MEDICAL EDUCATION IN THE 14th CENTURY*

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Why should one in the middle of the 20th century be interested in medical education in the 14th century? This is a question which puzzles the modern student, but should it? One cannot understand the present without a knowledge of the past and this fact justifies the study of the history of medicine, or any science, of art, in fact of every human endeavour and activity. The circumstance of this fact does not involve either a favourable or an unfavourable judgment on the achievements of past ages. It does, however, involve the need and duty of impartial weighing of these achievements.

In order to appreciate the state of medicine in the period under study one must have a clear understanding of the various trends of thought and practice of its leaders in medical education. To begin with it is important to remember Guy de Chauliac's assertion that the fundamental mistake of mediæval medical science was the divorce of medicine from surgery. It is generally agreed that the peak of mediæval medicine was attained at the close of the fourteenth century. If one reviews briefly the work of the

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two previous centuries sufficient orientation is obtained for our purpose.

About 1200 A.D. two currents of thought were developing which flowed in separate and devious channels to gradually merge to form the more clearly defined stream which reached its height about the year 1400.

One was controlled by the Church. "The church monopolized all scholastic activity and even dominated all thought. Aristotelian philosophy was drawn into the orbit of Christianity and became the centre around which revolved the doctrine of Thomas Aquinas, who became the spiritual leader of this tendency" (Castiglioni). This represented the inner branch of medicine.

The other stemmed from Sicily and Southern Italy. This was a mixture of Hippocratic and Arabian medicine developed at Salernum by lay physicians. Its force was felt at Bologna and later greatly influenced Montpellier, the first school in Western Europe. Surgery was fostered and advanced by this branch.

Frederick II of Italy in 1224 passed stringent laws for the practice of medicine. A preliminary course of three years was followed by a five year period of more specialized study. Before a doctor could enter his profession he had to spend a year with an experienced practitioner and then present suitable testimonials. This was a purely lay education and since the church in 1139 forbade monks to practice medicine it was the lay physicians who struggled against the scholastic medicine and prepared the way for the growth of medical science of the Renaissance.

The outstanding advances were in the field of surgery and the chief of these was the principle of aseptic treatment of wounds, a procedure which was fast gaining recognition when a great surgeon Guy de Chauliac frowned on it and it remained forgotten until its reintroduction by Lister. Roger of Salerno in 1180 taught that the provocation of pus was the greatest possible error. Hugh of Lucca (1252) and his son Theodoric followed the lead of Roger and later Henri de Mondeville (1260-1320) carried this method to Paris where it received a cold reception.

Let us see how close this aseptic treatment of wounds comes to that of today. Mondeville removed all detritus from the wound with as little damage as possible, and irrigated with wine. The edges of the wound were then brought together by stitches. Cloths soaked in wine were applied closely on either side to keep the deeper parts in apposition. Over the wound another wine-soaked pad was placed and over all a bandage tightly applied and the dressing left undisturbed for days. It seems inconceivable that such a method should have fallen into disuse and that the theory of "laudable pus" with the daily scraping of wounds and the use of tampons and vulnaries should have remained in surgery for so many centuries.

Another advance was the reintroduction of the knife which had been practically abolished by the Arabs. William of Saliceto (1210-1277) against great opposition advocated its use in preference to the cautery and it remained for Ambroise Paré to confirm its use.

When one views the middle ages in a spirit of impartiality one finds that the students of this period are divided into two classes. Singer, Professor of the History of Medicine at Oxford, representing one group, says of this period: "All theoretical knowledge was permitted to lapse. Anatomy and physiology perished. Prognosis was reduced to an absurd rule of thumb. Medicine deteriorated to a collection of formulæ punctuated by incantations: the life blood of the scientific stream was dried up at its source."

Others have called the 13th the greatest of all centuries, for it saw the foundation of the university, the signing of Magna Charta, and the origin of representative government in the west of Europe. It was the century of the Gothic cathedrals. In literature it gave us Dante, the shaping of the legends of King Arthur, the Romance of the Rose and Reynard the Fox, three books that had a universal appeal and were widely read for generations. The Meistersingers in Germany and the Troubadours of France were moulding the poetry of Europe. At the full flood of all this the 14th century dawned with a promise of intellectual and social advancement that was to be prematurely darkened by the Black Death in 1348 and 1349.

Let us see now if any reason can be found for the stagnation of all scientific, social and economic progress. Probably Roger Bacon can give us the answer. Summing up the doctrine he was teaching at the University of Oxford in the 13th century he started out with the principle that there were four grounds of human ignorance. These were: (1) There was inadequate authority. (2) The force of custom which leads man to accept too unquestioningly what has been accepted before this time. (3) The placing of confidence in the opinion of the inexperienced. (4) The hiding of one's own ignorance with the parade of a superficial wisdom.

A second reason can be attributed to the stifling of the spirits of the few survivors of the previous generations together with economic troubles at home and abroad consequent on long wars and the moral depression following the Black Death.

A survey of university and particularly medical education at this peak of mediæval progress presents many interesting problems. The founding of the university is unquestionably one of the most important factors, if not the most important, in the development of modern culture. The university is distinctly a mediæval institution. Its ideals, its organization, offices, titles, ceremonies, costumes, and degrees have been carried down to modern times. The Uni-

versity of Bologna was founded in 1088, Paris in 1200, Oxford 1206, Cambridge 1229 and Montpellier in 1289.

In all these early centres of learning education naturally remained the special concern of the Church. Both the subjects and the methods of instruction were under clerical supervision; educational disputes were settled before ecclesiastical tribunals. The students themselves all studied theology and wore clerical garb. At first, the teaching of law and medicine was not tolerated. Later, when medicine was introduced, only its theory was permitted since all clerics were enjoined against the shedding of blood. Indeed, surgeons had a hard fight to obtain recognition and the universities refused them the right to be called doctors, which resulted in the practice still found in England of a surgeon being referred to as Mr.

Let us turn now to the state of general medical knowledge, first, as found in the universities and then that without these halls of learning.

To begin with, medicine is both an art and a science. The art of medicine was born when the first savage claimed the power to protect his fellow tribesmen from the evil spirits which menaced his health. The science of medicine was of a much later date. Hippocrates in 440 B.C. consolidated the medical knowledge of the Greeks and separated from it the superstitions of mythology. His work was amplified by Galen a Latin author about 160 A.D. The works of these two physicians were preserved by the Arabs and with additions introduced into Spain at the time of the Moorish conquest, about 1000 A.D. Thus, a blending of Greek, Roman and Arab medicine arrived just in time to coincide with the foundation of the universities and became the medical authority of these institutions and remained so throughout the middle ages. Hippocrates was called the Father of Medicine and Galen the Prince of Physicians. Although a surgeon of the 13th century had the audacity to say that "God did not exhaust all his creative power when he made Galen", the teaching faculties considered it rank heresy to question the authority of the one who had been dead 1,800 years and of the other who had been sleeping with his fathers for thirteen centuries. One can well understand the truth of Roger Bacon's belief that one cause of human ignorance was the force of custom which led men to accept too unquestioningly what had been accepted before their time.

The student entered the University from the grammar school. These schools were permanent and significant institutions which were obligatory in every cathedral city and frequently found elsewhere. They held the key to the gateway of knowledge—Latin grammar. Because of this these schools were fundamental to the educational history of the Middle Ages, and the children often spoke Latin before being able to understand it. The methods of teaching it were substantially the same all over Europe and so the student was an international phenomenon and we find that he was able to transfer himself from one university to another; few English physicians had not visited several continental centres of learning. Unfortunately they clung to the outmoded theories of the ancients.

All this time medical knowledge based on experimental and practical experience was developing outside the universities and it was not for several centuries that it was incorporated into the curriculum of the well known colleges and brought about a more balanced and more complete medical training.

The 14th century medical student after being well grounded in grammar then began his real university course by attending lectures given in the schools by a master in the faculty from which he sought to graduate. These lectures consisted entirely of oral instruction and the scholar was after a time obliged to repeat what he had learned. If he were going on for medicine this preliminary work required five years. During this time he studied the seven arts: grammar, rhetoric, arithmetic, music, geometry, astrology and the three philosophies, natural, moral, and metaphysical. When this was completed to the satisfaction of the university he proceeded to one of the higher faculties of which medicine was one.

There is available information as to student life at Oxford which was more or less similar to that of the outstanding continental universities. Some of the conditions are of interest to the university student of today. There was very slight interference with his private life excepting preventing breach of the peace or enforcing the necessity of his wearing clerical dress. He was allowed to bear arms to and from the university. Apparently however, there was a great deal of laxity in his conduct off the campus for it is said that the poorer students were allowed to beg and no exception was taken to his poaching or the holding up of travellers on the highway to obtain funds necessary for his education. In England particularly it is recorded that many students paid their fees by this method. The students lived in residences but there were no fires in the university buildings and candles were beyond the means of the poorer students. The seniors had an ordinary bed with various gorgeously coloured coverlets. One at Oxford was described as being of red and blue with ostrich feathers. The juniors often slept in truckle beds which could be stored away during the day under the ordinary beds. In their rooms there was usually a table and a few plain jointed stools. A trough of lead or a pitcher and bowl was provided for their ablutions. Their recreations presented a curious contrast to those of the present day. Tennis

and chess, for instance, were forbidden but hawking and hunting were considered to be suitable pursuits. It is noted too, that murder which sometimes occurred during a hold-up was not deemed a reason for expulsion from the university and there are several records of such occurrences in the annals of the University of Oxford in the 14th century.

As to lectures, the maximum was three hours a day, some of these one and a half hours long and others three hours. They usually started at six in the morning and at times five in the summer time and in the winter at seven. Many were held before dawn without any light. The students sometimes gathered in a classroom with a floor covered with straw or rushes and with glassless windows. It was contended that the best time for study was between the hours of six and ten in the morning. At first both masters and pupils sat upon straw on the ground, the master having more straw so as to be able to dominate the audience but in 1366 the students were ordered to sit upon the ground "so they might have no reason to be proud". Breakfast was served at ten and the only other meal of the day was supper at six. On fast days dinner was at twelve and there was no supper. At curfew there was a collation or drinking, usually of beer.

Today the texts recommended by the faculty of medicine in the various universities are innumerable. No such difficulty worried the medical student of the 14th century whether he was in Italy, France or England. All that was necessary was to listen and then repeat portions from the works of Hippocrates and Galen and one Arab textbook and these excerpts excluded any reference to the practical application of the subject studied. Medical manuscripts were not plentiful in the 14th century. A hundred years later the University of Paris possessed only twelve. It would appear however that there were medical libraries outside the academic halls to which the student had access. These libraries belonged to the great abbeys or to rich folk. A contemporary catalogue of St. Augustine's Abbey contained over 330 treatises and that of Christ Church nearly 300.

One of the best known of English physicians, John of Gaddesden, who began the study of medicine at Oxford in 1303 wrote a book, the Rosa Anglica, and the list of authorities from which he quotes shows that he was a man of wide reading so he must have frequented some of these medical libraries. To obtain his degree four years later the student was required to dispute with his masters for several days on certain theoretical aspects of medicine which were selected by his examiner. Just what these were at that exact period we have no knowledge but some idea can be gained by a perusal of those of a later date. Here for instance, is an oral examination at the University of Paris for the degree of medicine in the 17th century.

1. From what part of the body did the water come which flowed from the side of the dead Christ when he was pierced by a sharp point of a lance?
2. Are heroes born of heroes? Are they splenetic?
3. Is woman an imperfect work of nature?
4. Is sneezing a natural act?
5. Is it salutary to get drunk once a month?
6. Does debauch bring baldness?

This makes us wonder whether Butler in Hudibras and Molière in his various satirical plays did not have just cause for poking fun at the medical profession.

When we, with our modern conception of science look back at that of the 14th century, one feels like agreeing with Artemus Ward that "there is nothing that makes man so ridiculous as knowing so many things that ain't so".

Let us now glance briefly at the medical knowledge as set forth by Hippocrates and Galen and as taught to the students in the 14th century. It was spoken of as humoral medicine. There were four humours namely, blood, phlegm, reddish bile and black bile. Each of these was made up of varying proportions of four elements: fire, air, water and earth. There were also nine qualities, eight unequal and one equal. Of the unequal, four were simple, namely hot, cold, moist and dry. There were several varieties of each of the four humours. There were also three spirits, the first, the natural spirit having its origin in the liver; the second, the vital spirit having its origin in the heart and third, the animal spirit having its origin in the brain.

The mediæval conception of nutrition was quite simple. Foods were divided into two kinds. Good foods were those which brought about good humour and bad foods were those which brought about an evil humour. Foods producing good or evil humours might also be heavy or light. Of the first kind were pork and beef; of the second; chicken or fish. Certain kinds of vegetables produced evil humour. Garlic, we find, was one of them. This was not in accord with the dictum found in the "Regimen Sanatatis" composed for Duke Robert, eldest son of William the Conqueror during a visit to Salernum in the 12th century. Here is the advice in verse:

"Six things, that here in order shall ensue,
Against all poisons have a secret power,
Pear, Garlic, Reddish-roots, Nuts, Rape and Rue,
But Garlic chief; for they that eat it,
May drink and care not who the drink do brew:
May walk in airs infected every hour,
Since Garlic then had powers to save from death.
Bear with it though it makes unsavery breath:
And scorne not Garlic, like to some that think
It only makes men wink and drink and stink."

There were three kinds of fever: First, that in the spirit which was called ephemeral; the second, arose from humours which putrefied and which was therefore called putrid; and

third, that which affected the solid portions of the body, and this was called hectic.

The practice of medicine was divided into three divisions, surgery, the giving of drugs, and what was known as the right ordering of the non-naturals. These non-naturals comprised the changes of air, the various seasons, the number and properties of the winds and variety of places and their qualities. Surgery dealt with the two tissues, that is with the flesh and with the bones. These then were the foundations of medicine as given us by Hippocrates and Galen. The Arabs made two contributions to this which complicated and beclouded medical art for many centuries but which later came to be of inestimable value to science. The first of these was astrology the forerunner of astronomy. It is interesting to note here that in their primitive forms, science, magic and religion were one. This fact is especially clear in the history of astronomy which developed from the pseudo-science astrology. It seems clear that Ptolemy was the first to link up astrology with medicine. It was he who first associated the qualities of ancient medicine with the planets, but it was a Christian bishop who introduced the signs of the zodiac and was executed, a martyr to his belief. Every medical student was required to study astrology in order that he might be able to observe the heavenly bodies and apply the correct treatment at a time when the planets or stars were in the proper position to influence the astrological fortune of the patient. It was believed in the 14th century that all diseases in the body, their origin, their cure, the rise and progress of epidemics, the efficacy of drugs at the time of blood letting and the preparation of medicine, all were in some way connected with the movement of the planets.

Of all medical procedures, phlebotomy or blood letting was the one most strikingly affected by astrologic beliefs. It was governed by the phases of the moon, tides and the position of the sun in the zodiac; and each one of the zodiacal signs corresponded to a part of the body and determined the point of election for the phlebotomy. Once more from the school of Salernum comes advice showing the influence of astrology on blood letting:

> "Three special months (September, April, May)
> There are, in which tis good to ope a veine
> In these three months the moone bears greatest sway
> Then old or yong that store of blood contain
> May bleed now, though some older wizards say
> Some days are ill in these, I hold it vain:
> September, April, May have days a piece,
> That bleeding do forbid, and eating geese,
> And those are they forsooth of May the first
> Of other two, the last of each are worst."

Astrology persisted in medical literature until the end of the 17th century. The belief in the influence of the stars on human life received its authority from a mistranslation of a passage in Hippocrates but nevertheless it was taught in the universities.

Alchemy, from which chemistry developed, was high in favour in the 14th century. A search for the philosopher's stone and for the elixir of life has long since been abandoned but chemistry and biochemistry hold a very important place in medical education today.

We have already seen that surgery was looked on with disdain by the physician of the 14th century. Since many of the university trained physicians were priests and were enjoined by the church to refrain from the shedding of blood, we can readily understand why instruction in surgery was at a minimum in the early universities. Where then did the surgeon get his training? Many of them after receiving a doctor's degree, which was first given about the year 1200 at Salerno, were called upon to attend the army both at home and abroad and learned the art of surgery in military camps and in the field.

The 14th century surgeon unless he had his doctor's degree from a university was greatly handicapped in many ways. Besides lacking the education, culture and social prestige of their august colleagues the surgeons were allowed to wear only a short robe, the long being reserved for the physicians. Then too the surgeon had few patron saints. This was a cause of many bitter taunts from the medical faculty who had St. Luke himself and perhaps a hundred minor saints, while the poor surgeons, aside from Saint Cosmas and Saint Damien, could muster only a paltry number of canonized patrons. The physicians tried to show their superiority whenever the two corporations came in contact. Thus if it became necessary to bleed the King the first physician held the torch, the surgeon performed the operation at a signal from the physician and the apothecary held the basin.

For 450 years quarrels took place between the physicians and barber surgeons and then began the fashion in England for the barber surgeons to have their own examining board. About the middle of the 14th century there was formed a guild of military surgeons. The demand for them in the 100 Years War and the Wars of the Roses must have been enormous. The conflict in France was not a savage tribal fight but English gold supported large bodies of well paid troops whose lives and health had a great monetary value, so that surgeons were almost as important as artillery, equipment and transport. In Britain the barber surgeon guilds became very important and were found in almost all of the large towns. They built up an excellent system partly by the old apprenticeship and partly by lectures. It was chiefly in this period that there was founded the legal corporation which educated and licensed nearly all British surgeons for 400 years. It was not until a later date that the guild of Apothecaries was

formed and then there were three groups of men practising the healing art.

One would naturally expect to find the leaders in medicine on the staff of the universities, especially in the 14th century, but such is not the case. Guy de Chauliac (1298-1368) the author of the "Chirurgia" the most important work before Paré, who is generally recognized as the first of modern surgeons, although he had a university education was not a faculty member. Lanfranc (1315) the first bedside teacher and a famous surgeon was denied a university position because he was married. John of Arderne, the first English surgeon of note obtained his training in the Hundred Years War. Arderne's method of treating fistula-in-ano was far in advance of that of his predecessors. John of Gaddesden (1280-1361) whom some think was the original of Chaucer's doctor of physic was a professor at Merton College, Oxford, but his writings were largely a re-hash of Arabic medicine.

In arriving at an estimate of 14th century medical teaching one must agree with Singer's statement: "Anatomy and physiology perished". Guy de Chauliac's belief that, "The fundamental mistake of mediæval medical science was the divorce of medicine from surgery", must be accepted. And one is justified, too, in heeding the dictum of Roger Bacon as to the lack of adequate authority, the custom of accepting what was accepted before, and the hiding of one's own ignorance with a parade of superficial wisdom. The practitioner of medicine of the 14th century came either from the university where he received no clinical teaching, or derived his experience as a barber surgeon in large towns or in the continuous wars of the period.

If one wishes to obtain a sketch of the character, learning and dress of a physician of this period none can equal that of Chaucer.

With us ther was a Doctour of Phisyk,
In al this world ne was ther noon him lyk
To speke of phisik and of surgerye;
For he was grounded in astronomye.
He kepte his pacient a ful greet del
In houres, by his magik naturel.
Wel coude he fortunen the ascendent
Of his images for his pacient.
He knew the cause of everich maladye,
Were it of hoot or cold, or moist, or drye,
And where engendred, and of what humour;
He was a verrey parfit practisour.
The cause y-knowe, and of his harm the rote,
Anon he yaf the seke man his bote.
Ful redy hadde he his apothecaries,
To sende him drogges and his letuaries,
For ech of hem made others for to winne;
Hir frendschipe has nat newe to biginne.
Wel knew he th'olde Esculapius,
And Deiscorides, and eek Rufus,
Old Ypocras, Haly, and Galien;
Serapion, Razis, and Avicen;
Averrois, Damascien, and Constantyn;
Bernard, and Gatesden, and Gilbertyn.
Of his diete mesurable was he,
For it was of no superfluitee,
But of greet norissing and digestible.
His studie was but litel on the bible,
In sangwin and in pers he clad was al,
Lyned with taffata and with sendal;
And yet he was esy of dispence;
He kepte that he wan in pestilence.
For gold in phisik is a cordial,
Therefore he loved gold in special.