

**Address on medical education : delivered at University College, Dundee,  
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# ADDRESS 4

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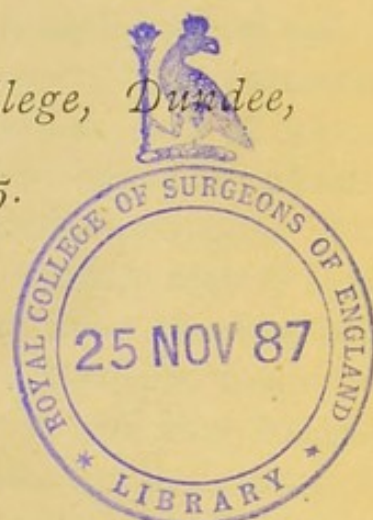
## MEDICAL EDUCATION,

*Delivered at University College, Dundee,  
June 27th, 1885.*

BY

W. T. GAIRDNER, M.D., LL.D.,

Professor of Medicine in the University of Glasgow.



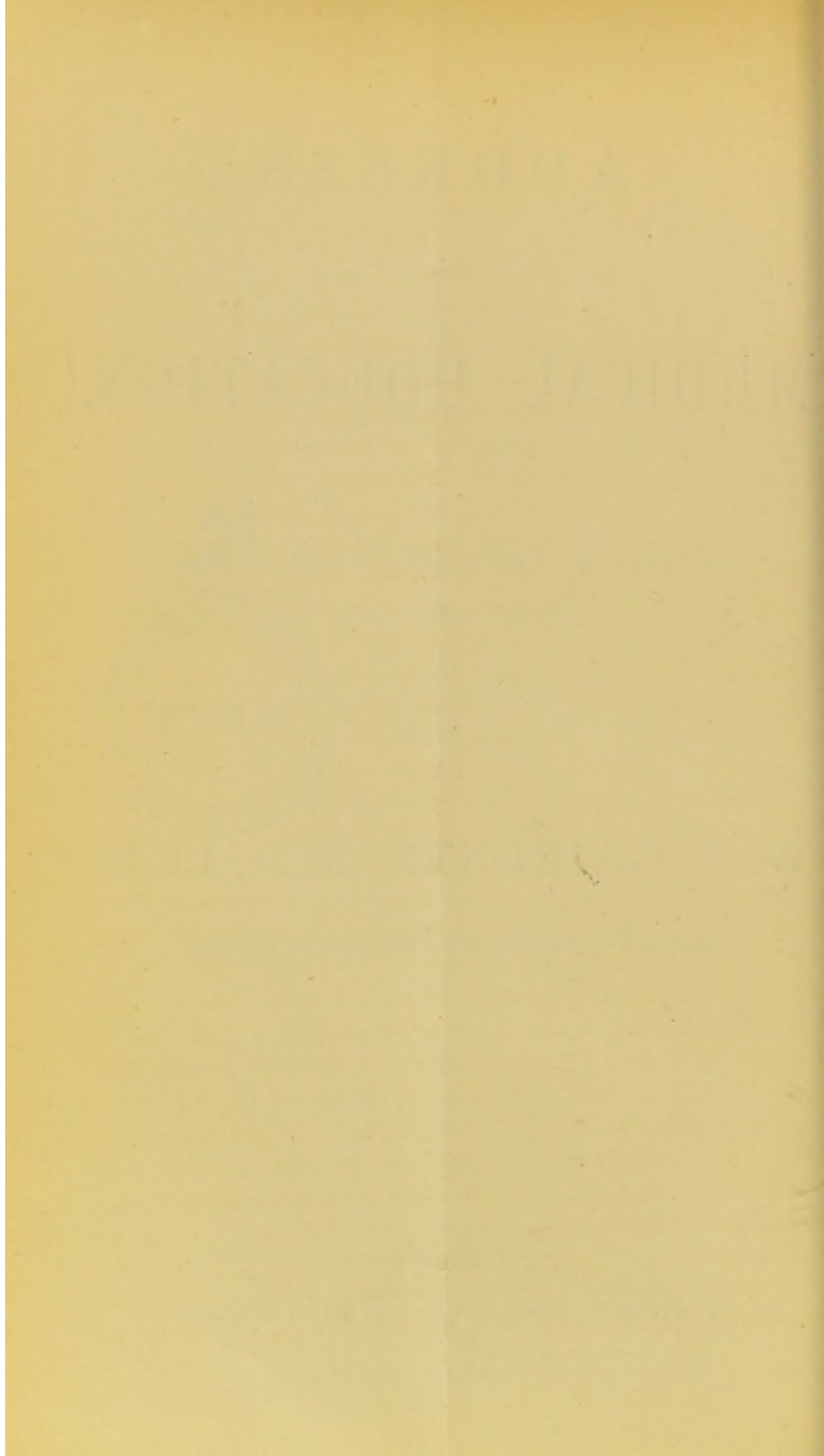
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1885.





## A D D R E S S.

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THERE is an old Scotch proverb which seems to me—if I may quote so rough and rude an expression in this academic hall—to express in one point at least very well the reason why I am here. The proverb is, “Teaching the cat the way to the kirk.” Now, every proverb contains certain implications without which it would not be what I believe the late Earl Russell used to call it—“The wisdom of many and the wit of one.” This particular proverb seems to me to contain two implications—one of which, if applied to the present subject, I am most happy to endorse; the other I shall quite as firmly and decidedly repudiate. The first implication is that the cat does not usually require to be taught the way to the kirk. Clearly pussy knows the way as a general rule, and if left to herself has no difficulty in finding it out. In like manner I do not think any one can, after hearing the admirable report which Principal Peterson has just read, help seeing that Dundee and the people of Dundee, and University College and the Principal and Professors thereof, clearly know the way to the higher education. The cat knows the way to the kirk. But the second implication contained in the proverb is that pussy ought not to be allowed to get to the kirk—in other words, as applied to the present subject, that the Dundee people ought not to have the higher education, or at all events ought not to have it unless they take it in the old and authorised ways, through some of the old Scotch Universities, or through some of the other regularly established schools. Now, it is that second implication that I wish, on my own part and on the part of a very large number who think as I do, to emphatically repudiate. It is from having repudiated it in conversation that I have been invited in the midst of those engagements referred to to appear here to-day.

But although I have willingly acceded to this request, I feel bound to say to you, as I before stated to Principal Peterson and



other gentlemen who kindly asked me, that I could not engage under the circumstances and in the midst of our clinical examinations to prepare a formal and elaborate address. What I understand to be the position is, that the question of the higher education in the main is already settled for Dundee. Dundee is to have the higher education, and why should she not have it at her own doors? The liberality of Miss Baxter and others has given her a fair and excellent start. The success of that start so far has been as great as anybody possibly or legitimately could have expected. At present the question is whether medical education is to be a part of the future ambition of Dundee in this respect. Now, I not only think Dundee justified in entertaining this ambition, but I think she is bound to entertain it. She has, as the Principal has stated, a large and important hospital—the Royal Infirmary, which is admirably administered, and well supported by a generous public—and she has besides numerous other medical institutions, which are there because, with reference to the general need in this great and populous city, they must be there—the Asylum for the Insane, the Workhouses and Workhouse Hospitals, &c.—and she has a staff of medical officers, public and private, quite equal, as far as my own personal knowledge goes, to any town of her size and importance. The question is, is she entitled to throw away all these great advantages and opportunities, with a centre of higher education in her midst, without making some attempt to bring the higher medical education into her curriculum? With a college of science and of the arts actually here, is she entitled to omit medicine from among those sciences and arts which she is to endeavour to teach? I think the question only requires to be put in order to be in general terms answered. Difficulties there may be; jealousies there may be. No doubt it is utterly impossible to start anything of this kind in a new form without exciting some of those jealousies and creating some of those difficulties; but if the position is sound, depend upon it those difficulties will be overcome, and those jealousies surmounted.

I was led to think this morning, when talking to Principal Peterson about the matter—I don't know how it came into my



mind—of a passage in Shelley, applied, however, not to Dundee College nor to any college of science, but to love. I think with the substitution of the word “science” for “love” you might make the passage applicable to the present occasion :—

True love in this differs from gold and clay,  
That to divide is not to take away.

Now, my appearance here to-day, whatever in other respects may be its result, will at least show that I am not, personally, in the least degree influenced by such local jealousies. I have such an abiding faith in the immensity, in the practical infinitude, of the desire of the human mind for knowledge as to believe that in no case almost is to divide to take away. In no way is the rise of one school the detriment of another. Possibly if Dundee goes on and adds medical education to the rest of its programme, instead of being a disadvantage it will be a positive advantage in many ways to all of us who are labouring in their vocation in the old Universities. In considering this subject, it is not possible to overlook the fact that Dundee has not at present, and is not likely, as matters go, to acquire the power in itself of giving degrees. But it is equally impossible to overlook the fact that at only a few miles distance there is an ancient University—the most ancient University in Scotland—which I say frankly, in my opinion, and certainly in the opinion of a very great number of persons besides myself, sustains discredit by the fact that its power to give degrees is not connected with and supported by an equally valid power of teaching. It may be, in the one notable instance of the University of London, that the power to give degrees, as severed from the teaching function, is not abused, and is in a certain sense advantageous. But I think that this is quite exceptional, and that the true ideal of a University never is and never can be that of a mere graduating institution, but that it must in the very nature of it be a teaching institution as well. Otherwise it never can even maintain a high standard, unless under peculiar and exceptional circumstances; and under any circumstances, it never can appear in the eyes of the public to do full justice to its own power of graduation. The University of London, being supported by large donations of public money for



the exclusive purpose of maintaining a high standard of examination in the greatest city, and for the richest country, in the known world, has no doubt done a great deal of good work in its day. But, as we see now from an agitation going on in London itself, and as I have said any time these twenty years, it utterly fails in fulfilling the purpose, broadly considered, of a University centre for the metropolis; and it especially fails, with regard to the organisation of medical instruction in the numerous and excellent teaching institutions at its own door. But all this has no reference to our present position. The University of St Andrews certainly cannot make itself another University of London. It must seek its function, if its true prosperity is to be sought in connection with medical education, on a different plan and model. Therefore it appears to me that Dundee has all the materials, as yet inchoate and unorganised, for a school of practical medical education. It has the materials in this Science College—the commencement of that high-class scientific training. It has in the University of St Andrews—I would say almost at its own door—the power of appealing for degrees; and with the organisation of a teaching staff in connection with these degrees it is, it seems to me, clearly the business of the two—the natural and instinctive tendency founded upon interest of the two—to come into combination, and to exercise these two great and invaluable privileges in harmony with each other.

This, I may say, is no new idea of mine. Many years ago—so many years now that I hardly like to remember them—I was for a time an examiner in medicine in the University of St Andrews, and in those days (when as yet, too, and for many years thereafter in Scotland, clinical examinations were things unknown, and not even spoken much about), I always made it a point to bring the honour students with me to Dundee to undergo a strictly clinical examination in the Royal Infirmary, and many of the men so examined remain in my memory to this hour as some of the best men I have ever had to deal with. The physicians of the hospital in those days lent themselves most kindly to my efforts, and owing to that circumstance the association, in my mind, has always existed between Dundee and St Andrews.



Now, in England we have had, in past days, a most noticeable example of what to avoid in this matter. In England we had throughout the days which preceded the present century two great and noble Universities, organised in the main on such a mediæval type, and looking with such absolute scorn upon the great and popular mass of Englishmen in their blind desire and struggle towards the light, that they made themselves—though things are changed now—so entirely the Universities of the aristocracy and the more fortunate members of the community that it may be said they did not even make an effort to reach or in any way to interfere with the education of the medical practitioner at large. What was the consequence? The consequence was that the medical practitioner in England—I am not speaking of Scotland—grew to be of a type quite unknown in any other western European country. He grew up a man who was apprenticed to a trade like any other workman, and who had hardly been taught in those days to admit into his mind even the merest notion of a scientific training. The medical student of those days—for in this, as in every other case, the child is father to the man, the student is father to the practitioner—may be said to be caricatured of course, but not on the whole very unfairly, by the immortal picture of Bob Sawyer in “Pickwick.” Everybody who knows that marvellous tale will at once recognise what I mean. It is not necessary to go further with the description of the animal. How did he come to be so? Because he was bound over in the beginning as an apprentice to a handicraft, and if in his soul he ever came to feel a little above this, his aspirations were completely and entirely checked. Now, I will not trust to my own memory or to my own knowledge in laying this before you, but shall quote an extract from a leading article in the *Times* of October 3rd, 1882, which I had occasion to quote some years ago in another academical address. It says:—“Five-and-twenty years ago, except in the case of the small number of men who graduated in medicine at Oxford or Cambridge with a view to consulting practice as physicians, the education of a medical student commenced by an apprenticeship to a licentiate of the Apothecaries Company, which was then the chief source of



the medical qualification for general practitioners. The apprenticeship was rendered necessary by the Act of 1815, from which the Company derived its powers, and it usually commenced at about the age of 14 years, so as to break prematurely into school education. The first year of the apprenticeship was often spent in the work of a surgery boy, varied by the preparation of medicines and by the attainment of some knowledge of their properties. The later years were devoted to learning the business of conducting a medical practice, the art of talking to patients, and so forth, and when the apprenticeship was concluded a short term of hospital study formed a prelude to the single examination which, when passed successfully, permitted the candidate to work his will upon the sick under the protection of the law. Originally, the full term of five years' apprenticeship was served in the house of the master; but as the term of hospital study was gradually extended from one year to nearly three, the two demands were found to consume an inordinate amount of time; and the two last years of apprenticeship were commonly remitted, and were suffered to form part of the period of hospital study. Even then the total period of professional as distinguished from general education extended over about six years, and as the examination might be passed at the age of twenty-one, was usually commenced not later than fifteen."

Now, with reference to that statement, I have simply to say that the type generated in England was utterly anomalous, when compared with that of any other country in Europe. In all other countries, either the Universities or the State have seen to it that a man professing medical qualification at all—that is, recognised in any sense as a medical practitioner at all—has been in some sense or other qualified all round, so as not to be wholly uninstructed in any ordinary department of practice. But in England, the apprenticeship system on the one hand and what I must term the almost supercilious attitude of the Universities and the Colleges towards the general practitioner on the other, gave rise to what we now call the double qualification—that is to say, that a man may be either an apothecary and a surgeon, or a physician, and in order to be a complete practitioner he must have two diplomas.



There is no such idea in any other country, of letting loose on the public men licensed to practise as surgeons or as apothecaries, and who have the opportunities in after life, owing to the necessary wants of humanity, of extending their practice, and this without any real previous training for it, to every possible department. That was the result of the old Universities of England, and I may say also of the Royal College of Physicians in London, refusing to have anything to do with the average, or ordinary, medical education at all.

The Scotch Universities were wiser in their generation. From the beginning or middle of last century the Scotch Universities, in a kind of blundering way, no doubt, and with instincts that often led them wrong, did take up the position that it was the proper function of a University to aid in the establishment of medical education. To this fact, beyond all doubt, we owe the high appreciation which now exists, and which more or less has existed all along, for Scotch degrees in England. But good cannot be done without an evil also following, and it has always been objected by those in England to whom the old apprenticeship system was dear as a relic of the past that in the new system, by which medical education was regularly organised as part of the University curriculum, we have sacrificed something that was valuable in the old apprenticeship system. It was said, and no doubt with truth, that the apprenticeship system of education turned out practitioners who were very rough and ready, but who were still practitioners. It was said, on the other hand, that this University system turns out men crammed full of certain novelties called science, who are not in any true sense of the word skilful practitioners. Now, I am not willing to admit—indeed, I have often maintained the contrary—that this is true to the full extent. But it may be admitted, nevertheless, that there is a tendency to some extent in that direction; that there is a tendency so to monopolise the mind of the young candidate with the earlier branches—chemistry, anatomy, biology, and the other departments of a scientific training—as to leave far too little time and far too little opportunity for the student to get an adequate and proper insight into what may be termed the work of his life.



I am no enemy, as all my friends here and elsewhere know, to the scientific side of medical education. I have rather been a supporter of the scientific branches in the broadest possible way in my own University during the whole course of my connection with it. But, nevertheless, looking at medical education as a practical whole, I cannot but confess that there is a possible danger—all the greater now that the immense and daily increasing number of details becomes more and more overwhelming to the young mind, or to any mind—in the scientific branches being so developed that it will be impossible to teach the practical branches in an adequate way. Only last night I happened to be in the company of a very old friend of my own, an excellent practitioner, whose son is at the University of Glasgow. He is a very clever young fellow, and has got immensely attracted by the study of biology. He is occupied all the day in the way Professor D'Arcy Thompson showed me in his laboratory to-day, making sections and studying microscopic forms. He is proud of the work. He is wholly absorbed in it, and says "I don't want to go beyond this. This is the sort of thing I wish to live by." In my own much earlier experience I had in my class a young man who was a very good linguist. He was a thoughtful man, with varied accomplishments, and endowed with a truly scientific brain. He came to my class and mastered everything that I had to teach him. Everything, by some kind of instinct, seemed to arrange itself in his mind in such a way that in the very first year he beat all the senior pupils in practice of medicine, with all their hospital experience (of which he had literally none at this time), in the easiest possible way. It came very naturally to me to say to that man, I should like to take you into the hospital as my assistant. But no; it would not do; nothing would induce him, after all his success in my class, to do a single day's turn in practical work. From that time to this he has hardly ever entered an hospital; or if so, only as a governor. I was utterly unsuccessful in bringing him face to face with true practical medical work, because the scientific instinct was so strong in him, that it overcame every other instinct. That man is now Professor of Chemistry in one



of the old Scotch Universities, and he is a very distinguished Professor. This, indeed, is an exception; but what is to come of the mass of the men who may be thus attracted by the earlier subjects, and who are induced in one way or another to prolong the association, so that in four years there is literally no time for us to teach the other important branches? We do our best, we clinical teachers. But what if the students come to us unprepared? What if they come to get their eyes and their ears educated for the first time as to things they should have been educated in long ago? Observe the difficulty, for it is a very serious difficulty. The practical training and discipline is, as it were, shunted into a corner, and so made impossible; and this is more especially the case with the physician's training which, coming in the order of time necessarily after the surgical, and yet being much wider and more complicated in its scope, is too apt to be run entirely into the fourth year of study, and not half done even then, simply because the man, with all his previous training, is not half ready for it.

Now to meet this difficulty, which we all acknowledge is a serious one, I have heard of two different kinds of proposals. One is to throw back a considerable portion of the early scientific training from the Colleges into the schools; to demand of the schools the teaching of elementary physics, chemistry, and biology. Well, perhaps many of those here who know the schools and the school system of Scotland much better than I do will be able to say whether that be desirable or not. It is plain we are not ripe for it just now. The schools have not the apparatus—have not the means of giving anything more than a mere knowledge by rote; and knowledge by rote is worse than no knowledge at all. Unless the schools can teach these things, as Professor D'Arcy Thompson and the other professors teach them here, they need not begin. Therefore, for a long time to come that plan may be considered as practically out of the question. A second proposal is to extend the curriculum to five years. Well, speaking for myself, I have no objection to that. The matter has been discussed and argued in the Medical Council without any decided conclusion being arrived at. At present you may regard it as



settled that the medical curriculum will not be altered generally to five years, in all probability, for some time at any rate. But, suppose it were, I have so much belief in the attractive power of these early scientific branches—I feel so much myself the attraction they have for the mind—that I am convinced that the same difficulty would still occur. The risk would be that a considerable number would still have their whole attention monopolised by these early branches, and that those branches which it is absolutely necessary for them to acquire as practitioners would be, to some extent, apt to be shunted out of the course. There is only one remaining way, and that is a way I ventured to propose more than a quarter of a century ago, but which is regarded by several of my colleagues as rank heresy. It remains for us to see whether we can inoculate Dundee with this idea, and whether this College, beginning with new men, and not hampered by old prejudices, can give a medical training in the way I propose, and so develop a new type of medical teaching, having all the advantages of the old apprentice system, and superadded to these a considerable portion of valuable scientific training.

What I propose is, that the scientific and practical training shall be carried on together throughout the medical student's education, so that he does not at any period of it lose touch either with the one or the other. Is it possible to teach the early scientific branches without monopolising a man's mind? The view adopted by Oxford and Cambridge is that they should take the man for two or three years to teach him the science only; and then turn him over into the London hospitals to teach him the practice. I venture to say that if that is the scheme of medical education that is to be adopted, not four years, not five years, not six years perhaps will be sufficient, and this education will ever remain the education of the few; and at least it is safe to say that this never can be the education of the great mass of medical practitioners; and remember, the studies of the great mass of the medical practitioners are what chiefly interest the public. Therefore, although the Oxford and Cambridge idea may be suitable for these great Universities and the great hospital centres of London, and is therefore by no means to be discouraged, I main-



tain that for the medical student as I know him, as I esteem him, and as I have a life-long knowledge of him, that method is quite out of the question. I think there might be in a medical school an organisation such that at every stage of the student's training an illustration could be sought out of the field of disease. He should be brought more or less face to face with the business of his life all through his course, so as at no time to lose touch with it altogether, and yet be in a position to apprehend the relation to it of thorough and genuine scientific work. I may illustrate what I mean by one or two examples. A great deal of what is called stethoscopy—the science of auscultation, which rests, in the main, upon a basis of pure physics, and might therefore be advantageously taught at the very commencement of a medical career, in connection almost with preliminary training; a great deal of this and of the most elementary principles of it has actually to be taught during the last year of a student's course. It is during the fourth year only that I can count absolutely upon his being brought into connection with me at all; although, in point of fact, many students begin in their third year to think it worth while to know something of what the practice of medicine is. The difficulty I meet with is that the man has at this advanced period to be taught for the first time really and personally what is normal, what is healthy, and it may take months before his ear, not to speak of his mind, is educated so that he can be made to draw a single correct inference. Now, why learn all that on the diseased subject when it could be learned so much more easily and satisfactorily on the healthy subject? There are scores of instances of matters of this kind that could be taught casually and incidentally during the progress of the scientific training. Illustrative cases which happen to present themselves at the hospital could be made good use of according to the stage of progress of the student at the time. The same method could be followed in the learning of physics, chemistry, and the whole realm of graphic physiology. There are facts in connection with all these sciences which could be explained in the lecture and illustrated at the hospital. But in the event of a School of Medicine being founded in Dundee, should it, it has been asked, take the Oxford and



Cambridge method, or go on a model of its own? If Dundee goes on the Oxford and Cambridge method, and makes itself purely a scientific school, and sends its pupils thereafter to Glasgow or Edinburgh, as a matter of course, and of necessity, it is losing practically half its advantage. It is giving up the game. It needs no prophet to see that in a poor country like Scotland a system by which the scientific training by itself is to be developed in this alarming way will not at all suit the purses of the students or the time they have at their disposal.

Now, what I have to suggest is that you might manage to interest my friend, Dr M'Cosh (the Medical Superintendent of the Dundee Royal Infirmary), in this matter. He is an old student of my own, and I know how good a man he is in the practical department, and how much he feels the whole value of a medical training. If we could manage to get Dr M'Cosh to support himself by one or two well-paid hospital tutors, young men recently off the irons, thoroughly well-trained both in the practical and theoretical side; and if the few students of your nascent medical school were paternally supervised by these tutors, who would follow them up in the lectures, learn what they were getting in the chemistry class, what in the biology class, and take them into the hospital for an hour or an hour-and-a-half every day, and teach them what the hospital affords in connection with disease, and explain such things as may bring the lectures into relation with the clinical side of medical training, you would make these students feel their profession all along, and you would add a new interest to their scientific training. I shall be told that this is impracticable. Well, in Glasgow and Edinburgh, with our large number of students, with all our old traditions, with certain interests involved, and with ways which have become fixed and stereotyped, it is impracticable. But to my mind it is not impracticable in a new school. If this were done in a new school it would, in my opinion, come to modify beneficially the whole course of medical training not only of the older schools of Scotland, but also of the hospitals and schools of England. I will not absolutely say that the student should go very much into the hospital from the first moment he enters the classes, but I do



think he should be led into the hospital soon, and be led under the tuition of a man who would make it his business to leaven his mind with ideas tending to forward him in his vocation, and at the same time to give an interest to his scientific study by showing its bearing upon his future vocation. This might occupy two years, this joint system of scientific and practical training. Then I may engage to say that in the third and fourth year the clinical training would begin at an immense advantage, and we clinical teachers—I am supposing myself for a moment in Dundee—would find our men with their eyes and ears educated, their senses trained, and their minds qualified to a certain extent much more accurately and really to appreciate the facts of disease, as we are obliged to study them and lay them down, from a practical point of view.

But I am afraid that in this long disquisition we are losing sight of one of the main objects of this assembly. We are losing sight of you, my young friends, and I may say here I have written this, the only previously written part of this address, without properly appreciating the number of the fairer and gentler sex that were to be present on this occasion. We are losing sight of you who have launched out already in your several careers of study, and are here to obtain the prizes which you have so well earned. For you, too, I have one word of warning and one word of encouragement. The word of warning I shall not give in my own words, but in the words of Mark Pattison. In his very pungent, but unmistakably sincere, book recently published (his memoirs), the late Rector of Lincoln says—and I may observe that the most remarkable thing about this passage (otherwise I should not be quoting it here), is that it is not a criticism on his opponents, but a severe, if just, commentary on the results produced by the reforming movement supported by himself and by his friends—“The young Oxford, which our present system tends to turn out, is a mental form which cannot be regarded with complacency by any one who judges an education not by its programme, but by its *élèves*. Our young men are not trained; they are only filled with propositions of which they have never learned the inductive basis. From showy lectures, from manuals, from



attractive periodicals, the youth is put in possession of ready-made opinion on every conceivable subject: a crude mass of matter which he is taught to regard as real knowledge. Swollen with this puffy and unwholesome diet, he goes forth into the world regarding himself, like the infant in the nursery, as the centre of all things, the measure of the universe. He thinks he can evince his superiority by freely distributing sneers and scoffs upon all that does not agree with the set of opinions which he happens to have adopted from imitation, from fashion, or from chance. Having no root in itself, such a type of character is liable to become an easy prey to any popular charlatanism or current fanaticism." The word of encouragement shall be taken from one of my own old addresses; in which I have endeavoured to show forth as regards the medical art, but in terms, I think, applicable equally to every other, the principle that underlies all sound teaching and learning. It is this: "The first lesson to be learned in order to make all other lessons possible is, in my opinion, this—to deal very largely with things and not with mere words; to realise as much as you can all your instruction by making it your own through personal observation; to suffer nothing, if it can possibly be avoided, to lie in the mind as a dead weight of vocables, oppressing the memory and dwarfing the intellect, but to bring everything into the living light of fact and of nature, and thereby at once to assure to yourself the truth and exactness of your knowledge, while at the same time you are stamping it down upon the memory by the most sure and lasting of all technical methods. This is essentially the modern spirit of scientific inquiry, in virtue of which alone you can rise out of the dogmatisms and orthodoxies of the past to make secure and beneficial progress in the knowledge of your profession." I do not for a moment suppose that any of the able and accomplished men whom I see around me will differ from me in respect of the words I have just cited, or will think that they are aimed contemptuously at scholarship or the study of languages, or especially of the Greek and Latin languages when studied in the spirit of Mark Pattison, or of the best representatives of such studies in Oxford or Cambridge. To speak such words in the presence of Principal



Peterson would in that case be an outrage on propriety which I could not bring myself to commit. But I appeal to the general context of these three published addresses of mine, which, however, I will not inflict upon you, in proof that I do not personally at all undervalue linguistic studies; and you will perhaps take it as an additional proof of my sincerity in this, that, as a matter of fact, having lost sight of almost all the little Greek I had in my school days during the absorbing claims of the medical curriculum, and after days of practice and scientific studies, I took pains to recover a little of it by renewed studies long after I had become deeply engaged in the business of life. But even in the study of languages there is a right way and a wrong way, and the principle here is the same—to keep close to nature and the facts—to make them, in short, a living study and not a dead one. The unamiable and self-sufficient type described by Mark Pattison grows everywhere, as well as in Oxford, out of want of thoroughness in doing the work in hand, whatever it be, or out of want of a right direction in that work. The best training in humility and truthfulness that can possibly be supplied, short of the highest Christian exemplar, and the moral and religious element which grows only out of that, is to be found in the study, the large and reverent study, of nature. Who that is once confronted—really confronted, I mean, and not merely verbally confronted—with a single realm, however apparently trivial or remote, of natural science, can avoid applying to himself the well-worn expression ascribed to Newton, of standing on the brink of an illimitable ocean of unknown truth, of which only the merest margin can be surveyed by mortal ken? What man of the present day, in all that belongs to the essence even of the Christian idea of humility and reverence, devotion to truth, and freedom from self-seeking, is greater and nobler than Charles Darwin, whom some would call (wrongly, as I believe) an Agnostic or an Atheist?

Now, in a College which, by its very constitution, is wholly divorced from theological opinion and teaching, you may require to be warned of a danger springing from this source. How far this is or may be so, I am not here to say. But I am here to say what I know from an experience of many years as a teacher, a



student, and a man of active and practical life—that there is no natural tendency in science and learning in themselves, and certainly no tendency in medical science or practice, to make men proud, overbearing, and self sufficient. When science is simply crammed out of books, indeed, and with a view to examinations and to prizes, there is, it may be admitted, some such risk, because then you are placing yourselves in relation, not with the illimitable majesty of nature and the overwhelming dominion of law, but with some little smattering of knowledge set aside for you to get up by rote, in which you are comparing your little paltry self, not with the whole field of knowledge, but with so much of it as has been “got up” by some other man. But to him who comes really face to face with nature, whether in the physical, vegetable, or animal world, whether in health or disease, who makes thoroughness his aim from the first in everything he does and thinks, and who is not to be diverted from this aim either by lucre or popular applause, or even by the desire to excel others—to such a man (and such men I hope your training here will make some or most of you) reverence and humility of character come as a matter of right, indeed of necessity, because they know and feel, even if they fail thus to formulate their convictions, that all nature is the temple of the living God, glorious and immense, and unspeakably great above all the possible conceptions of any finite mind. Those who enter this temple may well put their shoes from off their feet, and understand that the place whereon they are standing is holy ground. But they will only adopt this attitude of mind when they cease to compare their own puny efforts with those of their neighbours, and learn to contrast them with the enormous sum of human effort that has already, during all these centuries, taken the same direction; and finally with the illimitable ocean of the unknown, over which, if I mistake not, the Holy Spirit still broods, as of yore, and, if you are thus wise and reverent, will reveal Himself to every one of you.