THE KINDS OF ANATOMY*

by

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A FULL, or even adequate, discussion of the "kinds" of anatomy would be in effect a history of anatomy, and a partial history of medicine, biology and natural philosophy. The present discussion is more limited, and derives from work on certain aspects of medical education in seventeenth- and early eighteenth-century Britain. What is meant by "the study of anatomy" should emerge later.

At Oxford and Cambridge the medical faculties date from the early to mid-fourteenth century. From the "ancient statutes" of both universities it is clear that they adopted the same teaching texts as had been used in the medical faculty of Paris university. In this small group of texts there is none devoted specifically to anatomy. Not until the sixteenth century, when the crown began to take a positive interest in the universities—an interest dictated at first by political motives, but tempered with Renaissance scholarly attitudes—were the statutes affecting medical study revised. Thus in 1549, for the first time, was a requirement introduced for students of medicine to acquire some anatomical knowledge.[1] Credit for this innovation must probably justly be given to John Caius, whose friend Thomas Wendy, the royal physician, was among the Visitors who revised the statutes.[2] Caius himself had of course made translations of Galen into Latin, and it may be significant that he chose for the most part Galen's physiological/anatomical books. Moreover, Caius delivered lectures on anatomy to the Barber-Surgeons in London for twenty years.[3] When Caius came to refound Gonville Hall in 1557, he improved the endowment by, among other things, adding two medical fellowships, and he also provided funds for an annual dissection to take place and took care to secure also a royal patent for the supply of bodies from the assizes.[4] For the medical fellows of Gonville and Caius College at least the requirements of the new university statutes had some rationale.

On other occasions when the university statutes were revised or extended it is possible to detect some growing interest in anatomy/physiology: in 1559 the regius professor of medicine at Cambridge was enjoined to make an annual dissection if requested to do so by his students, who were to be prepared to defray the expenses;[5] at Oxford in 1565 some new (Galenic) texts were introduced, including *De usu partium*.[6] On the other hand, the requirement to have attended anatomies, as introduced in the 1549 statutes, seems to have been in effect abandoned at Oxford from

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about 1565.[7] Thus at the end of the sixteenth century at Oxford and Cambridge there was some interest in physiology, and "anatomies" had appeared as part of the curriculum for medicine, while at Cambridge not only could the regius professor perform dissections, but there were special provisions for the medical fellows of Gonville and Caius College. But it can hardly be claimed that the general attitude to learning medicine was centred around anatomy—its role was still negligible.

In the seventeenth century a lectureship of anatomy was founded at Oxford in 1624 by a certain Richard Tomlins.[8] This post was founded by a member of the mercantile class who was apparently a personal friend of the regius professor, who was to have the position annexed to his chair. All students of medicine were to be auditors of this lecture—although it was provided that Congregation could dispense candidates for degrees from attendance. At Cambridge, within three years of this, the Senate passed a grace obliging the regius professor to perform a dissection annually, the expenses of which were to be defrayed by fines on those taking the M.A. (1*d.*) and from medical fellows of the colleges (10*s.*) and candidates for medical degrees or licences (13*s.* 4*d.*).[9] It seems likely that the regius professor himself, John Collins, may have promoted this grace.[10]

Because of the relatively large number of anatomical works published during the seventeenth century, and because also of the great interest shown by the Royal Society and its individual members in physiological topics, it is easy to assume that the importance of the study of anatomy was universally recognized in this period. The situation in the universities, as indicated here, hardly bears out this idea, although it should of course be remembered that statutory provisions were relatively difficult to alter, and that they may not have reflected the actual interest in anatomy shown by teachers and students. But belief in the importance of anatomical study and knowledge was certainly not the touchstone of medical respectability. For instance, Thomas Sydenham (1624–1689) was the most celebrated physician in seventeenth-century England, and his singular and outspoken views on medical education questioned the desirability of anatomical study. Sydenham wrote repeatedly that the function of the physician should be limited to "industrious investigation of the history of diseases, and of the effect of remedies, as shown by the only true teacher—experience".[11] Sydenham's method to advance medicine[12] consisted in three main considerations: first there should be an accurate history of diseases, with diseases classified into genera and species according to their treatment; second there should be a proper *methodus medendi;* third the physician should search for remedies which are specific to the disease, that is to say, remedies which bypass nature's own healing method; where no such specifics are known, the physician should merely assist nature's own method. Although Sydenham ostensibly took Hippocrates as his guide, he was a modern who had assessed to his own satisfaction the ideas and ideals of the new science. He believed that the true path of practice could only be found through an infinite multitude of observations: these must be made without any preconceived theory, for the theory will emerge from the facts observed. But he considered that human intelligence was probably of a kind which obliged man to be ignorant of all but immediate causes.[13] Thus only those "hypotheses directly derived from the facts themselves, and arising from those observations only which are suggested by practical

and natural phenomena, are stable and permanent".[14] But he did not believe that, even by his own method, medicine would ever be able consistently to relate cause and effect (or diagnosis and prognosis); if it can usually do so, this is sufficient.[15] In this system there is no place for book-learning. Indeed, Sydenham is known to have taken apprentices to teach them his method.[16] But he had himself studied medicine at Oxford where he was installed as a fellow of All Souls College by the Parliamentary Visitors;[17] while there, he was able to graduate M.B. Later he graduated formally as M.D. at Cambridge.

Sydenham was aware of the ideas of the new philosophy and was a friend of most of its important devotees. But he was not a member of the Royal Society, and made little secret of the fact that he thought the recent anatomical investigations were, for practice, totally irrelevant. This attitude he frequently expressed, and was at one time reported to be writing a book "which will bring physitians about his ears, to decrie the usefulness of natural philosophie, and to maintain the necessitie of knowledg in anatomie [only] in subordination to physicke".[18] This projected book is probably the fragment of 1668, *Anatomie*, most of which is in John Locke's handwriting.[19] This begins:

> Others of them have more pompously and speciously prosecuted the promoting of this art [medicine] by searching into the bowels of dead and living creatures, as well sound as diseased, to find out the seeds of discharging them, but with how little success such endeavours have bin or are like to be attended I shall here in some measure make appear. Anatomie noe question is absolutely necessary to a Chirurgen . . . It often too directs the physician's hand in the right application of topicall remedys and his judgement in the prognostique of wounds, humors [? tumours] and severall other organicall diseases. . . . All that Anatomie can doe is only to shew us the gross and sensible parts of the body, or the vapid and dead juices all which, after the most diligent search, will be noe more able to direct a physician how to cure a disease than how to make a man. . . . Tis true it pretends to teach us the use of the parts, but this, if it doth at all, it doth imperfectly and after a grosse manner. . . .

This attitude may be seen as an elaboration of Sydenham's general philosophy of medicine, which was itself unusual. In questioning the validity of anatomical study for prospective physicians it was not unique, although others who decried the preoccupation with anatomical study were usually advocates of chemical or mystical remedies.

THE GALENIC AND VESALIAN HERITAGE

Unsympathetic attitudes to anatomical study were, of course hardly new in the seventeenth century: it was well known for instance that of the practitioners contemporary with Celsus (A.D. 30), the Empirics had argued that because dissection must preferably take place in the dead body, any knowledge gained therefrom must—beyond the mere recognition of situation, size etc. of the organs—be irrelevant to the treatment of the living body.[20]

Galen's advocacy of the need for dissection is best shown in his *De anatomicis administrationibus*. In this four main lines of justification are presented: to assist treatment; for the physician to know the extent of his (surgical) competence; for the completeness of the physician's knowledge; and to confirm the theory of nature. The first two of these refer to operations which by the sixteenth century had become the

exclusive province of the surgeon. The theory of nature includes the whole of humoral physiology, and the very important concept that every part has a function which can be ascertained by inspection, experiment or analogy.

The *De anatomicis administrationibus* was not known in the West until 1531, so it had no direct influence on dissections in the medieval universities. These took place solely to illustrate the texts lectured upon, to illustrate the theory of nature which was taken for granted. They were appositely called "demonstrations", and were concerned with demonstrating the site of the organs, their interconnexions, colour, shape, texture, i.e. "popular" anatomy (see below). Once the role of the Galenic physician had been divided into two areas of competence, physic and surgery, only a knowledge of internal anatomy was of value to prospective physicians, and this only for illustration of their physiological theory.

Responsibility for the revival of the belief that firsthand education in anatomy was of crucial importance for the physician is almost wholly due to the influence of Vesalius. In the preface to the *De humani corporis fabrica* (1543) he expressed his desire to revive the Galenic concept of a physician, in which treatment by diet, drugs and manual procedures would be united in the competence of the physician. "This very perverse distribution of the instruments of treatment among a variety of practitioners caused a very baleful disaster, and a far more cruel blow to that chief branch of natural philosophy [i.e. anatomy] which, since it includes the description of man, ought rightfully to be considered the very beginning and solid foundation of the whole art of medicine. . . ."[21]

Vesalius' first printed venture was the first of the *Tabulae sex* depicting the veins in order to decide between the relative merits of "revulsion" and "derivation" as therapeutic bleeding procedures. In his dissections too, he is known to have stressed the relation between knowledge of anatomy and of disease or malfunction. Vesalius acted as guest demonstrator at an extensive series of public lectures and demonstrations at Bologna in 1540, consisting of twenty-four lectures on the text of Mondino, and twenty-six demonstrations on three human bodies and six dogs.[22] The lecturer was Matthew Curtius, who corrected Mondino by textual comparison with Aristotle and especially Galen. The actual details of the anatomy did not interest him—"I am no anatomista".[23] The lectures and the demonstrations took place independently. Vesalius treated the demonstrations as an opportunity to deliver complete lectures, yet his presentation in these of the importance of a knowledge of anatomy for future practitioners is somewhat unspecific: he says that such knowledge can "explain" the action of medicaments, it can help show how (i.e. where) to apply healing remedies for toothache etc.[24] But, apart from the fact that he had a far better knowledge of anatomy, his advice in this respect differed little from that given by Curtius: "The knowledge of the parts of the lower venter is useful to you for the application of ointments, warm lotions, liniments, plasters etc., so that you might know where each one is to be applied. For instance if the epiglottal cartilage [is to be cured] then [the remedy] must be applied to the gullet, if the intestines, then it must be applied to the paunch."[25]

While such advice on the practical application of the detailed anatomical knowledge to be possessed by physicians may now appear somewhat limited, there can be no

doubt that the need for education in anatomy to improve the art of healing did rapidly become an article of belief. Certainly it contributed toward making the physiological theory more known; humoral theory may not have been replaced but it could be refined to a certain extent by relating it more closely to the actual interconnexions of the organs.

POPULAR ANATOMY

The detailed relationship of anatomical teaching and therapeutic procedures (other than surgical) continued to be discussed, and this led to new concepts about "medical" anatomy, which will be dealt with below. That this issue was discussed does not so much imply doubt about the validity of this relationship, as reflect the fact that other "kinds" of anatomy had been inherited from the Greek and medieval traditions. One of these, "popular" anatomy, as practised in the normal anatomical "demonstrations" in universities (especially those of Italy) had as its immediate source the 1316 textbook of Mondino,[26] which, because it was a guide for dissection, had laid down the order of dissection as the practical sequence of the order of corruption. Hence the belly was dissected first, then the thorax, then the brain, and lastly the limbs. This sequence, barely mentioned in Greek sources,[27] can be justified by the argument that it is in accord with the relative nobility of the principal organs contained within these regions. The idea of the correct order of teaching was applied also to the question whether one teaches about the body as a whole before its constitutent parts.[28]

PHILOSOPHICAL ANATOMY AND THE PHILOSOPHY CURRICULUM

Where "anatomies" were performed and there was a supply of bodies, the order of Mondino continued to be the one followed. Yet it was of course possible to have an anatomy without a body. As Curtius, in the lectures mentioned above, stated—"Anatomy and the art of dissection are not identical, the latter being contained in the former, just as architecture and . . . building are not the same". He defends this position as follows: "Even if Galen wrote many books which he calls 'anatomy' . . . in which he tells nothing about the division of the parts, I reply that dissection can be performed in two different ways: in one way really or actually, in another way through description, e.g. in writing or lecturing. For also this is to dissect the body. Thus in those books by Galen dissection means description by lecturing not dissection actually performed. . . ."[29]

This is not an idle distinction: teaching in "the order of knowing"[30] renders the terms "anatomy", "doctrine", and "description" largely equivalent. "Anatomy" without the dissection of a corpse was often carried out in Britain in the period under discussion. This was done in the context of the philosophy course at the universities.

"Philosophical" anatomy took its importance from Aristotle, and especially from that panegyric on the Final Cause, the *De usu partium* of Galen. "A work on the usefulness of the parts", Galen wrote, ". . . will be reckoned truly to be the source of a perfect theology, which is a thing far greater and far nobler than all of medicine. Hence such a work is serviceable not only for the physician, but much more so for

the philosopher who is eager to gain an understanding of the whole of Nature".[31] Vesalius too writes of the contribution that anatomy can make towards knowledge of the body and mind, and of the divine power arising from their harmony, "indeed about ourselves, that which in truth is the study of man". Anatomy is the study of the temporary lodging and the instrument of the immortal soul, a dwelling that in many respects corresponds admirably to the universe, and has great value in attesting the wisdom of the Creator.[32]

But while anatomy has an obvious place in the study of natural philosophy, there is no extant treatise by Aristotle dealing exclusively or conveniently with the body of man. On the other hand, the anatomy of man was central to Aristotle's biological system. In the *Historia animalium* he wrote that, to acquire a knowledge of animals "we must first take into consideration the parts of Man. For just as each nation is wont to reckon by that monetary standard with which it is most familiar, so must we do in other matters. And of course man is the animal with which we are most familiar".[33] Then follows a brief enumeration—and it is little more than that—of the external parts of man from head to foot. Further details of human anatomy appear in his presentation of comparative anatomy: a partial account of aspects of human anatomy can be culled from the *De partibus animalium*. For Aristotle of course the relative complexity of animal function reflected directly the attributes of the soul:

> Animals, however, that not only live but feel, present a greater multiformity of parts, and this diversity is greater in some animals than in others, being most varied in those to whose share has fallen not mere life but life of high degree. Now such an animal is man. For of all living beings with which we are acquainted man alone partakes of the divine, or at any rate partakes of it in a fuller measure than the rest. For this reason, then, and also because his external parts and their forms are more familiar to us than those of other animals, we must speak of man first; and this the more fitly, because in him alone do the natural parts hold the natural position; his upper part being turned towards that which is upper in the universe. For, of all animals, man alone stands erect.[34]

While the soul and its attributes were of great importance to Aristotle's epistemology, it was—for different reasons—even more important to the masters in the universities. The core of traditional teaching in the philosophy course consisted of the *trivium* (grammar, rhetoric, logic) and the *quadrivium* (arithmetic, music, geometry and astronomy); then followed the three philosophies, natural, moral and metaphysical, but the time generally allowed for their treatment was not as long as that devoted to the *trivium* and the *quadrivium*. Hence it may not have been possible to do justice to Aristotle's full scheme of natural knowledge and teach the human body in its full relationship with the soul. For example at fourteenth-century Oxford the texts read on natural philosophy were Aristotle's *physica, de caelo, de generatione, meteorologica, de anima,* the *parva naturalia*—that is the general attributes of soul and body in conjunction (sensation, memory, appetite, passion, etc.)—followed by *"de animalibus"*.[35]

"Philosophical" anatomy clearly appears in the philosophy course in Britain for the first time in the 1570s. It appeared during the reforms in education in the Scottish universities which were part of the Scottish Reformation. The main agent of reform was Andrew Melville, who returned to Scotland in 1574, and who was urged by the General Assembly and by the university to undertake the reform of Glasgow

University.[36] Melville's main qualification in the eyes of the religious reformers was that he had been a humanity regent at Geneva for five years. However, he had also been educated at Paris under the professors of the Collège Royal, including Ramus.[37] The reforms which he initiated owed a direct debt to the views of Ramus, not only in the authorship of texts but also in concept. It is not possible at present to assess fully the influence of Ramus on education in areas such as natural philosophy but it is known that he expressed dissatisfaction with the extent to which some accepted curriculum subjects were taught—the *quadrivium* subject mathematics, and also natural philosophy. In natural philosophy he pointed to the material which should be taught from the works of Ptolemy, Copernicus, Aristotle, Plato, Theophrastus, Hippocrates, etc., and from nature itself, and urged that the unchanging (*constantem*) doctrine of natural things be instituted in the curriculum.[38] When Melville came to revise the curriculum at Glasgow he added, under this kind of influence, subjects "nocht hard in this countrey of befor",[39] such as geography, Hebrew grammar and history. In accord with the Ramist philosophy of teaching, Melville taught these subjects from short textbooks. His biographer records that he also taught "Fernelius",[40] and it may be presumed that to do so he reduced the *De naturali parte medicinae* into a "compend".[41] By teaching in the "systematic" way recommended by Ramus, and by dictating a short compend, it was possible to give a more comprehensive treatment in the time available. Descriptive anatomy has an obvious place in the philosophy curriculum, but its teaching now may have been promoted by the new interest aroused in the subject by Vesalius, and hence the Aristotelian sources may not have been considered adequate.[42]

With Melville's influence the study of anatomy spread to the other Scottish universities in the course of their reformations.[43] Anatomy was read by the first principal of the new Protestant college of Edinburgh from 1582.[44] At the new college at Aberdeen, Marischal, it was laid down in the charter that the principal was, among his other duties, to give "*brevem anatomiae explicationem*".[45] An example of anatomy dictates given in 1619–1620 is shortly to be published.[46] At the same college the will of a medical benefactor in 1613, providing a professorship of mathematics, allowed the "superplus" of the benefaction to be employed "wpon ane learned physiciane to teich once in the week physiologica anatomica".[47] The text used at Edinburgh in 1628 was again Fernelius,[48] and anatomy was read—or rather, dictated—for two weeks, but it was not examined.

Anatomy appears to have been taught intermittently during the seventeenth century in Scotland, and continued to feature in proposed programmes of study. In the "Overtures" he submitted to the General Assembly of 1640, Robert Baillie, one of the Glasgow regents, proposed that it be taught as part of the uniform course then being considered by the Assembly for all universities. "In the Fourth yeir, besyde the compleat Physick, *De Anima*, and all the rest, the Metaphysick wold be taught; also Astronomie and Geographie, with Anatomie, wold not be neglected; every one wold be learned to name all the bones of a skeleton, all the stars of the third magnitude in our horizon, all the lynes, countreys, and chief tounes in the great mapp . . . A demonstration from the Mathematicks, whereupon the Anatomie wold be used [? would take place at laureation]."[49]

The programme given to St. Andrews by the General Assembly at this time suggested that in the fourth year should be taught, "if so much tyme may be spared, some compend of Anatomy".[50] The royal visitors of 1661 at Glasgow suggested that compends of mathematics and anatomy be gone through and examined on.[51] Epitomes of anatomy are included in the physics dictates of Edinburgh students. The verse at the end of notes taken in 1661 clearly illustrates the place of anatomy in the curriculum:

> *Ethica jungatur Physicae, te noscere si vis;*
> *Haec docet Anatomen corporis, illa animi.*[52]

Another of these sets of notes, for 1672, is illustrated with a picture of the regent teaching from a skeleton (Figure 1);[53] the college had received a skeleton the year before.[54] When the General Assembly again revived the idea for a common course of philosophy in the 1690s, some proposals were made, perhaps by the Edinburgh regents, that compends of astronomy, chronology, geography, and anatomy be made and taught from, but the result of this scheme is not known.[55]

There is less evidence for anatomy teaching at Oxford and Cambridge, but it is clear that its study played the same role in providing a bridge between natural philosophy and mental and moral philosophy. At Cambridge a student of the 1640s recorded that "As to ethics . . . and physics (abstracted from anatomy, astronomy, meteorology, and the natural history at large) he thought these jejeune studies [worth] not exceeding one month's enquiry . . .".[56] Some form of descriptive anatomy/physiology was usually included in the natural philosophy handbooks actually used by students.[57] Moreover, at Oxford at least, the subject was sometimes included in the subjects to be discussed by determining bachelors during a period running from before 1668 until 1742 or later.[58]

This philosophical role of anatomical study helps explain the wide interest that was taken in dissections when performed. It suggests also that the stated motives, and their priority, for the conducting of anatomies may be taken largely at face-value: the demonstration of human anatomy is of interest to everyone for reasons unrelated to medicine. Those of the Tomlins lecture (Oxford, 1624) are: "Forasmuch as the knowledge and true understanding of mans body and the partes and faculties of the same doth much conduce to the honor and glory of god our mightie and wonderful creator And is also of great use to the Professors of Divinitie, Philosophy and all other good Literature and more particularly necessary for the faculties and Artes of Phisicke and Chirurgery, the perfection whereof doth much avayle to the safety health and comfort of the whole Common wealth in the conservation of theire persons."[59]

The continuance of this philosophical interest may well have helped to promote the value of anatomical study for medical students until such time as a full "medical", or pathological, anatomy had been worked out. Such an interest is evident in the recorded lectures of seventeenth-century anatomists, in the statements of their intentions, and in the form of the lectures they delivered. Thus Francis Glisson could in 1640 define anatomy as "an artificiall dissection of [a certayne] objecte in such maner as may most conduce to the perfect knowledge of the same and all its parts . . .

Now this artificiall dissection implyes not the manuall dissection only but in especiall maner the mentall . . . which maynely denominats the artiste an anatomist, and hath use in livinge as well as dead bodys, and noe body desires the manuall dissection of dead bodys but in order to the livinge."[60] Glisson is here arguing for a "mental" dissection as a way of building a physiology, but implicit is the assumption that the "end" of the art of anatomy is the same as the "end" of the art of medicine.

Similarly, the adoption of any of the possible "divisions" of the parts has as great a pertinence to philosophical and teaching considerations as to medical ones. The account of the different divisions given by Caspar Bartholin in his *Anatomicae institutiones,*[61] a work widely used in Britain, is representative. Following Hippocrates, all the parts may be divided into "containing" (solid), "contained" (fluid, including humours), or "moving" (spirits). The natural components—including the humours and spirits—may alternatively be divided into "similar" and "dissimilar", according to their matter when subdivided, such that bone is similar but hand is dissimilar; this is taken from Aristotle.[62] The organs may be classified, and thus distinguished, by their site, figure, texture, connexion, use and action (Aristotle and Galen). Other divisions listed by Bartholin are: parts divided by "necessity", "commodity" or "ornament"; parts divided by their end or matter, or by use; the body can be divided into its greatest members, or into "bellies"[63] and limbs. Last of all Bartholin recounts a division proposed by Fernel. This is a basic division into private and public regions. The private regions are the brain, kidneys, lungs etc; the public regions are three-fold: "1. Hath the Vena porta, and all the parts whereinto its branches are spred. 2. Begins at the Roots of Vena Cava, and is terminated in the smal Veins, before they become Capillary. 3. Hath the Muscles, Bones, and Bulk of the body and ends in the Skin. We purge the first Region chiefly by the Guts; The second by the Urinary passages; The third by the Pores of the Skin". But Bartholin dismissed this division as one "which nevertheless is of no use save in Physick".

MEDICAL ANATOMY

"Medical" anatomy employs certain of the above divisions. This subject was related to systematic anatomical teaching by Jean Riolan the younger in his anatomical and pathological manual of 1649.[64] This was a reduction of his *Anthropographia* (1618), and was intended as a guide for his auditors when he conducted dissections in the Paris medical faculty. The procedure he adopted was to follow the order of dissection and to narrate first the natural constitution of every part, and then its contra-natural constitution.

> . . . the natural constitution of each part, . . . generally called health, is three-fold: similar, organic and common. Equally the contra-natural constitution of the parts is threefold and is termed a similar, organic or common disease. The natural similar constitution consists in the substance and balance (*temperies*); the organic constitution, pertaining to the structure of the organ, is defined by number, size, position and conformation (itself divided into shape, passage and cavity, roughness and smoothness). The common constitution unites with the similar and organic parts either as a unity or a connection. First I describe this threefold constitution in the individual parts; then I briefly explain what may be gathered from this knowledge of the healthy constitution toward diagnosis, prognosis and cure of the ill constitution. Anatomy handled in this method will be the beginning, middle and end of the whole of medicine.

Riolan included an apologia for treating anatomy in this new way, teaching it with pathology: it is justified, however, in his view, since body is the first matter of medicine, the subject of health *and* disease.

In the first of the letters to Riolan that he published (1649), William Harvey wrote that Riolan's example had determined him "to put forth and joyn my medicinal Anatomie being chiefly fitted for Physical uses".[65] Unfortunately he never seems to have done so, but he gave an indication of its aims. It would be delivered, "not with the same intention as he, by demonstrating the places of diseases, from the dead bodies of healthful men, and rehearsing the divers sorts of diseases incident to those places, according to mens opinions", but it would relate, from the dissection of diseased corpses, "in what manner, and how the inward parts of them are chang'd, in place, bignesse, condition, figure, substance, and other sensible accidents, from their natural form and appearance". However, in contrast to Riolan, Harvey maintained that the pathological part should be taught after the physiological. Only in this way will pathology provide help towards the art of discovering and administering medicines. Dissection is essential in establishing an authentic physiology: Harvey considered that personal experience of dissection was essential for the proper learning of that physiology.[66]

Riolan's attempt to integrate physiology and pathology in a new "medical" anatomy for teaching was not followed in extant seventeenth-century lectures in Britain even though the *Enchiridium* was translated in 1657.[67] Autopsy findings were sometimes related to disease, but the prevalent impression given by lectures intended for prospective and practising physicians is that dissection was increasingly considered essential, but (solely) for learning physiology adequately. In some unspecified way it was assumed that thereby a physician would know what to do in diseases. The lack of an agreed "medical" anatomy may have contributed toward the continued preoccupation with philosophical anatomy in medical circles—an interest which, with the need to absorb into anatomy new physiological findings, turned toward natural theology.

The works recommended to those wishing to study anatomy indicate the relative popularity of different approaches to anatomy/physiology. A tutor at Trinity College Oxford, John Lydall, wrote to John Aubrey in 1653: " . . . Riolanus (I think) is farre more accurate in describing of each part & mentioning some not observed in Bartholinus, and besides hee hath one peculiarity in telling ye diseases incident to each of 'em: yet I believe Bartholinus to bee easier than him, or any other".[68] A Cartesian physician, writing to a student at Cambridge *c.*1649, recommended for medical study only anatomy and botany (the two legs of physic)—which clearly illustrates the way in which anatomy had become recognized as an essential part of medical education in some circles.

> First, I should advize you to read Anatomy, especially of ye 3 venters, & their contents: For as for ye Muscles & fleshy parts of ye Body, they, regarding rather a Chirurgion then a Physician, need not to be so strictly inquired after: neither would I have you distract or loose your selfe in this by multiplicity of Authors: the best, I thinke, are Veslingius in 4°, & Bartholinus; ye former is very curt & short, & seem's rather to take up & shew, then to handle & search ye parts . . . ye latter is large & plain enough, & one yt delivers both ye old, & new way since ye circulation was found. When you have got some little knowledge in this, your best

will be to read Harvey de circulat. sanguin. ye most excellent & admirable peice extant: to him adde Regius his 10[th]Cap. Fund. Phys. who will give you more subtile & satisfactory reasons of ye blood's circulation, then any of them.[69]

AVAILABILITY OF ANATOMICAL LECTURES

As has been indicated above, anatomical dissections and demonstrations had been incorporated into the official medical curricula of Oxford and Cambridge as one result of the Renaissance resort to classical texts. They were given with varying regularity and few examples of them survive.[70] It is likely that their form was generally that of the "popular" anatomy (as was the Tomlins lectureship). In London a wider range of lectures was available. These were not intended for the education of those aiming to be medical graduates, but their execution was in the hands of the London-based academically trained members of the College of Physicians. Hence the interest in anatomy in London may be taken to reflect the general attitudes of the academic physician, even if the actual education in anatomy within the universities was unsatisfactory. For the sake of clarity and to give an idea of the relative significance of anatomical teaching, a very brief account will be given of all forms of medical lecture available in London.

At Barber-Surgeons' Hall five kinds of lecture were given by the end of the seventeenth century. In the Act of Parliament of 1540, officially uniting the surgeons and Barber-Surgeons, provision was made for the supply of four bodies of felons "for anathomyes . . . and to make incision of the same . . . for their further and better knowlege instruction, insight, lerning, and experience, in the sayd science . . .".[71] A formal *annual* lecture was instituted with a public dissection which it was obligatory for surgeons and apprentices to attend; it was "public" primarily because the bodies used were those of public malefactors. The public dissection was given by a physician (from 1546 to *c.*1566 by John Caius), attended by surgeons who actually performed the dissection. The course consisted of six lectures over three days, concluded by a ceremonial dinner. *Private* anatomies could take place with the permission of the court of the company, but only within its hall: they were given by Masters of Anatomy.[72] The company considered that the performance of anatomies outside its jurisdiction constituted a derogation of its authority. Lectures held elsewhere, so they claimed, restricted the number of pupils. From before 1530 a weekly *surgical* lecture was held on Tuesdays, given by the surgeons themselves. However the usual readers were, after 1612, physicians, reading from "Gwydoes Surgery", a fourteenth-century text (Guy de Chauliac). On several occasions the court of the company tried to reinstitute a system of surgeons reading in order of seniority.[73] By the benefaction of the worthy Alderman Arris in 1645—who was himself a surgeon at St. Bartholomew's—an annual lecture was established, and the court of the company, rather than the benefactor, seems to have decided that this should be *on the muscles.*[74] This required a body, although none was provided by any Act, on which six lectures were to be read. Although the court thought that this lecture should be delivered by a Master of the company, physicians were again invited actually to do so. Finally the Gale lecture *on the bones* was given annually from 1698, and once more a physician was the first reader.[75]

While little teaching could in the event take place at the Chirurgeons' Hall without

a physician present, there was for a long time a comparable situation at the College of Physicians for dissection. Dr. Wright in the 1640s was said to have been the first physician that dissected at the college which before his time had made use of chyrurgeons in their publick theatres.[76] A new anatomy theatre was built in 1637 "As also to performe their publique operations of Anatomies and other exercises thereunto belonging".[77] It was in the 1660s equipped with teaching aids—skeletons and a statue depicting the muscles.[78] For surgeons the lectures provided formed merely a supplement to the real teaching which lay in the apprenticeship system. It is in this light that they seem to have been regarded by most surgeons, despite assertions that a surgeon should also be knowledgeable in natural philosophy, and the intermittent attempts of the court to insist that all apprentices should know Latin.[79] The first examination, which made an apprentice "free" of the company, demanded of the candidate that "he knoweth what ys Surgery and also what an Anatomye ys, and howe manye perts it ys, and of what the iiii Elements and the xii signes be".[80] Although it was expected that apprentices should attend the annual dissection and the surgical lectures, the answers to such questions could be given without having made such attendance—they appear for instance in the work of Vicary.

At the College of Physicians four kinds of lecture were given by the end of the seventeenth century. While the College had no educational functions, the earliest statutes of the College (1555) stipulated that when a candidate became a Fellow he had to swear to read Galen's *de simplici medicine* and *de usu partium* within the year; these are texts on which he would have just been examined. There is an obvious parallel here with the lectures of the regent masters in the universities. Those intending to be Fellows may have been expected to attend.[81]

Then from about 1565, and probably under the influence of John Caius, a series of *annual* anatomy lectures was begun. Given at first in Latin, they were probably of the "popular" form, and given by each Fellow in turn. Up to four bodies were allowed to the College by Queen Elizabeth in 1564/5 (increased in 1663 to six), granting "*quod rem medicam profitentibus maxime necessarium est*", namely "*quedam humana corpora ad anatomizandum . . . ad incrementum cognicionis medicine experimentum . . .*".[82] These were public lectures and ceremonial; they appear to have been replaced by the Gulstonian lectures.

The *Lumleian* lectures, founded in 1581 by Lord Lumley with, and at the instigation of, Richard Caldwell, were primarily intended for the education of surgeons, but within three years attendance was so sparse that the College stipulated that the hearers should include its own candidates until admitted, its licentiates for five years, and its fellows for the first year after their admission.[83] The course was closely stipulated, consisting mainly of surgical works, lectures being given twice a week over a period of six years; this fitted very well with the normal seven-year apprenticeship. In the first year there was a five-day dissection of the whole body "particularly all the interior parts",[84] in the second of the trunk showing especially the veins, arteries and nerves, the third of the head, the fourth of an arm and a leg with reference to wounds, and in the fifth the lecturer was "to make anatomie of a skeleton".[85] A new theatre was built to accommodate this lecture which was to be given for the first three-quarters of an hour in Latin, and the last quarter in English.

In 1632 the *Gulstonian* lectures were officially instituted, the lectures "to be read from time to time by one of the 4 youngest Doctors of the said College upon 2, 3, or more diseases as the Seniors of the College should appoint . . .".[86] If a body could be obtained it was to be dissected. These lectures were probably delivered from the first in English. They are the first in England which seem to be inspired in their concept by "medical" anatomy. But this intention may not have been fulfilled as the Seniors of the College decided that the lectures should be on regions, and the diseases affecting them, rather than on diseases as such, and the regions and organs they affect.

The only other London institution in which formal medical lectures were given was Gresham College. Lectures had been endowed here in the seven liberal sciences, and were to be given in such sort as the professors would read the same lectures in the universities, except that each weekly lecture in Latin was to be repeated in English. The content of the physic lecture, according to the resolution of 1597, "is to be refered to the discretion of the reader; yet it is (to be) wished, that herein he follow Fernelius his method, by reading first physiologie, then pathologie, and lastly therapeutice; whereby the body of the said art may be better imprinted by good method in the studious auditors, rather than be disjointed and delivered out of order by exposition of some part of Galen or Hippocrates."[87] The audience was to consist of citizens of London and foreigners—since everyone wishes to have some knowledge of physic for his own health's sake. The college had no grant of bodies for anatomies, yet dissections appear to have been carried out.[88] A eulogy of the facilities (1633) described how, "Sometimes wee heare a learned Physitian reade upon all the parts both Homogenean and Heterogenean of the dead Corps of a malefactor, one while of the head, shewing how from the *braine the nerves have their essence and being*. . . . Another while we heare him discourse of the *Liver* . . . another while we heare him relate where the heart is seated, of what forme it is, how it is severed from the naturall parts of the body, and from whence the arteries have their originall & being . . . at other times we heare him discourse of the stomacke, of the spleene, of the longs, of the reynes and kidneyes, of the guts, and of all the rest of the parts of the bodie from the head to the foote. . . ."[89]

CONCLUSIONS

It can be seen that a relatively large amount of anatomical dissection could be given by and for the London physicians. Certainly it may be said that anatomy increasingly came to be seen as the cynosure of medicine.[90] It is the means by which we learn what is the natural constitution, the general rule, before we can understand the various deviations from that rule.[91] However, the conflict between the two aims of teaching anatomy and prosecuting anatomy were not resolved. In the first place, the elaboration of a full "medical" anatomy was not pursued. In the second, the knowledge and interest derived from the prosecution of anatomy influenced teaching: increasingly the procedures of anatomical investigations were taught. Thus it could be maintained that the "through knowledge of the fabrick of animals is not to be attained from the publick and promiscuous Demonstrations from a Theatre, nor from any wordy discourses . . . but from curious and minute Disections made . . .

from various insufflations of wind, injection of Liquors . . . colours . . . by various ligatures and transfugions, and by several Desications . . . (and) by poreing upon microscopes upon small particles illuminated by extraordinary helps."[92]

Observations from comparative anatomy were frequently included in lectures.[93] "Chemical" anatomy, an interest in the "contained" fluids especially the blood, was also now evident.[94] None of these interests deflected the actual course of anatomical teaching, except to render it more detailed and accurate: but equally, although they were all ultimately concerned with "medical" anatomy, none could offer an alternative form in which the teaching of anatomy could develop. Their cumulative effect was to foster a general belief that detailed anatomical knowledge was the *sine qua non* of a complete medical education, for physicians as well as surgeons.

In the traditional centre of anatomical teaching, London, at the turn of the century, private anatomical teachers began to emerge; the first so far noted, Dr. Connors, was teaching in 1697.[95] In the universities too there was private teaching, by James Keill, George Rolfe, and others.[96] In 1707 Rolfe's activity at Cambridge was recognized by the creation of a nominal professorship.[97] Ultimately, by the 1740s, the idea was to grow that personal experience of dissection was of prime importance: attendance at a private anatomical school, and the hospital practice of the surgeons who ran these schools, became a recognized part of the education of many intending physicians as well as surgeons. These developments were of course heavily influenced by foreign models,[98] but they nevertheless took place in a climate in which the teaching of philosophical and popular anatomy continued to be pursued, and in which also a faith had been preserved that, thereby, the ends of medical anatomy were being achieved.

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1. The statutes are printed in Strickland Gibson, *Statuta Antiqua Universitatis Oxoniensis*, London, Oxford University Press, 1931; and in James Heywood, *Collection of statutes for the University and Colleges of Cambridge*, London, Clowes, 1840.
2. On Wendy see *Dictionary of national biography*.
3. John Venn (ed.), *The works of John Caius, M.D.*, Cambridge University Press, 1912, pp. 8–9.
4. Ibid., p. 29.
5. Heywood, op. cit., note 1 above, p. 324.
6. Gibson, op. cit., note 1 above, pp. 378–379.
7. See the evidence of dispensations in Andrew Clark, *Register of the University of Oxford, vol. 2 (1571–1622)*, in Oxford Historical Society, vols. 10–12 and 14, 1887–1889.
8. Details about this position are given below.
9. Printed in James Heywood and Thomas Wright, *Cambridge University transactions during the Puritan controversies of the 16th and 17th centuries*, 2 vols., London, Bohn, 1854, vol. 2, p. 358.
10. See ibid., vol. 2, p. 364. Cf. A. Macalister, *The history of the study of anatomy at Cambridge*, Cambridge University Press, 1891, p. 11.
11. *The works of Thomas Sydenham, M.D.*, edited by R. G. Latham, 2 vols., London, Sydenham Society, 1848–1850, vol. 2, p. 12.
12. Extracted from the preface to the 3rd edition of *Observationes medicae* (1676), printed in op. cit., note 11 above, vol. 1, pp. 11–27.

Figure 1
First page of the anatomy dictates of James Pillans, taken down by Alexander Flint, Edinburgh 1672.
From Edinburgh University Ms Dc 6.4.

13. Op. cit., note 11 above, vol. 2, pp. 83–84. *Theologia rationalis,* in Kenneth Dewhurst, *Dr. Thomas Sydenham (1624–1689): his life and original writings,* London, Wellcome Historical Medical Library, 1966.
14. Op. cit., note 11 above, vol. 2, p. 173.
15. *De arte medica,* in Dewhurst, op. cit., note 13 above, pp. 83–84. Cf. R. M. Yost, 'Sydenham's philosophy of science', *Osiris,* 1950, **9:** 84–105.
16. Following his own dictum that "Physick is not to bee learned by going to universities, but hee is for taking apprentices; and says one had as good send a man to Oxford to learn shoemaking as practicing physick" (Charles Severn, *The diary of the Rev. John Ward, M.A. (1648–79),* London, Colburn, 1839, pp. 241–242); D'Arcy Power's partial transcript (deposited in the Wellcome Institute), vol. 4, p. 957. Thomas Dover and Richard Blackmore were among Sydenham's apprentices.
17. Montagu Burrows (ed.), *The register of the Visitors of the University of Oxford. From 1647–1658,* London, Camden Society, 1881, new series vol. 29, pp. 36, 227–228.
18. Severn, op. cit., note 16 above, pp. 241–242.
19. Printed in Dewhurst, op. cit., note 13 above, pp. 85–93, and in 'Locke and Sydenham on the teaching of anatomy', *Med. Hist.,* 1958, **2:** 3–8. For an alternative evaluation by Sydenham of the need for anatomical study see *On dropsy,* in op. cit., note 11 above, vol. 2, pp. 170–171.
20. Celsus, *De medicina* [Loeb edition], London, Heinemann, 1935, especially pp. 15–17.
21. C. D. O'Malley, *Andreas Vesalius of Brussels 1514–1564,* Berkeley, California, University of California Press, 1964; a translation of the preface appears as an appendix, pp. 317–324.
22. Ruben Eriksson (ed.), *Andreas Vesalius' first public anatomy at Bologna 1540. An eyewitness report by Baldasar Heseler, together with his notes on Matthaeus Curtius' Lectures on Anatomia Mundini,* Uppsala, Lychnos-Bibliotek for the Swedish History of Science Society, 1959.
23. Ibid., p. 273.
24. Ibid., pp. 225, 253.
25. Ibid., p. 69.
26. On which see Charles Singer, *The Fasiculo di Medicina, Venice 1493,* 2 vols., Venice, Lier, 1925.
27. Cf. Galen's *De anatomicis administrationibus,* Book 5, Chapter 6. (See Charles Singer, *Galen on anatomical procedures,* London, Oxford University Press, 1956, p. 134).
28. As Curtius on Mondino—"Then [Mondino] divides the body into the external and internal parts. And he says that we must begin with those more known, and start with the simple principles and afterwards take the 'composita'. Consequently, the body as being a whole moulded together, must be divided into its parts so that we might better know each one of them", Eriksson, op. cit., note 22 above, p. 55.
29. Ibid., pp. 45–47.
30. I.e. teaching from the general to the particular, from the simple to the less simple, from the more known to the less known.
31. M. T. May (ed.), *Galen on the usefulness of the parts of the body,* 2 vols., Ithaca, Cornell University Press, 1968, vol. 2, p. 731.
32. O'Malley, op. cit., note 21 above, pp. 323–324.
33. Book 1, Chapter 6 (491a): see the translation in *The works of Aristotle,* edited by J. A. Smith and W. D. Ross, vol. 4, London, Oxford University Press, 1910.
34. *De partibus animalium,* Book II, Chapter 10 (656a): in ibid., vol. 5, 1912.
35. James Weisheipl, 'Curriculum of the Faculty of Arts at Oxford in the early 14th century', *Mediaeval Studies,* 1964, **26:** 143–185, see pp. 168–176.
36. Robert Pitcairne (ed.), *The autobiography and diary of Mr. James Melville* [c.1600], Edinburgh, Wodrow Society, 1842, p. 49.
37. On Ramus (Pierre de la Ramée, 1515–1572) see Walter Ong, *Ramus, method and the decay of dialogue . . .,* Boston, Mass., Harvard University Press, 1958.

38. P. Ramus, *Scholae in liberales artes* (Basle 1578 edition), Praefatio; *Scholarum physicarum libri octo . . .*, Basle, 1562, lib. VIII, cap. 10.
39. Pitcairne, op. cit., note 36 above, p. 49.
40. Ibid.
41. Among the books left to St. Mary's College, St. Andrew's, by John Johnston in 1611 was "Anatomica Gallica—Melv. habet" ("Inventories of buikis in the colleges of Sanctandrois 1588–1612", in Maitland Club's *Miscellany*, Glasgow, 1834, **1**: 327.) Glasgow University holds copies of the 1542 and 1551 editions of Fernel's book, and two copies of his *Medicina* of 1554, but it is not known when these were acquired (Sir Charles Sherrington, *The endeavour of Jean Fernel*, Cambridge University Press, 1946, Appendix).
42. That the introduction of anatomy may be ascribed to Ramus seems likely as it was recommended by one of his later disciples in Britain, John Milton, in *On education*, London, Underhill, 1644.
43. On these reformations see the second chapter of my Ph.D. Thesis.
44. W. M. Gunn (ed.), *The select works of Robert Rollock*, Edinburgh, Wodrow Society, 1849, vol. 1, p. lxvi: from Charteris' *Life* written *c.* 1600. D. B. Horn errs here in claiming that Melville's reforms had no early influence at Edinburgh ('The origins of the University of Edinburgh, Part 2', *Univ. Edinb. J.*, 1966, **22**: 306–307.)
45. P. J. Anderson (ed.), *Fasti Academiae Mariscallanae Aberdonensis: Selections from the records of the Marischal College and University*, 2 vols., Aberdeen, New Spalding Club, 1889–95, vol. 1, pp. 43, 63.
46. By Dr. R. K. French who very kindly sent me a copy of his translation from King's College MS. 150. This consists of the notes taken by John Moir on anatomy from the dictates of the fourth regent, 1619–20, at Marischal College; the original source of these seems to be Caspar Bauhin (1560–1624). See Roger K. French, *Anatomical education in a Scottish University* [Aberdeen], *1620*, Edinburgh, MacInnes & White, 1974/5.
47. Anderson, op. cit., note 45 above, vol. 1, p. 134.
48. Alexander Morgan, *Charters, Statutes and Acts of the Town Council and Senatus* [of Edinburgh] *1583–1858*, Edinburgh, Oliver & Boyd, 1937, p. 113; Margaret Wood, *Extracts from the records of the Burgh of Edinburgh 1626–1641*, Edinburgh, Corporation, 1927, p. 284; Alexander Bower, *The history of the University of Edinburgh*, 2 vols., Edinburgh, Smellie, 1817, vol. 1, p. 404. The reading "Servelius" which appears in Morgan and Wood has been checked with the Town Council MS Minutes: it should read "Fernelius".
49. David Laing (ed.), *The letters and journals of Robert Baillie . . . 1637–1662*, 3 vols., Edinburgh, Bannatyne Club, 1841–1842, vol. 2, p. 465.
50. *Evidence, oral and documentary, taken and received by the Commissioners for visiting the Universities of Scotland* [1826 Visitation], 5 vols., London, H.M.S.O., 1837, vol. 3 (St. Andrews), p. 206; R. G. Cant, *The University of St. Andrews: a short history*, University of St. Andrews Publications no. 59, 1946, revised 1970, p. 70. For Aberdeen see P. J. A. [nderson], *The arts curriculum*, Aberdeen, for the Author, 1892: anatomy was not included in the 1647–1648 curricula.
51. *Munimenta . . . Glasguensis*, 4 vols., Glasgow, Maitland Club, 1854, vol. 2, pp. 454–455, 483–484.
52. Edinburgh University MS. Dc 5.55, p. 275. The section is titled "Compendium doctrinae anatomicae ex Andrea Laurentio" and was dictated 14–29 June 1661 by Thomas Craufurd, and taken down by Alexander Burton.
53. Edinburgh University MS. Dc 6.4. Entitled "Epitome partium similarium corporis humani praesertim vero ossium", dictated 20 June to 13 July by James Pillans, and taken down by Alexander Flint. The initial letter, illustrating the skeleton, has been reproduced before in C. P. Finlayson, 'Two Highland protégés of Dr. Archibald Pitcairne', *Edinb. med. J.*, 1953, **60**: 54.

54. The Library Donation Book (Da 1.31, p. 26) records that "The Grave and Learned Physician Doctor Michael Young in Testimony of His respects to the Colledge bestowed upon the Library by free gift A Sceleton Virile in October 1671". For its condition in 1702 see Wood, op. cit., note 48 above, volume for 1701–1718, p. 48, n. 5.
55. Edinburgh University MS Dc 1.4ii f 178. See also the opinion given by the regents at St. Salvator's College on their curriculum (1695)—"In the fourt yeer Wee teach the Physicks generall and speciall . . . neither do we hold it necessary to add to the Physicks any thing *de anima* ffor all things concerning it may be discust in the Pneumaticks. And albeit, Aristotle after his Acroamaticks and his other books *de corpore naturali,* has added his books *de anima,* as pairt of his physicall systeme, yet he himself did not judge the soul to be the propper subject of those books, but handles it ther only because of its relation to the body *et tanquam principi facultati et operationi corporis animati*". (*Evidence, oral and documentary* . . ., op. cit., note 50 above, vol. 3 (St. Andrews), p. 218.)
56. *The life of Mathew Robinson* (printed in J. E. B. Mayor, *Cambridge in the seventeenth century,* 3 parts, Cambridge, for the editor, 1855–71, vol. 2, p. 21). The best account of the integral part of anatomy in the natural philosophy course is given by W. T. Costello, *The scholastic curriculum at seventeenth century Cambridge,* Boston, Mass., Harvard University Press, 1958, Chapter 3.
57. See P. Reif, 'The textbook tradition in natural philosophy, 1600–1650', *J. Hist. Ideas,* 1969, **30**: 17–32.
58. References are given in E. H. Cordeaux and D. H. Merry's *Bibliography of printed works relating to the University of Oxford,* Oxford, Clarendon Press, 1968, p. 181. Bodleian Library MS. G A Oxon b19, for instance, contains printed lists of names and subjects for twelve of the years between 1707/8 and 1773: anatomy is one of the subjects in 1707/8, 1731/2, 1736/7, 1741/2, but not 1740/1. Other subjects listed are the three philosophies, logic, jurisprudence, music, history, languages, astronomy and geometry. The comparable subjects in 1636 were grammar, logic, ethics, geometry, Greek and Latin.
59. Gibson, op. cit., note 1 above, p. 551.
60. From the original draft, in English, of the *Anatomia hepatis* . . ., London, Du-Gardianis, 1654; British Museum MS Sloane 3315 ff 165–9. The lectures were delivered in the Gulstonian series at the College of Physicians, 1640; they were translated into Latin by George Ent.
61. First published in 1611, ? at Wittenburg, and frequently reissued in various editions, including one at Oxford in 1633. Quotations are taken from the English translation by Nicholas Culpeper and Abdiah Cole, *Bartholinus anatomy* . . ., London, Streater, 1668; first published 1651.
62. *Historia animalium,* Book 1, Chapter 1, (486a). Op. cit., note 33 above, vol. 5.
63. "The Bellies are certain remarkeable Cavities of the Body wherein some noble bowel is placed and as there are three principal Members [liver, heart, brain] so there are *three Bellies* . . ." Bartholin, op. cit., note 61 above. After Harvey had effectively disproved the blood-making faculty of the liver, and the Helmontians had put new emphasis on digestion, the three most important organs were considered to be the stomach, heart, and brain.
64. *Encheiridium anatomicum et pathologicum. In quo ex naturali constitutione partium, recessus a naturali statu demonstratur. Ad usum Theatri Anatomici adornatum,* Leyden, Wyngaerden, 1649. The quotation has been translated from p. 2.
65. The 1653 translation has been used here: *Two anatomical exercitations concerning the circulation of the blood, To John Riolan* . . ., London, Leach, pp. 1–3.
66. Ibid., p. 70 (the second letter to Riolan).
67. As *A sure guide; or the best and nearest way to physick and chyrurgery* . . ., translated by Nicholas Culpeper and "W.R.", London, Cole, 1657.
68. Quoted from Bodleian Library MS. Aubrey 12 f 314r by Robert G. Frank jr. in, 'John

Aubrey, F.R.S., John Lydall, and science at Commonwealth Oxford', *Notes Rec. R. Soc. Lond.*, 1973, **27**: 216.

69. British Museum MS Sloane 801 f 1. Neither the writer nor the recipient can be identified, but the writer was probably a friend of Henry Power. The works referred to are Johann Vesling, *Syntagma anatomicum*, Frankfurt, Beyer, 1641; the 1647 edition is the first in quarto; Bartholin, op. cit., note 61 above; Harvey, *Excitatio anatomica de motu cordis . . .*, Frankfurt, Fitzer, 1628; Henricius Regius, *Fundamenta physices*, Amsterdam, Elzevir, 1646.
70. For surviving manuscripts see Robert G. Frank jr., 'Science, medicine and the universities of early modern England', *Hist. Sci.*, 1973, **11**: 208 and notes 59 and 60 there. Lectures given by William Petty when he acted as deputy to Sir Thomas Clayton are said to survive at Bowood House.
71. See the Early English Text Society edition of *The anatomie of the bodie of man by Thomas Vicary* [1548–1567 edition], edited by F. J. and P. Furnivall, London, 1888, p. 205. On the probable text used, see Sanford Larkey 'The Vesalian Compendium of Geminus and Nicholas Udall's translation', *Library*, 1932, **14** (4th series): 367–394.
72. John South, *Memorials of the craft of surgery in England*, edited by D'Arcy Power and Sir James Paget, London, Cassell, 1886, p. 134. The expression "Master of Anatomy" is equivalent to "Steward of Anatomy", and meant a master surgeon who was deputed to assist the lecturer and who could also teach anatomy to apprentices; he was admitted to the London corporation of Barber-Surgeons as a "Maister of Surgery and of the Anatamye", indicating that he was "substancyally well exercysed" in the knowledge of "the parts of mans body comonly called the Anathomye". Sidney Young, *The Annals of the Barber-Surgeons of London*, London, Blades, 1890, p. 312.
73. South, op. cit., note 72 above, p. 347; Young, op. cit., note 72 above, pp. 365, 367.
74. South, op. cit., note 72 above, p. 369.
75. Ibid., p. 371; Young, op. cit., note 72 above, pp. 220, 373.
76. Severn, op. cit., note 16 above, p. 237. According to Sir George Clark, *A history of the Royal College of Physicians of London*, 2 vols., Oxford, Clarendon Press, 1964–1966, vol. 1, p. 252. Dr. Foxe, Wright's teacher, made this suggestion in 1638.
77. Young, op. cit., note 72 above, p. 133.
78. Severn, op. cit., note 16 above, pp. 9–10.
79. E.g. South, op. cit., note 72 above, p. 215 (in 1629).
80. Young, op. cit., note 72 above, p. 310 (1556).
81. Clark, op. cit., note 76 above, vol. 1, pp. 101, 388.
82. Ibid., vol. 1, p. 122. The charter is printed in Charles Goodall, *The Royal College of Physicians of London . . .*, London, Kettilby, 1684, pp. 35–36.
83. On Lumley's medical interests see S. Jayne and F. R. Johnson (eds.), *The Lumley library: the catalogue of 1609*, London, Trustees of the British Museum, 1956, pp. 6, 257–273. See also F. W. Steer, 'Lord Lumley's benefaction to the College of Physicians', *Med. Hist.*, 1958, **2**: 301; Clark, op. cit., note 76 above, vol. 1, p. 151.
84. Gweneth Whitteridge (ed.), *The anatomical lectures of William Harvey*, London, Royal College of Physicians, 1964, p. xxvi, citing a manuscript of the College. Harvey's Lumleian Lectures, 1616–56, are printed in this work.
85. South, op. cit., note 72 above, p. 184n, citing Holinshed.
86. Clark, op. cit., note 76 above, vol. 1, pp. 250–251, and Royal College of Physicians MS. 28 (Sir William Browne's copy of Extracts).
87. John Ward, *The lives of the professors of Gresham College . . .*, London, Author, 1740, p. viii. This history has not been replaced. On some aspects of the College see J. E. C. Hill, *Intellectual origins of the English Revolution*, Oxford, Clarendon Press, 1965, pp. 34–61, and the criticism of this by Hugh Kearney in 'Puritanism, capitalism and the scientific revolution', *Past and Present*, 1964, no. 28, 81–101 (esp. pp. 86–90). The Ramist influences on the early days of the College, illustrated by this quotation, have been pointed out in Hugh Kearney, *Scholars and gentlemen: universities and*

society in pre-industrial Britain, 1500–1700, London, Faber, 1970, p. 65.

88. By their charter of 1662 the Royal Society was allowed bodies for dissection, and anatomies took place under their auspices also for a time at Gresham; however, these were not intended for teaching.
89. 'Philopolites' [Thomas Nash], *Quaternio or a fourefold way to a happie life . . .*, London, Dawson, 1633, pp. 44–46. The Physic Professor at this time was Thomas Winston, some of whose lectures were published posthumously as *Anatomy lectures at Gresham Colledge . . .*, London, Eglesfield, 1659. On attendance at his lectures see Clark, op. cit., note 76 above, vol. 1, pp. 256–257.
90. "Physick must certainly acknowledge Anatomy its best Cynosure"—Edward Tyson in the Preliminary Discourse to his *Phocaena, or the anatomy of a porpess . . .*, London, B. Tooke, 1680, reprinted in M. F. Ashley-Montagu, *Edward Tyson . . .*, Philadelphia, American Philosophical Society, 1943, p. 93.
91. Ibid., p. 94; Harvey 'Lectures', op. cit., note 84 above, p. 17; etc.
92. William Petty's Anatomy Lecture delivered to the Dublin College of Physicians in 1676; printed in Marquis of Lansdowne (ed.), *The Petty papers . . .*, 2 vols., London, Constable, 1927, vol. 2, pp. 171–179.
93. E.g. in the anatomy lectures of Dr. Edward Browne at Surgeons' Hall 1675–8, British Museum MS. Sloane 1914. On the inclusion of comparative observations in these lectures, see the advice given to Browne in letters from his father, printed in Sir Geoffrey Keynes (ed.), *The works of Sir Thomas Browne*, 4 vols., London, Faber, 1964, vol. 4.
94. E.g. Walter Charleton, *Enquiries into human nature in VI anatomic praelections in the new theatre of the Royal College of Physicians in London*, London, Boulter, 1680, p. 430. Internal evidence shows that these covered the customary three days, although it is unlikely that dissection took place.
95. Cited from the *London Gazette* by James Axtell in 'Education and status in Stuart England: the London physician', *Hist. Educ. Quart.*, 1970, **10**: 152. Examples from 1701 are given in chapter one of George C. Peachey, *A memoir of William and John Hunter*, Plymouth, Author, 1924.
96. Occasional unofficial courses are known, for instance, *c.* 1661 at Oxford when "Dr. Stephens went over a bodie of Anatomie 16 termes to Schollars: hee read Vestlingius . . .", D'Arcy Power, op. cit., note 16 above, vol. 1, p. 147; an Italian was teaching there in 1692 (A. Clark (ed.), *The life and times of Anthony Wood*, 5 vols., 1891–1895, see vol. 3, p. 387, Oxford Historical Society, vol. 26.) On Keill and Musgrave, see 'Dr. Wallis' letter against Mr. Maidwell' in Oxford Historical Society *Collectanea*, 1885, **1**: 316. For the teaching of Dr. Lavater in 1710 in the basement of the Ashmolean Museum see W. H. and W. J. C. Quarrell (eds.), *Oxford in 1710: from the travels of Zacharias Conrad von Uffenbach*, Oxford, Blackwell, 1928, pp. 36–37. This list is not exhaustive.
97. On Rolfe see Peachey, op. cit., note 95 above, pp. 12–14. The grace of the Cambridge Senate is printed in John Willis Clark (ed.), *Endowments of the University of Cambridge*, Cambridge University Press, 1904, pp. 182–183, and in Macalister, op. cit., note 10 above, p. 17.
98. Such as that of France. See Toby Gelfand 'The Paris manner of dissection: student anatomical dissection in early 18th century Paris', *Bull. Hist. Med.*, 1972, **46**: 99–130.