Introductory Address

DELIVERED AT

UNIVERSITY COLLEGE, LONDON,

On the Opening of the Winter Session of 1882.

By MARCUS BECK, M.S., F.R.C.S.

GENTLEMEN,—It having fallen to my lot to deliver the customary Address at the commencement of the present session, I have thought I could not better employ the time than in pointing out to you some of the theoretical principles upon which modern medical education is supposed to be conducted, and the reasons why the practice does not as yet, for all students, quite correspond with the theory.

Medical education, as we understand it now, is of comparatively recent origin. At the beginning of this century the profession was divided into distinct grades. There were, first, the physicians who had, as a rule, received such scientific education as was to be obtained at that time. They had mostly attended lectures at one of the English or Scotch Universities, and spent some time in practical study in a hospital. Then there were the surgeons, licensed by the College of Surgeons, then just founded in its present form. These also had received some education in anatomy and surgery. Lastly, there were the apothecaries, and to them fell the larger share of medical practice of the time. It was not uncommon, however, for these two last to be joined together in the person of one man, forming the surgeon-apothecary, who was the precursor of the modern general practitioner. The practice of the apothecaries differed from anything we have within the limits of the legitimate medical profession in the present day. They were essentially prescribing druggists, and could legally charge only for the medicine they prescribed. Thus they could receive no remuneration unless they ordered some medicine, and the more they ordered the more they got; a style of practice calculated to inspire a firm belief in the efficacy of drugs. It was not necessary for the apothecary to receive any medical education beyond being apprenticed to some one already in the trade, and the jurisdiction of the Society of Apothecaries, which necessitated even this amount of training, only extended to a distance of seven miles round London.

That the greater part of the practice of the country should have been in the hands of men like these seems to us now rather surprising; but we must not forget that even as late as the end of the last century science had not reached such a point of advancement as to make it a trustworthy guide to practice. The study of human anatomy was doubtless more advanced than other branches of medical knowledge, but even this was very far short of the perfection it has now reached. In chemistry oxygen had only been discovered for some twenty years, and the atomic theory had not as yet been established. The work of John Hunter and Baillie had raised morbid anatomy to the rank of a science; but, from want of proper instruments, investigation into the finer processes of disease was almost impossible. In medical practice almost all the means of physical examination now in constant use, and without which we should feel it impossible in a great proportion of cases to make a diagnosis, were unknown. Auscultation, percussion, the use of the thermometer, the accurate chemical examination of the secretions, had yet to be invented, and the medical man had therefore little to do but to feel the pulse, look at the tongue, and listen to what the patient had to tell him. Surgery, being to a great extent dependent on anatomy, was, in some respects, more advanced than medicine; moreover, wounds and injuries require no special means of observation for their diagnosis.

At this time, therefore, science being of but little assistance, the apothecary was chiefly guided in his practice by empirical knowledge, handed down from generation to generation, and it was but natural that a long period of apprenticeship was considered the best means of acquiring such knowledge. The pupil was, as a rule, apprenticed at a very early age, and his term of service lasted seven years. His master during this time initiated him into

the art and mystery of healing, taught him to bleed and compound medicines; and from an early period it was his duty to attend to such patients as were willing to trust themselves to him. Being necessarily at first very ignorant, he thus learnt one thing, at any rate, to perfection, and that was the invaluable art of concealing his want of knowledge from the patient; and he probably learnt it much better than he would have done had he been troubled, as the young practitioner now is, with sufficient knowledge to raise in his mind any doubt as to whether he really knew what was the matter with the patient or not. Education by apprenticeship was, perhaps, fairly adapted to the knowledge of the time. It was useless for a student to spend years in the study of sciences which were not sufficiently advanced to be of any real practical service to him in his profession, and the mental training he would have derived from such a course of study would have been of but little use to him, when, from the insufficiency of the means of observation at his command, it could seldom have been possible for him to arrive at a conclusion as to the nature of a case by any logical process of reasoning. Perhaps his experience while an apprentice enabled him to jump to a conclusion as to what drug would best suit a given case as well as all the science of the time could have done. The instruction communicated to him by his master included a great deal that was true and useful, for much as science has done for us since that time, we are still as yet very far from being independent of traditional and empirical knowledge. The want of scientific training to instil a wholesome spirit of disbelief enabled the pupil to receive what his master taught him in faith, and to believe it with an earnestness rare in the present day. It was this that made him afterwards honestly believe that he knew a great deal in spite of what we should now consider his lamentable ignorance, and prevented his becoming the mere impostor that he is sometimes accused of having been. Under such a system of training it was, however, impossible for any but men of great original genius to break away from the trammels of tradition, and to take any part in the advancement of knowledge.

Yet the advance of medical knowledge at the beginning of this century was not without its influence on the lower branches of the profession, and many of the surgeon-apothecaries began to feel it a disgrace that so large a number of their branch of the profession had never received any proper medical training, and consequently a society was formed called the Association of Surgeon-Apothecaries of England and Wales, the object of which was in their own words "to improve the education of, and render more respectable, their own body." The effect of this agitation was the extension of the jurisdiction of the Society of Apothecaries to the whole of England and Wales, and after that no person was able to start in practice as an apothecary without having undergone a proper examination. From this time the old system of education gradually underwent a transformation. At first the period of apprenticeship was fixed at five years, the whole of which might be spent by the pupil in the service of his master. About ten years later it became the custom for every student to spend at least one year in a regular medical school. In 1826 this College, then called London University, was founded, and for the first time a systematic scientific education was given in London on essentially the same lines as are followed to the present day. Influenced by the example of this College, other schools quickly improved their arrangements for conducting the education of every student upon scientific principles. As the amount of scientific knowledge expected from the student increased, so it became necessary to prolong the time spent in the medical school at the expense of the period of apprenticeship. Twenty years ago it was the custom for the majority of students to spend one year, or sometimes two, as apprentices, and three years in the medical school. Now the change is almost complete, and it is rare for any student to be bound apprentice. The real cause which has been at the bottom of this change is that science has now so far advanced as to become an actual guide to practice, and consequently medicine and surgery can no longer be properly taught on the old empirical principles, but must be studied as sciences.

The change, however, from the old system to the new having been the result of a series of compromises, has succeeded in producing for the ordinary student a course of study which corresponds but imperfectly with the laws of scientific education. The amount of knowledge in every branch of medicine, and in each of the allied subjects, has

enormously increased, and every student now has to learn a great deal more than was expected from his predecessors of twenty years ago; while at the same time there is no reason to believe that the human intellect is increasing in capacity. How, therefore, to enable the student to acquire such a proportion of the increased sum of knowledge as to justify him in considering himself even decently educated has become a problem of no little difficulty. At present the examining boards require from the student a standard of knowledge which, unfortunately, many find it difficult to attain to; but it is not because it is too high that they cannot attain unto it. The standard has only been raised proportionally to the increase of knowledge, and the student will doubtless feel inclined to say with Solomon, "He that increaseth knowledge increaseth sorrow," for it is a serious fact that the proportion of students rejected at their examinations has correspondingly increased as the standard has been raised; and it is not now only the hopelessly lazy, or those who have some natural difficulty in acquiring knowledge who are rejected, but the industrious student of fair abilities sometimes meets with the same fate. Since in an evil hour the Royal College of Surgeons commenced the publication of the numbers passed and rejected from each school, it has become the custom in some places to submit the student to a test examination of equal severity to that of the College before signing the necessary schedule. By this means an apparent improvement has been obtained in the work of some schools, but it seems to me to matter but little to the student whether he is plucked by his teachers or by the examiners. This test examination, it is needless to say, has been devised for the benefit of the school and not of the student, ignoring the fact that the school is made for the student, not the student for the school. It has never been instituted in this College, and I hope it never will. The real effort to meet the higher standard must not be by such tricks as these, but by adopting the best possible course of training to enable the student to think well and correctly, and so more easily to acquire the necessary amount of knowledge; and in this we must be guided by the laws of scientific education. These laws are founded on certain principles now more or less generally recognised as true. The first of these is, that those manifestations of the functions of the brain which we call the mind are as capable of being improved in quality and order by training as are our muscular movements, and that just as those wonderful coördinated movements involved in playing a complicated musical instrument can only be acquired by commencing with the simpler exercises and gradually increasing their complexity and variety, so in training the mind the course of education must proceed from the simple to the more complex subjects. Thus, in a scientific education, the study of the exact sciences must precede that of the inexact. Another principle of equal importance is that in estimating the value of a given subject we must take into account its influence in mental training, as well as its direct practical utility in the business of life. The material with which the teacher has to deal no doubt varies greatly. There are some few happy individuals possessed of true genius who can acquire knowledge even under great disadvantages, and whose minds are by nature accurate and logical, and for these systems of education are of but little importance. Of this class, perhaps, John Hunter formed the most conspicuous example. With the vast majority, however, a correct mode of observation and thought is only acquired by proper training. A man of ordinary intelligence but devoid of mental training possesses a mind liable to lead him into error in many ways. He is unable to observe any but the simplest facts correctly, and supposing facts of any complexity are placed before him he is unable to draw correct conclusions from them. Should he attempt to generalise he is almost certain to fall into the error of drawing general conclusions from insufficient data, and premature generalisation is worse than none at all. In the history of medicine innumerable instances of this fallacy in reasoning are to be met with, but I am afraid we need not go back to history to find examples. From the want of sound generalisation to consolidate his knowledge, the learning of such a man is composed to a great extent of isolated facts, and, consequently, unless he is blest with an exceptionally good memory, it must be somewhat limited in extent. Undue credulity, especially under the influence of educational or emotional bias, is another natural failing only to be corrected by proper mental training. The spirit of disbelief thus cultivated by scientific education is not perhaps an unmixed source of satisfaction, as it often leads us to

demand evidence and to find it wanting, when we would gladly for our peace of mind be allowed to exercise a little faith. In reading the works of many of the writers of the last century, it is difficult not to envy their simple faith in the useless drugs with which they drenched their patients. Perhaps nothing, however, marks the difference between the trained and untrained mind more than the instinctive way in which the former turns immediately from an effect to think of and search for its cause, and as our only hope of ever raising medicine to a true science lies in our fully understanding the causes of the various diseases we are called upon to treat, the value of this effect of proper mental training can hardly be overrated. Lastly, in any proper system of education some attention must be paid to classification, so that the knowledge acquired may be methodically arranged and immediately ready for use when wanted. In no branch of knowledge is a mental training more needed than in medicine. In no science are the facts to be observed more numerous or more difficult of observation; in none is the plurality of causes and the intermixture of effects more marked, and upon the correctness of the conclusions we draw from our observation, depends frequently the health or even the life of a fellow creature.

The practical application of these principles is perhaps best exemplified by the course of education prescribed by the University of London for its medical degrees. This has remained practically unchanged for twenty-two years, and the influence of its example on other examining bodies has been productive of great improvements in medical education. The essential feature of the system is that, before commencing medical study proper, the student shall receive a thorough training in the allied sciences. Each of the subjects comprised in the preliminary scientific examination is supposed to possess some special influence in cultivating a correct habit of thought and observation, in addition to its direct value in the practice of medicine. Chemistry and physics illustrate in their simplest form the mode of arriving at truth by observation and experiment; they show the precautions necessary to avoid error, the mode of arriving at general laws, and the dangers of premature generalisation. They impress upon the mind the necessary relations of cause and effect, dealing as they do to a great extent with conditions in which the causes are few and their effects clearly defined.

Botany and zoology teach the student the art of observing details accurately, and train the mind in methodical arrangement and classification of facts; and, as Bain says, "to learn to classify is in itself an education." Zoology and comparative anatomy also form an excellent introduction to, and give broader views of, human anatomy, and the study of the simpler structures and functions of plants prepares the student for the more complex subjects of human histology and physiology. The direct practical utility of these subjects varies considerably. Without some knowledge of physics and chemistry it is impossible for any man to study or practise medicine intelligently. Botany, including as it does the study of the lowest forms of vegetable life, which take so prominent a place in the pathological theories of the present day, has some direct influence on medical practice; but its value in other respects is not what it was, when "every green thing from the cedar to the hyssop" was supposed to possess some medicinal virtue, and when the apothecary in remote country places frequently gathered and prepared for himself the herbs that formed the chief part of his *materia medica*.

For zoology and comparative anatomy it is, I am afraid, almost impossible to claim any great practical utility. The exact knowledge of the anatomy and life history of the various parasites that infest the human body has done something to enable us to prevent their attacks, but even in this respect it is far behind botany. If any subject had to be omitted from this part of a medical education, zoology and comparative anatomy would probably be generally considered the one. As a training in observation and classification it is not superior to botany. To teach it properly a museum and dissecting room are necessary, while botany can be taught very sufficiently without any such means. The time required for botany is less than that for comparative anatomy; the dissection of a plant takes only a few minutes, that of the simplest animal can scarcely take less than one hour, and often many hours of patient labour. It is not likely, therefore, that zoology could ever be made a compulsory subject in an ordinary medical education, at the same time it would be a

most grievous error to exclude it from the subjects required for the higher qualifications.

A student who has been thus prepared by a short preliminary course of science, commences the study of the more special subjects of the medical curriculum with a mind trained to a proper habit of thought, and prepared to follow the inductive reasoning upon which medicine is founded. He is sufficiently trained in habits of observation to commence without difficulty the study of anatomy and histology, and his knowledge of chemistry and physics is sufficient to enable him to understand those parts of physiology to which these sciences are essential.

I need not follow further in detail the course of education according to this plan; the same system is followed to the end. The student does not commence to study the diseases of the body till he is familiar with its structure and functions in a state of health; and in studying disease he is encouraged to apply himself to medicine and surgery simultaneously, in order that he may learn that the same general principles apply to both, and that they are in fact merely branches of the same science. The fault of this system of education a few years ago was that it was too theoretical, and contained nothing in it to take the place of the practical instruction given so abundantly in the old system of apprenticeship. This has, however, of late years been corrected by the institution of practical classes and compulsory hospital appointments, and by teaching in the out-patients' room, until, at the present time, I am inclined to believe that the student gets quite as much practical instruction in every branch of his profession, except pharmacy, as he did under the old system.

Although the University of London, being unfettered by any previous system of education, was able thus to establish a scientific course of training according to the best theoretical principles, it has been otherwise with the corporations, and the consequence is that the education of the student whose object it is merely to obtain a licence is now conducted on principles which do not agree accurately either with the old empirical or the new scientific system, and consequently, he does not get the full advantage of either. The great majority of students in the present day begin medical study immediately after they leave school, having first passed one of the preliminary examinations conducted by one of the corporations or the College of Preceptors. This examination includes no science as a compulsory subject, except the rudiments of mathematics, which, although of course a useful training in methodical thought, is, as a purely deductive science, of comparatively little value as a preliminary training for medical study. A student, therefore, who has passed only the compulsory subjects, arrives at his medical school without any preliminary training in natural science. He finds then that he is expected to attend three classes during his first winter session—anatomy, physiology, and chemistry. One of the first things he will learn also is that, if he follows the course perhaps most commonly adopted, the first examination for which he will have to present himself is the primary at the College of Surgeons, and that this includes two subjects only—anatomy and physiology—and will not take place for two years. Upon these two subjects, therefore, he concentrates his attention, in but too many cases neglecting chemistry more or less completely; for I fear it may be said of but too many that the fear of examinations is the beginning of wisdom. In anatomy, with a mind totally untrained in accurate and minute observation, he begins by trying to learn the infinitude of details concerning the bones; and it is not to be wondered at if he finds it not only a difficult but a distasteful task. The study of descriptive anatomy, however, makes no demand upon any of the higher faculties of the mind, and, consequently, preliminary mental training is, as far as it is concerned, of comparatively little importance; and if the student will only give time and attention to it, he will almost certainly succeed in reaching the required standard of knowledge; although, perhaps, he will not master the subject as quickly and easily as if he had had some preliminary training in biological science.

Physiology being a subject full of fascination and interest, should naturally be very attractive to any student who takes real pleasure in his work; but, unfortunately, it consists in great part of the application of chemistry and physics to the study of life, and the ordinary student is at first ignorant of both these subjects; it is therefore impossible that he should gain more than a confused notion of what he tries to learn. From this point of view of mental training physiology,

valuable as it is in its proper place, is perhaps the very worst of all subjects with which to commence a scientific education. It is not an independent and self-contained subject, nor has it as yet acquired, or is ever likely to acquire, a place amongst the exact sciences; and it is a rule of scientific education that some training in the exact sciences should precede the study of the inexact.

(To be concluded.)

Introductory Address

DELIVERED AT

ST. THOMAS'S HOSPITAL,

On the Opening of the Winter Session, October 2nd, 1882.

By SEYMOUR J. SHARKEY, M.A., M.B. OXON.,

ASSISTANT-PHYSICIAN, JOINT LECTURER ON PATHOLOGY, AND DEMONSTRATOR OF MORBID ANATOMY AT THE HOSPITAL.

GENTLEMEN,—When I was requested by my colleagues to deliver the Introductory Address at the opening of the Winter Session of 1882, I had no little trouble in arriving at a conclusion as to the most appropriate subject for the occasion. It did not appear to me that anyone occupying the position which I do to-day, and filling the office of teacher in one department only of medical science, was peculiarly fitted to advise students in detail as to the best method for them to pursue in all the branches of their future study. Far more valuable advice would come from each teacher in his own department. Nor did I think that the social and moral difficulties which students are likely to encounter in their career would be lightened most effectually by counsel given *ex cathedra*. Such subjects are better adapted for private conference among friends, as occasion may arise. Questions of great public interest, such as the anti-vaccination and anti-vivisection movements, would have afforded fitting topics for consideration, had they not already been so thoroughly threshed out and their absurdities exposed by men of far greater ability and holding far more prominent positions in the profession than I. But it did appear to me that an attempt to point out some of the most striking characteristics of modern medicine might be of service not only to those who are on the point of commencing their medical education, but to those also who have already accomplished a portion of it. For it must not be supposed that the science and practice of medicine at the present time, with all their imperfections, are such as they were in the student days of many a man now living; or that the knowledge in some subjects which the merest tyro now possesses was within the reach of even the greatest masters of our art so lately as half a century ago. No, medicine, like other sciences, though a plant of gradual growth, has passed through the greatest vicissitudes. From time to time it has burst into bloom, warmed by the glow of some enthusiastic genius, and then again it has languished almost to extinction under the withering influences of unscientific culture or neglect. Age after age passed away before it entered upon its present period of uninterrupted growth.

In the earliest times of which we have any record, when the priests were the repositories of all knowledge, real or pretended, medicine also, such as it was, formed a portion of their craft. The gods were supposed to be the originators of all good and evil among men, to reward them with health and to plague them with disease; and the priests were the intermediators. Left in their hands, the practice of medicine grew rank with ignorance, superstition, and imposture. So absurd a position did the art occupy in ancient times, that among the therapeutic agents quoted by a writer are "an hexameter from the 'Iliad' to allay the gout, and a verse of 'Lamentations' to cure the rheumatism."

The medicine of those early days was productive of but little which could materially assist in its future development, except the votive tablets which were hung by grateful patients in the temples of the deities, and which contained