

Surgical Education in the Middle Ages

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SUMMARY

1.—Surgery becomes text-based. 2.—Inserting surgery into medical faculties, c. 1300. 3.—The second-class status of academic surgery in the later Middle Ages. 4.—Techniques of university surgical instruction.

ABSTRACT

The new surgical texts of the thirteenth century suggest that their authors wished their subject to appear as a learned discipline, yet it was still communicated by individual practitioners privately to one or two disciples, not in a university setting. But by 1300, surgery was beginning to be taught formally as part of medicine in many Italian *studia*, for example, by Dino del Garbo at Siena, though Henri de Mondeville's programme to accomplish the same at Paris (1306-16) was unsuccessful. Surgery continued to be taught in Italian schools in the fourteenth and fifteenth centuries, though it was of much lower status than medicine, as is revealed at Bologna and Padua; during the same period, surgeons in Paris eventually achieved a limited association with the faculty of medicine there. Dissections and models were perhaps used in university teaching of surgery, which nevertheless appears to have been primarily text-based.

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In a famous passage from the historical overview of medieval surgery with which Guy de Chauliac (d. 1368) introduced his *Introductorium* or *Chirurgia Magna*, Guy described its development as—implicitly—one that in the past two hundred years had moved out of the darkness of empiricism into the illumination of scholarly learning.

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«[Before Avicenna] everyone was both physician and surgeon, but afterwards, whether because of greed or because of too much to do, surgery was set apart and given into the hands of mechanics. The first of these were Ruggiero, Rolando, and the Four Masters, who wrote separate works of surgery into which they put much of an empirical character... Afterwards came Bruno, who correctly adopted the teachings of Galen and Avicenna and the techniques of Albucasis, though he did not have a complete translation of Galen's books and left out anatomy almost entirely. Immediately after him came Teodorico, who wrote his book by stealing everything that Bruno said and adding a few tales from his master Ugo da Lucca. Guglielmo da Saliceto was a notable figure, and wrote two texts, one in medicine and one of surgery, and in my judgement he wrote well about what he treated. Lanfranco also wrote a book in which he put very little besides the things he found in Guglielmo, though he reordered them... At Paris, Henri de Mondeville began a treatise in which he tried to harmonize Teodorico and Lanfranco, but it was left incomplete at his death.» (1).

As though to reinforce this view of irregular but steady progress towards a structured scientific surgery, Guy's portrait of the ideal medieval surgeon begins by insisting on his learning:

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- (1) «Et usque ad eum inveniuntur omnes fuisse phisici et cyurgici, sed post, vel propter lasciviam vel occupationem curarum nimiam, separata fuit cyurgia et dimissa in manibus mechanicorum. Quorum primus fuit Rogerius, Rolandus, atque quatuor magistri, qui libros separatos de cyurgia ediderunt et multa emperica in eis immiscuerunt ... Subsequenter invenitur Brunus, qui satis discrete dicta Galieni et Avicenne et operacionem Albucasis assumavit; translacionem tamen librorum Galieni totam non habuit et anathomiam penitus dimisit. Post ipsum inmediate venit Thedericus, qui rapiendo omnia que dixit Brunus cum quibusdam fabulis Hugonis de Luca magistri sui librum edidit. Guillelmus de Saliceto valens homo fuit, et in phisica et in cyurgia duas summas composuit, et iudicio meo quantum ad illa que tractavit satis bene dixit. Lanfrancus eciam librum scripsit, in quo non multa posuit nisi que a Guillelmo recepit, in alio tamen ordine mutavit... Hinricus de Hermondavilla Parisius tractatum per notabilia incepit in quo nitebatur de Theoderico et Lanfranco facere matrimonium; ipsum tamen tractatum morte preventus non complevit». GUIGONIS DE CAULHIACO. *Inventarium sive Chirurgia Magna*, Leiden, Brill, 1997, vol. 1, pp. 6-7 and ix-x (for the English translation) [ed. Michael R. McVaugh].

«As regards theory he has to understand the *res naturales*, *res non naturales*, and *res contra naturam*. First he has to understand the *res naturales*, especially anatomy, without which nothing can be done in surgery... Let him understand complexional doctrine too, because medicines must be adapted to the different bodily natures... and the same is true of the faculties. He also has to understand the *res non naturales*, air and food and drink and the like, since these are the causes of all health and illness. He must also understand the *res contra naturam*, especially disease, because the program of treatment is derived directly from this, and let him not be ignorant of cause, because if he cures without understanding it the reward should be not his but fortune's. And let him not overlook symptoms, for they sometimes are more important than the cause itself and overturn the whole course of treatment... In practice he must know how to regulate diet and drugs, because without them surgery, medicine's third tool, cannot be brought to perfection» (2).

Such a history and such a portrait would seem to imply that Guy thought that by his day the ideal surgeon should be expected to have been university-trained, not just in the principles of surgery but in medicine and even the liberal arts as well; Guy himself had studied at Bologna and at Montpellier and could afford comfortably to insist on an academic standard for the subject. But how perceptive his history was, how widely his portrait and standard were accepted by the later

(2) «Requiritur ergo primo quod cyurgicus sit litteratus, non tantum in principiis cyurgie sed eciam phisice, tam in theorica quam practica. In theorica oportet quod ipse cognoscat res naturales et non naturales et contra naturam. Primo enim oportet quod ipse cognoscat res naturales, precipue anathomiam, nam sine ipsa factum est nichil in cyurgia... Cognoscat eciam complexionem, nam secundum diversitatem nature corporum oportet et diversificare medicamina. Illud idem probatur de virtute... Res eciam non naturales, ut sunt aer et cibus et potus et cetera, oportet quod cognoscat, nam iste sunt cause tocius egritudinis et sanitatis. Oportet eciam quod cognoscat res contra naturam, morbum insuper, nam ab ipso proprie sumitur intencio curativa. Causam nullo modo ignoret, nam si sine cognitione ipsius curaret, non esset eius muneris sed fortune. Accidencia non pretermittat, nam ipsa aliquociens suam causam superant et totam curam prevaricant et pervertunt... In practica oportet quod sciat dietare et farmacare, nam sine istis non perficitur cyurgia, que est tercium instrumentum medicine . . .». GUIGONIS DE CAULHIACO, note 1, pp. 9 and x-xi.

fourteenth century, and indeed whether they imply what they seem to, are questions not entirely easy to decide, as this synthetic review of some of the existing scholarship on medieval surgical education is intended to demonstrate.

1. *SURGERY BECOMES TEXT-BASED*

The modern historian of medieval surgery is likely to follow Guy's lead and to begin his account with Ruggiero (Frugardi, c. 1170) and Rolando (of Parma, c. 1230) because they are the earliest identifiable figures in a remarkable new tradition of surgical writing—of whom Guy de Chauliac was, in a sense, the last. Over two hundred years, these writers produced a series of increasingly comprehensive, increasingly learned, increasingly sophisticated surgical encyclopaedias. Ruggiero and Rolando launched this tradition in Italy at the moment when education was undergoing an explosive transformation, when municipal and cathedral schools were beginning to mutate into institutionally autonomous corporations. They were undoubtedly enviously aware that medicine was losing its older craft associations and was becoming accepted as *physica*, a learned text-based discipline taught in the schools, and that physicians were gaining esteem and status as a result of their association with academic learning. Their writings should probably be seen as an attempt to give surgery its own texts, to raise it from craft status and to try to gain for it something of the prestige of medicine, for these earliest expressions of the emerging surgical tradition are cast in the manner of academic productions: Rolando's text is in effect a commentary on Ruggiero's. A generation or so later the so-called «Four Masters» published in turn a commentary (significantly titled a «gloss», again in imitation of academic productions) on Rolando.

As best we can tell, however, there is no evidence that any of these works were expressions of oral teaching, that they proceed from a classroom context. Surgical instruction was not part of thirteenth-century academic medicine. Surgery was still taught as it traditionally had been, privately, in an association between a practitioner and his occasional disciples or apprentices in which ultimately the apprentice could hope not only to acquire his master's skills but also to inherit something of

his reputation, as well perhaps as his instruments and books. Family traditions of practice were thus often strong, as a master trained his son or sons to the same craft. A famous case in point is that of Ugo da Lucca, who was hired by Bologna as municipal surgeon in 1214, accompanied the city's crusading troops to the siege of Damietta in 1219-1220, and continued to practice in Bologna after his return until his death in the 1250s. Ugo brought up three of his sons to be surgeons, and a fourth, Teodorico, who entered the Dominican order, had as a boy received enough exposure to the craft from his father that he continued to practice as a religious: he treated patients at the courts of Pope Innocent IV and Pope Martin IV, even after becoming bishop of Cervia in 1266 (though he resided mostly in Bologna). Teodorico is another in this remarkable series of surgical authors, and his *Chirurgia* (composed in several recensions between 1243 and 1266) was intended in part to explain his father's methods to a friend and patron, even though Ugo had sworn his students to secrecy. The abandonment of secrecy is a further sign that some surgeons in the mid-thirteenth century wanted to change their subject from a traditional craft to something approaching a learned discipline.

What helped give this new understanding of the character of surgery some plausibility was surgeons' growing recognition that they had inherited their own authoritative texts from the Greeks and Arabs. Galen and Avicenna, the two most important authorities for thirteenth-century medical faculties, had also written on surgery, though the surgical material was imbedded in more general works. Books 3-6 of Galen's *De ingenio sanitatis* (the *Methodus medendi*) were essentially surgical in their subject-matter; so were fen 3-5 of book 4 of Avicenna's *Canon*. Both these sections came eventually to circulate independently of the larger works, as the so-called *Chirurgias* of one author or the other. Surgeons had other textual authorities of which to boast, notably the seventh book of Rasis' *Almansor* and, above all, the great surgical collection of Albucasis, which we now know to have been based on the work of Paul of Aegina. If they chose to, they could now find passages to quote from those authorities with which to justify their preferred methods of practice. The first recension of Teodorico's *Surgery* showed how Ugo's techniques fitted in with Galen's teaching; the second made more use of the *Canon* and showed that Avicenna was consistent with those techniques as well.

Such intellectual resources made it easier for ambitious surgeons to reshape the traditional orientation of their subject. Guglielmo da Saliceto drew up the final version of his *Chirurgia* while practising in Bologna (1272-75). Teodorico's book had been written for an individual patron; Guglielmo's was written for his colleagues, and marks the next stage in the transformation of surgical training from private—oral and personal—instruction to public, almost collective, teaching, where written texts could complement the practical experience that individual masters needed still to provide to their students. Like Teodorico, Guglielmo was strongly attracted by what texts could offer his craft: the authoritative knowledge of authors such as Galen, Avicenna, and Albucasis, for one thing, but also the possibility of structuring and ordering that knowledge into the kind of teachable *doctrina* characteristic of other kinds of more prestigious schools—of arts, medicine, and law. In a variety of ways, Guglielmo made explicit his conviction that surgery was, like them, «a *scientia specialis* requiring intellectual as well as manual skill», and he brought a new element into the medieval surgical textbook, a particular emphasis on anatomy per se. His is the first textbook that devotes a separate chapter to anatomy, indeed insists on the necessity of a prior mastery of anatomy for anyone who wishes to become a surgeon, and this was of course one more way in which the disciplinary autonomy and intellectual merit of surgery could be justified (3).

2. INSERTING SURGERY INTO MEDICAL FACULTIES, C. 1300

Late-thirteenth-century Bologna must have been in every respect an unusually suitable place for introducing surgery into the *studium*. Ugo,

(3) SIRAISSI, Nancy G. *Taddeo Alderotti and his Pupils: Two Generations of Italian Medical Learning*. Princeton, NJ, Princeton University Press, 1981, p. 17. For a detailed analysis of Guglielmo's understanding of the character of surgery, see AGRIMI, Jole; CRISCIANI, Chiara. The science and practice of medicine in the thirteenth century according to Guglielmo da Saliceto, Italian surgeon. In: Luis García-Ballester *et al.* (eds.), *Practical Medicine from Salerno to the Black Death*, Cambridge, Cambridge University Press, 1994, pp. 60-87; and SIRAISSI, Nancy G. How to write a Latin book on surgery: organizing principles and authorial devices in Guglielmo da Saliceto and Dino del Garbo. In: *ibid.*, pp. 88-109.

Teodorico, and Guglielmo had given the subject local fame; the character of medical education at the *studium* was still in flux, for it is at this very period that the medical and arts masters of Bologna were joining to create a single faculty; and the leading medical figure in that faculty, Taddeo Alderotti (d. 1295), and his students were much interested in the anatomy so important to surgery. Indeed, the very changes taking place in the characterization of surgery meant that to some extent, at least, the distinction between the two fields was beginning to weaken: Guglielmo da Saliceto had practiced (and written on) surgery and medicine alike. The connexion between learned medicine and an academic place for surgery is suggested again by the fact that two other physicians who had studied with Taddeo—Guglielmo da Brescia and Dino del Garbo (d. 1327)—wrote not only medical but surgical works as well; Dino, whose father Bono had himself been a surgeon, seems actually to have taught surgery at Bologna early in his teaching career. Nevertheless, it should be pointed out that these developments by no means brought to an end the older tradition of teaching through apprenticeship. At the end of the thirteenth century (1294), Francesco, the son of Ugo da Lucca, was still offering private instruction to would-be surgeons in Bologna, teaching them in the same way that his father had taught him.

We have less evidence for the other Italian *studia* in the fourteenth century, but it is clear from their statutes late in the century that their medical faculties too provided for instruction in surgery, based again (at Ferrara, Pavia, Piacenza, and Turin) on the «Surgeries» of Galen and Avicenna. At Padua, where the information is a little fuller, we know that a professor of surgery was being paid by the commune as early as 1321 and perhaps before. It seems for the moment to have been a European phenomenon. Even the new *studium* at Lleida in north-eastern Spain, founded only in 1300, could boast a master responsible *pro lectura artis chirurgie*, and when he died in 1330 no less a person than the King of Aragon took an interest in the replacement candidate (4).

(4) McVAUGH, Michael; GARCÍA-BALLESTER, Luis. The Medical Faculty at Early Fourteenth-Century Lerida. *History of Universities*, 1989, 8, 2. I very much regret that through a typographical error in McVAUGH, Michael R. *Medicine before the Plague: Practitioners and their Patients in the Crown of Aragon, 1285-1345*, Cambridge,

Dino del Garbo wrote what is perhaps the first commentary on Avicenna's *Surgery*, although it is not a product of his classroom teaching, and it happens to illuminate very well something of the constraints that surgery had to contend with when it first tried to enter the academic world. He began it in the 1290s, when he was temporarily forced to abandon his studies at Bologna, inspired by his daily observation of his father's practice, and completed it about a decade later (1308), after he had finished his education and had begun to teach at Siena. The very choice of the Avicennan work (rather than, say, Albucasis) was significant, for the *Canon* was, beyond controversy, an authoritative medical text that could scarcely be caviled at. Dino may have intentionally blurred the line between medicine and surgery still further by choosing to comment primarily upon those portions of Avicenna's text that dealt with surgical conditions treated by the «medical» techniques of diet and medication (apostemes, wounds, bruises) and paying little or no attention to other portions that dealt with dislocations and fractures, conditions that, of course, compelled the surgeon to exercise *operatio manualis*. Dino was careful to argue that surgery was more than such a manual activity, that it qualified as a *scientia* in both a narrow and a broad sense; narrowly, in that it taught precisely how that manual activity was to be carried out, but broadly in that surgery should teach all the ways in which a condition could be treated before turning to *operatio manualis*. He stressed the superiority of the surgeon who was a *rationalis medicus* to someone who was a mere empiric, and appropriately took advantage of the scholastic *questio*-format to make his point. It is altogether probable, as Nancy Siraisi has pointed out, that «his authorial strategy... [was] inspired by a desire to emphasize that surgery had a legitimate place as a part of 'rational' medicine of the kind transmitted in a university setting» (5). Dino went on to a successful career at Bologna as well as Siena, as a teacher not just of surgery but of medicine as well, with a marked interest in medical theory and its relation to natural philosophy (6).

Cambridge University Press, 1993, pp. 114-5, this king is referred to as Jaume II (who had died in 1327); he should instead have been identified as Alfons IV.

(5) SIRAIISI (1994), note 3, p. 98.

(6) SIRAIISI (1994), note 3, p. 98. See also SIRAIISI (1981), note 3, pp. 55-64, and, for his views on surgery, pp. 109-110.

In the other great academic center of the medieval world, Paris, surgery was still apparently an utterly disorganized activity in the late thirteenth-century, so that the provost of Paris found it necessary to impose order and control upon the city's practitioners by singling out six of the most trustworthy and swearing them to examine the competence of the rest; there seems to have been no sense of collective identity before then (7). The Parisian faculty of medicine was certainly suspicious of these surgical practitioners, but not perhaps of surgery itself. Its regulations of 1271 limited the medical activity of surgeons to manual operations, but they did not forbid physicians from practising surgery (8). When a few years later Jean de Saint-Amand drew up a *Revocativum memorie* designed to assist Parisian students in mastering the complexities of a rapidly expanding medical literature, he prepared three-quarters of the work himself by digesting and organizing the works that he felt students should know, and appended to this the *Surgery* of Bruno Longobucco (a contemporary of Teodorico), full and unedited, calling it «ordinata et sufficiens» for the student (9). Saint-Amand's action makes it clear that some Parisian masters of the late thirteenth century felt a knowledge of surgery to be appropriate to their discipline, but it also suggests that they were not themselves entirely sure of how to integrate it with scholastic medicine.

(7) JACQUART, Danielle. *La médecine médiévale dans le cadre parisien*, Paris, Fayard, 1998, pp. 21-26.

(8) «Cyrurgicus se nullatenus intromittat nisi de manuali practica et ut ad ipsum pertinet». DENIFLE, Heinrich; CHATELAIN, Emile (eds.). *Chartularium Universitatis Parisiensis*, Paris, 1889, vol. 1, pp. 489-90. See also JACQUART, Danielle. *Le milieu médical en France du XIIe au XVe siècle*, Genève, Droz, 1981, p. 34; and JACQUART, note 7, p. 76. O'BOYLE, Cornelius. Surgical texts and social contexts: physicians and surgeons in Paris, c. 1270 to 1430. *In: García-Ballester et al.*, note 3, pp. 168-75, evokes the attitudes of the Parisian medical masters at this moment.

(9) JACQUART, note 7, pp. 76-77; and JACQUART, Danielle. L'oeuvre de Jean de Saint-Amand et les méthodes d'enseignement à la Faculté de Paris à la fin du XIIIe siècle. *In: Jacqueline Hamesse (ed.), Manuels, programmes de cours et techniques d'enseignement dans les universités médiévales*, Louvain-la-Neuve, Institut d'études médiévales de l'Université Catholique de Louvain, 1994, pp. 263-64, where the *Surgery* of Ruggiero Frugardi is referred to as the work in question.

Their interest in the possibilities of a learned surgery and their willingness to explore its place in the university is further indicated by the encouraging reaction that Lanfranc of Milan met with, a quarter-century later, when he came to Paris in exile from his Italian home (he had been a pupil of Guglielmo da Saliceto). In his *Cirurgia* of 1296, composed not long after his arrival, Lanfranc spoke enthusiastically of the French capital as a kind of paradise, and explained how the masters' welcome had led him to prepare that work as a compilation of his lectures on the subject within the academic setting at Paris:

«There, at the request of certain lords and masters and in particular the reverend lord master Jean de Passavant of the medical faculty (as well as of certain worthy bachelors deserving of every honor) that I draw together in writing those things that I had been teaching concerning the science of surgery (*ea que de rationibus cyrurgie legendo dicebam*), as well as my method of practice and my experiences, for the general advantage and as a future record, acceding to their petition, I have taken on the responsibility» (10).

Danielle Jacquart has concluded from this language that Lanfranc probably presented orally to the Parisian scholars no more than the theoretical framework in which the new Italian surgery had been imbedded, whereas his discussions of manual techniques and clinical experiences, less suitable for academic discourse, were reserved for his book (11). His *Surgery* continues the practice of his master Guglielmo of making a section on anatomy part of a general surgical text, but it is notable that Lanfranc began his *Surgery* with that section (Guglielmo had put it at

(10) «Ibique rogatus a quibusdam dominis et magistris, et specialiter a viro venerando domino magistro Ioanne de Passavanto magistrorum medicinae, necnon a quibusdam valentibus bachalariis omni dignis honore, quod ea quae de rationibus cyrurgiae legendo dicebam et meum operationis modum et experimenta quibus utebar in scriptis ad communem utilitatem et recordationem perpetuam compilarem, ipsorum petitionem admittens onus assumpsi». LANFRANC. *Practica... que dicitur ars completa totius chirurgiae*, in *Ars chirurgica Guidonis Cauliaci* (Venice, 1546), fol. 261rb. Elsewhere, Lanfranc refers in similar terms to the support of the faculty, saying that the work was written «propter preces praeceptaque venerabilium physicae magistrorum, propter fraternum amorem valentium medicinae scholarium mihi tam honorabilem facientium comitivam». *Ibid.*, fol. 207rb.

(11) JACQUART, note 7, p. 76.

the end); anatomy was a subject that surgeons were beginning to claim as their own peculiar science. It is notable too that Lanfranc added a special section on pharmacy to his exposition of surgical procedures, something that had hitherto been absent in surgical texts—surgeons and physicians, of course, found common ground in their need to understand the nature and activity of drugs.

At the turn of the fourteenth century, there were thus two ways in which surgical education might have gone on to develop at Paris; either as the system of essentially practical apprenticeship it had always been, independent of the university, or as linked to the exposition of surgical doctrine within the medical faculty, as was happening at contemporary Bologna. The latter possibility was vigorously championed by Henri de Mondeville, whose own education is unfortunately unclear; he was at any rate a master of medicine and had lectured on both medicine and surgery at Montpellier before beginning in 1306 to write his *Chirurgia* at Paris, where he was surgeon to the king but taught surgery and perhaps medicine as well. In this remarkable and wholly original work Mondeville tried to win over two groups: he had to convince the academic physicians of Paris that it would do their discipline no harm to introduce *operatio manualis* into medical training, and he had to convince empiric surgeons that their practice could only be truly successful if they first obtained a theoretical grounding in anatomy, physiology, and pathology. He seems to have hoped to enlist the support of King Philip IV in this program, and must have been disappointed when in 1311 the king provided for the regulation of surgery instead along lines that reinforced its traditional character as a manual craft communicated by personal apprenticeship. Parisian surgeons would continue to obtain a *licentia operandi* by satisfying a commission of sworn practitioners as to their expertise: the idea of academic training or even some element of scientific learning was not to be part of their qualifications. Paris would develop along different lines from Bologna and Padua.

3. *THE SECOND-CLASS STATUS OF ACADEMIC SURGERY IN THE LATER MIDDLE AGES*

In Italy surgery continued to be offered in *studia* either as part of the medical course or as a separate subject throughout the fourteenth

century, but there are reasons to think that it was considered to be inferior in status to physic or internal medicine. At Bologna, all members of the college of *physica* were understood to be competent in surgery, but those who chose to matriculate in surgery alone were not allowed to offer treatment that was strictly medical (12), and they were examined in another spot from those graduating in arts and medicine, *propter multa scandala evitanda* (13). According to the Bologna statutes of 1378, students in surgery were to be examined on two texts: a portion of Avicenna's surgery, followed by the first part of Bruno Longobucco's *Surgery* (composed in 1252, and an unusual example of a modern author serving as an academic authority) (14); in 1405, Avicenna's *Surgery* followed by the seventh book of Rasis' *Almansor* are also included in the curriculum, and they may also have been read thirty years earlier (15).

While we know of more than four dozen masters who taught surgery at Bologna in the fourteenth and fifteenth centuries, it seems that the more ambitious taught it for only one or two years in the midst of a career teaching the practice or theory of medicine—this, it will be remembered, had already been Dino del Garbo's career path in the early 1300s. Pietro d'Argellata (d. 1423) supplies a particularly telling example, because he is probably the most famous surgical writer of late-

(12) «Omnes et singuli doctores de collegio phisice facultatis... qui voluerint legere aut praticare in arte ciruxie, sint et esse intelligantur de matricula perfectorum cirugicorum, nullo alio examine vel scrutinio eis impenso, et valeant et possint legere et praticare in arte ciruxie hic et ubique locorum; huic autem addimus sanctioni, quod nullus qui in matricula cirugicorum tantum fuerit constitutus, audeat vel presumat infirmos curare in physica». MALAGOLA, Carlo (ed.). *Statuti delle Università e dei Collegi dello Studio Bolognese*, Bologna, Zanichelli, 1888, p. 444. The provision quoted is from the statutes of 1378; a similar provision is entered in the statutes of 1395 (p. 471).

(13) MALAGOLA, note 12, p. 470.

(14) MALAGOLA, note 12, pp. 442-443.

(15) MALAGOLA, note 12, pp. 247-248. Malagola also proposed (p. 284) that the «guilielmine» included in a list of *pecia*-works to be maintained by stationers (in 1405) referred to Guglielmo's *Surgery*, but it comes at the end of a list of medical works (Bruno and Rasis, required reading for surgical students, are not there), and the reference is more probably to Guglielmo's medical compendium, the *Summa conservationis*.

medieval Bologna (his commentary on portions of the fourth book of the *Canon* went into at least seven fifteenth- and sixteenth-century editions). He received a degree in arts and medicine from Bologna in 1391, taught logic there in 1392-3, astrology in 1395-6, and medicine from 1397 to 1406; he lectured on surgery in the 1410-11 academic year—as far as we know, for the first and only time—and then went back to teaching medicine, from 1411 to 1421 (16). On the other hand, Bologna did have masters like Guizzardo de Principibus, who seems never to have lectured in anything but surgery between 1395 and 1430 (17).

Argellata's commentary on Avicenna illustrates this asymmetric and evidently uneasy relationship between medicine and surgery at Bologna at the end of the Middle Ages. In form, the work was scarcely a commentary at all (unlike Dino's): the *Canon* simply offered him the vehicle to respond to student requests for a review of the treatments surgeons could use for the classes of conditions they dealt with—apostemes, wounds, ulcers, cosmetics, and dislocations and fractures. Nor was it in the line of the textbooks by Lanfranc or Chauliac, for it did not begin with an account of the science peculiar to surgery, anatomy; Argellata promised to conclude the work «quam brevius potero adiungens aliquid anothomie», but he seems to have forgotten even that minimal promise. Instead, this is a compilation of therapeutics. His discussion of each condition usually includes a brief account of its causes and signs, followed by a list of remedies culled from an enormous range of authorities. From the Galenic sources he appeals to (*Tegni, De regimine sanitatis, Ad Glauconem, De accidenti et morbo, De simplicibus medicina, De interioribus*), it is clear that he believed surgery had to be grounded in medical science, but it is clear too that he recognized a division between medical and surgical learning and that he believed in the superior competence of the physician (18). A surprising number of his sources are modern

(16) FORNI, Giuseppe Gherardo. *La chirurgia nello studio di Bologna dalle origini a tutto il secolo XIX*, Bologna, Cappelli, 1948, pp. 47-48.

(17) FORNI, note 16, p. 49.

(18) For example: «Multos canones alios possem ponere de flebotomia qui pertinent ad phisicos quos omnes dimisi ponens solum canones chirurgico pertinentes». *Cirurgia magistri Petri de largelata* (Venice, 1480), VI.1.2, f. (170) vb. Again: «Quia

medical writers—Bernard Gordon, Jean de St Amand, Arnau de Vilanova, Gerard de Solo, Bartolomeo and Guglielmo da Varignana—although surgical ones such as Teodorico and Lanfranc are certainly present. Where they are a possible option, he generally devotes more attention to setting out the possibilities of drug therapy and regimen than he does to describing manual procedures, and places them solidly within a Galenic frame of reference. We might bear in mind that the conservatism of medical treatment was more prudent for a would-be surgeon who hoped eventually to establish himself in a city, and in fact Argellata often encouraged his readers to leave *operatio manualis* to wandering empirics (19). In the light of this «commentary», the direction that his

hidropisis est morbus difficilis, ideo de ipso parum promittere debes in solo asclite operatio cirurgici habet locum quare alias species dominis phisicis dimitto». *Ibid.*, II.26.1, f. (73) ra. Or again: «De debilitate visus pauca loquar licet ad decorationem faciat quia domini phisici multa dixerunt ad quos pro istis recurre... Speculatio omnium istarum rerum pertinet ad altioem scienciam, ideo breviter transeo volens opus cyrurgicum solum pertransire et quia cura pertinet ad dominos phisicos leviter in his me expediam». *Ibid.*, V.7.5.4, f. (137) va-vb. Pesenti (below, note 22, p. 12) illustrates this point by partially quoting Argelata's statement that «De his omnibus Rai. de villa nova in uno suo libello mentionem fecit de rebus concedentibus et denegantibus flebotomiam; quia tamen istud est magis phisicum quam cirurgicum, ideo phisicis dimitto ponens solum illud quod cirurgicis convenit». *Ibid.*, VI.1.2, f. (171) ra. That in this particular passage Argelata is probably saying, not that flebotomy should be left to the physician, but that Arnau de Vilanova's treatise on it (*De consideracionibus operis medicine*) was addressed to the physician rather than the surgeon, does not invalidate the general point, in which I follow her.

- (19) On operating for scrofula, for example, Argelata comments: «Ego dico quod in hoc casu melius est paliare quam curare et infamiam incurrere ut faciunt emperici qui omnem egritudinem curare volunt». *Ibid.*, II.20.4; f. (69) ra. On operating for bladder stone, he lists the dangers of the operation and then says, «propter ista tria periti istam artem dimiserunt cursoribus». *Ibid.*, V.17.4; f. (157) rb. Or again: «Dico ego quod melius est dimittere aliquantulum egrum quam totaliter egrum, quod vidi semel. Ita una domina prope burgum Galerie cui supervenit empericus quidam et voluit ipsam curare et cum corruptorio voluit apostemationem remove—et finaliter eam interfecit». *Ibid.*, II.20.4; f. (69) rb. It is in keeping with these expressions of professional prudence that Argellata acknowledges many cases where he had failed to keep the patient from dying—unlike earlier surgical authors, who typically described cases in which they had succeeded where others

own academic career took, towards medicine and away from surgery, seems scarcely surprising.

The same sort of thing appears to have been true at the other Italian *studia*: they included the teaching of surgery, but they conceded it only a sort of second-class academic status. At Padua, indeed, there was a separate surgical course that led to a separate licence conferred by the college of doctors of medicine that allowed its recipient to practice surgery (but not medicine), and sometimes also to carry on the full range of academic acts in surgery—in this case the *ius ubique legendi* would presumably have given the graduate a teaching entree into any of the schools that offered a surgical course, Ferrara, Pavia, Pisa, Piacenza, and Turin, as well as Padua and Bologna (20). By the 1430s, the Paduan

had failed: SIRAISSI (1994), note 3, pp. 100-103. For example: «Vidi alium vulneratum in gula, cuius nomen erat Matheus, et breviter ferrum sagitte remansit fixum in spatula. Ego autem videns ferrum non posse haberi timui et non curavi de visitatione sui, et breviter stetit sic per aliquos dies et demum ad mortem devenit pauper homo». *Cirurgia magistri Petri de largelata*, note 18, III.1.7; f. (91) va. Perhaps Argellata here remembered a parallel case in which he agreed to operate on a prisoner who had an arrow in his throat after getting clearance from his friends and from the *podestà* to do so: «Ego videns istum pronosticatus fui de periculo, et dixi amicis suis ut facerent ipsum confiteri, et sic fecerunt; et licentiam volui habere a potestate, et sic eam dedit mihi. Ego incepti dilatare vulnus. Dicebat iste, dum vulnus dilatabam: magister, facias audacter nec timeas! Facta dilatione, cepi cum tenaculis astam sagitte et extraxit, et subito per vulnus et per os exivit magna quantitas sanguinis, et breviter—tu non dixisses unum pater noster—quod fuit mortuus». *Ibid.*, III.1.12; f. (95) va.

- (20) Typical of such products is Niccolò de Seravalle, who followed lectures in both medicine and surgery at Padua for four years, but in 1391 was given an examination in surgery alone (but by the entire college of doctors of arts and medicine!) and was declared «sufficientem et bene meritum in dicta scientia cyrurgie». GLORIA, Andrea (ed.). *Monumenti della Università di Padova (1318-1405)*, Padua, Tipografia del Seminario, 1888, vol. 2, p. 252, no. 1794. In 1442, the result of such an examination was the «licentiam ubique legendi, disputandi, catedrandi, glosandi et alios chirurgicales actus exercendi», or, for a less distinguished performance, the «licentiam medendi in chirurgia ubique locorum cum hac condicione, quod non possit... legere, catedrare, glossare, interpretare nec disputare». ZONTA, Caspare; BROTTTO, Johanne (eds.). *Acta graduum academicorum gymnasii Patavini ab anno MCCCCVI ad annum MCCCCCL*, Padova, Antenore, 1922, p. 329, no. 1602, and p. 325, no. 1573, respectively.

medical faculty had five lecturers in surgery among its sixteen members (21). But there were more masters than students there. Between 1405 and 1434, not a single student completed the surgical degree. Tiziana Pesenti has concluded that the full academic program had come to seem irrelevant to serious would-be surgeons: those who chose to enroll studied for only a few years, to acquire a basic medical foundation, and then left. They could expect a successful career in surgical practice even without the degree, which the medical faculty itself did not respect—academic physicians typically insisted on treating conditions such as hernia and bladder-stone medicinally before turning them over to surgeons. Padua had many such surgeons who believed that their craft gained from a grounding in medical science but who still stressed their skill at *operatio manualis* (22).

Padua's most famous late-medieval surgical teacher was certainly Leonardo Buffi di Bertapaglia (d. after 1448), who paradoxically exemplifies this dismissive attitude towards academic teachers of surgery and their practical skills (23). He was a student in medicine/surgery at Padua between 1400 and 1412, but he never took a degree, explaining, as he tells us, that «numquam voluit graduare propter excusare vituperium multorum doctorum ignorantium, nam potius voluit esse bonus scutifer quam malus miles». Instead, he left school to travel and practice surgery until he was called back to Padua in 1421 to teach his subject—called back not by the school, significantly, but by the Venetian government. Like Pietro d'Argellata, Bertapaglia is one of the few authors of a surviving commentary on Avicenna's surgical material, and, like Argellata's (which he quotes), his commentary is not so much an expose of the *Canon* per se as it is a collection of recipes and his own experiences bearing loosely on the subject-matter of fen 3 and 4 of book IV (his treatment of the fifth fen is markedly skimped); it concludes with a

(21) SIRAI, Nancy G. *Medieval and Early Renaissance Medicine*, Chicago, University of Chicago Press, 1990, p. 64.

(22) PESENTI, Tiziana. «Professores chirurgie», «medici ciroici» e «barbitonsores» a Padova nell'età di Leonardo Buffi da Bertapaglia († dopo il 1448). *Quaderni per la Storia dell'Università di Padova*, 1978, 11, 1-38.

(23) «Cum multi doctores atque periti decepti fuerant et maxime in vulneribus nervorum et fracturis capitis»; quoted by PESENTI, note 22, p. 2.

section on astrology that has nothing to do with Avicenna and that is not paralleled in Argellata (24). Bertapaglia's text and the many medical authorities he cites make it plain that for him too, at the end of the Middle Ages, surgery had still to be studied as a part of medicine broadly speaking; his often-expressed contempt for the academics who had taught him did not mean that he dismissed the learning for which they stood (25). One might perhaps say that Bertapaglia and Argellata understood the intellectual foundations of surgery in the same way, but acted upon them differently as they developed their careers here at the end of the Middle Ages.

In France, surgery had coalesced during the fourteenth century as a distinct occupation, a non-academic craft, one whose autonomy was recognized by a series of royal acts (26). French surgeons with academic training are difficult to identify in the later fourteenth century, except for Etienne Aldebaldi (1350), the author of a Provençal surgery who refers to his study of medicine at Montpellier, and a Lyon surgeon (1372) with medical training at Bologna (27). The medical faculty's attitude had evidently hardened and a decision made that surgical practice was inappropriate for a master of medicine. In 1408, shortly before Jean de Pise (identified as *chirurgicum manualiter operantem*) was about to accede to the mastership, the Faculty solemnly forbade him to practice surgery manually any longer, since «it would be *inhonestum* for a medical master to carry out manual activity, inasmuch as that has never been done at the University of Paris» (28) evidently the Faculty

(24) THORNDYKE, Lynn. *Science and Thought in the Fifteenth Century*, New York, Columbia University Press, 1929, p. 59.

(25) He told his son Fabrizio, who planned to be a surgeon, «Primum naturale fac quod tu sis instructus in principiis medicina, et hoc est loyica et philosophia, si possibile est, et per hoc cognosces principia rerum nature». Like his father, Fabrizio spent some time in medical studies in Padua but did not bother to take a degree before setting up practice as a surgeon there: see PESENTI, note 22, pp. 27-28.

(26) BULLOUGH, Vern L. *The Development of Medicine as a Profession*, New York, Hafner, 1966, p. 85.

(27) JACQUART, note 8, pp. 56-59.

(28) «Inhonestum fore magistrum in medicina manualiter operari, considerato quod hoc nunquam visum est in isto studio Parisiensi». WICKERSHEIMER, Ernest

did not choose to remember the days of Lanfranc and Mondeville. For their part, however, the surgeons' confraternity tried as far as possible to assume the trappings of learning by adopting the university titles of bachelor and master for their members and by insisting that new apprentices should be able to read and write Latin, perhaps in an attempt to emphasize their own superiority to empiric barbers (29), and early in the fifteenth century they managed to overcome the medical bias against *operatio manualis* and to gain a limited association with the faculty. After 1436 the Paris faculty conceded the status of *scolaris* to qualified surgeons who chose to enroll; and Jean Bruni of Avignon could be surgeon to the king yet *licencié* in medicine c. 1439 (30).

4. *TECHNIQUES OF UNIVERSITY SURGICAL INSTRUCTION*

There is unfortunately little concrete that can be said about the specific techniques that were used to teach surgery in the medieval schools. Above all, it is probably inevitable that we should wonder whether surgeons taught anatomy there in connexion with human dissection. The coincidences are striking: it is in the years around 1300 not only that surgery begins to be a teaching subject in the universities, but that anatomy becomes a distinctive feature of surgical textbooks, and that we have fragmentary evidence for autopsies (often by academic physicians) and—probably not coincidentally—the occasional practice of human dissection in medical faculties. The earliest direct testimonies to such dissections come from Bologna in the second decade of the fourteenth century, but they probably occurred still earlier (31). But none of these Italian testimonies link the new practice of dissection to the teaching of surgery rather than medicine—assuming that the distinction

(ed.). *Commentaires de la Faculté de Médecine de l'Université de Paris (1395-1516)*, Paris, Imprimerie nationale, 1915, p. 47. See also JACQUART, note 7, p. 87.

(29) O'BOYLE, note 8, p. 183.

(30) JACQUART, note 7, pp. 84-86; JACQUART, note 8, p. 58.

(31) A good overview of our knowledge of the earliest medieval dissections is provided by CARLINO, Andrea. *La fabbrica del corpo: Libri e dissezione nel Rinascimento*, Torino, Einaudi, 1994, pp. 198-219.

was of any importance—except that in the earliest instance, the public dissection described in the *Anatomia* (1316) of Taddeo Alderotti's famous student (of medicine), Mondino dei Liuzzi, certain anatomical passages incorporate discussions of surgical procedures carried out on those parts of the body (32). In France, Mondeville is known to have used, not dissections (of which he says nothing in his work), but teaching aids to fix anatomical structures in his students' minds. At Montpellier, at the request of scholars in the medical faculty, he had already written out an *Anatomia* «secundum quod ostensa fuit et prosecuta sensibiliter et publice coram ipsis» in 1304 (33). Two years later he revised this work and placed it at the beginning of his *Surgery*, and he accompanied it with «thirteen figures by which alone the entire anatomy and inquiry into the human body can be demonstrated» (34). Whether he employed drawings or paintings to illustrate his teaching, as well as his written work, we cannot say; but it is perhaps even more interesting that he *does* appear to have taught with the help of physical models. «Anyone who wants to demonstrate (*ostendere*) the anatomy of the head», he says,

«inside and out, perfectly and in detail (*sensibiliter*), should—if he cannot obtain a real human head—employ an artificial skull that can be opened, serrated to show the commissures, and separable into four parts so that after he has demonstrated its external anatomy he can open it and let the anatomy of the pannicles and brain be seen in detail. Such a skull ought to be furnished on the outside with things to represent the hair, the skin, the muscles, and the pericranium;

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- (32) For example, the text's account of the anatomy of the bladder passes naturally into a description of the operation for bladder stone, and its treatment of the anatomy of the eye includes an account of the operation for cataract. The text is conveniently accessible in WICKERSHEIMER, Ernest (ed.). *Anatomies de Mondino dei Luzzi et de Guido de Vigevano*, Paris, E. Droz, 1926, pp. 28-29, 46-47. Siraisi has concluded that it is uncertain whether such demonstrations were intended for medical or surgical instruction: SIRAIISI (1981), note 3, p. 111.
- (33) PAGEL, Julius Leopold (ed.). *Die Anatomie des Heinrich von Mondeville*, Berlin, Reimer, 1889, p. 16.
- (34) MacKINNEY, Loren C. The Beginnings of Western Scientific Anatomy: New Evidence and a Revision in Interpretation of Mondeville's role. *Medical History*, 1962, 6, 233-39.

inside it there should be something to represent in detail the form of the pannicles and the brain» (35).

Mondeville may well have been idiosyncratic in this practice as well as other things, but at least his remark shows that medieval surgical instruction could have a visual—«sensible», as he himself might have said—element.

Yet we would expect that such manual procedures could not have been common where surgery hoped to maintain its marginal foothold in the university. We should perhaps imagine that where surgery survived as an academic teaching subject it conformed to the normal teaching methods of the day, dependent upon the exposition of an authoritative text. «Bruno» was a set text at Bologna, and perhaps also at Ferrara (36), so that it would not be surprising to discover a commentary on the work, and in fact Susan Hall has identified traces of «a systematic exposition» of the text in MS Vat. Palat. 1314, including a formal *introductio* and a number of summary and analytical passages scattered through the margins, which she suggested might have derived from an even fuller exposition (37). On the other hand, the apparent contrast that we have remarked on between the commentary on Avicenna's

(35) «Quicumque vult anatomiam ostendere capitis intus et extra, sensibiliter et perfecte, si non posset habere verum caput humanum, ipse debet habere craneum artificiale, aperibile, serratum per commissuras, divisum in 4 partes, ut cum anatomiam extrinsecam ostenderit, illud aperire possit, ut sensibiliter anatomia panniculorum et cerebri videatur. Et debet dictum craneum exterius esse munitum aliquibus, quae capillorum et cutis et carnis lacertose et panniculi ossa ligantis vices gerant. Similiter debent interius aliqua esse ficta, quae sensibiliter formam panniculorum et cerebri repraesentant». PAGEL, Julius Leopold (ed.). *Die Chirurgie des Heinrich von Mondeville (Hermondaville)*, Berlin, Hirschwald, 1892 [*Chirurgia* I.2], p. 24.

(36) HALL, Susan P. *The 'Cirurgia magna' of Brunus Longoburgensis: A Critical Edition* [D. Phil. thesis, Oxford University, 1957], p. 61*, points out that the Ferrarese statutes are almost identical to the Bologna ones, except that the former read «pro prima lectione Cirurgiam Dini» rather than «pro prima lectione Cirurgiam Bruni», as at Bologna, and argues that Dino's commentary on Avicenna is a less likely subject for lecturing than Bruno, especially since Avicenna's work itself was also prescribed at Ferrara.

(37) HALL, note 36, p. 62*.

Surgery by Dino del Garbo, on the one hand, and those by Argellata and Bertapaglia, on the other, makes one wonder whether after all surgical instruction was in fact as consistently text-oriented as has just been assumed. Dino's, composed early in the fourteenth century, has a familiarly «scholastic» character, but the other two, written a hundred years later, have lost their focus on the language of the text. Is this change perhaps significant, reflecting a change in the nature and content of surgical classroom teaching in the later Middle Ages? These three commentaries have been printed but have never been studied with particular care, while other witnesses to late-medieval surgical teaching remain unpublished: the commentary on *De ingenio sanitatis* 3-6 (Galen's *Surgery*) by Bractinus de Pistorio and Rainerius de Burga in MS Paris, BN Lat. 6877; the commentary on Avicenna's *Surgery* by Ludovicus de Florentia in MS Vatican, Palat. Lat. 1131; the commentaries on both Avicenna's and Galen's works by Niccolò da Bologna in MS Munich, CLM 13054; the marginal gloss on Lanfranc in MS London, BL Add. 20616. There are enough such glosses and commentaries on surgical texts awaiting investigation to suggest that the themes and methods of medieval surgical education may one day become clearer than they now are.

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Against these developments, what are we to make of Guy de Chauliac, with whom we began, and of his manifesto for surgical learning that seems hardly less emphatic than Mondeville's? Guy's *Inventarium* was finished in 1363, at a time when an academic surgery can no longer have seemed as realistic a possibility in France as it had fifty years before. But the distinctiveness of Guy's career can help explain his endorsement of an apparently unpopular program. Mondeville was a Norman and a northerner, Guy was a southerner, trained perhaps at Toulouse and certainly at Montpellier, where he seems to have earned a medical degree, perhaps in the 1320s. He also studied anatomy at Bologna with Mondino dei Liuzzi's student, Niccolò Bertruccio (d. 1347), before practising in Paris and Lyon while holding a series of church offices, and finally becoming physician to the Avignonese popes for the twenty-five years before his death in 1368. Guy's position as a

cleric-physician was secure; he was not, like Mondeville, under professional pressure to fight for surgery's status. He could expound approvingly and defend the kind of academic surgery that he found in Mondeville's treatise, and that he had seen established in Bologna, without too much concern over whether it could be realized (38). In a number of ways, indeed, Guy's attitude can be seen as foreshadowing that of Argellata (who quotes from the *Inventarium* extensively). But his work kept alive the ideal, and because of its popularity the ideal has seemed to have more power than perhaps it did (39). And by a mildly ironic twist, the strong medical component in the *Inventarium* gave it appeal to the Parisian master Jacques Despars when in 1438 he was completing a commentary on the *Canon*; perhaps it was now important for the medical masters who were beginning to teach surgeons who hoped for the status of *scolaris* to know something about the subject-matter of their listeners (40). The gap between the two disciplines was not always as broad as we tend to imagine.

(38) In any case the cleavage between surgery and medicine seems to have been weaker in the south than in the north: JACQUART, note 8, p. 57.

(39) Guy's understanding of the position of surgery is summarized by O'BOYLE, note 8, pp. 176-78.

(40) JACQUART, note 7, pp. 92-98.