INTRODUCTORY LECTURE

ON

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DELIVERED AT THE

NEW MEDICAL SCHOOL,

ALDERSGATE STREET.

OCTOBER 2d. 1826.

BY

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Delivered at the New Medical School, October 2d, 1826.

GENTLEMEN,

As the teacher of Anatomy in this School, I have the honour of being the first to address you; and as this is the commencement of a new undertaking, I shall, before I proceed with the particular objects of my own department, endeavour to explain to you the reasons for forming this School, and the plans that will be adopted for the benefit of those gentlemen who come to us for instruction.

The principal motive which has induced

me and the gentlemen with whom I am associated, to institute this Academy for Medical Education, is the expectation of benefiting the profession and ourselves. We aim at the distinction which belongs to successful medical teachers; and this distinction we know we can only attain by thoroughly and properly instructing a large body of students. The undertaking must, therefore, be as useful to the community as to ourselves; and I shall briefly state why we expect success in it.

The large medical schools in this metropolis have hitherto been connected with the great hospitals, and have been considered as under the management of the governors who administer the affairs of these institutions. The advantages with which such an arrangement was at first accompanied, may have been considerable. The pupil had the opportunity of receiving instruction on all necessary branches of medical science, within the walls of the hospital; and probably all the physicians and surgeons attached to these institutions were allowed, if competent and desirous of teaching, to take a share of this important duty.

The profession has, however, grown in importance and numbers, with the wealth and population of the country; while, on the other hand, the managers of the medical schools in these hospitals, instead of seeking for, and encouraging talent and industry, have rejected the assistance of their own medical officers. It is notorious, that at present the situations of lecturers at these schools are considered as private property, which may be disposed of in part, or in toto, as the present possessor pleases; while the lustre attached to splendid public charities, and the late regulations of the Council of the College of Surgeons, seemed to secure this property against all foreign invasion.

Monopoly is generally productive of much mischief, as it creates indolence and inattention in those who benefit by it; and it prevents fair and open competition, the best means of encouraging talent and industry, and of securing to the public honest and upright dealing. The exclusion of Mr. Lawrence from the School at St. Bartholomew's is, I imagine, sufficient to satisfy any unprejudiced person of the folly and mischief of such monopoly, as regards professional education. Mr. Lawrence has for many years been a medical officer of St. Bartholomew's Hospital; he has obtained the highest character for professional talent and acquirement; he has proved himself an eloquent and instructive lecturer; and he has been most anxious to become a teacher in that school. I only wonder that he has so calmly and patiently abided the injustice which has been shewn him, and that he has not before undertaken that duty he is in every respect so well fitted for, and which he will, I am happy to say, commence to-morrow under this roof. I have, for more than nine years, had the honour and pleasure of being associated professionally with this gentleman at the London Ophthalmic Infirmary; I feel proud of the opportunity here afforded me, of further connexion with him, and rejoice in being thus able, publicly to express my admiration of his talents and professional zeal.

With the causes of this exclusion, I have here nothing to do; nor with its result, except in as far as it has suggested our undertaking. We have thought that under such circumstances, an association of teachers not selected from the medical officers of any one hospital, and not depending upon the reputation of any established school, had every prospect of being useful. Each of us relies, not on the merit of a predecessor, but on his own exertions, and on the ability and zeal of those with whom he has associated. If each of us has over-estimated the abilities and industry of the others, the shame of a failure will rest upon us all. But the medical world will see, in the circumstances under which we have commenced our labours, the best pledge that we have calculated the means of success, and that no exertion on our parts will be wanting to ensure it.

Having thus frankly stated the motives of our undertaking, I shall only add that it will be pursued without any narrow feeling of rivalry.

Those teachers in the other schools, who have discharged their important duties with zeal and perseverance, need not consider us as opponents; we shall always consider them as coadjutors in the great work of medical education. Their task is, however, light compared with ours. It requires but moderate care and attention to ensure good and continued crops from a soil already highly and properly cultivated; but it requires infinite labour and perseverance to bring the soil to such a state of cultivation. The present teachers at the hospital schools may be considered as possessors of ground already cultivated, while we must have all the anxiety, labour, and expence necessary for its preparation.

You may have seen from our advertisements, that Lectures will be delivered on every branch of Medical Education, a knowledge of which is essential to the general practitioner. As each lecturer will have the opportunity of explaining to you more fully than I could hope to do, the plan and objects of his own course of lectures, I do not think it necessary to occupy your time with my opinions respecting them; but I shall take the liberty of offering some observations on the present mode of anatomical instruction in this metropolis, which appears to me to be in many points defective, and capable of being much improved.

Anatomy is, I believe, universally acknowledged to be the foundation of medical science, as without a knowledge of it, the practice of the art must be in a great measure empirical, and fraught with the greatest danger to the public. It is true that many men are engaged in the practice of the profession, and apparently with success, having but an imperfect acquaintance with anatomy, and perhaps some few in entire ignorance of it; but I am sure that a very short attendance at any one of the public hospitals, would shew with what kind of success it is that these men really practice, and what dreadful, and often irreparable misery results from their ignorance. It is to these institutions that they send their victims, maimed or ruined in constitution.

Often are persons submitted to great torture in attempting to reduce dislocations which never existed, and frequently are lives sacrificed from a deficiency of anatomical knowledge on the part of the practitioner, either from his rashly undertaking that which he cannot perform, or from his neglecting to do that which, if he possessed sufficient anatomical information, he could not for one moment have hesitated to perform. There are many accidents which require immediate assistance, on which the future comfort of the patient, or perhaps the preservation of his life depends; but in many instances such relief, as is necessary, cannot be afforded by any one but an anatomist. When you are acquainted with the nature of dislocations, of herniæ, of retention of urine,

&c. you will be better able to appreciate these observations: one example, however, which you will all understand, will at present suffice to prove their truth.

Suppose a person to receive a wound in the arm or leg, by which a large artery or blood-vessel is opened, the consequence must be that the patient would bleed to death, unless the flow of blood were arrested. But this cannot be effected, except for a short period, by any one unacquainted with the situation and course of the vessel itself, and of the trunk from which it is supplied; as it is necessary not only to close the orifice of the divided artery by the application of a ligature, but, at the same time also, to arrest the course of the blood directed to it, by pressure on the trunk through which it passes.

No man can with propriety and confidence engage in the practice of our profession, without a general and accurate knowledge of the structure of the human body; as it is impossible for him to have any idea of the alterations and changes so constantly occurring from disease, when he has never seen or examined these structures in their natural or healthy state.

Unfortunately, from the present system of medical education, the time usually devoted to this important subject is much too short, and many pupils can obtain but a very limited and superficial knowledge of it; certainly not sufficient to give them the confidence necessary to make them good and useful practitioners.

The mode in which anatomy has been taught in many of the schools of this metropolis, has long appeared to me to be extremely defective. If the time which is usually devoted by the student to gain a knowledge of anatomy be too limited, this forms the strongest inducement to economize it.

By lectures alone anatomy cannot be taught. Lectures are of use to direct the studies of the pupils, to connect their knowledge, and to enable them to apply it; but the knowledge itself must be acquired by their own industry and activity. Anatomy, a science of form and colour, must be learned by the hands and the eyes. If we attempt to teach it by lectures merely, the state of the pupil's knowledge will be like that of the blind man mentioned by Locke, who boasted that he knew what scarlet (as applied to colour) signified. On being asked by a friend what scarlet was, the blind man replied that he conceived it to be like the sound of a trumpet.

It is absolutely necessary for a student, who is desirous of obtaining an accurate and lasting knowledge of the important branches of his profession, that he should go through all the labour of preparing the parts of the body himself in the dissecting room; that he should examine the various structures and systems in a regular order, first individually, and afterwards in connexion; and that he should thus learn by his own industry, and not depend on that of others. The best description that can be given of any object by the most eloquent person, cannot be compared in utility with the examination of the object itself.

As it is only in the dissecting room that the pupil can obtain the requisite knowledge of anatomy, it is there that the greatest care and attention should be bestowed. At present, however, in many of the anatomical schools, the demonstrators think the most important part of their duty to be that of delivering daily a kind of lecture, attending to, or assisting but little the pupils in the progress of their dissections; excepting, perhaps, their own personal friends. They frequently, also, pursue a very different system of teaching to that adopted by the lecturer; and this, particularly in the descriptive part of anatomy, bewilders the pupil, and renders his task much more tedious and difficult. How much soever, in ordinary writing, variety of diction may render the style agreeable, nothing in scientific pursuit is more essential than that the same word should be always employed in the same meaning, and that the same object should always be designated by the same name. Suppose that the various masters in a public school were each to adopt his own mode of instruction, each teaching by a different grammar, and each using different names and terms, what would be the consequence? One instance, out of many I am acquainted with, which will well illustrate the effects of such a mode of teaching anatomy.

There is a covering to the protruded gut in oblique inguinal hernia, after it has descended into the scrotum, with which you will hereafter be made acquainted, and which is called by various names by different anatomists—as *fascia superficialis; fascia spermatica; fascia of the cord; aponeurosis of the external oblique, &c.* A gentleman who did not want for diligence, but who had employed that diligence at a school blessed with several teachers, came to my house to attend the private examinations I have been long in the habit of holding. During the evening, I asked him to tell me the usual coverings of oblique inguinal hernia. He answered, the skin, the superficial fascia, the fascia spermatica, the fascia of the cord, the aponeurosis of the external oblique, the cremaster muscle, &c., thus supposing the unhappy gut to have as many or more coats than the grave digger in Hamlet.

Another great evil existing in the present schools is that of allowing each pupil to dissect what part he pleases, and of not keeping him to any regular plan; on which account much time is often spent in minute examinations of parts really of little practical utility, but of which a neat and pretty exhibition can be made. It is perfectly right that dissections should be performed with neatness and attention; but as extreme minuteness is not necessary for practical purposes, the student may employ his time better than upon dissection for such exhibitions.

These appear to me to be the chief faults of the present system of anatomical education; and I shall briefly state in what manner I propose to remedy them in this school. I am confident that the gentlemen resorting to us for instruction will readily and cheerfully submit to what may at first appear rather arbitrary, but which will, I am sure, be much for their own benefit.

The object of dissecting is, that the pupil may learn, by seeing and examining, the various parts and structures of the human body, and thus fix in his memory their forms, natures and connexions. But in this, as in every other process, time may be lost through ignorance, or it may be saved by skill. It is not necessary that, because the pupil is attentive, he should be allowed to grope out his own way in the dark; he should be led to bestow all the pains necessary to examine a part thoroughly and to fix it in his memory, but no more. An inexperienced pupil, left to himself, is apt to waste much of his time on trifling objects, while he overlooks others of importance; he is apt prematurely to occupy himself in investigations, which for want of preparatory knowledge can lead him to no result; and even the objects he sees and understands in their proper places and in their proper orders, are not so firmly rivetted in his memory, as when his attention is stimulated by the presence and suggestions of a skilful teacher.

It is, therefore, by the constant presence of one of the teachers, and by the directions which will be given as to the order of the studies, that I intend to obviate the waste of time and labour.

The advantages of observing a certain order in the dissections will be explained to the pupils, and will, I hope, be made so clear to them, that they will feel no temptation to depart from it. They will not be allowed to pass on to the second part or system, until well acquainted with the first; nor to the third, without having become familiar with the second; and so on. For instance, the pupil will first study the bones individually, and then in connexion; and when I have ascertained by examination, that he is acquainted with this system, he will proceed to dissect and examine the muscles; after the muscles, the ligaments; and thus he will go through each part or system, in the course of the season.

When the impressions are once made on the mind, the next object is to prevent them from fading; and, if possible, to strengthen them. This we shall attempt to do by frequent examinations, and by exciting so much emulation as to give the pupils a pride in the extent of their knowledge, and the readiness with which they can apply it. Besides testimonials of diligence, prizes will be offered twice in the year to those gentlemen who excel either in theoretical or practical anatomy; and this expedient, among others, while it stimulates the exertions of the pupils, must, I think, afford an additional pledge on the part of the teachers, that a close and discriminating attention will be paid to the progress of those who are committed to their care.

To recapitulate in a few words, I propose to economize the time of the student, by directing the order of his studies; to economize it also, and to fix his attention to the proper objects, by the constant presence and superintendance of one of the teachers in the dissecting room; to root the acquirements more firmly in his mind by frequent examinations, and to stimulate him, if he need it, by special honorary rewards.

In the anatomical lectures, independently of the description of each part of the body, the peculiarities and properties, physical and chemical, of each system, will be explained; and also their development, or formation. The functions of each part, with the morbid changes to which it is liable, will be also briefly stated, but only sufficiently so to prepare the pupil for the lectures expressly relating to those subjects.

In the dissecting room, the pupil will have the able assistance of Mr. Quain and Mr. Coulson, to direct his studies in the practical acquirement of anatomy. These gentlemen will pursue the same plan of teaching as myself; and one of them will deliver a demonstration daily, the object of which will be chiefly to explain the best modes of dissecting and examining the different structures and organs of the body, instead of giving a mere descriptive lecture on parts previously prepared. They will examine the pupils frequently, and report to me the progress they make, preparatory to their being examined by myself.

With respect to the qualifications of these gentlemen, I can confidently assure you, that they are of the highest order. Mr. Quain has been for some years preparing himself for an anatomical teacher in Dublin, and in France; he has excellent testimonials of industry and acquirement, and he possesses great zeal and perseverance. Mr. Coulson was one of my earliest pupils. I have had for many years the pleasure of an intimate acquaintance with him; and I consider myself fortunate in having obtained the assistance of one whom I know, from experience, to have every requisite necessary to enable him to discharge the duties he has undertaken, with credit to himself and with advantage to the pupils.

Much difficulty has of late years arisen in procuring bodies for dissection, but I have made such arrangements, that I trust no inconvenience or delay will be experienced for the want of them.

It may be here also proper to state our intention of keeping open our rooms for dissections during the summer, although we are assured, by the illustrious promoters and encouragers of sound chirurgical knowledge, that anatomy cannot be learnt at that period of the year. Our winter pupils will, of course, have the advantage of such an arrangement.

The intimate connexion between Anatomy and Physiology, renders it necessary for me to say a few words respecting the latter science. It treats of the various functions and uses of the different textures, structures, organs, &c. which it is the object of Anatomy to examine. As you may readily imagine, but little practical good could result from a most intimate acquaintance with the form, colour, size, &c. of any object, unless we had also a knowledge of its properties or use. Suppose the master of a ship to be acquainted merely with the names, forms, colours, textures, &c. of the various ropes, masts, sails, and other necessary apparatus, with which the ship should be furnished, would he be able to direct her motions, and to navigate his charge in safety, between shoals and rocks? Certainly not: no more would the medical practitioner, although an excellent anatomist, be able, without a knowledge of Physiology, to guide his patient through the mazes of disease; but he would inevitably, sooner or later, fall into some one of the many dangers to which, under such circumstances, he is constantly exposed.

Deviations from the natural or healthy functions are as frequent, if not more so, than any actual change of structure; and an alteration in function often indicates the commencement of some morbid change which would otherwise escape observation at the time. The various sympathies, and all the interesting and wonderful phenomena of growth and decay, can be explained or understood only by the Physiologist.

In the anatomical lectures, a general view will be taken of Physiology, and the most important parts in relation to practice will be explained; but the time required for mere anatomical description will prevent my entering very minutely into the subject. A full course, however, will be given on this interesting and important branch of medical education, by Dr. Roget, who has long made it the particular object of his study, and has already gained much popularity and reputation by his Lectures on this part of medical science. The mode in which he proposes to illustrate human physiology by reference to the comparative, or that of animals, will much increase the interest and utility of his lectures.

I have made arrangements with Dr. Roget, by which our anatomical students will have the opportunity of attending these lectures at a very moderate expence.

In what I have said of the method in which I propose that you shall pursue your studies, I have presumed that you are not altogether ignorant of the scope of anatomical inquiries. It is usual, however, on occasions like the present, to give some definition of Anatomy, and some account of the origin and rise of the science.

ANATOMY, in its etymological and primary signification, is mere *dissection,* or cutting up. In its secondary, and now usual meaning, it is the investigation of the structure of animated beings, and especially, when used without any qualifying epithet, the investigation of the structure of the *human* frame. Dissection, or cutting up, is indeed a principal method in the pursuit of these investigations; but maceration, desiccation, injection, and other means are also frequently employed.

It has been justly observed, that a minute history of Anatomy, by which anatomical courses have been ordinarily commenced, presupposes a knowledge of the science in its perfect state, and is therefore misplaced in an address to those who come to learn its rudiments. But some sketch of the rise and progress of so important a branch of human knowledge may be useful, even at this early stage of our studies, not only because no well educated man, unconnected with our profession, should be ignorant of it, but because nothing is better calculated to excite the zeal of the youthful student, than the honour which, after the lapse of ages, attaches itself to the great discoverers of the science which he cultivates. The names of Hippocrates and of Galen rank, like those of Plato and of Aristotle, with the great ornaments and benefactors of the human race. Who is not proud to be the countryman of Harvey or of Hunter?

Anatomy, in its widest sense, being the investigation of the structure of the human body, must have had a very ancient origin. Some general knowledge, even of the internal structure of the human body, must have been acquired by men in the earliest stages of society, not merely by the sight of the frame in rest and in action, but by the wounds and other accidents which expose the internal parts, and by the observations which would not fail to be made on those animals which bear a resemblance to man. But it was not till other sciences had made considerable progress, that anatomy began to be studied in reference to medical objects. Whether Podalirius or Machaon, the great supporters of our College of Surgeons, had performed dissections, I cannot take upon myself to decide; but as Machaon is said by Homer to have been famous for cutting out arrows, we must hope, for the credit of the body with which he is associated, that he had gone through at least three winter courses.

The first person who is known to have written on Anatomy, is Hippocrates, who flourished 400 years before Christ; and it is worthy of remark, that the first known anatomist gave to medicine a separate and honourable existence; thus proving, if proof were necessary, that anatomy is the only true and solid basis on which medicine can rest. Though the works of Hippocrates retain at this day a great share of credit, the anatomical knowledge scattered through them is, as we might expect, very imperfect. We may say of him, as of the other celebrated ancient physicians, that his merit is not to be measured by the amount of his knowledge, so much as by the earnestness and ability with which he applied himself to the attainment of it. The religious zeal with which he availed himself of all the imperfect opportunities that presented themselves; his diligence in recording facts, and his caution and sagacity in drawing inferences, have been deservedly repaid by ages of admiration. But it is pretty well ascertained that Hippocrates never dissected a human subject, and he did not even know the difference between arteries and veins.

About 300 years before Christ, numerous

dissections of the human body are said to have been performed by Herophilus and Erasistratus, at Alexandria, in Egypt. But as the works of both these anatomists are lost, their labours are known only by the quotations in the works of Galen, the most celebrated of the Greek anatomists, who flourished in the year 150, of the Christian æra. Galen, however, for the most part only dissected apes and other such animals, the several parts of which he conceived most nearly resembled those of man. But he was not earnest in impressing on the students of Anatomy the necessity of dissections, and advises them to travel from Rome to Alexandria for the purpose of examining the human skeleton. It is fortunately not necessary for us to go so far in order to acquire a knowledge of Osteology, though the barbarous prejudices which are fostered against dissections have occasionally threatened to make the study of anatomy in England impracticable.

From the time of Galen, anatomy declined, as did almost every other branch of useful knowledge. From his age, indeed, to the beginning of the sixteenth century, little need be said of the history of the science. In some countries, it was not cultivated at all; and where it was studied, its professors were satisfied with copies and compilations from the Greek authors, especially from Galen himself. As those who copy, profess to follow, it is no great wonder that they did not outstrip their predecessors.

The most celebrated copyists and compilers from the Greek anatomists, were the Arabians under the Caliphs; but religious ceremonies prevented them from performing actual dissections.

For some time previous to the beginning of the 16th century, Anatomy was revived and improved in the Universities of Italy, especially in Bologna; and there, it is probable that dissections of the human body were, for the first time, systematically performed. But the opportunities for dissection were rare, and the Professors never ventured to dispute the authority of Galen.

In 1514, Vesalius was born at Brussels. At an early age he commenced his studies at Louvain, and prosecuted them in Italy. He relied, as I would advise *you* also to rely, for the acquisition of his knowledge on his own eyes, hands, and reason, and not on the *dicta* of his predecessors; and he was enabled to correct the errors of Galen, and lay the foundation of all the improvements in modern anatomy. Vesalius published some admirable plates of the human body, which, independently of their general accuracy, are well deserving admiration from the nature of the workmanship bestowed on them. It will be seen, however, on an examination of these plates, that Vesalius was not entirely free from the charge which he brought against Galen—for in the plates of the female organs of generation, instead of representing the human uterus, we find this organ described from some other animal.

The improvement of anatomy seems to be one of the most unobjectionable ameliorations; but there are certain persons by whom no improvement is deemed innocent, and by this class Vesalius was assailed.

Vesalius's great offence was that he had differed, not from nature, but from Galen; but as in the most unreasonable disputes men appeal to reason, so in maintaining the superiority of Galen, the opponents of Vesalius were obliged to refer to the human body. This reference, Gentlemen, to the true source of anatomical knowledge improved anatomy; and thus Vesalius gave an impulse to the science, not only by his own labours, but by the discussions and inquiries to which those labours gave rise.

Vesalius died about the year 1564; and before the end of the same century, our countryman, Harvey, went to study in Italy. If the labours of Vesalius and his predecessors gave to anatomy a perfect form, to Harvey the praise is due of having imparted to it life. At the age of nineteen, Harvey removed from Cambridge, where he had studied for five years, to the University of Padua, where he pursued the study of anatomy under Fabricius ab Aquapendente, one of the most famous anatomists of that age. In Padua, Harvey studied for five years. I dwell on these points of his early history, Gentlemen, to shew you that with him, as with most other great discoverers, his fame was not the result of fortune, sudden inspiration, or what some call *genius;* but that he diligently sought the best sources of knowledge, and that he bestowed much time as well as labour on the acquisition of it. Of the instructions of Fabricius, Harvey spoke ever afterwards with reverence and affection, one of the proudest rewards which a teacher can possibly receive. The great anatomical and physiological point, for the discovery of which the name of Harvey has been handed down to posterity, is, as you all well know, the circulation of the blood. It was in the year 1628 that he published an account of the circulation, although he had taught it in his lectures as far back as the year 1616. As happens with most other discoverers, some persons refused to allow Harvey any merit, stating the discovery had been known before, and others denied the truth of it in toto. Succeeding ages, however, have bestowed on Harvey the praise which he so justly deserved.

But you must not imagine, either, that nothing was known of the circulation before Harvey's time, or that he unfolded all the difficult points connected with this subject. Hippocrates, the Anatomists of Alexandria, Galen, and others, had some confused ideas respecting it. Galen, indeed, was aware that the blood flowed both by the arteries and veins, although he was unacquainted with its exact course. Harvey first ascertained the general fact of the circulation; but even he was ignorant of the direct communication which exists between the arteries and veins.

The discovery of the absorbents of the intestines by Asellius, at or about the same time that Harvey discovered the circulation, gave a new impulse to anatomy, and afforded materials for investigation to a host of distinguished anatomists who now followed. Shortly afterwards, the general absorbents of the body were brought into notice by Bartholine and Rudbeck; and in 1654, the Receptaculum Chyli was discovered by Pecquet, from which circumstance you very frequently find it called in the older authors, and even in the modern Italian ones, the Receptaculum of Pecquet.

From this time no discoveries, as great as those I have mentioned, were made. The peculiar feature in the labours of the anatomists who lived at this period, was the making of minute anatomical preparations, in the execution of which they availed themselves of the microscope and of fine injections, which were now first brought into use. Italy had hitherto been the country in which anatomical pursuits had been cultivated with the greatest zeal, but in one of those sudden changes, the causes of which it is scarcely possible for the most philosophic mind to detect, the Italian school sunk into disrepute, and Leyden became the centre of anatomical learning. Ruysch, Diemerbroeck, Swammerdam, and others, are the men who now chiefly distinguished themselves. By their minute investigations they threw considerable light on the structure of the absorbents, and discovered some of those points connected with the circulation which had escaped Harvey's observations. It was in this place, also, that the finest injected preparations were first made. But, Gentlemen, what will be your surprize when I tell you, that the very individual who thus contributed to facilitate the study of anatomy by an improved mode of injecting the body, should have kept that mode a secret, which he told only to the individual who was his successor in office, and that on the condition that he should only tell his successor, and so on. If there be one thing in the world more contemptible than another it is the spectacle of a scientific man, who may have contributed to the advancement of science, withholding from the world an account of the means by which he has effected it. Were such a man but for a moment seriously to consider on the consequences which conduct like this, if universally adopted, must have entailed on the happiness of mankind, the reflection must, if he possessed the slightest particle of feeling, operate in preventing such conduct. I scarcely know how to contain my indignation when I see men endeavouring to cut off from others those very sources of happiness which they themselves enjoy.

This spirit unfortunately prevailed at Leyden, but like every similar endeavour to check the spread of knowledge beyond the pale in which it was commenced, proved perfectly powerless.

From this period, viz. the end of the 17th and beginning of the 18th centuries, anatomy began to be cultivated in England, France, and Germany, with a zeal which still continues, and which I trust will never abate. Cowper, Cheselden, and Monro, in this country; Winslow, in France; and Haller, in Germany; are the names most conspicuous at this period of the history of anatomy. Since this, Hunter, Baillie, Bichât, Walter, Soemmerring, the Meckels, Scarpa and Tiedemann, have, by their writings, obtained immortal celebrity. To determine to which of these distinguished characters the greatest merit is due, would be a difficult and arduous task: for it is by the writings and labours of all in conjunction, and not of any one in particular, that the science of anatomy has made such considerable advances.

Such, Gentlemen, is the general outline of the history of anatomy, which I have thought it necessary here to offer you; and I trust, hereafter, that the names of many who now hear me, will be classed by future lecturers with those I have mentioned.

In examining the whole of the animal kingdom, we find a gradation from the most simple structure of the common polypus, to the extremely intricate formation of the human body. It may be interesting, as well as instructive, to give here a brief account of the scale, extending between them, as it will shew the development of the various systems and organs proper to animal life, and will demonstrate the necessity of their division and classification, while pursuing our investigations of the structure of the human body. Beyond the functions proper to vegetables, as nutrition and generation, we find in the most simple animal bodies, the power of motion and of sensation; the latter, however, is also apparent in some plants, as the mimosa, which shrinks from the approach of violence. This power of motion and sensation is absolutely necessary for their existence and preservation, as without the first they would be incapable of changing their situation to seek for nourishment, or to avoid danger; and without the latter they could not select the food proper for their support.

In the lowest order of animals, the *Infusoria*, and in some of the ***Polypi***, no marked structure can be perceived, and they present merely a gelatinous and homogeneous mass, having pores or cavities for the purpose of taking their food. Corresponding to this exceedingly simple formation, we have the most simple mode of nutrition. These animals derive the matter which serves to support them from the surrounding medium, probably by absorption. This power of motion enables them to change their situation, when they can no longer find sufficient nourishment in the fluid which encircles them. Such a mode of support very much resembles that of plants, and these animals are considered as the connecting link between the animal and vegetable kingdoms: they are, therefore, very properly called ZOOPHYTES, or animal plants.

As we ascend the scale, we find animals possessing a more defined and perfect cavity, provided with an opening or mouth, which is surrounded by tentacula or limbs, for conveying the food into it. In many, this opening is also furnished with horny teeth, for dividing the nutritious matter. This opening, or mouth, is very elastic, and will admit large substances; it also serves as an anus for the discharge of the excrement. These animals propagate by shoots or buds, which arise from their surface, and in a few days drop off from the parent, but soon become parents themselves in the same way. It often, however, happens that this first shoot begins to bud or propagate before it separates from the original animal, and thus the three are connected. The most curious circumstance respecting these animals is, that they not only survive if cut into pieces, but each piece in a very few days becomes a perfect animal of its kind. In some, the cavity assumes a membranous appearance, and may be considered as a stomach; in many instances a short canal leads from this cavity, but it terminates in a *cul de sac*, which may be regarded as an intestine: but the excrement is still discharged by the mouth. Instead of the former uniform and gelatinous appearance, a fibrous structure becomes evident, and the animal is found to possess a more decided and extended power of motion.

The next structure we find, is a kind of net work situated between the stomach and external covering: in this the ovaries are placed; but there is further evidence of organs of generation. Thus we have systems for digestion, for motion, and for propagation, but all simple in structure and in effect.

These are, however, soon further developed; the intestine becomes complete, and terminates at a distinct and proper anus, so that the excrement is no longer discharged by the mouth—muscular fibre becomes more apparent, and organs of generation for each sex are readily distinguished. As the formation of separate organs of generation renders it necessary that the different sexes should copulate in order to propagate their species, and as this new property requires more energy, we now find a new system in the nervous; the first appearance of which consists of two white cords, small and delicate, extending the whole length of the body. The power of motion is greater, and there is a more perfect apparatus for digestion or nutrition.

The vascular system is the next that appears in conjunction with the respiratory. At first only one or two simple vessels are perceived, which communicate with the intestine, but which do not extend the whole length of the body; the blood is white. Respiration is performed by means of small tubes, or stigmata, penetrating the body of the animals.

The other systems already mentioned,

become at the same time more and more developed and complex; the digestive organs are placed in a proper abdominalcavity; the animal is provided with limbs, which, although of imperfect formation, greatly assist and increase the power of motion. Muscles are formed, and the exterior covering is found more dense and firm, serving for the attachment of the muscles, and for the protection of the more important organs and viscera.

In the next order of animals, or that of Insects, the most remarkable addition is that of the head, with some of the senses—such as the organs of sight, of smell, and in a few, of hearing. The eyes are of two kinds, simple and compound; they are often numerous in the same animal, three or more being found, some simple and some compound, and they are seated usually in the head. The organs of touch, or the palpi, are also connected with the head, and are small, slender and very flexible projections : a mere cavity or depression marks the first seat of the organ for hearing.

Some of these animals live by suction, in which case they are provided with a tube, projecting from the head, instead of the mouth ; but in many of them a mouth is found of a very complicated formation, for the purpose of masticating their food, and preparing it for a more intricate process of digestion. The œsophagus, stomach, and intestines are distinct, and furnished internally with further apparatus for triturating and dividing the food ; no salivary or other glandular structure can be discovered, but many of these animals are known to secrete an acrid fluid, somewhat resembling saliva. Bile is also secreted, although no proper liver exists ; but small tubes opening into the alimentary canal, and closed at the opposite ends, are known to pour out this fluid. Many of these animals are also furnished with a tongue, which assumes an almost endless variety of form and structure.

The organs of generation are more perfect, and the modes of copulation exceedingly various. The males and females are in some instances so unlike, that they could scarcely be supposed to be of the same species. Several only copulate once, and the act is soon followed by death. The increase of the pregnant female is in many instances extraordinary; for instance, the abdomen of the white ant, when ready for laying, is calculated to be two thousand times longer than it was before impregnation.

We find these animals capable of performing a great variety of motions, and many of them can walk, run, swim, and fly with the greatest facility, a combination which is very seldom met with in any of the other classes. To enable the animal to perform these complex motions, the structure is very different from that hitherto met with; the limbs and body are articulated and covered by a horny substance, which serves for the attachment of the muscles, and as a fulcrum for their action, as well as to protect them, and the more delicate organs, as those of digestion, generation, &c.

The organs of digestion, generation, and motion, being now more developed in extent and complexity, require a more abundant and perfect supply, and consequently have the vascular system in greater perfection.

Instead of the single vessel at the back, two or more are formed, and from these branches are passing to the various parts of the body. The organs of respiration, which appear with the vascular system, increase towards perfection as the latter becomes more perfect; pouches are added to the respiratory tubes, forming the first rudiments of lungs; the air is also allowed to pass to any part of the body by minute ramifications from the exterior tubes. For as there is not yet any decided circulation of the blood, it cannot be otherwise exposed to the influence of the atmospheric air.

The nervous system is developed in the same proportion as the others; an appearance of brain is first discovered as a nervous mass, situated near the œsophagus, and from this, two principal cords pass throughout the whole length of the animal, and send off minute ramifications, which interlace, and form an intricate kind of net work in the lateral parts of the body.

Thus the organs for digestion, for generation, for motion, for circulation and respiration, and also for sensation, are found progressively increasing in structure and in power.

In the VERMES, and MOLLUSCA, the next grand divisions, a glandular structure for the assistance of digestion is first manifest; salivary glands and a proper liver are found.

The vascular system is rendered more complete by the addition of a ventricle, or ventricles, fleshy, and assuming decidedly the character of a heart. If more than one ventricle exists, they are not joined together, but placed at different points in the circulating vessels; so that some of these animals may be said to possess several hearts. A double set of vessels is also formed; one set for carrying the blood to the respiratory organs, and the other for distributing it through the various parts of the body; with veins for its return: thus proper circulation is established. The respiratory organs are rendered more complete by the addition of gills, or branchia.

The nervous mass considered as the brain, is now enclosed in a proper cartilaginous covering, and other masses are found in different parts of the system, connected to each other and to the brain by proper nerves; and it is from these masses that the lateral and more numerous ramifications proceed.

We now come to a class of animals, in which the general structures already mentioned are found much more perfect; and in which many important additions are taking place, viz. that of FISHES. It is here that we have the first formation of an internal skeleton; and although on a superficial view, it appears very different from that of other animals, yet on an accurate examination, we find a great analogy between them. Besides the spine, or vertebræ, bones proper to the head, pelvis, and those supporting the fins, which may be considered as the extremities, are formed ; ribs are wanting in some, but exist in others.

The skeleton serves for the attachment of muscles, which are well defined, and of considerable power, in many fishes. The brain, spinal marrow, and some of the more important organs and viscera are also in a great measure protected by it. Besides the organs of digestion, and those assisting in the process already mentioned, the pancreas and spleen are discovered ; the former, indeed, exists but in few animals of this class; but the latter is, I believe, found in all. The apparatus or connecting medium, between the organs of digestion and circulation, may now be recognized distinctly for the first time. The lacteals, or absorbents of the nutritious matter, pass from the stomach and intestines to a cellular bag, which is placed near the stomach. Absorbents are also found coming from all parts of the body, communicating with each other, and with the former, and terminating in the veins corresponding to the subclavian.

Instead of a single ventricle, or separate ventricles, the heart is composed of two cavities, an auricle and a ventricle; the former receives the blood from the veins of the body, and the latter propels it to the branchiæ or gills, to undergo the change necessary for its further circulation. After passing through the branchiæ, the blood does not immediately return to the heart, as in man; but it goes directly into the vessels destined to convey it all over the body. In general, three principal vessels are found, which give branches to the head and upper part, and afterwards unite into one grand trunk, or *aorta*, which again divides and subdivides in the trunk and other parts of the system.

Another important set of organs is found in this class of animals, namely, those for the secretion and excretion of urine. They consist of the kidneys and urinary bladder ; the former are much larger, in proportion to the body, than in any other animal. They are placed close to the vertebral column, and often extend considerably farther than the abdominal cavity. In some, the ureters merely offer an enlargement before their termination ; but in others, a distinct bladder is formed, capable of containing a considerable quantity of urine ; the external opening for the discharge of the urine is usually separate, but, in a few instances, is common with the anus.

The brain is enveloped in membrane, and enclosed in a proper cavity. The cerebrum is composed of two lobes, smooth and without convolutions, having a hollow in each, answering to the lateral ventricles. The cerebellum is as large, and sometimes larger than the cerebrum; it is single, not having any lobes or division, and is usually cordiform.

The nervous system is very large in comparison with the bulk of the brain, and we can distinguish separate nerves from the brain and from the spinal cord; also a grand sympathetic is found extending through the body, and supplying the viscera. The nerves from the brain are principally passing to the different senses, which these animals possess in a much more perfect state than in any before described; but others also exist. They generally have nine pairs of nerves. 1. The optic to the eye. 2. The olfactory to the nose. The 3d, 4th, and 6th, to the appendages of the eye. The 5th, in part to the orbit, in part to the organs of smell, taste, &c.—7th, to the exterior of the head, communicating, as in man, with the 8th, the portio mollis, or proper auditory nerve. The 9th or par vagum, supply principally the branchiæ, œsophagus and stomach; but it also sends a branch, which goes to the integument at the side of the body, and is continued as far as the tail.

The spinal nerves of fishes resemble each other in their course and distribution; they are connected with the sympathetic, which is very small and slender: no ganglia are found at the points of communication.

Fish have not any particular organ for touch, and this sense must be but imperfectly possessed by them; the end of the nose or snout, appears to be its principal seat, and it is largely supplied with nerves.

The organs of smell are contained in the head, and consist of cavities lined with membrane, but not communicating with the fauces, or other cavities of the part; the external opening of these organs can be closed at pleasure by a kind of sphincter muscle.

Organs of taste cannot be very perfect in fish, as their tongue does not exhibit the usual character and appearances which are found in the tongues of those animals which we know to possess this sense.

The apparatus for the sense of hearing in fish is altogether internal; for as the sound is always conveyed to it through the same medium, no external appendage is necessary: the external opening or depression is found at the back of the occiput, near the junction of the head with the spine. Hunter and Munro describe an external opening; but Scarpa and Cuvier only admit of a depression. The internal ear is chiefly composed of the semicircular canals of the higher animals, and a curious bag, containing calcareous bodies, three in number, placed in a gelatinous pulp; these are for the purpose of increasing the impressions of sound, as they are in contact with the nerves.

The eye has its coats and humours, but so modified as to adapt the organ to the density of the medium through which these animals see. One circumstance, perhaps, is worthy of notice, that the ciliary processes do not exist, but the pigment on the choroid is found; a proof that it is not secreted by those bodies, as some anatomists have supposed. There is also a substance surrounding nearly the optic nerves, and placed between the choroid coat and the membrana Ruyschiana; this has been called the choroid gland, but its use does not appear to be at present understood.

In Reptiles, the next class, a further degree of perfection is taking place in some of the systems already mentioned; but no new system is added. The principal alteration is in the vascular and respiratory organs; the heart presents two auricles and a ventricle, instead of, as before, only one auricle and one ventricle. One of these auricles receives the blood from the lungs, and the other from the veins of the body; and each communicates with the ventricle into which they pour the blood received by them; and from the ventricle it passes to the lung and various parts of the body.

The lung is contained in the thorax; and has the air introduced into it through the trachea, or air tube, which is furnished with an imperfectly formed larynx, but there are no further organs for producing or modifying the voice.

The kidneys have capsulæ renales attached to them; but no important addition is occurring to any of the other systems.

In Birds, the digestive organs are somewhat modified according to their mode of living and general formation; and they have no teeth to divide their food, the stomach is unlike that of the animals possessing these instruments. It has added to it the gizzard, or powerful muscles which divide the food by triturating it with the small stones these animals swallow for that purpose. The tongue can hardly be considered as an organ of taste, as it has not the proper characters belonging to the organ when endowed with this sense: its figure, size, and mobility are also extremely various.

The heart is now found with four cavities, as in man; namely, two auricles, and two ventricles; and the circulation is performed in the same order. The lungs communicate with the cavities of the body, and with the interior or hollow part of the bones, which can be inflated by the animal at will; by which arrangement the capability of flight is no doubt facilitated. The larynx is of complex formation, and the organs of voice are more devoloped; so that some of these animals are capable of producing sounds as various as they are beautiful.

No urinary bladder is found; but the uretus terminate in the rectum, and the organs of generation are modified and adapted to the formation and habits of the animal.

The brain and senses are also more complicated in structure; and the size of the former, in comparison with that of the whole body, is larger than in any other animal; even greater than in man. For instance, the brain of the Canary bird is equal in size to one fifth or one fourth of its whole body; while in man, it is not more than one twenty-fifth: but in point of structure there is still a great difference.

The organs of sight have an apparatus connected to the choroid coat, and projecting into the interior of the eyes, a structure which is peculiar to them. It has been supposed to assist in altering the position of the crystalline lens, for the purpose of adapting the organ to distinguish either near or distant objects.

Birds have no external ear; but the internal structure of the organ of hearing, is much more perfect than in fishes, as the former possess a tympanum and labyrinth. The tympanum is shut by a membrane, and contains a bone and some cartilageous processes: a tube is found in place of the cochlea.

We now arrive at the highest class of animals, the MAMMALIA, in which man is included; and the characters of which, according to Linnæus, are as follow:—The heart has four cavities, two auricles, and two ventricles; the blood is warm and red; the lungs respire regularly; the jaws are placed horizontally upon each other, and are covered with lips, within which the teeth are generally included; they are viviparous, bringing forth their young alive, and nourishing them at the breasts, or mammæ; from which circumstance the name of the class is derived; they procreate by an intrant penis; they possess taste, smell, sight, hearing, and touch; and their organs of motion are four legs, except in those confined entirely to the water. The chief differences existing between this class and any of those already described, consists in the greater perfection of their various structures and functions.

I have not entered into the various modifications of the systems and organs belonging to the different classes, but I trust that this short sketch will be sufficient to shew the progressive development of the numerous systems and organs, and to prove that not any of them are at first found perfect, either in form or function.

In the first class of animals I mentioned, we find a kind of digestive cavity; but did we not know from observation that the food is deposited in it by the animal, and that the excrement is afterwards ejected from it, we could not have supposed, when comparing it with the stomach of the more perfect animals, that it was destined for such a function; but in pursuing our investigation we soon find that this cavity assumes a membranous appearance, and has an appendage, which afterwards proves to be the first rudiment of the intestine; and we soon perceive a separate opening for the discharge of the matter not employed in nutrition. The stomach and intestine being now developed, we soon find other organs added to assist in a more complicated process of digestion; salivary glands and a liver are formed, and subsequently the pancreas and spleen; at the same time the stomach and intestine approach nearer and nearer to perfection.

As the digestive apparatus is at first simple, so are all the other organs and systems which are afterwards found. If we view the vascular, the nervous, the sensitive, the generative functions, we find in all the same regular gradations of improvement.

In the scale I have followed, I am perfectly aware that organs developed in one class of animals are not met with in others, which are in other respects more perfect; but this observation applies more particularly to those organs which are not, under any circumstances, perfectly essential to each other, or to the whole economy of the animal. For instance, we never find the vascular system disappearing, and the respiratory organs remaining; nor the stomach wanting, while the intestines are present; nor do we discover any organs of sense when there is no nervous system; but we find some animals with feet, and some, otherwise as perfect, without feet; some with wings, others destitute of these organs; and so on. And if we take the trouble to inquire into the reasons for such deviations, we shall find that, under different circumstances, the same organization is not required, and that nature does not form any thing in vain.

From this striking gradation of animal life, Milton has drawn a beautiful illustration of the scheme of the creation.

One Almighty is, from whom
" All things proceed, and up to him return.
" ——————— One first matter all,
" Indued with various forms, various degrees
" Of substance, and in things that live, of life;
" But more refined, more spirituous, and pure,
" As nearer to him placed, or nearer tending,
" Each in their several active spheres assigned,
" Till body up to spirit work, in bounds
" Proportioned to each kind. So from the root
" Springs lighter the green stalk. From thence the leaves
" More airy; last the bright consummate flower
" Spirits odorous breathes."

I explained to you at the outset of the lecture, the arrangements which are proposed for making your attendance at this School most profitable to yourselves, and most creditable to your teachers; but without your own zealous co-operation nothing can be done. I may tell you how best to employ your time, but I cannot prevent you from wasting it. Most of you are now entering upon manhood, having for the first time entire liberty, with strong temptations to enjoyment, both from your age, and from the circumstances in which you are placed.

Let me earnestly impress upon you, that it is upon your conduct now, that your respectability, your fortune, and your peace of mind in after life, will depend. Miserable, indeed, is the condition of the medical practitioner, who is destitute of a proper share of knowledge, and especially of anatomical knowledge, of which, if you do not acquire it now, you will probably ever after remain in ignorance.

Conscious that he is pursuing a profession in which he can only perpetuate mischief, the incompetent practitioner must steel his conscience against the immorality of such a course, or live in a constant state of shame and apprehension. But if he can set his mind at rest, and purchase peace by the extinction of the moral principle within him, how difficult must it be, in a community continually improving in the knowledge of the physical sciences, to hide his ignorance, or to protect himself from the consequences of detection? The law gives to those who suffer from surgical ignorance, damages against those who injure them. But small is the penalty which is paid in this way, compared with the degradation of character, and the loss of every prospect in life, which must fall upon the ignorant practitioner, when he meets with that detection which it becomes daily more difficult to avoid.

On the other hand, a mind well furnished with anatomical knowledge, not only secures to the practitioner the respect of society, but provides him with a never-failing source of internal satisfaction. While in such a country as this, distinguished scientific acquirements can scarcely fail to place wealth and distinction at the command of the possessor.

A still higher reward is to be found in knowledge itself. The activity of mind which the diligent student acquires; the widening range of facts which expand themselves before him, secure for him a source of pleasure, which increases at an age when all other powers of enjoyment begin to decline. It is, if we rightly consider it, the great happiness of our profession to have mixed up with our daily business the study of a science of universal interest to all classes of men in all regions, and which affords unlimited range for the most active and worthy objects of inquiry, to the most exalted minds.

I am confident that you will not, for any momentary temptation, neglect so noble a privilege—that you will not, through indolence, turn it to your own disgrace. I am confident that the seeds of knowledge, which it will be our duty to sow, will yield an abundant harvest; and that we shall reap hereafter that most pleasing of all rewards, the gratitude of men who are themselves the objects of the respect and gratitude of the community. If so, I shall ever have cause to remember, with pride, that I have been the first here to put my hand to the plough.

THE END.