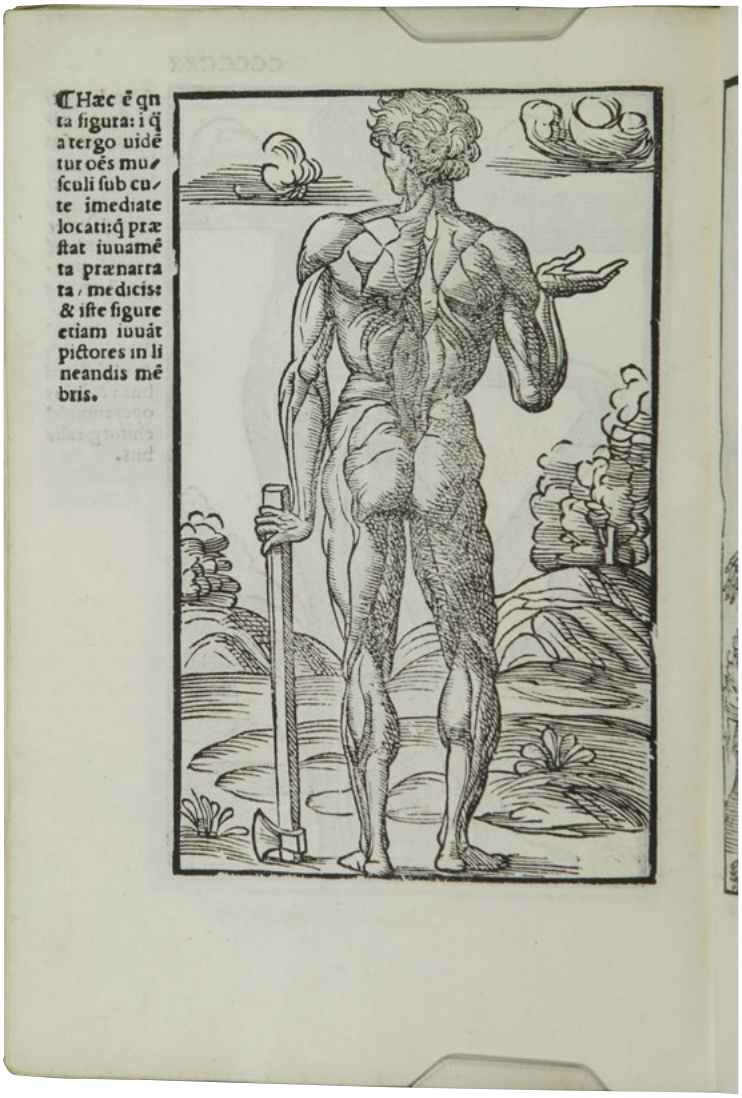

Figure 3: Ecorché showing the exterior muscles of the back. Jacopo Berengario da Carpi, *Commentaria cum amplissimis additionibus super anatomia Mundini una cum textu eiusdem in pristinum et verum nitorem redacto*, fol.520v.
Bologna: Hieronymus de Benedictis, 1521.
Photo: Biblioteca Nazionale Centrale di Firenze, CFMAGL. 1.6.542

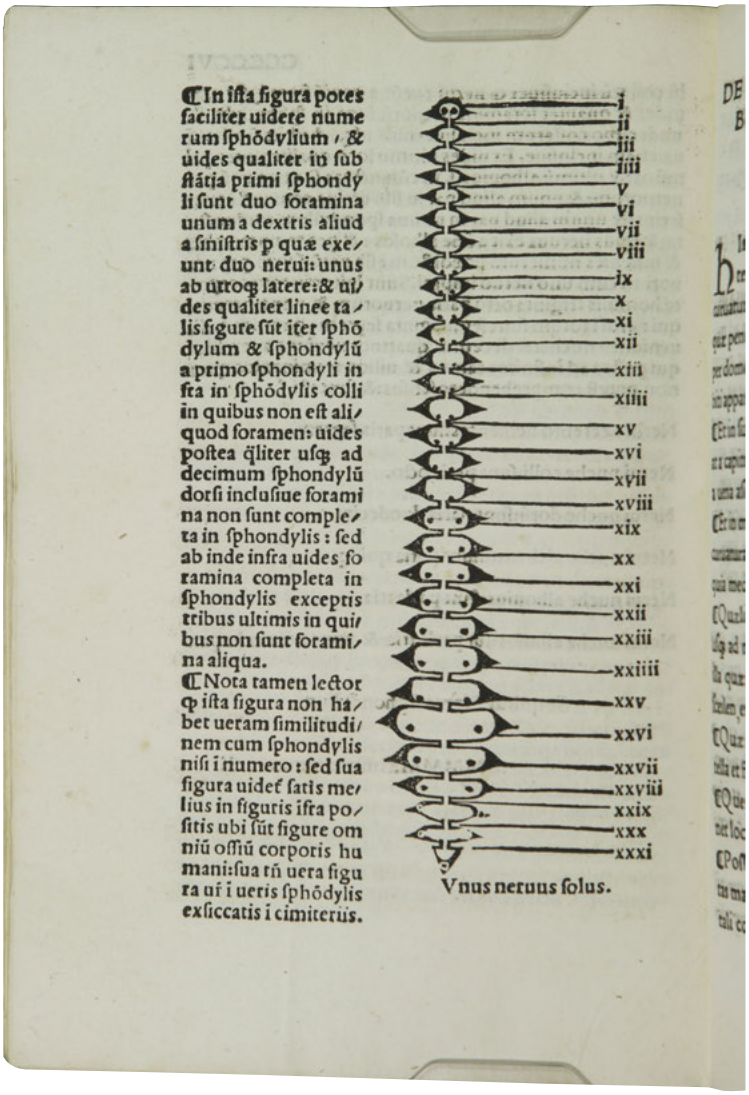

Figure 4: Spine. Jacopo Berengario da Carpi, *Commentaria cum amplissimis additionibus super anatomia Mundini una cum textu eiusdem in pristinum et verum nitorem redacto*, fol.506v. Bologna: Hier. de Benedictis, 1521. Commentaria 1521.
Photo: Biblioteca Nazionale Centrale di Firenze, CFMAGL. 1.6.542

see what the spine actually looks like.[63] Direct observation trumps the consultation of images and in doing so undermines the image's very authority in the text. Such an observation reflects Berengario's aforementioned approach to the body, which in its empiricism is fundamentally skeptical, relying on his own skills of judgement tied to cumulative, practical experience, something that is irreplaceable by a woodcut. It was this dissatisfaction that made the spine the only pre-existing woodcut to be entirely redesigned for the 1522 *Isagoge*. The new woodcut was less schematic with greater delineation of individuated vertebrae and stronger articulation of the transverse process, sacrum, and coccyx [Figure 5]. Despite these changes, the author remained dissatisfied. The illustrator still only depicted thirty-one vertebrae rather than the thirty-three that that actually comprise the spine. Thus, the note to the reader remains, admonishing the reader of the inaccuracy of the image and once again referring them to a graveyard to see the "*vera figura*."[64]

Despite the sustained inaccuracy of the new woodcut of the spine in the first edition of the *Isagoge*, the woodcut remains the same in the second edition [Figure 6], as evidenced by the line on the first vertebra and the open bottom on the sixth, suggesting the same plate. However, the caption changes. There is still the erratum, but rather than pointing the reader towards the cemetery, the author directs them towards another images, saying that the next image allows the reader to better see ("melius videtur") more details of the spine. On the following page [Figure 7], the image goes into much greater depth in its depiction of the spine, providing three different views: the first, a profile view of the entire spine which captures the curvature of the backbone; the second, an overhead view of the second vertebra with an inscription identifying the transverse process; and finally, a frontal view of the sacrum. It is the suggestion of three-dimensionality that affords greater accuracy as well as a proposition of objectivity to the image, with a new way of confronting the transcription of three-dimensional information onto a two-dimensional plane.[65]

One possible source that the illustrator was looking towards was the architectural treatise.[66] Vitruvian architecture and its Renaissance derivatives placed heavy emphasis on the relationship between architecture and the body, so it is not implausible that there would be formal similarities in their representation. Concerns with structures, both macro and micro, as well as the interrelated functioning of systems, be it structural or physiological, could have led to the borrowing of certain representational techniques. One image was not enough to convey all the visual information. Multiple woodcuts were needed to make the image effective from an informational standpoint. The image allows the reader to gain an appreciation of the construction of the form

63 Berengario da Carpi 1521: 526v: "in veris sphondylis exsiccatis in cimiteris."

64 Berengario da Carpi 1522: 62v.

65 For questions of the ontology and objectivity of the scientific image see: Daston 2015: 13–35; Daston and Galison 2007; Daston and Lubeck 2011: 47–80; Elkins 1995; Kemp 2010: 192–208.

66 Long 2011: 50–56.

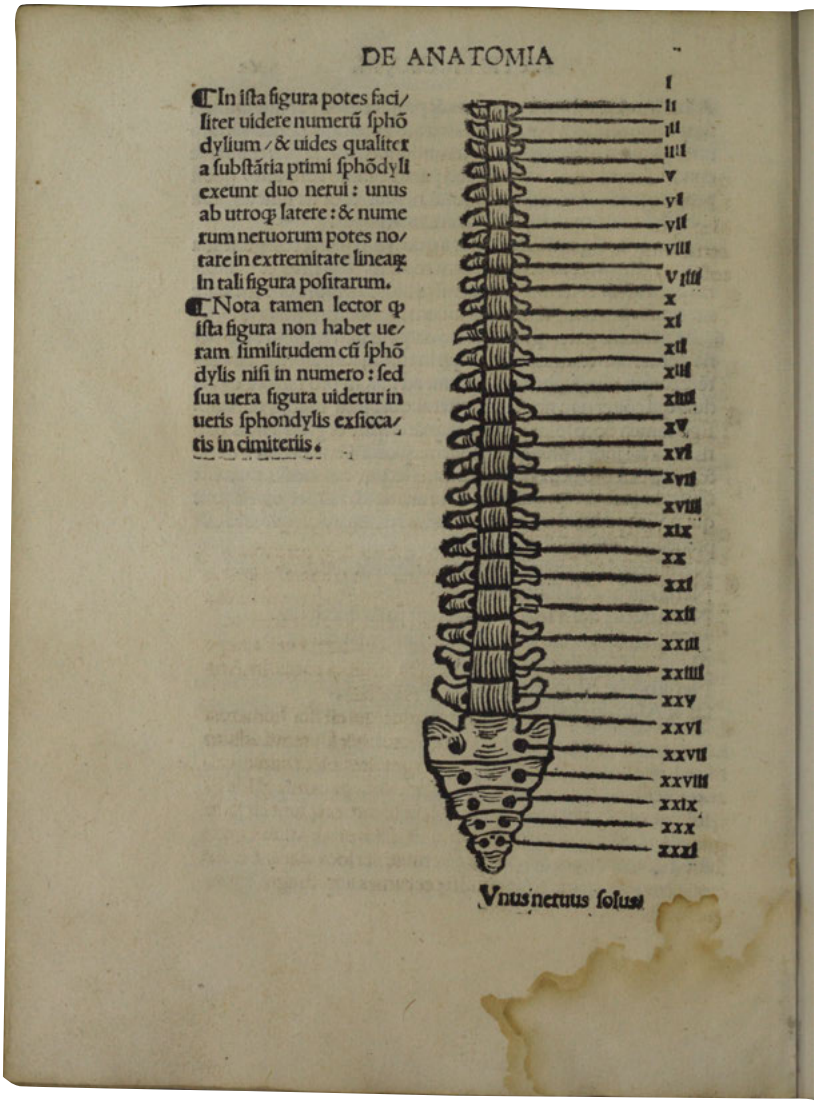

Figure 5: Spine. Jacopo Berengario da Carpi, *Isagogae breves perlucide in Anatomiam humani Corporis.* Bologna: Benedictus Hector, December 30, 1522, fol.62v.
Bologna, 1522.
Photo: Isagoge breves prelucide ac uberime in anatomiam humani corporis. A communi medicorum academia usitatam. *** / [Jacopo Berengarius da Carpi]. Wellcome Collection. Public Domain Mark
EPB/B/782
https://wellcomecollection.org/works/ujm5ynjj

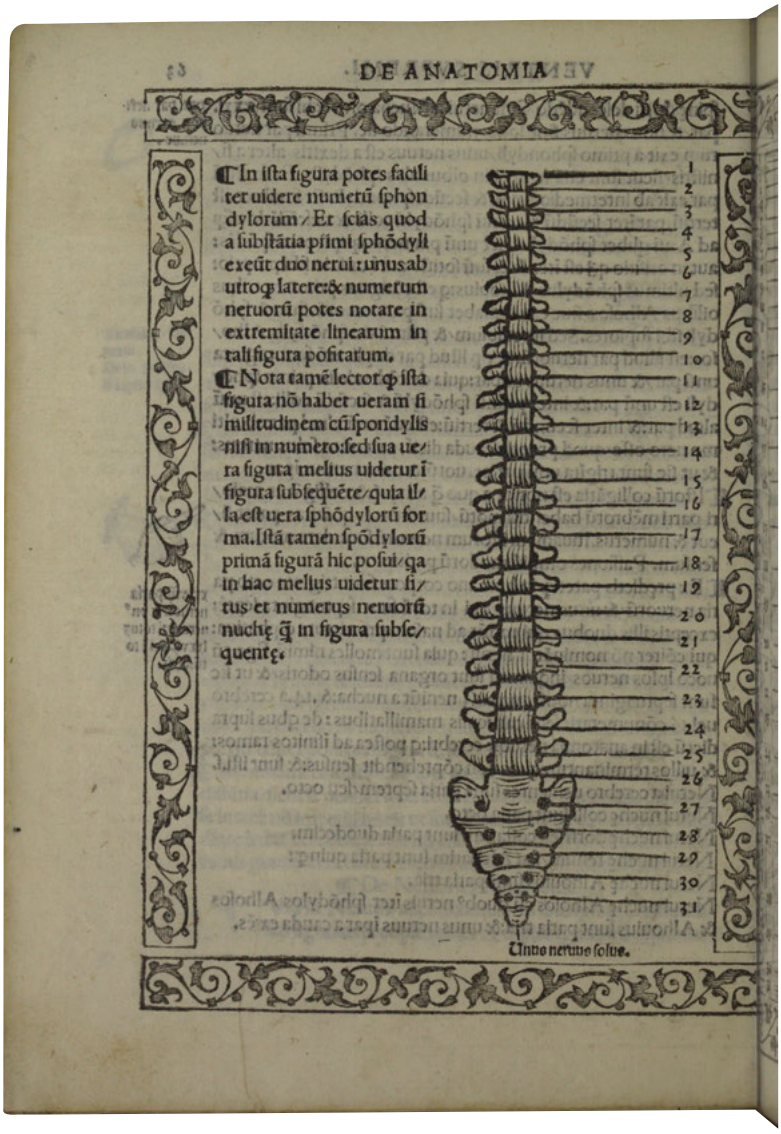

Figure 6: Spine. Jacopo Berengario da Carpi, *Isagogae breves perlucide in Anatomiam humani Corporis.* Bologna: Benedictus Hector, December 30, fol.63v.
Bologna, 1523.
Photo: Isagoge breves prelucide ac uberime in anatomiam humani corporis. A communi medicorum academia usitatam. *** / [Jacopo Berengarius da Carpi]. Wellcome Collection. Public Domain Mark
EPB / B 783/B
https://wellcomecollection.org/works/ujm5ynjj

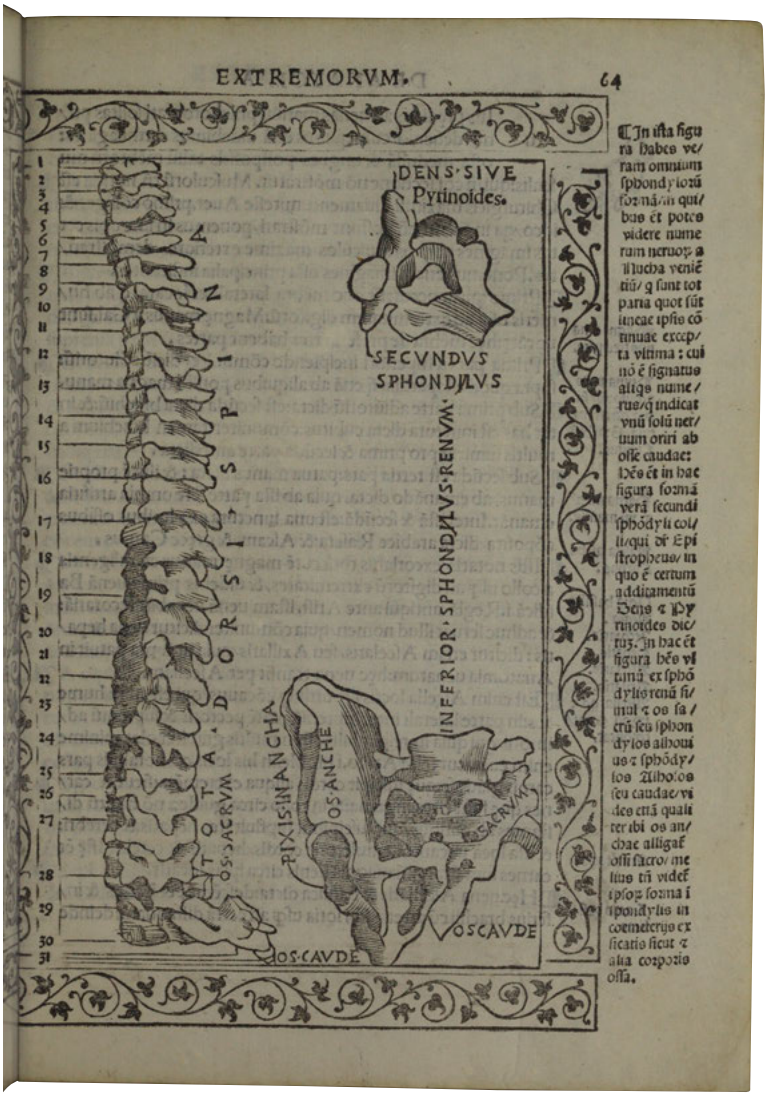

Figure 7: Profile of the spine, coccyx, sacrum, and second vertebra. Jacopo Berengario da Carpi, *Isagogae breves perlucide in Anatomiam humani Corporis.* Bologna: Benedictus Hector, December, fol.64r.
Bologna, 1523.
Photo: Isagoge breves prelucide ac uberime in anatomiam humani corporis. A communi medicorum academia usitatam. *** / [Jacopo Berengarius da Carpi]. Wellcome Collection. Public Domain Mark
EPB / B 783/B
https://wellcomecollection.org/works/ujm5ynjj

whether human or architectural and it becomes a study tool; however, because of the three-dimensional source it needs another image to complete it.

Despite these ameliorations, Berengario remained unsatisfied, keeping the note to the reader that sends them to the cemetery to study the original. Berengario makes it clear in this sustained advice that the image should never serve as a substation for the primary object of investigation as it is a mere "figura" the noun repeatedly employed in the caption. Even though images can help the reader they are but one didactic tool. The body is to be handled, poked, and prodded in order to gain the requisite skill and experience. Judgement and experience are gained from looking and touching the corpse, not images.

With the shift from the *Commentaria* to the manual and thereby the increased prominence of the image, it appears that the author and printer saw the need to make the images an integral part of the text. The new woodcuts reflect such changes in their very design and distillation of the human body as well as the overlay of word and image. The image, in capturing three-dimensionality, takes on a new epistemic valence. The changes suggest that there was a desire for an increased reliance on these images as conveyers of anatomical information in line with the text. The captions of the spine represent ongoing concerns not only in medicine, but also theories of art and religion at the time of the relationship between "*similitudinem*" – likeness and "*vera figura*" – true form.[67]

The Theologian

Another sphere of interest is how the body engages or not with the Christian body, in particular the perfect human form, the body of Christ. Included in the *Commentaria* is an image of the crucified Christ used to depict the abdominal muscles. The woodcut does not make an appearance in any of the subsequent editions printed in the 1520s. By looking at religious practice and theology new ways of approaching this image open up [Figure 8].

Late medieval Europe saw the rise of a particular literary genre called *ars moriendi*, handbooks containing instructions for the preparation of a good and Christian death which were widely diffused throughout urban centers. Around the same time, the benefits of confession and absolution came to be extended to criminals condemned to execution. This new concern was reflected by the foundation of confraternities in the early-fourteenth century devoted to ensuring a good death for the condemned. While in northern Europe these duties were administered by clerics, these confraternities of laymen were instead tasked with assisting with religious care from their initial conviction to the very moment they went to the scaffold.

67 See Belting 1994.

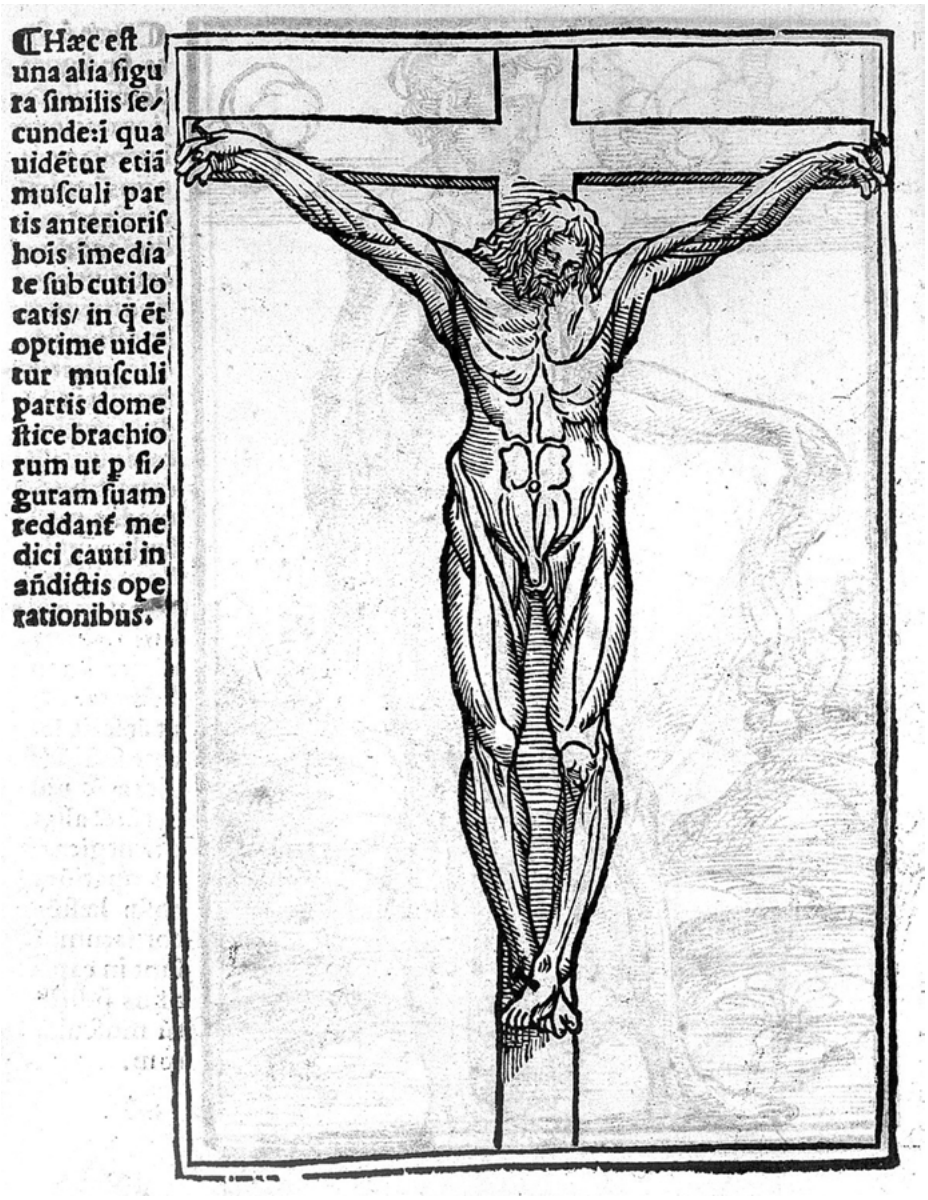

Figure 8: Crucifixion. Jacopo Berengario da Carpi, *Commentaria cum amplissimis additionibus super anatomia Mundini una cum textu eiusdem in pristinum et verum nitorem redacto.* Bologna: Hieronymus de Benedictis, 1521.
Photo: Biblioteca nazionale Centrale di Firenze, CFMAGL. 1.6.542

The Bolognese brotherhood that was committed to this task, the confraternity of *Santa Maria della Morte*, was among the most powerful in the city.[68] Confraternities were responsible both for the comforting of the condemned until the very moment of execution and for the dramatic staging of religious plays, predominantly the Passion and Resurrection of Christ. Audiences flocked to outdoor stages on religious feast days to see these dramatizations of the death of the Saviour and martyrdoms of saints. In these same spaces, audiences would gather to watch the rituals that accompanied a prisoner's final hours. The first "staged" drama of Christ and the saints would clearly have colored their reactions to the second "real-life" drama of the prisoner going to die with piety and dignity. It happened that a single layman could both perform in a Passion play and serve as a comforter at the prison or on the scaffold. This powerfully emphasizes interconnected spiritual realities: "brothers" and prisoners as "brothers penitent" were seeking an intimate union with Christ in his redemptive sufferings where "dramatic and penal forms interpenetrated each other."[69] Dedicated laymen were making strong efforts "to transform a brutal penal event, public execution, into a ritualized and very "real" re-enactment of the death of Christ or one of the martyrs, such as John the Baptist."[70]

The *Comforters' Manual, Santa Maria della Morte's* fifteenth-century "handbook," explicitly told the comforter to incite the condemned to view himself and behave like a martyr. The comforters, besides songs and prayers, presented those about to be executed with a *tavoletta*, a little tablet decorated with images of the instruments of the Passion, the Crucifixion, and/ or a martyrdom. The comforter had to keep these boards as close to the face of the condemned as possible in order to keep his attention fixed on the image while he was on public display, focusing his mind on the virtuous and paradigmatic examples of Christ and the martyrs amidst the jeering and leering of the masses just prior to execution.[71] The image of the crucifix, too, was presented to criminals executed by hanging, and so it may well be the case that Berengario's crucified Christ audaciously alluded to one of these *tavolette* as part of a grouping with the other images that gesture towards the provenance of the dissected bodies.

This idea of sanctity and martyrdom is also conveyed by Berengario's famous flayed man with the radial ornaments, as if the condemned individual, before having been executed and dissected, had obtained the illumination of the spiritual light of redemption after having experienced a revelation. The image also shows something like a tear that runs down his cheek, as if he was sacrificing himself like a martyr for the knowledge of the human body [Figure. 9].

68 On the history of the brotherhoods of lay comforters in medieval and Renaissance Italy see: Edgerton 1985; Fanti 2001; Prosperi 2013.

69 Falvey 2008: 13.

70 Falvey 2008: 13–14.

71 Falvey 2008: 16–17; Fanti 2001: 171–73.

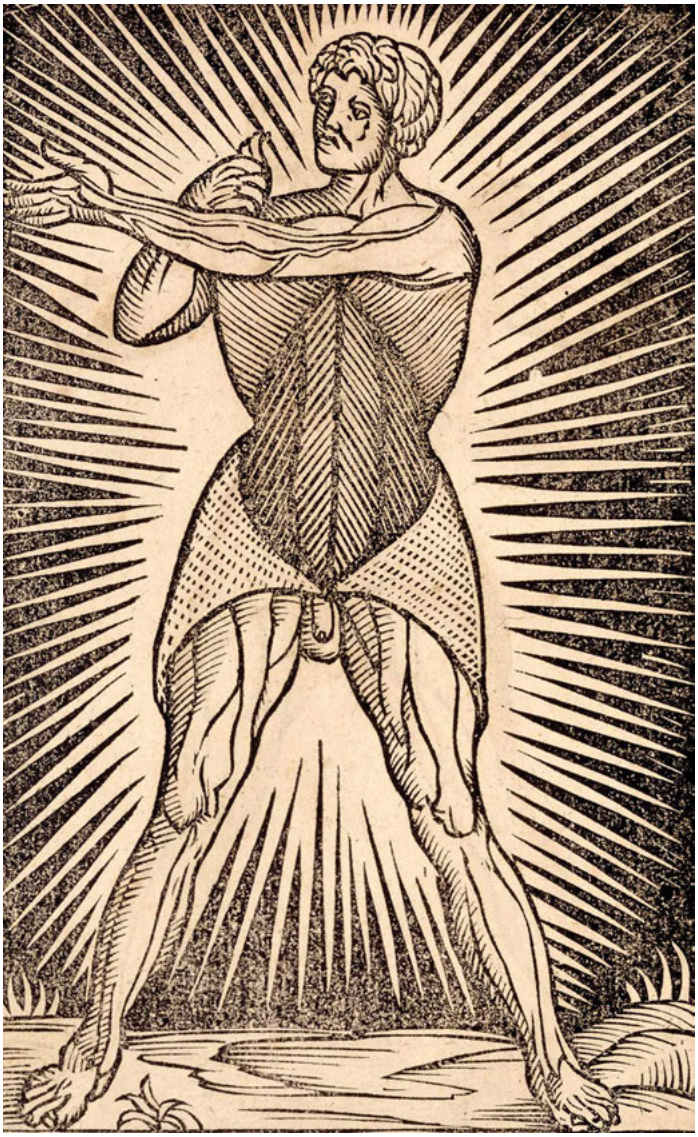

Figure 9: Muscles of the abdomen with rays. Jacopo Berengario da Carpi, *Isagogae breves perlucide in Anatomiam humani Corporis.* Bologna: Benedictus Hector, December 30, fol.6v. Bologna, 1523.
Photo: Isagoge breves prelucide ac uberime in anatomiam humani corporis. A communi medicorum academia usitatam. *** / [Jacopo Berengarius da Carpi]. Wellcome Collection. Public Domain Mark
EPB / B 783/B
https://wellcomecollection.org/works/ujm5ynjj

Besides cultural resonances with religious ritual, understanding the nature of and theological debates surrounding the body of Christ might be pertinent to making sense of the crucifixion woodcut. In the section of the *Commentaria* that discusses the heart, Berengario inserted a long discussion on the possible causes of the death of Christ, starting from the Gospel of John, which reported that his heart, when pierced with a sword by a Roman soldier, flowed both blood and water (John 19:32–34). Berengario asked whether this flow of blood and water was natural or supernatural. He finally concluded that this event was miraculous, but he reported that others in the past had made the argument that there was enough water in the veins and in the heart to explain the phenomenon by way of natural causes. Berengario argued against this by claiming that the amount of water could not have been enough to generate a strong flow, and that it would have been impossible for water to spring from the veins separately from blood.[72]

The miracle, therefore, was accounted for by two phenomena: the enormous amount of water in Christ's body, and the fact that blood and water remained separated from each other. In this, Berengario followed fourteenth-century French theologian Nicholas of Lyra's *Postillae litterales* (composed in the 1330s and printed in 1471–72), which insisted on the fact that Christ's body was composed of the Galenic four humors and was therefore completely human.[73] In this way, Berengario proved that observation, and anatomical and surgical experience confirmed the miracle of Christ's body, thus proposing an alliance between anatomical inspection and the verification of miracles which had a long history that was ultimately destined to become epistemologically and institutionally very well established in the early modern period.[74]

Conclusion

As we have seen the dissection manual was a form that was still being experimented with. The place of the image was not yet codified, but images were seen as something with the potential both as a didactic tool and as capable to engage with larger cultural understandings of the body. Berengario and his collaborators brought together an array of visualization strategies borrowed from religious, classical, and technial imagery to find agreeable formal solutions to the representation of the human body. The changes in illustrative strategy present a fascinating pre-Vesalian case study of

72 Berengario da Carpi 1521: 336v. We wish to thank Katharine Park for directing our attention to this passage.

73 Berengario da Carpi 1521: 337r–v. Berengario likely consulted the 1519 Venetian edition of Nicholas of Lyra.

74 Park 1993.

how printed images were indicative of approaches to medical education and a shifting understanding of the body brought about by the greater frequency of dissection.

Looking at Berengario within the larger narrative of the history of medicine, the surgeon formed part of a group of lower-status surgeons who played a significant role in the renewal of anatomy. These men had to present anatomy as a science in the service of the living and with a significant natural philosophical import. This in turn meant that they had to link their science of the human body both to the authorities and to new observational and tactile practices. This is especially true in the case of Berengario, who despite his earlier training with his barber-surgeon father felt the need to receive a university education and a degree. Moreover, Berengario was a man of his times in that he navigated the complex and intricate relationship between medical and religious practice surrounding one of the focal points of Western Christianity: the rituals accompanying the dead in the afterlife.

Berengario was just one of many who were working towards reforming medical education and practice, but the long afterlife of his works and their reception from Italy to England, France, the Low Countries, and beyond are a testament to how his particular approach contributed strongly to a wider anatomical Renaissance.