THE HARVEIAN ORATION ON PATHOLOGY AS THE BASIS OF RATIONAL MEDICINE.

Delivered before the Royal College of Physicians.

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[AFTER referring to the conditions under which the annual oration was founded, Dr. Pye-Smith proceeded to deal in the first place with the claim of Harvey to have been the true discoverer of the circulation of the blood, pointing out that, although conjectures had been made upon the subject which nearly approached the truth, to Harvey belonged the honour of having appreciated the importance of the subject and of having proved it by argument founded on experiment and observation. "He," Dr. Pye-Smith said, "only discovers who proves." The orator next turned to a brief consideration of Harvey's treatise upon Generation, and then proceeded as follows:—]

There is, however, a third phase of Harvey's intellectual work, of which, unfortunately, the records have perished, and which has not, perhaps, been duly appreciated. I do not speak of his practice. A file of his "bills," however interesting to the antiquarian, would probably be of as little therapeutical value as those of his contemporaries. Diagnosis, in the modern sense of the word, was scarcely thought of at that time, and treatment was either empirical or mischievous. What I believe Harvey contributed, or would, but for adverse fate, have contributed to medicine as distinct from physiology, was a systematic study of morbid anatomy. In the following passage he speaks of the great benefit that would ensue from the regular observation of the structural changes produced by disease:—

In the same way that the dissection of healthy bodies is of the greatest importance for true scientific physiology, so the inspection of diseased bodies after death is no less necessary for scientific pathology.

For physiology is the study of natural conditions, and must first be studied by physicians, inasmuch as what is normal is healthy, and the rule for its own rightness, as well as for every abnormal deviation therefrom. But when deviations from health, or any abnormal conditions are defined by the light of healthy structures, then pathology, the science of disease, becomes intelligible. Then also from a knowledge of pathology the practice and art of healing, and numberless new methods of treatment, will naturally spring.

No one would easily believe how greatly the viscera are altered by disease, particularly in chronic cases, and how extraordinary the anatomical effects of prolonged sickness often are. Indeed, I am confident that the opening and thorough inspection of one dead body, which has been wasted by slow disease or by infection, is of more real service to the art of healing than the dissection of ten corpses of healthy criminals.¹

Now this was a new notion. It was not uncommon for the body to be opened after death, especially in the case of great personages, either for the purpose of embalming or for discovering (as it was supposed) the fact of poison or other foul play; and occasionally a physician would obtain permission for a like inspection when something unusual in the symptoms had excited a laudable curiosity to ascertain their cause; but the records of such inspections in the seventeenth century by Bartolinus, or Tulpius, or Bonetus, or, in our own country, by Mayerne, or Bate, or Morton, are fragmentary, their object being limited to the individual case. There was no attempt to search out the secrets of Nature in disease by a systematic observation of the state of the organs after death, nor was there for more than a century after Harvey's death. Morgagni in Italy; the French anatomists of the early part of this century, Corvisart and Laennec, Broussais and Cruveilhier; in Germany Meckel and Rokitsansky; and in England Baillie, Abercrombie, Carswell, and Bright—these were the founders of scientific pathology on a sure anatomical basis almost within living memory.

Not only had Harvey the prescience to recommend the study of morbid anatomy for itself, but he had himself recorded a large number of dissections, or, as we should now call them, inspections, of diseased bodies. Unfortunately, most of these *post-mortem* reports, with his observations on

the generations of insects, and other manuscripts were destroyed, or irrevocably dispersed, when his house in London was searched while he was with the King at Oxford. If the records of these inspections had been published, may we not assume that Harvey's great authority would have set the fashion, and that the systematic study of morbid anatomy would have begun a century and a-half earlier than it did? And think what this would have meant. With the exception of a few shrewd observations, a few admirable descriptions, and here and there a brilliant discovery, such as the origin and prevention of lead colic and of scurvy and the introduction of vaccination, it may be said that medicine made no important progress between the time of Harvey and that of Laennec. The very notion of diagnosis in our modern sense of the word depends upon morbid anatomy. The older physician seldom attempted to determine the seat of an ailment.² Disease was looked upon not as a condition depending upon disordered physiological functions, but as something external, attacking a previously healthy person, disturbing, and, if not expelled by art, finally destroying him; while any structural changes which were found after death were regarded rather as the effects than the causes of the symptoms during life.

Now, the ambition of every intelligent student—and in medicine we are life-long students—is to fix upon the most objective, certain, and important of the symptoms of a patient, to follow out this clue, to determine the organ affected and the nature of the affection, so that in his mind's eye the tissues become transparent, and he sees the narrow orifice for the blood stream and the labouring muscle behind it; or the constricted loop of intestine with violent peristalsis above and paralysis below, the blood current stopped, and congestion passing hour by hour into gangrene; or the spinal cord, with grey induration of a definite region, and the motor, sensory, and trophic changes which physiologically ensue.

Sometimes this minute search to fix upon the locality and exact nature of a lesion has been ridiculed; and we are asked what benefit to the patient such knowledge when attained can bring? We answer, that in medicine, as in every other practical art, progress depends upon knowledge, and knowledge must be pursued for its own sake, without continually looking about for its practical application.

Harvey's great discovery was a strictly physiological discovery, and had little influence upon the healing art until the invention of auscultation. So also Du Bois Reymond's investigation of the electrical properties of muscle and nerve was purely scientific, but we use the results thus obtained every day in the diagnosis of disease, in its successful treatment, and in the scarcely less important demonstration of the falsehoods by which the name of electricity is misused for purposes of gain.

It is true that Bernard's discoveries of the diabetic puncture and of the digestive function of the pancreas have not yet received their practical application. He was right when he said: *Nous venons les mains vides, mais la bouche pleine d'espérances légitimes*, but he should have spoken for himself alone.

The experiments on blood pressure begun by Hales, and carried to a successful issue in our own time by Ludwig, have led to knowledge which we use every day by the bedside, and which only needs the discovery of a better method of measuring blood pressure during life, to become one of our foremost and most practical aids in treatment.

Again, we can most of us remember using very imperfect physiological knowledge to fix, more or less successfully, the locality of an organic lesion in the brain. I also remember such attempts being described as a mere scientific game, which could only be won after the player was beaten, since when the accuracy of diagnosis was established, its object was already lost; but who would say this now, when purely physiological research and purely diagnostic success have led to one of the most brilliant achievements of practical medicine, the operative treatment of organic diseases of the brain?

Morbid anatomy not only teaches us what lesions we have to discover, but also their true pathological relation. We learn that every disease does not affect every part of the

² I have been told by a contemporary of an eminent physician in this city that the accuracy of his diagnosis—it was before the introduction of the stethoscope—was remarkable, for he rarely failed to fix the seat of a disease in that one of the three great cavities of the body in which it was found after death.

¹ P. 92 of the Quarto College Edition.

body. If we make a horizontal list of all the organs and tissues, and a vertical one of all the known morbid changes, according to Rokitsansky's laborious and thorough-going method, we find the table almost useless, since the blanks are more numerous than the entries. If the liver, for example, were the possible seat of every tumour described in our College nomenclature of disease, it would be hopeless to attempt the diagnosis of a hepatic growth; if the small intestine were subject to every morbid change which can affect a mucous membrane, we should be lost amid such a crowd of possibilities. But morbid anatomy teaches us that each organ has its peculiar liabilities to disease, so that when we have determined the seat of a malady we have gone far towards establishing its nature. Moreover, such concomitant variations as hypertrophied left ventricle and granular kidneys, basal meningitis and caseous lymph glands, visceral abscess and ulceration of the cardiac valves teach us much more than anatomy or diagnosis. They throw a clear light upon the nature and the origin of diseases, and hence upon their prevention and cure.³

True, there are functional disorders and others which are toxic or parasitic; but it is the object of the study of morbid anatomy to limit, and, as nearly as may be, to abolish the former group by tracing disordered functions to structural changes or to poisonous or parasitic influences. We may measure the progress of medical science during the present century by the fact that fever, dropsy, paralysis, and apoplexy are for us no longer diseases, but only symptoms, which leave us unsatisfied till we have traced them to their origin.

It has often been questioned whether study of morbid anatomy has not withdrawn attention from morbid physiology; and, again, whether the time employed upon pathological researches would not have been better spent in directly therapeutical inquiry. To both these questions I take leave to answer, No. Anatomy must precede physiology, whether in the normal or the diseased state. The humoral physiology of the ancients did infinite mischief (mischief not yet exhausted), because it lacked the sound basis of anatomy; and experimental pathology—necessary and important as it is, and valuable as even its first endeavours have proved—was impossible without previous knowledge of the anatomy and histology of disease. As to therapeutics, while professing full faith in the ultimate value of such laborious chemical and physiological researches of the laboratory as those which were the subject of the recent Croonian Lectures, I hold that for the successful cure of a patient it is far better that his physician should have a thorough and extensive knowledge of morbid anatomy than that he should be acquainted with all the baths and waters, the hotels and lodging-houses throughout the world, or familiar with the barbarous names and pretended virtues of all the advertised nostrums that deface the fair English fields from London to Oxford. The public suppose that it is their business to know what is the matter, and the doctor's to find the remedy; if so, our art would be confined to learning the name of the patient's disorder by letter, postcard, or telegram, and looking up in an index of remedies the twenty or thirty drugs which are "good" for that particular complaint. We know that the real difficulty is to ascertain the nature and origin of our patient's disorder; when that is done the treatment in most cases is obvious, and in many effectual; when it is not done our treatment is vacillating, and either futile or mischievous. We have already ample means at our disposal for influencing almost every organ of the body. A new tool is occasionally offered us which deserves proving, but what we want far more is knowledge how to use the tools that we have. Treatment without diagnosis, besides its inefficiency, brings us for the time unpleasantly near to the charlatan who, whatever title he may assume, is always therapeutical and never pathological. Rational, bold, and effectual treatment, whether preventive or curative, must always depend upon accurate diagnosis and sound pathology, and the power of diagnosis depends upon that systematic inspection of the bodies of diseased persons which was recommended and practised by Harvey.

Suffer me, then, to obey the instructions of the founder of

this lecture, by exhorting my hearers, and especially those Fellows who are junior to myself, to emulate, according to the varied talents entrusted to each, the example of Harvey in these three particulars:

(1) In investigation by experiment, whether in pathology or physiology. We have now difficulties unknown to Harvey in carrying out this duty, for duty it certainly is, incumbent upon all who have the opportunity and the necessary training. The countless experiments on living animals which were carried out during the 17th century in all civilised countries—in Italy, Holland, Denmark, France, Germany, and England—bore a rich fruit of physiological knowledge. If the anatomy of the human body was thoroughly ascertained by the great men of the 16th century, by Vesalius, Sylvius, and their successors, it is no less true that to the 17th century is due the discovery of the elements of physiology. The action of the heart and the circulation of the blood, the absorption of chyle by the lacteals and thoracic duct, the mechanism of respiration and some knowledge of its chemical effects, the function of secretion by glands, the minute structure of the eye and ear, and of the reproductive apparatus, and a knowledge—imperfect, but true as far as it went—of the functions of the brain and nerves, these were the achievements of the 17th century due to Harvey, Glisson, Willis, and Mayow, among our own countrymen, and to Pecquet, Malpighi, Leuwenhoeck, De Graaf, Swammerdam, Aselli, Redi, and Bartolinus. In all this brilliant advance of knowledge, experiment upon the lower animals was the method used, and the method is as indispensable now.

Anyone conversant with a single branch of natural science is aware that experiment, as well as observation, is necessary. Who would expect discoveries in physics, or in chemistry, without laboratories and experiments? Do not botanists investigate the functions of plants by dissection, by microscopic and chemical investigation, and by experiment? Have we not this very year celebrated the important results of fifty years' experimental researches into the life and growth of plants by Lawes and Gilbert? And is it not obvious that the same necessary, well-tryed, and indispensable method of inquiry must be continued in the case of animals? Happily the same experimental science has discovered the means of abolishing the tribute of suffering which the brute creation paid in the hands of Harvey and Hales, of Haller, Magendie, and Sir Charles Bell. By means of chloroform and other anesthetics, and by means of the antiseptic methods which we owe to Sir Joseph Lister, the subjects of experiment are spared the pain and shock of an operation, and the pain which used to follow an operation. In fact, almost the only experiments upon the lower animals which involve distress are those which are most immediately and directly useful to ourselves and to them; inoculations, namely, with a view to reproduce diseases, and the direct therapeutical testing of drugs. Cruelty is utterly repugnant to our calling; and it seems absurd that men, who will with just confidence entrust themselves and the lives of those nearest to them to our protection and care, should yet so far distrust us as to shackle attempts to improve our knowledge and our power by cumbersome and ridiculous restrictions. Let us hope that on the one hand increasing humanity and gentler manners will extend compassion for the lowest of God's creatures from the educated classes of England and America until it permeates all ranks and all nations; and that, on the other, full liberty will be given to the prosecution of researches, laborious and thankless in themselves, but of the utmost value for the relief and prevention of disease in man and brute alike. May I also express a hope that those who administer our laws will take heart of grace, and in this, as in other matters, try whether Englishmen do not prefer the conscientious maintenance of a statesman's own judgment before a time-serving submission to ignorant clamour.

(2) In the second place, I would exhort my brethren, and especially the Members of this College, to cultivate learning. Harvey went to study in Italy, then the nursery of science as well as of art, and he was familiar with the writings of Plato and Aristotle and Virgil, as well as with those of his immediate predecessors, Fabricius and Columbus. So in that golden time which comes to most of us, between taking the academical degree and becoming immersed in the daily duties

³ See Dr. Wilks's article in *Guy's Hospital Reports* for 1865 (3rd series, vol. xi, p. 1.)

of hospital life, I strongly advise a visit to one of the German universities or to Paris, to acquire the key to the two languages in which the best modern books are written, and to widen the mind by seeing the aspect of science and affairs from a Continental standpoint. It is lamentable that there is so little professional intercourse between the students of one of our London schools and the teachers of another. The laudable energy which has made each of them complete and well-equipped colleges has had this drawback, that at the present day the attention of a diligent student is more confined to the teaching and practice of his own school than it was sixty or seventy years ago.⁴ The narrowness and prejudice bred by this isolation may be corrected by a visit to the famous sister universities of Edinburgh or Dublin; for their complete removal no prescription is so efficient as a prolonged stay in Continental laboratories and hospitals. But even such a broad and liberal education, even familiarity with the daily advances of medical science recorded in periodicals and archives and yearbooks, or transmitted by telegraph to the wondering readers of the daily newspapers, is not all that is needful to make a learned physician. We know well the difference between reading of an experiment, or even seeing it performed, and doing it with our own hands. We know the difference between studying a pathological atlas, or even a cabinet of histological slides, and seeing and handling morbid tissues and making sections for ourselves. So also is there all the difference between learning the present conclusions as they stand recorded in the last edition of a textbook or compendium and tracing the steps by which our present knowledge has been reached.

With regard, for instance, to the physiology of the circulation, it is not only curious but instructive to follow its gradual growth from Galen and Vesalius, Columbus, Cæsalpinus and Servetus, to Harvey and Lower and Malpighi, to Hales and Vierordt, to Ludwig, to Chauveau and Marey, to Gaskell and Roy. The only true scientific method is the historical one. If we only know the results of a science without the steps by which they have been reached, we have indeed its practical use, but lose half its educational value. We are almost in the position of an engineer who knows the conclusions of trigonometry by rote, but is ignorant of the demonstration. I would therefore urge upon junior Fellows, while still enjoying the prospect rather than the fruition of professional success, to spare some of the time which is unoccupied by work in wards and laboratories for the perusal of such antiquated works as have been published as much as twenty years ago, and particularly for gaining acquaintance at first hand with Virchow's *Cellular Pathology*, and the lectures of Watson, Trousseau, and Stokes; or, if their time and inclination does not allow of more extended research, at least to read such succinct masterpieces as Laennec's *Mediate Auscultation*, Heberden's *Commentaries*, Sydenham's *Treatise on Gout*, and Harvey on the *Movement of the Heart and of the Blood*.

(3) I would, moreover, exhort Fellows of the College to see that, while all the new methods of experimental pathology and of pharmacology are carried out by duly trained physiologists, we do not neglect the fundamental method taught and practised by Harvey of inspecting the bodies of those who have died of disease. It was this union of morbid anatomy with clinical observation which made the discoveries of Laennec and of Bright really fruitful. Without these necropsies, clinical medicine is but an empirical art, diagnosis a sham, and treatment little better than quackery. Exclusive attention to therapeutics is apt to bring a man dangerously near to homœopathy and other pretended systems of treatment, but sound pathology and diagnosis controlled by *post-mortem* inspection give positive knowledge and that union of modest self-confidence and prudent enterprise which become the physician.

⁴ Let us hope that the University of London, when reconstituted by the labours of the Royal Commission, which is now preparing its Report to the Crown, may provide by the regulations of its medical faculty for more community of teaching and learning among students of medicine in this city.

MEDICAL MAGISTRATE.—Mr. George Stoker, of London and Dunloe Castle, Killarney, has been appointed to the Commission of the Peace for the County of Kerry.

ON METHODS OF ANATOMICAL STUDY.

An Address delivered to the Medical Society of University College, London.

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THE GRIEVOUS BURDEN OF THE STUDENT.

THE student of medicine at the present day has a grievous burden laid upon him. He is expected in the short space of five years to master the principles and details of the five preliminary sciences—physics, chemistry, biology, anatomy, and physiology—to become proficient in the four more purely professional subjects—pathology, bacteriology, pharmacology, and therapeutics—to invade the domain of the lawyer in the study of medical jurisprudence, and to make himself expert in the applications of all these to the practical branches of medical and surgical science. These are not only the three specified in the Medical Act—surgery, medicine, and obstetrics—but also the finer subdivisions, such as ophthalmology, rhinology, laryngology, otology, etc., the mere recital of whose names reminds us of the description of the state of Egyptian medicine given by Herodotus.

We have a rough measure of the amount of work which this course entails in the bulk of the textbook literature which covers the ground. About 10,000 pages—for the most part crammed with facts—have to be studied with an attention which amounts to a virtual committing to memory of their contents. In addition to this private reading the student must spend time and strength in practical work in the special laboratory of each department and in the hospital wards, so that he may educate his eye and his hand to a high degree of scientific precision.

There is also this farther complication in the educational outlook that the amount of knowledge in all these branches is rapidly growing. The literature of new work in human anatomy published in the year 1892 amounted to a little more than 2,000 octavo pages, and research in the other subjects is quite as prolific in its results. This advancement of learning has led to a necessary division of labour in our medical schools—a differentiation of teachers consequent on the specialisation of subjects, so that the student is instructed in anatomy by an anatomist, in biology by a biologist, in chemistry by a chemist, and so on through the alphabet of the sciences.

Theoretically, the plan of this arrangement is a counsel of perfection, and the result—the ideal physician—is the marvellous man of erudition and skill with whom we are familiar in novels, who combines the omniscience of an Admirable Crichton with the astuteness of a Sherlock Holmes. But, unfortunately, in the practical working of our system there is one drawback—human receptivity is a limited quantity, for many a conscientious student has discovered from sad experience that the brain is as impatient of overfeeding as the stomach. Here we are brought face to face with a real and growing difficulty, and eventually we must come to a deadlock, unless some satisfactory measure of reform in our method of education be devised.

The fundamental consideration which should be the guide of all medical teachers, and especially of all those authorities whose business it is to plan curricula and to arrange for qualifying examinations, is the clear perception of the central aim of all medical study, which is the relief and prevention of disease and of suffering among men. Our profession, as a profession, exists solely to this end, to which all the branches of knowledge in the curriculum are ancillary. He is the most successful healer who aids Nature most effectually to fulfil these purposes, and to this touchstone should all our knowledge be brought—How far does it help us in doing this work?

It is at this point that our present system is liable to fail. The sciences which form parts of the medical curriculum may be viewed from two distinct standpoints, the academic