N. CARAME, *Avicennae metaphysices compendium*, Rome, 1926 (trad. latine de la métaphysique de la *Najât*.)

Henry CORBIN, *Risâla de Hayy b. Yaqzân*, texte arabe, version et commentaires en persan (attribués à Juzjânî), trad. française, notes et glose, t. II d'*Avicenne et le Récit visionnaire*, Téhéran, 1954.

A. M. GOICHON, *Introduction à Avicenne : son épître des Définitions*, éd. Desclée de Brouwer, Paris, 1933.

Max HORTEN, *Die Metaphysik Avicennas*, Halle, 1907 (trad. allemande de la métaphysique du *Shifâ'*).

A. F. MEHREN, paraphrases françaises et quelques traductions glosées des *Traités mystiques*, Leyde, 1889-99.

F. RAHMAN, *Avicenna's Psychology*, Oxford, 1952 (trad. anglaise de *Najât*, II, 6, avec introduction et notes).

Ajoutons que G. C. Anawati prépare une traduction française de la métaphysique du *Shifâ'* et de la *Risâla adhawiyya*.

3. Quelques ouvrages sur Avicenne : Outre les ouvrages cités dans les notes, on pourra se reporter aux travaux suivants (la liste est loin d'être exhaustive, les travaux consacrés à Avicenne ont été particulièrement abondants ces dernières années) :

Cruz HERNANDEZ, *La Metafisica de Avicenna*, Grenade, 1949.

Louis GARDET, « La connaissance mystique chez Ibn Sînâ et ses présupposés philosophiques » (texte français et résumé arabe par M. Ahmad F. AHWANÎ), *Mémorial Avicenne II*, Institut Français du Caire, 1952.

Étienne GILSON, « Avicenne et le point de départ de Duns Scot », ap. *Arch. d'Histoire doctr. et Litt. du Moyen Age*, éd. Vrin, Paris, 1927.

— « Les sources gréco-arabes de l'augustinisme avicennisant », ap. *Archives, id.*, 1929-30.

A. M. GOICHON, *La distinction de l'essence et de l'existence d'après Ibn Sînâ*, éd. Desclée de Brouwer, Paris, 1937.

— *Lexique de la langue philosophique d'Ibn Sînâ, id.*, 1938.

— *La philosophie d'Avicenne et son influence en Europe médiévale*, éd. A. Maisonneuve, Paris, 1944.

Louis MASSIGNON, « La philosophie orientale d'Ibn Sînâ, et son alphabet philosophique », *Mémorial Avicenne IV*, Institut Français du Caire, 1952.

Djémil SALIBA, *Etude sur la métaphysique d'Avicenne*, éd. PUF, Paris, 1926.

5

MEDICAL EDUCATION IN THE MIDDLE AGES

by

Loren C. MACKINNEY *.

I

IN Aristotle's *Politics* (III, 11) medical men were divided into three classes : (1) craftsmen, (2) master physicians, and (3) laymen who studied medicine as a part of their general education. These three categories also represent three types of medical education which prevailed during the Middle Ages, in part as a heritage from the ancient world : viz. (1) the education of simple craftsmen by practical experience ; (2) the education of the higher type of physician by formal instruction in theoretical medicine plus practical experience ; and (3) the study by cultured laymen of theoretical medicine along with the liberal arts.

During the pre-medieval centuries from Augustus to Constantine, most medical men in the Roman Empire seem to have belonged to the first category [1]. They were craftsmen of the manual-labor class ; sons of ordinary practitioners following the family tradition of healing ; or apprentices in a collective association ; or ambitious freedmen, perhaps Greeks, the medical " murderers ", whom Pliny the Elder hated so cordially [2] ; or the *valetudinarii* in military hospitals ; or even slave trainees on the medical staff of a villa infirmary. In any case, most practitioners were men of little or no *formal* education, trained almost entirely by experience. Such were the *centum discipuli* who accompanied the physician of the poet Martial [3] ; also the physicians of the second

* Article commandé par le Prof. G. WIET, Directeur du Vol. III.

1. For the reference to Aristotle and for other items on this period we are indebted to I. B. DRABKIN, " On Medical Education in Greece and Rome ", in *Bulletin of the History of Medicine*, XV (1944), 333-351. See also Theodore PUSCHMANN, *A History of Medical Education* (London, 1896).

2. PLINIUS SECUNDUS, *Naturalis Historia*, XXIX, 8. Edited by C. Mayhoff, 6 vol. (Leipzig, 1897-1906), IV, 373 ff.

3. MARTIALIS, *Epigrammata*, V, 9. Edited and translated by Walter Ker, 2 vol. (London, 1925-1927), I, 300.

century whom Galen considered illiterate or worse. To be sure, Galen's opinion was prejudiced by his ideal of the physician-philosopher [4]. A more objective attitude, more representative of public opinion is found in the advice of Archibios concerning the training of young surgeons in the first century. " Since life is short and the art long, as Hippocrates says ", Archibios thought that they should concentrate, " from the very beginning on the more necessary things ", such as types of dressings, use of sponges, etc. They should leave to scholars the " extraneous problems " such as " What is surgery ? " ; " Is it better than dietetics ? " etc. " These questions are not pressing [5]. "

Although our second category, " master physicians ", constituted a minority of the profession in the Roman Empire, their importance should not be underestimated. They were " Masters of the Art ", men trained in both theory and practice. Among them were the " Masters of the Craft ", heads of the associations of apprentices who received a modicum of instruction in medical theory with a maximum of practical experience. This type of education approximates in some measure that of modern medical schools, with their combination of book learning, observation and apprenticeship as internes. However, according to Galen, the most advanced medical school of his day, at Alexandria, provided only limited opportunities for observation and practice [6]. Most practical training came after formal schooling, in service as an assistant of a practicing physician.

Medical theory was taught, as in all ages, by lecture. Granted that students of the better sort were literate, education by reading was difficult. Manuscript books were so limited, and libraries so difficult of access that most book learning was transmitted by the professor's reading of a text and commenting thereon. This method of teaching became more necessary during the later centuries when the rising tide of internal disorder and barbarian invasion reduced available stores of books.

From the modern point of view Aristotle's third category, the layman's study of medicine, is interestingly unique. It is also the most important of the three so far as the Middle Ages is concerned. Troughout the centuries of Rome's greatness and decline, cultured laymen studied medicine as a non-professional subject connected with the liberal arts curriculum. This curious subordination of medicine to general education is reflected in the handbooks written and read by learned Romans. Late in the first century B.C., Varro included medicine among the nine liberal arts described in his *De Disciplinis* [7]. About a half-century later (30 A.D.), another writer, Celsus, included medicine in his survey of the principal fields of practical knowledge. Incidentally the *De Medicina*, the only surviving portion of his encyclopedic *Artes*, is by far the best handbook on the subject from Roman times [8]. A generation after Celsus, Pliny the Elder, presented a very different survey of medicine, in his unscientifically popular compilation entitled *Naturalis Historia*. His medical data, unlike Celsus's, were chiefly pharmaceutical and were scattered among the sections of the books concerned with herbs, trees, animals, and stones [9]. Pliny's mass of fact and fancy was used widely during the Middle Ages, often to the exclusion of better handbooks.

Apart from such factors, and minor variations in treatment, the compilations read by intelligent Romans presented medicine as one of the worthwhile general fields of knowledge. Roman educational institutions followed the same trend ; medicine was taught as a non-professional subject, closely integrated with, and often subordinated to, the liberal arts. Evidence thereof will be presented in our survey of late Roman medical education in Gaul. This combination may be taken as an indication both of the breadth of lay education, and of the superficiality of medical science. Obviously the medical data presented by Pliny would not tax the mental powers of an educated layman. On the other hand, Celsus' *De Medicina* indicates the thoroughness with which a layman could master the theoretical aspects of the Graeco-Roman system of medicine. Further evidence of this ideal is found in the writings of Athenaeus and Aulus Gellius. In the first century A.D., Athenaeus wrote that, " It is desireable for all men from the time of their youth to study medicine along with their other studies [10] ". A century later, Aulus Gellius thought that it was

> " shameful, not only for a physician, but for all cultivated and liberally educated men, not to know even such facts pertaining to the knowledge of our bodies as are not deep and recondite, but which nature for the purpose of maintaining our health has allowed to be evident and obvious. Therefore I devoted such spare time as I had to dipping into those books on the art of medicine which I thought were suited to instruct me [11]. "

Of our three categories of medical men, the laymen such as Aulus Gellius, Pliny and Celsus contribute the most important evidence concerning education. In numbers they were doubtless the least of the three, and probably they rendered the least medical service. On the other hand, they exerted the most lasting influence on the medical education of the Middle Ages. The idea that a liberally educated man

4. See especially the beginning of GALENUS, *De Libris Propriis*, in *Opera Omnia*, edited by G. Kühn, XIX, 9. Also see Lynn THORNDIKE's references to Galen's low opinion of Roman physicians, in *A History of Magic and Experimental Science*, 6 vol. (New York, 1923 ff.), I, 123 ff.

5. Excerpts taken from Drabkin's translation, *op. cit.*, p. 335.

6. GALENUS, *De Anatomicis Administrationibus*, I, 2, in *Opera Omnia*, ed. Kühn, II, 220.

7. The *De Disciplinis*, which is not extant ,treated of grammar, logic, rhetoric, geometry, arithmetic, astrology, music, medicine and architecture.

8. The *Artes* treated of rhetoric, philosophy, law, military science, agriculture and medicine. The *De Medicina*, edited by Fritz Marx, is in *Corpus Medicorum Latinorum* (Leipzig, 1915) ; also other editions.

9. PLINIUS SECUNDUS, *Naturalis Historia*, *passim*.

10. Excerpt taken from Drabkin's translation, *op. cit.*, p. 343.

11. *Noctes Atticae*, XVIII, 10, 1.8. Edited and translated by John Rolfe, 3 vol. (London, 1927-1928), III, 332 ff.

should know something about medicine became one of the basic principles of medieval clerical education.

There is neither a sudden nor complete break between Roman and medieval civilization, nor between Roman and medieval medical education. The fourth century, which began with Diocletian's revival of Roman imperialism and ended with Christianity triumphant, saw no changes sufficiently important to permit us to consider that era as the beginning of the Middle Ages. Medical education was not yet Christianized nor barbarized. This is most evident in the older and more completely Romanized provinces of the West, such as southern Gaul. Here medical practice and education continued their close association with the liberal arts. At Bordeaux medicine was an integral part of the curriculum of the famous school of which Ausonius (d. 397) was justly proud [12]. In verses dedicated to his fellow professors already deceased he made no distinction among " worthy teachers *(doctores)* whether it were history, or poetry, or eloquence... or medicine or Plato's system (of philosophy) [13]." Ausonius's Italian contemporary, Symmachus, specifically mentioned a " professor of medicine ", at Bordeaux, Dusarius by name, who rightly held high rank among *professores* of the Art [14]. At Bordeaux and elsewhere during the fourth century, teachers of the liberal arts, including medicine, were called either *professores* or *doctores* ; seldom was the medieval title *magistri* used.

At first glance certain passages from the section of the Theodosian Code *De Medicis et Professoribus* seem to contradict our inclusion of teachers of medicine with teachers of the liberal arts [15]. Laws granting privileges to professional men and their families mention physicians *(medici* and *archiatri)* as distinct from teachers *(doctores, magistri, preceptores* and *professores)* of the liberal arts *(litterarum studiorum, liberalium artium, liberalium litterarum)* [16]. Obviously the term *medici*

12. Among the secondary accounts concerning education in Gaul during this period, are the following, none of which contain details concerning the education of physicians. Theodore HAARHOFF, *Schools of Gaul : a Study of Pagan and Christian Education in the last Century of the Western Empire* (Oxford, 1920) ; Percival COLE, *Later Roman Education in Ausonius, Capella and the Theodosian Code* (New York, 1909), and *Histoire Littéraire de la France*, 38 vol. (Paris, 1865 ff.), II, 49 ff.

13. The passage is from the last of the *Commemoratio professorum Burdigalensium :* " Valete, doctores probi, historia si quos vel poeticus stilus forumve fecit nobiles, medicae vel artis dogma vel Platonicum dedit perennii gloriae ". *Ausonius, Opera.* Edited and translated by H. G. E. White, 2 vol. (London, 1919), I, 138.

14. In two letters, Symmachus recommended Dusarius as follows : " Dusarius medicinae professor... rerum suarum Aquitaniacam nonulla praemisit " ; " Dusarius clarissimus vir qui inter professores medendi summatem vire obtinet locum ". Symmachus, ep. IX, 43 ; III, 37 ; edited by O. Seeck, *Monumenta Germaniae Historica, Auctores Antiquissimi* (Berlin, 1877 ff.), VI, part 1, 82, 249.

15. *Theodosiani Libri XVI cum Constitutionibus Sirmondianis...* Edited by Theodore Mommsen and Paul Meyer, 2 vol. (Berlin, 1905). There is an excellent annotated translation by Clyde PHARR, *The Theodosian Code and Novels and the Sirmondian Constitutions* (Princeton, 1952).

16. Book XIII, section 3 of the Code is entitled " De Medicis et Professoribus ". It contains 19 decrees, the earliest dating from 321-4, the latest from 428. Most of them have to do with the exempting of *medici* or *archiatri*, and *professores*,

refers to physicians, and probably to professional medical practitioners ; certainly, not to teachers of medicine. *Archiatri* refers to the top physicians in the hierarchy of public medical service. Since medical theory was taught in the schools of rhetoric along with the liberal arts, it is our contention that teachers of medicine were included among the *professores, doctores, magistri* and *preceptores*. In the liberal arts schools of their day, Ausonius and Symmachus mentioned *professores medicinae* [17]. They must have been eligible for the privileges mentioned in the Code, and as *professores* rather than as *medici*.

From the available evidence concerning fourth-century Gaul we draw the following tentative picture of medical education in the West. Basic training in medical theory began in the liberal arts curriculum of the grammar schools, and was continued on a more intensive scale in the schools of rhetoric. Doubtless, practical medical experience came thereafter as a sort of apprenticeship under a private practitioner *(medicus)* or a public physician *(archiater)*. This aspect of medical education is reflected in the provision of the Theodosian Code, by Constantine in 333, to the effect that " physicians, grammarians and other professors of literature " were exempted from certain public duties " so that they may more easily train many persons in liberal studies and in the aforesaid arts (medicine and grammar ?) [18] ".

Two aspects of this educational system are noteworthy ; theoretical medicine was taught in the liberal arts curriculum, and advanced medical training, both theoretical and practical, was given informally without benefit of organized institutions such as schools of medicine. To be sure, in the Eastern Mediterranean Alexandria boasted a center for medical training that might justify the term school [19]. But there is no evidence of such institutions in the West. The *schola medicorum* mentioned on an inscription of this period from the Appian Way, seems to have been a reference to the *archiatri* of Rome acting as an official group for certain administrative purposes [20]. The Theodosian Code provided for

from certain public burdens. For example, decree no. 1 : " Medicos, grammaticos et professores alios litterarum immunes esse... " Decree no. 3, addressed " ad populum " confirms earlier exemptions in favor of " medicos et professores litterarum, uxores etiam et filios eorum... " and appends the explanation " ...quo facilius liberalibus studiis et memoratis artibus (i.e., medicine, etc.) multos instituant ". Decree no. 16 concerns " grammaticos, oratores, atque philosophiae praeceptores nec non etiam medicos ". No. 17 concerns " artium liberalium professoribus ac praecipue medicis ". Nos. 9 and 13 concern *archiatri*, with a reference to their functions in the selection of new members of their organization. No. 10 provides exemptions for " medicis et magistris urbis Romae " ; no. 14, for " archiatris sacri palatii, salutaris ac necessariae artis professoribus ".

17. See above, notes 13 and 14.

18. See above, note 16, for the text of the decree ; viz., no. 3.

19. Although Ammianus Marcellinus, commended Alexandria highly as a center for medical training ,he made no actual mention of a school : " ... sufficiat medico ad commendandam artis (medicinae) auctoritatem Alexandriae si se dixerit eruditum ". *Ammianus Marcellinus, Res Gestae*, XXII, 16. 18. Edited and translated by John Rolfe, 3 vol. (London and Cambridge, Mass., 1935-1939), II, 306.

20. *Corpus Inscriptionum Latinarum* (Berlin, 1862 ff.), VI, part 5, p. 80. See above, note 16, for decrees nos 9 and 13 of the Theodosian Code concerning the *archiatri* at Rome and their group organization. Decree no. 8 refers to a group

their meeting as a *consortium* to replace deceased *archiatri*. Nowhere is there evidence of any formalized educational activity on their part.

Of all centers in the West during the fourth century, Bordeaux would seem to be one of the most promising for a medical school. Here were eminent physicians, even a woman who antedates by centuries Salerno's legendary " Trotula ". Although Ausonius's Aunt Aemilia is more definitely authenticated by historical evidence than Trotula, she is not so famous. All that is known of Aemilia's medical career is Ausonius's verse to the effect that the woman-hating old maid was, " like a man, experienced in the arts of medicine [21] ". Only an uninhibited imagination could find in this quotation a fourth-century Trotula, attending a medical school at Bordeaux, establishing a gynecological clinic, lecturing on obstetrics, and writing concerning diseases of women. There is more detailed evidence concerning masculine physicians at Bordeaux, both writers and professors of medicine ; but no medical school [22]. Ausonius and his contemporaries mentioned chairs of grammar and of rhetoric, also *scholae* and groups of students of these subjects, but not of medicine.

As in Bordeaux, so also in Rome, and elsewhere in the West, there were teachers of medicine but the search for schools of medicine is fruitless [23]. Nor is Puschman's hypothesis concerning hospitals as important

of *archiatri* as a *consortio*. The *schola* mentioned in the inscription may have been a body of this sort. On the other hand, in the sixth century Cassiodorus mentioned *scholas magistrum* in a letter concerning physicians in Italy. See below, note 26.

21. *Ausonius, op. cit., Parent.* 6 ; vol. I, 66. The passage reads as follows : " ... more virum medicis artibus experiens ". Obvious this contributes nothing to our knowledge of the education of women physicians.

22. See above, notes 12-14, for Ausonius' and Symmachus' references to the school and professors at Bordeaux. Ausonius (*op. cit.*, I, 2, 42, 60) referred to his father's medical skill in the following terms : " studuit medicinae ", " non ultimus arte medendi " and " ratione medendi ". Even though Ausonius used the term *studuit*, he seems not to be referring to his father's medical education, but rather to his practice of medicine. Other physicians were ridiculed mercilessly ; *op. cit.*, II, 156-159, 202. Another of the physicians of Bordeaux was " Professor Dusarius " concerning whom Symmachus wrote (see above, note 14). The elder Ausonius and two other eminent medical men of Aquitania were cited by a contemporary, Marcellus Empiricus, himself a native of Bordeaux. In the introduction to his *De Medicamentis*, he paid tribute not only to medical writers of ancient times, but to " ... illustres honoribus viri, cives ac maiores nostri, Siburius, Eutropius atque Ausonius... " *Marcellus Empiricus, De Medicamentis*, preface. Edited by Maximilian Niederman, in *Corpus Medicorum Latinorum* (Berlin, 1916), V, 3.

23. In *The Life and Times of St. Ambrose* (Oxford, 1935 ; I, 19) ; F. H. DUDDEN makes the observation that " Ambrose appears to have known something of medicine, though he emphasizes the fact that he is only an amateur, and not a professional physician ". It seems obvious, from Ambrose's reference to himself as one of those who are *indocti* yet capable of understanding something of anatomy (*Hexaemeron*, VI, ch. 9, section 70 ; in *PL*, vol. 14, 286), that fourth-century Italy followed the normal western trend of educating learned gentlemen in medicine by way of the liberal arts, and not in medical schools. Nevertheless, Ambrose manifested a surprising grasp, for an amateur, of various aspects of medicine. Passages in his works (as cited by Dudden) adequately indicate this point. One passage is of interest in that it concerns the apprentices of professional physicians. To these men of empirical training was left the care of lower-class patients. Ambrose referred to them as *medicorum pueri* and *ministri*, with the conclusion : " Dives magistrum adhibeat, pauper ministrum ". *Enarratio in Psalmum* 36, Praef. 3

centers for medical training convincing [24]. Even in the East, where hospitals were more numerous during these early centuries, and also in the West throughout the Middle Ages, hospitals were hospices *(xenodochia)* dedicated to the care rather than the cure of the sick. In the West, active medical service in hospitals was conspicuous for its absence [25]. It is obvious that early *xenodochia* and *hospitia* were not teaching hospitals, and whatever medical training resulted was individual, informal, inorganized, and strictly practical.

All in all, medical education in the fourth century Roman Empire can be summarized in the three Aristotelian categories which were applied to classical medical education. (1) Practical training in the craft was by informal apprenticeship to practicing physicians. (2) Specialized training, both theoretical and practical, was obtained under professors of medicine in certain of the more advanced schools of rhetoric and/or

(*PL*, vol. 14, 1013). The training of medical apprentices is indicated more definitely in a letter of Symmachus to an Italian physician whose reputation for both morals and medicine *(morum et medicinae fama)* led Symmachus to send young men to him for medical instruction. The pertinent passages read as follows : " ... The fact that application is made to you as a preceptor *(praeceptor)* by those whom I have sent for instruction in the art of medicine will give you unusual proof of my judgement. Therefore repay me with a pledge of mutual good will and accept for instruction in medicine those whom I am committing to your faith and honor through the agency of Euscius ". The Latin text, *Ad Dionysium*, is as follows : " ... Dabit autem tibi iudicii mei non mediocre documentum quod his, quos eruditendos missimus arte medicinae, praeceptor adhiberis. Repende igitur mihi pignus mutuos voluntatis et suscipe in disciplinam medendi quos et fidei tuae et honestati Euscio tradente comittimus ". Symmachus, ep. IX, 4, edition by O. Seeck, *op. cit.*, VI, part 1. Our translation of the letter is adapted from John A. MCGEACHY, *Quintus Aurelius Symmachus and the Senatorial Aristocracy of the West* (Ph. D. thesis, Chicago, 1942), p. 161. It seems likely that Dionysius was a professional physician who trained those entrusted to him as apprentices. The fact that there were several of them and that he had the benefit of Euscius' agency, gives a faint suggestion of a group of students who might be called members of a school or guild. The locale may be southern Italy or Sicily, where Euscius is known to have travelled (SEECK, *op. cit.*, VI, part 1, p. CCII).

24. Theodore PUSCHMANN, *op. cit.*, p. 143 ff. To be sure, Puschmann stresses the practical nature of hospital training, but he gives the impression that they were teaching hospitals.

25. It is our contention that modern historians of medicine have perhaps inadvertently given their readers the inference that hospitals were centers of active medical practice, and therefore of training in medical practice. In the following works, the fundamentally non-medical function of early medieval hospices is stressed. Loren MACKINNEY, *Early Medieval Medicine with special reference to France and Chartres* (Baltimore, 1937), p. 74 ff. An unpublished thesis by E. H. GIBSON, *Hospices and Hospitals in France in the Middle Ages* (Chapel Hill, University of North Carolina, 1937) carries the theme throughout the Middle Ages. A very thorough and well documented survey of the subject is to be found in Karl SUDHOFF'S " Aus der Geschichte des Krankenhauswesens im früheren Mittelalter in Morgenland und Abendland ", *Sudhoffs Archiv für Geschichte der Medizin*, XXI (1929), 164-203. In both Sudhoff's and MacKinney's treatment of the subject (MACKINNEY, *op. cit.*, p. 74 ff), a distinction is made between hospitals (hospices) and monastic infirmaries (such as that at St. Gall in the ninth century) where there is evidence of specific medical treatment such as pharmacy, purging and bleeding. Sudhoff once expressed the opinion that purposeful treatment of disease in general hospitals began late in the Middle Ages with the attempts to cure syphilis. SUDHOFF, *Essays in the History of Medicine*, edited by Fielding Garrison, with various translators (New York, 1926), p. 255.

under *archiatri* in the still-existing system of state-supported medical services. (3) A smattering of basic medical theory was taught in the regular liberal arts curriculum. With minor changes and regional variations, the classical Roman methods of medical education continued throughout the West, though on a much lower level of intelligence.

II

Major changes came about during the fifth century. While Roman imperial government was disintegrating and falling into the hands of Germanic chieftains, medical education was coming under the influence, even domination, of Christianity. Christian clerics, usually monastically trained, eventually replaced the state-supported professors of medicine, the municipal physicians, and the *archiatri*. To be sure, the ancient system persisted, especially in Italy and Gaul. In Ostrogothic Italy, as late as the first quarter of the sixth century, Theodoric's secretary, Cassiodorus, was transmitting to the " Count of the *archiatri* " specific orders concerning the proper education and control of young physicians [26]. During the same century, according to Gregory of Tours' *Historia Francorum*, Frankish Gaul had *archiatri*, court physicians, specialists in ophthalmology, and practitioners of various types, including Jews [27]. One *archiater*, Reovalis of Poitiers, had been in Constantinople, where he learned how to perform operations on testicles [28]. Another Gallic *archiater* had received an official communication from Cassiodorus [29]. Such evidences led Dalton, the eminent authority on Gregory's *Historia*, to the conclusion that " the study and practice of medicine was the one province of Gallic knowledge which preserved a scientific character [30] ". This he attributed to the Roman " schools " of medicine which he believed had spread their influence into Gaul and Spain. Granting that Gaul had contacts with Italy and also Constantinople during this century, we are of the opinion that the roots of the continuing classical tradition go deeper ; back to the medical men of Ausonius' Bordeaux, or even earlier to Marseilles with its Greek heritage [31]. Nowhere, however, was there formal, specialized teaching of medicine.

26. *Viz.*, " ... Habeantur itaque medici pro incolumitate omnium et post scholas magistrum vacent libris delectentur antiquis ; nullus justius assidue legit quam qui de humana salute tractaverit... " CASSIODORUS, *Variae*, VI, 19 (*PL*, vol. 69, 700).

27. For numerous pertinent references in Gregory's works, see O. M. DALTON's translation of Gregory of Tours, *Historiae Francorum*, entitled *The History of the Franks by Gregory of Tours*, 2 vol. (Oxford, 1927), I (introductory volume), 415 ff ; also Samuel DILL, *Roman Society in Gaul in the Merovingian Age* (London, 1926), p. 261 f.

28. Reovalis said that he operated " sicut quondam apud urbem Constantinopolitanam medicos agere conspexeram ". Gregory of Tours, *Historiae Francorum*, X, 15 (*PL.*, vol. 71, 546). Reovalis, " archiater Pictaviensis ", is mentioned also in the *Vita Radegundis*, II, 14 (*MGH, Script. Meroving.*, II, 364 ff.).

29. CASSIODORUS, *Variae*, IV, 41 (*PL.*, vol. 69, 635).

30. *Op. cit.*, I, 415.

31. *Histoire Littéraire*, I, part 1, 208 ff., 250 f.

In general, medicine and medical education were becoming less classical and more clerical. By the end of the sixth century, the ancient system of public schools and municipal medical service had given way to church-controlled institutions. In the written records of the period lay physicians are condemned or ridiculed, in marked contrast to the praise lavished on faith healers and clerical practitioners. Apollinaris Sidonius (d. 489), a classical-trained gentleman of southern Gaul, wrote of the wearisome visits of physicians who were more likely to kill than cure their patients. To an ailing friend he quipped ; " Socrates (i.e., philosophy) is more agreeable than Hippocrates (i.e., medicine) [32] ". A century later, Gregory of Tours pictured Gallic physicians as either low-class, untrustworthy persons or as wealthy upstarts in a disreputable profession [33]. The low repute of the practices and practitioners of secular, classical medicine strengthened public reliance on clerical healers, not only on those whose methods were spiritual, but on those whose methods were scientific. At any rate, there were increasingly strong incentives for clergymen to study medicine.

From the sixth century onward, a smattering of medicine was included in the education of most clergymen, somewhat after the fashion of Roman gentlemen in Aulus Gellius's day. Obviously the quality of medical education was not the same in the two periods. The similarity lies in the fact that a Roman gentleman normally was a liberally educated person ; likewise a medieval clergyman of the higher type. The medieval liberal-arts curriculum, although dominated throughout by religion, included a modicum of classical medical theory. Here it is that we find the continuation of our third Aristotelian category, non-professional medical education. Despite public condemnation of the pagan classics, they continued to be the basic material for secular subjects such as medicine.

This fact can be most clearly traced in the general handbooks of the period, where medicine was presented as a specialized, advanced subject of the liberal arts. Even a superficially popular textbook such as Martianus Capella's *Marriage of Philology and Mercury* (ca. 450) followed Varro's classical pattern, giving detailed treatment to the first seven of the liberal arts, then introducing specialized subjects such as medicine and architecture. Capella, however, merely mentioned medicine and architecture, omitting extended treatment [34]. Isidore of Seville, in his *Etymologiae*, written about a century and a half later, gave ample

32. *Epistulae*, IX, 14 (*MGH*, *Auctores Antiquissimi*, VIII, 166). See also III, 10 and V, 14 (pp. 46 and 87).

33. See O. M. DALTON, *op. cit.*, I, 415 ff., for a summary of the medical references in Gregory's works.

34. *Martianus Capella*, edited by F. Eyssenhardt (Leipzig, 1866), IX, 891 (p. 332). The passage comes at the beginning of the last book, concerning music ; *viz.*, " ... cui (Pater) Delius Medicinam suggerit Architectonicamque in praeparatus adsistere... "

space to medicine, as well as to other miscellaneous topics [35]. In addition to including medicine in the *Etymologiae*, Isidore explained its close relationship to the basic liberal arts, and their importance in the training of physicians. His reasoning is not convincing, but it illustrates the attitude of pre-moderns on a problem that is still of concern to medical educators. Isidore's ideas were influential, for his handbook was immensely popular throughout the Middle Ages. In the ninth century, Rabanus Maurus took over most of Isidore's medical data in composing his handbook *(De Universo)* for clerical students [36].

There is one marked difference between the medical education of the medieval cleric and that of the Roman gentleman of Aulus Gellius' day. The medieval cleric was trained for semi-professional practice. In the early fifth century, Jerome reminded a priest of his " duty to visit the sick ", citing the cautions of the Hippocratic Oath concerning sick-room ethics, notably chastity and secrecy [37]. A century later the monastic rule of St. Benedict enjoined that " Before all things and above all things care must be taken of the sick brothers... The abbot shall take the greatest care that they suffer no neglect [38]. " Obviously the question arises : To what extent was such " care of the sick " *medical* care ? Was the patient given anything more than physical comfort and spiritual encouragement ? At least a partial solution to the problem can be made by determining whether clergymen were trained to render positive medical service. At Cassiodorus' monastic school, late in the same century, they were. In a well known passage of his *Institutes*, he urged the use of classical handbooks, advising the monks to " learn the nature of herbs and diligently practice *(tractate)* the compounding of the various species ". If they absorbed much of the medical knowledge in the " various writings on the healing art which by God's help I have been able to procure for you in my library ", they learned considerably concerning pharmacy and general medicine [39]. The same assumption holds true for other monastic centers of the West ; from the fifth century onward, their libraries contained manuscript copies of classical handbooks such as were mentioned by Cassiodorus. Extant manuscripts from the early centuries contain corrections and additions that are evidences of continuing use. Contemporary chronicles make reference occasionally to clerical triumphs of practical healing, and the early

35. In book IV (*PL*, vol. 82, 183 ff.), immediately following the sections on the seven liberal arts, medicine is dealt with ; then law, chronology, religion and practical subjects such as botany and domestic utensils. Jerome, in *Ep.* 53 (*PL*, vol. 22, 544), listed eight studies ; the seven liberal arts and medicine.

36. Book XVIII, 5 (*PL*, vol. 111, 500 ff.). On Rabanus' borrowings from Isidore, with omissions of sections, see Loren MACKINNEY, " Medical Ethics and Etiquette in the Early Middle Ages : The Persistence of Hippocratic Ideals ", in *Bulletin of the History of Medicine*, XXVI (1952), p. 10 and note 13.

37. *Epistulae*, 52 (*PL*, vol. 22, 539).

38. Chapter 36. *De Infirmis Fratribus* (*PL*, vol. 66, 581 f.).

39. *Institutiones*, I, 31. *De Monachis Curarum Infirmorum Habentibus* (*PL*, vol. 70, 1146). The heading reads *De Medicis* in the edition by Roger Mynors, from the manuscript texts (Oxford, 1937).

Germanic law codes reflect something of practical medicine [40]. Remnants of classical medicine were available during these early centuries ; they were read ; and monks, priests, and lay *medici* applied methods of this sort in their treatment of the sick.

From about 500 to about 1000 medical education can be said to have been dominated, though not monopolized, by monks. The monasteries had in their possession most of the medical book-learning of the West, and this theoretical knowledge had some influence on the practical care of the monks in the infirmary, and of the sick and afflicted at the monastic portals. The secular clergy doubtless had less of medical book-learning and a wider scope of practice, notably in the course of their parochial visitations. The seldom mentioned, but probably numerous, lay practitioners were largely apprentice-trained. Such were the *Judaei* mentioned by Gregory of Tours [41], and the *discipuli* in the *Lex Visigothorum*, who paid fees to the *medici* from whom they learned as " servants " *(famuli)* [42]. Here we see the persistence in the early Middle Ages of Aristotle's first class, the craftsman. In the monastic and priestly physicians there are faint traces of his second class, the physician who combined theory and practice.

From the scattered evidences available it is possible to outline very tentatively the various aspects of the educational career of an early medieval medical student. The contrast with our earlier picture of medical education in fourth-century Gaul is noteworthy. From beginning to end, medieval education was by clergymen. First came the parish school (or, in the case of a nobleman's son, the family chaplain) ; here he was taught the fundamentals of religion and perhaps some music, grammar and arithmetic. Students of intellectual promise went on to a monastic or cathedral school. During the earlier centuries it was more likely to be a monastic school, such as Jarrow where Bede spent most of his life, studying, writing, and teaching. From the eleventh century onward cathedral schools became more prominent. Whatever school one attended, the liberal arts were basic. In the specific seven subjects of the trivium-quadrivium there were interspersed considerable amounts of information on history, poetry, geography, medicine, and, of course, religion. More intensive study came in later years, in some cases taught by specialists.

All of this medical education was theoretical and general. It was both broader and shallower than medical education today. Apropos of breadth, it was almost all-inclusive in subject matter and student personnel. Practically every educated person, whether lay or clerical, was exposed to at least a smattering of medical knowledge. One of Charlemagne's capitularies ordered that " youths *(infantes)* be sent

40. MACKINNEY, *Early Medieval Medicine* (*op. cit.*), p. 35 ff.

41. *Historiae Francorum*, V, 6 (*PL*, vol. 71, 323).

42. *Viz.*, " De Mercede Discipuli. Si quis medicus famulum in doctrinam susceperit, pro beneficio suo duodecim solidos consequatur ". *MGH*, *Leges*, sect. I, vol. I, 402.

to learn medicine [43] ". A few years later, in the Rhinelands, Rabanus Maurus wrote that clergymen " must not be ignorant... of the medicines for various ailments [44] ". As we shall see tenth-and eleventh-century sources, notably Richer of Rheims and Fulbert of Chartres, indicate that clergymen were far from " ignorant " not only of medicines but of other cures for ailments.

Medical education was as broad in subject matter as in student personnel. It went to the opposite extreme of modern highly specialized medicine. In its all-inclusiveness, it stressed both the liberal arts background and also the unity of the medical profession. The early Middle Ages made no clearcut distinction between physician and surgeon and pharmacist. All clergymen seem to have been trained in pharmaceutical medicine, especially herbs. Cassiodorus urged his student monks to learn how to recognize the various herbs and to compound medicines [45]. His failure to mention surgery, diet, and other medical practices was doubtless due to the fact that, like Rabanus Maurus three centuries later, he was giving instruction to clergymen only in the fundamentals of medicine.

The person who took up this non-specialized medical study was almost sure to be a clergyman. Occasionally the sources reveal lay, Jewish, or low-born practitioners, but not in the schools. At any rate medical training began early in life ; as early as 15, according to ninth-tenth-century texts. Among the qualifications for medical students, physical traits were mentioned less often than good character. One text, the earliest known manuscript of which dates from the ninth century, lists over fifty desirable traits and almost half as many bad ones [46]. They are as follows : graciousness, innate goodness, aptness, inclination or zeal for learning, sobriety, modesty, charm, ease as a conversationalist, conscientiousness, intelligence, vigilance, affability, adeptness in details, skill, amiability, humility, benevolence, good will, accumulativeness, sweetness, sagacity, lovableness, discipline, obedience, wisdom combined with fear, diligence, respectfulness, honorableness, assurance, chastity, discretion, irreproachableness, taciturnity, good cheer, mildness, dignity, diligence, pleasant demeanor, rationality, restraint, refinement, patience, and tranquility. The undesirable traits are : offensiveness, hesitancy, timidity, turbulence, pride, scornfulness, lasciviousness, garrulity, love of women, drunkenness, lewdness, fraudulence, vulgarity, criminality, disgracefulness, greed. This impossibly high standard, like the Hippocratic Oath, was apparently a summary of universal ideals, derived more from classical works than from Christian precepts. In it one notes

43. " De medicinali arte, ut infantes hanc discere mittantur ". Capitulare Missorum in Theodonis Villa, 805, VII (*MGH, Leges*, sect. II, vol. I, 121).

44. " Nec enim eis aliqua eorum ignorare licet... scientiam sanctarum Scripturarum... differentiam medicaminum contra varietatem aegritudinem ". *De Clericorum Institutione*, III, 1 (*PL*, vol. 107, 377).

45. See above, note 39.

46. Paris, BN, lat. MS 11219, folio 14 r. For a translation and commentary on this, and other early manuscript texts, see Loren MACKINNEY, " Medical Ethics... " (*op. cit.*), p. 11 ff.

the conspicuous absence of any emphasis on Christian piety. Nobility of character and good manners are stressed over and above medical knowledge. In short, the qualifications for the early medieval medical student were integrity, personality, and (finally) intelligence.

The importance of a liberal arts background for the serious student of medicine is obvious from our previous remarks. In the late sixth century Isidore of Seville expressed it as follows :

" It is sometimes asked why the art of medicine is not included among the other liberal disciplines. It is because they comprise single subjects, whereas medicine involves all. It is necessary for a medical man to know grammar so that he may be able to expound what he reads ; also rhetoric so that he may support it with sound arguments ; also dialectic so that by the exercise of reason he may investigate the cause of sickness ; he should also know arithmetic so as to calculate the times and periods of the day ; and geometry so that he may teach what a man should know as to different places ; he should know something of music, for many things may be done for the sick by this art ; last let him know astronomy by which he may calculate the stars and changes of seasons, for a physician has said that our bodies are affected by them. This is why medicine is called a second philosophy [47]. "

Of these subjects, dialectic seems to have been emphasized, whereas students often were cautioned against rhetoric lest they become overly talkative. Apparently physicians were supposed to be men of dignity and of deeds rather than words.

Education by means of actual practice, resembling modern internship, cannot be clearly proved from early medieval sources, though there are indirect traces in the texts. For example, as indicated above, early Visigothic law codes regulated the fees received by practicing physicians from their student apprentices [48]. Furthermore, a treatise (extant as early as 900) instructed young physicians in detail as to how they must learn to take the pulse properly, even to the position of fingers on the patient's wrist, etc. [49]. Both Cassiodorus (in the sixth century) and Fulbert of Chartres (early in the eleventh) mentioned their medical assistants [50], and it is likely that most young doctors learned the profession thus personally associated with an experienced physician.

III

Whatever the uncertainties as to details of the medical education that has been described, it is clear that it was carried on under the influence of, if not actually in, schools. But these were not medical schools. As in

47. *Etymologiae*, IV, 13 (*PL*, vol. 82, 196 ff.).

48. See above, note 42.

49. Paris, BN, lat. MS 11219, folio 13 r. For a photoreproduction of folio 13 r, also a translation of the text and comments concerning other similar manuscripts, see MACKINNEY, " Medical Ethics... " (*op. cit.*), fig. 3, and p. 19 ff.

50. Cassiodorus' assistants, like Fulbert's, were students in his school. See MACKINNEY, *Early Medieval Medicine* (*op. cit.*), pp. 50, 137 ff.

the case of Roman Gaul and Italy, medical education was a part of the liberal arts. But what of " The School of Salerno ", variously reputed to have been the continuation of a Roman medical school, a *Civitas Hippocratica*, a Benedictine medical foundation, a fourfold center of Greek, Latin, Hebrew and Arabic teaching ? Was it not the first scientific professional school in the West, and the first European university ? An excellent critique for these extravagant traditional claims can be found in five historically substantiated factors of Salerno's medical evolution set forth by Kristeller in a recent survey of " The School of Salerno [50] ". Salerno had (1) medical practitioners before 900. Since there were medical practitioners there *may* have been (2) *practical* instruction in medicine. There was (3) a corpus of Salernitan medical literature before 1100. By 1200 there was (4) a medical school, that is, organized teaching ; and about a century later this was recognized as (5) a university. Certain modern historians have defined school or university in such a fashion as to claim earlier origins than we have given, but there are no definite evidences of an organized group of teachers of medicine at Salerno prior to the eleventh century at the very earliest [52].

For our purposes it is more important to describe Salernitan medical education than to quibble over definitions that might make it a school or university. No factual evidence exists for the period before the ninth century. All of the claims of ancient origins are assumptions supported only by the vaguest of circumstantial evidence. The existence of medical practitioners in the region of Salerno from the middle of the

51. " The School of Salerno : Its Development and Its Contribution to the History of Learning ", in *Bulletin of the History of Medicine*, XVII (1945), 138-194.

52. The claims of early origin of the school are based on the interpretation of " school " as merely a group of physicians, and on the assumption that they must have trained young men in an organized group of some sort (whether legally established or no). Among the outstanding scholars who have tended to this position are Salvatore de RENZI, *Collectio Salernitana*, 5 vol. (Naples, 1852 ff.), I, 131 ff. ; II, 771 ; Karl SUDHOFF, " Salerno, eine Mittelalterliche Heil- und Lehrstelle am Tyrrhenischen Meere ", in *Archiv für Geschichte der Medizin*, XXI (1929), 43-62, see pp. 44, 46 f. ; George SARTON, *Introduction to the History of Science*, 3 vol. (Baltimore, 1927 ff.), I, 725 ; Theodore PUSCHMANN, *op. cit.*, p. 198 ff. A curious contradiction concerning early Salernitan origins occurs in Kristeller's essay (*op. cit.*). After asserting (p. 145) that " The second half of the tenth century may thus be considered as the date of origin of the school of Salerno ", he proceeds very effectively (p. 162 ff.), to show that " The twelfth century thus marks for the school of Salerno... the gradual emergence of a regular curriculum... " and that the " legally recognized public university and an organized guild or *collegium* of physicians " came even later. Obviously Kristeller's tenth-century " school " was not a recognized institution of formal education. Less confusing than Kristeller's dating of origins, is the conclusion of Hastings RASHDALL, in *The Universities of Europe in the Middle Ages* (3 vol., revised edition, Oxford, 1936), I, 76. Along with most critical scholars of recent years, Rashdall sees no evidence of a school until the middle of the eleventh century. This necessitates the rejection of Ordericus Vitalis' assertion in his *Historia Ecclesiastica*, III, 11 (*PL*, vol. 188, 260) to the effect that " in urbe Psalernitana, ubi *maximae medicorum scolae ab antiquo tempore* habentur, neminem in medicinali arte, praeter quamdam sapientem matronam, sibi parem inveniret (Rodulfus Mala Corona, in the year 1059) ". Even granting that Ordericus Vitalis word is reliable, it is not necessary to interpret these *scolae* as anything more than groups of physicians.

ninth century onward is proved by documents which give the names of a half dozen *medici* during the period from 848 to about 1000 [53]. Before 1000 northerners were visiting Salerno for treatment and Salernitan physicians were practicing in the North. Specifically, at about 985 a bishop of Verdun went to Salerno " *causa salutis* ", but in vain ; " he could not be healed by the *medici* [54] ". Somewhat earlier according to a monastic chronicler, a Salernitan physician was treated in a most unfriendly fashion by the physicians of the French royal court. The story was told by Richer of Rheims, himself a medical man, in his *Historia*, written shortly before 1000 [55]. It concerned the rivalry between " *Deroldus medicus* " (d. 929), the king's favorite, and *quodam Salernitano medico*, who was the queen's favorite. To test the two physicians, at dinner the king propounded medical questions, notably concerning *dinamidia*, pharmacy, botany and surgery. Deroldus, who was very erudite in the liberal arts *(litterarum artibus eruditus)* outwitted the Salernitan who though unlettered had by reason of natural ability gained wide practical experience. For revenge he tried to poison Derold. Derold used antidotes and outpoisoned his rival.

Apart from the accuracy or inaccuracy of its details the story indicates that in the tenth century Salernitans were known in France as clever, but illiterate, practitioners. It is noteworthy that North-French clerical physicians disapproved of the practical medical craftsmanship for which medieval Salerno has been lauded in modern times. It seems likely that most educated Westerners of the early Middle Ages disapproved of Salernitanism as a threat to clericalism, to culture, and in general to the prevailing type of liberal arts education. To use a modern analogy, Salerno was a center that turned out overspecialized technicians lacking in broad cultural education. Even though Northerners continued to disapprove of Salerno, eventually they paid grudging tribute to its technological superiority. A liberally educated clerical physician of Chartres, Rodulfus Mala Corona, after visiting Salerno (ca. 1050) reported that he found no one equal to him in the art of medicine except " a certain wise matron [56] ". The assumption that she was Trotula is gratuitous, but the tribute to a woman's speciality hints at gynecological specialization. We shall mention later a third reference by a Chartrain to Salernitan technology.

To summarize the evidence concerning Salerno before 1000, it produced medical practitioners who were widely known, and sometimes disliked, for their technical skill. So far as education is concerned, it is probable that, as in other less famous centers, practical instruction was given individually to apprentices in the craft. It is also probable that, at Salerno, such instruction was freer from clerical domination than elsewhere, in liberal arts schools where young clerics practiced the art of

53. De RENZI, *op. cit.*, I, 131 f. ; II, 771.
54. Hugo FLAVINIACENSIS, *Chronicon*, I, ann. 983 (*PL*, vol. 154, 196).
55. Book II, 59 (*PL*, vol. 138, 74).
56. See above, note 52, for the Latin text, from Ordericus Vitalis.

medicine only in monastic infirmaries or in the course of parish visitations.

In the light of the traditional claims of antiquity for the school of Salerno, it is surprising to find that the only detailed account of medical education before 1000 concerns Chartres, a clerical liberal arts school which did not specialize in medicine. The account reveals no school of medicine, but it is a clear case of advanced, individual instruction in medical theory, with specialized study of classical texts. It seems to be part and parcel of the prevailing Western system of liberal arts education, and in striking contrast to traditional Salernitanism. Once more the evidence comes from Richer's *Historia* [57]. It concerns his own education at Rheims and Chartres late in the tenth century [58]. It seems that Richer, who was an appreciative student of Gerbert's at the cathedral school of Rheims, and (as he wrote) deep in the study of the liberal arts, became interested in the " *logica* of Hippocrates ". On invitation from Master Heribrand of Chartres [59], a cleric of great liberality and knowledge *(magnae liberalitatis atque scientiae)*, he left Rheims for Chartres, to specialize in theoretical medicine. After studying Hippocrates' Aphorisms with Heribrand, in the course of which he " learned only the prognosis of diseases ", " since such a simple knowledge of ailments was insufficient " he asked Heribrand for " a reading of his book entitled *The Concord of Hippocrates, Galen and Soran* ". Heribrand agreed " since he was very eminent in the art (of medicine), being well informed in *dinamidia* (i.e. pharmacology), pharmacy, botany and surgery [60] ".

It is noteworthy that Richer, though a monk, studied at cathedral schools, the liberal arts at Rheims and medicine at Chartres. His teacher, Heribrand, was not a practitioner ; perhaps not even a physician (nowhere is he referred to as *medicus*). He closely resembles the professors of medicine in fourth-century Bordeaux. His method of teaching was highly individualized, the reading of texts with Richer. There is no hint of formal lectures or of other students. Nor is there any evidence of practical training. To be sure, in Richer's *Historia* there are twenty-five passages concerning diseases, accidents, and deaths, some of which he may have observed [61]. Apparently he had an academic interest in medicine, somewhat like that of Aulus Gellius. His and Heribrand's penchant for Hippocrates is noteworthy, and suggests that the designation *Civitas Hippocratica* might well be applied to Chartres.

After Heribrand and Richer, the liberal arts continued to dominate

57. Book IV, 50 (*PL*, vol. 138, 145).

58. For a detailed analysis of Richer's education, see MACKINNEY, *Early Medieval Medicine* (*op. cit.*), p. 121 ff.

59. There is no apparent reason for Kristeller's reference (*op. cit.*, p. 144) to Richer's teacher as " Erchembertus ".

60. The normal divisions of medicine were diet (i.e., regimen), pharmacy and surgery. Concerning the unusual term *dinamidia*, see Loren MACKINNEY, " *Dynamidia in Medieval Medical Literature* ", in *Isis*, XXIV (1936), 400-414.

61. See Loren MACKINNEY, " Tenth-Century Medicine as Seen in the *Historia* of Richer of Rheims ", in *Bulletin of the Institute of the History of Medicine*, II (1934), 347-375.

education at Chartres. However, practical training was not entirely lacking. Under Bishop Fulbert (d. 1028), himself a practicing pharmacist, young clerics were given informal instruction in the preparing and administering of medicines [62]. One of the products of this practical-minded, liberal arts school was the clerical physician already mentioned, Rodulfus Mala Corona, who was reported to have known as much as the Salernitans. Throughout the eleventh, twelfth and thirteenth centuries, Chartres continued its emphasis on the liberal arts. It never attained the stature of a medical school or university [63].

IV

The general trend of education during the high Middle Ages (1000-1300) was two-fold ; cathedral schools tended to expand into universities, and medical education became formalized. Medical schools and universities evolved along lines that suggest a compromise between the technology of Salerno and the liberal arts of Chartres. The old classical curriculum was expanded by the addition of a wealth of neo-classical, Arabic learning. Medical theory was supplemented by specific requirements of medical practice, notably in anatomy and surgery. In short, medical education freed itself from the extremes exemplified at Salerno and Chartres, and developed a curriculum suggestive of the modern balance between theory and practice. Chartres became more empirical, Salerno more scholastic.

Salerno's development during this period (1000-1300) negates the traditional claims of its unique progressiveness. The only evidence concerning Salernitan education during the eleventh century is found in certain medical texts attributed to Gariopontus and other unidentifiable writers [64]. If this literature is a fair indication of the subject matter taught there, Salerno's educational record is not epoch making. There are traces of empiricism, but there is more of the classical and pseudo-classical medicine that had prevailed throughout the West during the early Middle Ages. To be sure, late in the century Constantine of Monte Cassino's translations of Greek and Arabic works appeared along with new texts on medical practice, including anatomy [65]. These gained wide usage, and there can be little doubt that they constituted a new corpus of teaching-subjects as well as a continuation of Salernitan empiricism. But, at the same time, Salerno was emphasizing medical

62. See MACKINNEY, *Early Medieval Medicine* (*op. cit.*), p. 136 ff.

63. Jules A. CLERVAL, *Les écoles de Chartres au moyen âge du V^e^ au XVI^e^ siècle* (Chartres, 1895).

64. For bibliography of these early texts, see George SARTON, *op. cit.*, I, 726. For critical analyses, see KRISTELLER, *op. cit.*, p. 147 ff. ; and Lynn THORNDIKE, *op. cit.*, I, 733 ff.

65. George SARTON, *op. cit.*, I, 769 lists the older, traditional accounts concerning Constantinus. KRISTELLER, *op. cit.*, p. 151 ff., and THORNDIKE, *op. cit.*, I, ch. XXXII, give a more critical and credible account.

theory, Aristotelean logic, and philosophy ; adopting, as it were, the methodology of the liberal arts curriculum. This is shown in the increasing number of commentaries, written in the prevailing scholastic style ; also in the trend toward Galen's ideal of the physician-philosopher [66]. The late Dr. Bayon, in an article on " The Masters of Salerno and the Origins of Professional Medical Practice [67] ", cogently summarized the evidence for the twelfth-century beginnings of the school of medicine by stressing the importance of the Salernitan *magistri*. He called attention to " ... the manner in which the doctrines of a *Magister* differed from the practice of a *medicus*, who might be a cleric or a simple lay medical adviser. The inception of academic study during the eleventh century led to a remarkable alteration, ... the scholastic method of study ". " But these teachers were singly independent *Magistri*.. .; (ca. 1150) these *Magistri medicinae* possibly became united in a corporate guild of teachers of medicine... Mention is made of it, under the name of *curia*, in the edicts of 1231 and 1240 (by Frederick II). All the documentary evidence supports this view [68]. " The same edicts set up a prerequisite of three years of logic before taking up the study of medicine, after which there must be instruction in both the theory and the practice of medicine [69]. Thus, before Salerno gained formal recognition as a university, it had worked out a well balanced curriculum, more than ever before like that of the normal liberal arts schools of the West. As summarized by Dr. Bayon, " (Salerno's) University in the modern sense of the word, ... first originated in the fourteenth century ".

Two medical schools located north of Salerno and south of Chartres are excellent illustrations of the normal, balanced medical curriculum — Bologna and Montpellier. Montpellier, like Salerno, has an uncertain origin, reconstructed by surmise and imagination [70]. Apollo, as its founder, matches Salerno's Hippocratic tradition. Montpellier's early growth has been attributed to ancient Graeco-Roman influences in Southern Gaul, to Arabic influences from Spain, and to groups of Jewish

66. See KRISTELLER's summary of these trends ; *op. cit.*, p. 159 ff.

67. In *Science, Medicine and History : Essays on the Evolution of Scientific Thought and Medical Practice, written in honour of Charles Singer*. Edited by E. A. Underwood, 2 vol. (London, 1953), pp. 203-219, especially pp. 203, 205, 209.

68. KRISTELLER, *op. cit.*, p. 162 ff., comes to similar conclusions ; *viz.*, in the twelfth century there were individual teachers, but no organized school until the thirteenth century. He vigorously and convincingly combats SUDHOFF's claims for the twelfth century, made in " Salerno, Montpellier und Paris um 1200 ", in *Archiv für Geschichte der Medizin*, XX (1928), 51-62. See also, above, note 52, concerning Salerno.

69. The original text of the regulations is found in J. L. A. HUILLARD-BRÉHOLLES, *Historia Diplomatica Friderici Secundi* (Paris, 1852 ff.), IV, part 1, 235 ff. There is a translation and analysis in Edward HARTUNG, " Medical Regulations of Frederick the Second of Hohenstaufen ", in *Medical Life*, XLI (1934), 587-601.

70. RASHDALL, *op. cit.*, II, 120, briefly surveys the legendary origins, citing Alexandre GERMAIN'S, *Histoire de la Commune de Montpellier* (3 vol., Montpellier, 1879) which is the most thorough secondary source. The revisors of Rashdall's work, Powicke and Emden, added a detailed footnote (p. 121, note 3) on the subject, and also (p. 117) recent bibliographical items, such as Stephen d'IRSAY, *Histoire des universités françaises et étrangères des origines à nos jours* (Paris, 1933).

and Salernitan practitioners. The earliest factual records, dating from the twelfth century, indicate that already technical medical training had been merged with a liberal arts curriculum. It was reported that in 1137 a German clergyman named Adelbert, after studying the liberal arts at Paris, went to Montpellier to obtain both theoretical and practical instruction in medicine from teachers who were professional physicians [71]. Later in the century, John of Salisbury, Bishop of Chartres (d. 1180), wrote that when students at Paris wearied of the liberal arts they went to Salerno or Montpellier to learn medicine as apprentices *(clientuli)* of physicians. Soon they were transformed from philosophers into physicians who spouted Hippocrates, Galen, aphorisms, etc. [72]. Apparently the Chartres of Bishop John, like the Chartres of Rodulfus Mala Corona and of Richer, was uncompromisingly hostile to medical technicians, whether from Salerno or Montpellier.

But Montpellier was not as bad as Bishop John intimated. It offered instruction in the liberal arts as well as specialization in theology, law and medicine [73]. Unlike Salerno, its medical fame did not eclipse other disciplines ; unlike Chartres, it did not permit the liberal arts to dominate the specialized disciplines. Perhaps this helps to explain how it attained European-wide fame and university status at a time when the reputations of both Salerno and Chartres were waning. Montpellier merged theory with practice, the classical medicine of Galen with Avicenna's Moslem science. By the end of the twelfth century Montpellier was remarkably free from inhibiting influences. The lord of the town had granted " all persons whatsoever " freedom " to conduct classes in medicine " *(regant scolas de fisica)* [74]. Little wonder that Montpellier became a

71. According to his *Vita*, by Anselm of Havelberg, Adelbert went to Montpellier and " ... Hic et doctrina preceptaque de medicina a medicis dantur, qui verum vim meditantur, sanis cautelam, lesis adhibendo medelam. Ergo manens didicit brevitor, quod phisica dicit, perspiciens causas nature, res sibi clausas... ". *Cartulaire de l'université de Montpellier*, 2 vols. (Montpellier, 1890, 1912), I, 758 ; also in Marcel FOURNIER, *Les statuts et privilèges des universités françaises depuis leur fondation jusqu'en 1789*, 3 vol. (Paris, 1890-1892), II, part 1, 1.

72. " Alii autem, suum in philosophia intuentes defectum, Salernum vel ad Montem Pessulanum profecti, facti sunt clientuli medicorum, et repente, quales fuerant philosophi, tales in memento medici eruperunt... Fallacibus enim referti experimentis in brevi redeunt, sedulo exercentes quod didicerunt. Hipocratem ostentant aut Galienum ; verba preferunt inaudita, ad omnia suos loquuntur afforismos et mentes humanas, velut afflatas tonitruis, sic percellunt nominibus inauditis. Creduntur omnia posse, quia omnia iactitant, omnia pollicentur. " *Metalogicus*, 1, 4 (*PL*, vol. 199, 830).

73. See RASHDALL, *op. cit.*, II, 115 ff ; and d'IRSAY, *op. cit.*, 110 ff. An excellent analysis of medical education at Montpellier (and at other universities), based on the original sources and the most recent secondary works, is in an unpublished thesis by Vern BULLOUGH, *Medical Education in Western Europe during the Thirteenth and Fourteenth Centuries* (University of Chicago, 1954), pp. 46 ff. (Montpellier).

74. The Latin text is in the works cited above, note 71, and also in RASHDALL, *op. cit.*, II, 122. It seems obvious that the term *scolas* means classes, rather than schools, of medicine. Of interest, also, is the term *fisica*. It refers to medicine, since elsewhere in the text there is mention of the regulation applying to " facultate fisice discipline ". In some medieval texts, however, *fisica* or *phisica* is specifically related to the seven liberal arts (e.g., *physica naturalis*, or natural science). It seems

popular center for teachers of medicine. By 1220 the teachers' organization was formally recognized as a *universitas medicorum*, with its own officials and regulations [75]. Among the regulations adopted before 1250 were prerequisites in the liberal arts and requirements of practical training in medicine under a professional physician [76]. Thus, early in the thirteenth century, Montpellier could boast, not only a well balanced medical curriculum, but also formal recognition as a medical university, coordinate with sister universities of law, theology, and liberal arts. Salerno has no comparable claims at this period. If Salerno is to be deprived of unearned and unproved honorary titles, it would seem that Montpellier might well be awarded the designation of " First European Medical University " and Chartres that of " *Civitas Hippocratica* ".

Bologna, like Montpellier, quite early developed a well balanced medical curriculum. There are records of practicing physicians *(medici)* and, toward the end of the eleventh century, a *magister* physician who may have been a teacher [77]. By the thirteenth century there are numerous authenticated cases of teachers of medicine, often called *professores* or *doctores physicae* [78]. By 1292 teachers of medicine and the liberal arts were formally united in a single corporate body, the *collegium magistrum*. Although this organization included the specifically designated disciplines of grammar, rhetoric, logic, philosophy, notarial science, astrology, surgery and medicine, it was dominated by the physicians [79]. And, as in all branches of the University, student influence was outstanding. Another distinction of Bologna was the acceptance of surgery, including anatomical dissections, as an essential part of medical training. This is exemplified in the development (ca. 1300) of a new method of teaching anatomy. Instead of studying pictures or diagrams, students

likely that the close and confusing relationship between the terms for medicine and physics during the Middle Ages was due to the long subservience of medical science to the liberal arts. On the confusion of terms, see Louis DUBREUIL-CHAMBARDEL, *Les médecins dans l'ouest de la France aux XI^e et XII^e siècles* (Paris, 1914), p. 221 ff. ; MACKINNEY, *Early Medieval Medicine* (*op. cit.*), pp. 131 and 145 (see notes) ; and KRISTELLER, *op. cit.*, p. 159 f. Also see below, note 83, on *phisica* at the University of Paris ; and above, note 71.

75. For the Latin texts of the regulations, see the works cited above, note 71 ; *viz.*, *Cartulaire*, I, 180 and FOURNIER, II, part 1, 4 f. RASHDALL, *op. cit.*, II, 123 f. ; and BULLOUGH, *op. cit.*, p. 50 ff., give analyses and significant passages ; e.g., the formal title " Universitas medicorum tam doctorum (i.e., teachers) quam discipulorum ".

76. For the Latin texts of regulations of the year 1240, see the works cited above, note 71 ; *Cartulaire*, I, 186 ff. ; and FOURNIER, II, part 1, 6 ff. See BULLOUGH, *op. cit.*, p. 52 ff., for detailed analysis.

77. The Latin texts for the Bologna documents cited in this and following notes are found in Mauro SARTI and Mauro FATTORINI, *De Claris Archigymnasii Bononiensis Professoribus a Saeculo XI usque ad Saeculum XIV* (Bologna, 1769-1772, in 1 vol. 2 parts ; revised edition 1888-1896 in 2 vol. ; my citations are from the 1769-1772 edition) ; I, part 1, 433 mentions Jacobus Britonoriensis as *magister* and *medicus*.

78. See RASHDALL, *op. cit.*, I, 236, note 1, for citations from Sarti concerning the apparently new titles, *doctor* and *physici*. On the latter term, see above, note 74.

79. See RASHDALL, *op. cit.*, I, 237 f., and citations from Sarti.

watched a professor of surgery dissect a corpse ; a professor of medicine read appropriate passages from a textbook, while another professor pointed out the various organs, muscles and bones [80]. Miniatures in late medieval manuscripts from other parts of the West provide evidence of the widespread popularity of this Bologna innovation [81]. The statutes of the University also indicate that theoretical instruction was not neglected. They provided that candidates for medical degrees must have studied the liberal arts and have specialized in medicine for four or five years, during which time their knowledge of medical theory was tested by disputations and the delivering of lectures. Thus from the late thirteenth century onward Bologna's curriculum was noteworthy for the breadth and depth of its medical instruction [82].

One other medical school, at the University of Paris, will suffice to complete our survey of the prevailing non-Salernitan trend of medical education in the thirteenth century. Paris, in a sense, carried into university education the earlier liberal-arts ideal of the cathedral school of Chartres. By mid-century Paris had three well established faculties (theology, law and medicine) in addition to the basic liberal arts faculty [83]. Of the three superior faculties, medicine seems to have been the least important [84]. However, by about 1270 the medical faculty had its own set of statutes which included specific requirements concerning text-

80. See RASHDALL, *op. cit.*, I, 244 ff. ; BULLOUGH, *op. cit.*, p. 94 ff., gives a more detailed analysis, including a translation of a passage from Guy de Chauliac's *Chirurgie* which mentioned Henri de Mondeville's use of anatomical pictures whereas later teachers used corpses. Medical regulations of Frederick II prove that dissection was praticed at Naples earlier in the thirteenth century. During the next century, it became common in medical schools.

81. See Charles SINGER, *The Evolution of Anatomy* (London, 1925), pp. 74, 87, plate X, for photoreproductions of manuscript miniatures showing dissections at universities. I have a number of micofilm reproductions, in color, of such teaching methods ; notably from Glasgow, Hunter, MS 9, folios 10, 30, 34, etc. ; and Montpellier, MS 184, folio XIV. I shall publish lists of such miniatures from my collection of some 3000 medical miniatures in microfilm, as soon as possible. See also, below, note 91.

82. An excellent summary of the subject for the late medieval centuries is to be found in BULLOUGH, *op. cit.*, p. 103 ff.

83. For the Latin texts of the documents, see *Chartularium Universitatis Parisiensis*, edited by H. Denifle and A. Chatelain, 4 vol. (Paris, 1889-1897). Ernest WICKERSHEIMER analyses them in the introduction to his *Commentaires de la Faculté de Médecine de l'Université de Paris (1395-1516)* (Paris, 1915). Before the thirteenth century one finds only vague references to medical teaching at Paris. For example, Alexander NECKHAM, *De Laudibus Divinae Sapientiae*, V, verses 569-570 (edited by T. WRIGHT, Rolls Series, London, 1863 ; p. 453) wrote that " medicina viget " along with theology, law and the liberal arts. In 1210, about a quarter of a century later, Guillaume le Breton wrote that the study of medicine was highly esteemed at Paris. *Gesta Philippi Augusti*, ann. 1209, in *Œuvres de Rigord et de Guillaume le Breton, Histoires de Philippe Auguste*, edited by H. F. DELABORDE (Paris, 1882), I, 230. The earliest official records of a medical faculty are from the *Chartularium*, for the years 1213 (I, 76) and 1331 (I, 137, 144) ; but these use the term *phisica*, and associate it closely with the liberal arts (see above, note 74). Thereafter, for the years 1251, 1254, 1281, etc. (*Chartularium*, I, 223, 252, 590, etc.), the faculty of medicine is clearly indicated.

84. As late as 1359 the order of precedence for formal occasions, placed the medical faculty third, following theology and law, but preceding the arts faculty, *Chartularium*, III, 61 ff. ; see especially nos. III, XIII, XX, XXIII.

books, length of the course of study and liberal arts pre-requisites [85]. In general the regulations of the medical faculty reflect the guiding hand of liberal arts scholasticism. Not only was it normal procedure for a student to have an M. A. degree before specializing in medicine, but the medical course was predominantly theoretical [86]. At the same time (ca. 1270) the medical faculty took action against unlicensed practitioners, who were self-trained empiricists without theoretical schooling. There also were strict prohibitions against the practice of medicine by bachelors of medicine, apothecaries and surgeons [87]. Early in the fourteenth century the medical faculty prosecuted a number of Parisians, including women, for practicing without having been licensed. Throughout this period the French kings and the Avignon popes supported the medical faculty in its efforts at the elimination of non-University practitioners [88]. These continuing efforts indicate that complete enforcement of the University's educational standards was impossible. Thus the late medieval experience of the Paris medical faculty illustrates the eternal conflict between the formally educated physician and the uneducated or empirically trained practitioner. It also indicates that Paris carried on to the very end of the Middle Ages the early ideal of the subservience of medical education to the liberal arts [89].

As must be evident from our cursory treatment of the fourteenth and fifteenth-century history of the universities, the year 1300 virtually marks the end of this survey of medieval medical education. By that time medical education in the West had attained a relatively stable curriculum that was to carry on well into modern times. There were generally accepted curricular standards that provided for (1) a strong liberal arts background, (2) theoretical training in the principles of classical and Moslem medicine, and (3) something of practical experience along with medical theory. Whereas the early Middle Ages had emphasized medicines (especially those from herbs) as the principal factor

85. *Chartularium*, I, 515 ff.

86. A document for the year 1382 (*Chartularium*, III, 81) indicated that " magistri facultatis medicine ", were " omnes magistri artibus ". Apparently the M. A. degree, though not required, was common. See RASHDALL, *op. cit.*, I, 435; and BULLOUGH, *op. cit.*, p. 70 ff., for details concerning the theoretical character of the medical course.

87. *Chartularium*, I, 488 ff. Especially interesting are the prohibitions of medical students prescribing medicines or even visiting patients more than once without a master physician. See also II, 149, 255, 285, 336.

88. See Pearl KIBRE, " The Faculty of Medicine at Paris, Charlatanism, and Unlicensed Medical Practices in the Late Middle Ages ", *Bulletin of the History of Medicine*, XXVII (1953), 1-20, especially 7 ff. In one of the cases described, the prosecution claimed that its authority was based on a two-hundred-year old statute of the diocese of Paris.

89. Pierre Dubois' plan for the education of picked youths, to be sent to the Holy Land, included training in the liberal arts, then specialization for clerical service or for medicine and surgery. Even girls were to be instructed " in medicine and surgery, with other subjects prerequisite to these ". See Lynn THORNDIKE, *University Records and Life in the Middle Ages* (New York, 1944), p. 138 ff., for a translation of the pertinent sections of *De Recuperatione Terrae Sanctae*, with an introductory explanation. The volume has other translations of texts relating to medieval medical education.

in healing, medical education in the thirteenth-century universities gave increasing attention also to anatomy, surgery and regimen [90]. By 1300 medical education also had attained a structural norm, the university, the organizational and regulatory elements of which reflect the new era. Medieval medicine, and medical education, had progressed from the rather primitive pseudo-classicism of its monastic-dominated period to the fairly well balanced ideal of University-controlled, theoretical and practical training. And this evolution seems to have come about with little reference to, or influence by, the traditionally famous school of Salerno.

In fact, the much applauded empiricism which Salerno is so often said to have monopolized through the early centuries, seems to have had its stronghold among the lowly practitioners, to whose education we have given little attention. Until late in the Middle Ages, almost nothing is known of the details of the apprentice-training of those who had no formal medical education. These much condemned healers of the masses, the charlatans, barbers, surgeons, apothecaries, midwives and other types of " medicine men ", must have greatly outnumbered the licensed physicians. The higher levels of these unlettered folk included members of guilds (e.g., apothecaries, barbers and surgeons). There are existing evidences of such guilds before 1300 (Dante belonged to the Florentine apothecaries' guild) but no details concerning their training of apprentices. Obviously they learned the trade by the practical methods of observing and imitating the master practitioners. Medical miniatures from late medieval manuscripts often show young men assisting at autopsies and surgical operations, or in apothecary shops wielding pestles (sometimes two at a time) in the preparation of medicines [91]. In this relatively unexplored field of medieval medicine we have a reflection of the technical type of education which contrasts so sharply with that of the liberal arts schools. Such was the training of those who cared for the great majority of the sick in medieval times.

There is one point at which, late in the Middle Ages, the two opposing types of medical education are found working together. The universities, led by Bologna, gave recognition to the study of anatomy and surgery. We already have noted this trend at Bologna. At Paris soon after 1330 the surgeons began to imitate the methods of the medical faculty. Late in the century, after having obtained royal recognition as a faculty, they set up distinctions between bachelors and licensed masters in surgery. The teaching surgeons even adopted the long robe, to distinguish

90. The increased attention to anatomy and surgery is reflected in the large number of illustrations of these subjects in late medieval manuscripts (see above, note 81, concerning miniatures). As for regimen, the late Middle Ages turned out many lavishly illustrated, books with titles such as *Theatrum Sanitatis*, *Diaeta*, *Tacuinum Sanitatis*, etc.

91. There are many such miniatures in the collection of microfilms mentioned above, note 81; also in the photoreproductions, many of which are full-page color prints, in Maxime LAIGNEL-LAVASTINE, *Histoire générale de la médecine, de la pharmacie, de l'art dentaire et de l'art vétérinaire*, 3 vol. (Paris, 1936-1949), II, *passim* (vol. I has photoreproductions from a number of Greek manuscripts).

them from the short-robed practitioners of surgery. They also belittled the lowly barbers, just as they themselves had been belittled by the physicians. To barbers they allotted certain minor operations considered degrading to surgeons. Finally, late in the fifteenth century, both barbers, and surgeons were admitted, on occasion, to medical lectures at the University, but with none of the privileges pertaining to medical students. Unlike Italy, France (and England also) clung to the rather strict segregation of physicians from surgeons, barbers, and apothecaries. As in classical times the gulf between the manual arts and the liberal arts was difficult to bridge [92].

It is apparent that medical education from about 1300 onward manifested more of the characteristics of modernness than of the medievalness which we have traced through the centuries. Outstanding factors are the development of specialization and institutionalization. The physician of classical and early medieval times has become the physician, the surgeon, the barber and the apothecary. Today the list of specialists is much longer. Institutionalized education at the end of the medieval period manifested itself not only in the University medical faculties but also in the regulated training of manual practitioners in the guilds of surgeons, barbers and apothecaries. The midwives seem not to have been so completely institutionalized. The two trends above mentioned were not unmixed blessings. But they were inevitable aspects of the evolution toward the more complex civilization which we associate with progress.

92. BULLOUGH, *op. cit.*, p. 131 ff., has a lengthy section on the training of surgeons, barbers, apothecaries, and midwives in the late Middle Ages. Even for the late medieval centuries, however, detailed evidence is very scarce.

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