The relations of the medical profession to modern education : an address delivered at the commencement of the Medical Department of the University of Vermont, June 16, 1869 / by Edward S. Dunster.

THE RELATIONS OF THE MEDICAL PROFESSION TO MODERN EDUCATION.

AN ADDRESS

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MEDICAL DEPARTMENT OF THE UNIVERSITY OF VERMONT,

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NOTE.

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THE RELATIONS

OF THE

MEDICAL PROFESSION TO MODERN EDUCATION.

THERE is no question, perhaps, at the present day, which has so large and many-sided an interest for almost all classes of society as that of education—education, I mean, in its broadest sense, as applied to whole peoples, and not in its old acceptation of overculture of the few, or its still more subordinate aspect of teaching, which is but one of the means to the end of education. This question has assumed various phases and vast proportions, for it has a direct bearing on the material progress of society, and its advance in civilization. For this reason it has directly engaged the attention of our ablest scholars and keenest thinkers, and indirectly the opinion of the people has been unmistakably made manifest, by their distrust of the old systems of education, and their demand for a new, better adapted to fit the growing mind for the important responsibilities of life. The question has elicited the most antagonistic opinions, and powerful arguments have been put

forward in favor of the opposing lines of policy which are advocated by different parties. It is a question, however, that cannot be decided by argument, precedent, or authority; its solution is to be found in the relation which obtains between the demands of life and the existing systems of education. And, although I hold that we ought all to have sharply-defined opinions on a subject which is so important a concern of all, it is no part of my plan at the present time to enter into the controversy, nor to advocate either the classical or the utilitarian studies. But, keeping aloof from the questions immediately at issue, and from a distance, as it were, observing the progress and tendency of events, and accepting the situation precisely as it presents itself to my view, even if it does not accord with cherished wishes or convictions, I purpose to consider simply the relations which the medical profession should sustain to this work of the new and the incoming education.

The solution of this problem necessitates two other inquiries: 1. What is the general tendency of modern education? 2. What is it that is shaping and directing that tendency? The answer to these inquiries will be apparent as we proceed.

I.

"Modern civilization," says Prof. Huxley, "rests upon physical science," and herein we find the explanation of the rapid advance which civilization has made during the last century, in which time the experimental and applied sciences have been especially active. The prominent features of this new era are sharply defined, and the basis upon which they rest is apparent almost at a glance. The most careless observer cannot fail to be impressed with two characteristics of modern civilization, wherein it is immeasurably superior to the old order of things. They are, *locomotion and interchange of thought.* The improved methods of locomotion have virtually shortened distance, and brought the ends of the world into close relation; while the telegraph, flashing thought from city to city, and from continent to continent, gives us a knowledge of

events that are taking place in far-off lands, and, so far as the interchange of thought is concerned, it has practically annihilated terrestrial space. The printing-press, also, by the marvellous rapidity of its processes, and the wonderful cheapness and unlimited supply of its products, diffuses thought throughout the whole civilized globe, and places within the reach of everybody the means of acquiring and extending knowledge. Now, these potent civilizers are the direct and immediate creations of science. Without it no one of them could have been devised or perfected—no one of them could continue in existence. To illustrate : The invention of movable type was the starting-point in that remarkable series of improvements which have brought the printing-press to its present perfection. But the full benefit and the prodigious expansion of that invention could never have been realized, had not science come to its aid in the application of the laws of mechanics, of the expansive power of heat, of the chemistry of the metals, of the economy and transmission of power, of the strength of materials, of motion and resistance, etc.; and even all these would practically have been of no avail, had not science devised the means of furnishing a supply of material for receiving the impressions of the type. Indeed, it has been playfully maintained that civilization depends for its continuance on the supply of paper. In the improved methods of locomotion and in the telegraph, it is equally evident, without specifying details, that science is the leading factor.

In addition to these prominent and distinctive features of the present era, we need only look at the industrial pursuits which are alone productive of material prosperity and wealth, to see how largely science has contributed to civilization. She has impressed upon these pursuits new features: 1. In the form of production; 2. In the transformation of the products; and 3. In their distribution. Even in agriculture, the most simple and unskilled of all these pursuits, whose purpose is merely to draw from the earth the means of subsistence, there is implied a knowledge of the physiology of plants, the chemistry of fertilizers and soils, the economy of force, and the application of machinery; and, just in proportion as these scientific principles are understood and applied, is

success attained in this branch of industry. Indeed, in the struggle for life, there is no chance whatever between unskilled and skilled labor. This conviction is forcing itself upon our agricultural classes, and they are hastening to avail themselves of the methods and results of the applications of science to their occupation, although they may be in entire ignorance of the laws on which those applications are based. In this way not only the quantity but the variety of the earth's vegetable products has been materially increased. So, too, with the mineral products, which have been so bounteously stored up within the substance of the earth. Science has provided the means of extracting them, and making them subservient to man's interests.

2. In the transformation of these products is seen a still more remarkable evidnce of the impress of science on our civilization. New products are evolved by the separation or combination of the old, and the old are worked over and reappear in countless new shapes adapted to the necessities and convenience of man. Materials that were considered worthless are turned to profitable account, and made to minister to our daily wants. Each new supply creates new demand, while the never-ending demand of the advancing arts is met by new sources and means of supply. Thus the rude tastes and simple wants of the olden times have given place to the refinements and luxuries of modern life, not because man is more effeminate or degenerate, but because of the new relations imposed on him by the ever-changing conditions of civilization. These refinements and luxuries have become so interwoven with his daily existence that they must now in a large degree be looked upon as essentials. This feature of modern civilization is directly traceable to the application of science in the arts and manufactures. The invention and perfection of the steam-engine have furnished the means for the practical application of the laws of the expansive power of heat, and have thus made available a limitless supply of motor power for our manufactories. The laws of mechanics, which are based upon the laws governing the movement of solids, fluids, gases, and vapors, are applied to the construction and operation of machinery. Chemistry has devised new processes in the arts, and explained the old; in

deed, so numerous and important are its applications, that there is hardly an art which is not indebted in some way to chemistry for the advance which it has made or which is not absolutely dependent upon chemistry for its every-day processes. Even the imponderables, light and galvanism, are made subservient to man's material interests, and it is impossible to anticipate what limits may yet be set to their application and usefulness. But it is unnecessary to pursue this illustration further. It is almost a self-evident proposition that science, applied to the arts and manufactures, is the prime motor in this transformation of products.

3. In the distribution of these products we can trace clearly another prominent feature in the influence of science upon the industrial pursuits. The application of steam to the purposes of locomotion and transportation has subverted to a large degree the old methods of the distribution of supplies. It has rendered both possible and profitable the bringing of raw materials from all quarters of the globe, and the placing back in return the manufactured products. Thus by the facilities afforded for communication between distant countries, and the economical carrying of large quantities of materials, it has both increased the demand for these products, and has enabled the supply to be adequate to the demand. Science has brought to bear its forces in the solution of this problem, for, underlying the whole, there is implied a knowledge of the workings and applications of many of the laws which, as we have seen, are applied in the other phases of the industrial pursuits. The illustrations are, however, so obvious, that it is quite unnecessary to enumerate them.

We discern in these considerations the first great *material* ground of the claims of science to recognition in education.

But, furthermore, science in recent times has been directed to the explanation of the physical and physiological laws whose workings, although not apparent to the superficial or hasty observer, are constantly manifested in all our surroundings and the conditions of our existence. Man, considered collectively, is unquestionably subject to the influence of these laws. It is the business of science to determine what these laws are, and what are the mode and limit of their action and

their possible modifications; for "science," to use the words of Mr. Hodgson, "is, in brief, the pursuit of law," or, in the still more concise phraseology of Herbert Spencer, it is "organized knowledge." By the exposition of these laws, then—another prominent feature in modern civilization—science takes cognizance and control of the most important questions of life affecting man in his social capacity and relations. Now, these questions, constituting the body of social science, or sociology, relate largely to the conservation of life. They have therefore a special and peculiar interest for all, and they establish a *second* fundamental claim for the recognition of science in education.

Finally, science has an important function to fulfil in training the mind to correct habits of thinking, and disciplining the mental powers. It is folly to assert that this can only be accomplished by the study of mathematics and the languages. Observation, comparison, classification, reasoning on external phenomena, and exercising the memory, are carried to as high a perfection in the study of the natural sciences as in the intricacies of the calculus, or the inscrutable mysteries of grammar. This is another consideration, substantiating the claims of scientific education, for there can be no doubt that, in the training of the young mind, the disciplinary value of the studies pursued should always be kept in view.[1]

[1] A writer in the *Edinburgh Review*, for January, 1868, on Liberal Education in England, gives the following testimony in favor of scientific studies—testimony which is all the more weighty from the fact that the whole bent of his argument, except this admission, is to sustain the classical studies, but not, however, as they were then studied in England. Speaking of the physical and natural sciences, he says: "Valuable for their own sake, they are also useful for the sake of every thing else. It is in these sciences that the intellect of the age we live in is most active and progressive. It is by the order of mind to which the study of these sciences is conducive, that our civilization is chiefly guided and controlled. The treasures wrung from that study constitute the richest heir-looms in the power of this age to bequeath to posterity. If we look to what should be the grand object of all study, namely, the formation of mind and character, we shall assuredly be compelled to admit that there is no kind of study so conducive to its attainment as science. For there is hardly any mental or moral faculty which science does not exercise, discipline, and develop better than any thing else which a man can set himself to learn."

II.

These great facts, which have been long familiar to careful observers and cautious thinkers, are now clearly perceived by all peoples, and the consequence has been a growing dissatisfaction with the traditional systems of education, and a demand for a culture which shall distinctly recognize this material element in a nation's progress, shall take into account the changed conditions of modern life, and shape the growing mind into harmony with them. This dissatisfaction has at length organized itself into open revolt, and the whole educational system, from top to bottom, is under arraignment. Our colleges and higher grades of educational institutions are indicted as clinging to an outworn curriculum, whose only effect is to overload their graduates with a mass of antiquated lore, which, while it may fit a man for the occupation of a gentleman, does not contribute largely to his usefulness as a member of society—does not even qualify him for the ordinary avocations of life. The lower grades of schools are charged with adapting their studies simply to meet the demands made upon them by the higher, acting as it were as feeders to these last. This influence extends even to the lowest and most primary of our schools, whose elementary instruction, it is claimed, loses sight of the great principle, which should constantly be kept in view, of training the young to meet and grapple with the realities and responsibilities of life. In short, the entire existing systems of education are declared unsatisfactory and inadequate so far as concerns the fitting of man for action, and action implies labor, and labor by divine command is ordained as the *great* and *only essential* condition of life.

This cry for reform is already producing its results, and a reaction has commenced which threatens to entirely subvert the old method of education, and possibly even to lose sight of the real value of the old studies, and so produce injurious results by giving a discipline and a culture as one-sided and unsymmetrical as was the old. The evidences of the new order of things are seen on every side. In our colleges, not only has the curriculum been remodelled, allowing a wide election in the mathematics, pure and the classics, but supplementary depart

ments devoted exclusively to scientific instruction are everywhere being established. Special schools, for the technical education and scientific training of the large classes who will not attend college, are springing up all over the land, and in the various countries of Europe. In the lower grades of schools the plans of instruction give a greater prominence to the utilitarian studies; and even at the very outset young children, by the method of object teaching now so largely introduced, are made familiar with many of the principles and applications of the physical sciences long before they know even the meaning of the word science.

And while scientific education is thus forcing its way in our institutions of learning, its claims to recognition, not only as an integral part, but as a controlling influence in our system of education, are evidenced in many other ways. It pervades the periodical literature of the times; even the daily press has entered into the discussion of the question with an enthusiasm which, although not always based upon very clear views as to the necessities of the case, or the true principles which should underlie every method of education, is a reflex of the popular sentiment, and an evidence of the very general interest which obtains in this matter. It has received the indorsement of many of the most eminent men of the day; and, while it is true that a strong fight has been made by many distinguished men for the old order of studies, the weight of authority has preponderated largely in favor of the sciences. Even those who have taken the broadest view of the question, such as Mr. Mill, Lord Stanley, Mr. Farrar, and others, have made powerful arguments in favor of the scientific studies, both as a means of increasing knowledge and as a method of disciplining the mind. Others, equally eminent, like Profs. Huxley, Tyndall, Henfrey, Paget, Baron Liebig, Mr. Froude, Herbert Spencer, and many more, have not hesitated to throw the weight of their authority in favor of the superior claims of scientific studies, and to insist upon the necessity of a greater and increasing degree of attention to them.

It is curious to observe at this point that, almost without exception, the men who have made the strongest claims for science are men whose early education had been conducted

under the old method. Some of the profoundest classical scholars that our universities have produced have been the most bitter opponents of the old system of education; and in England, famous for its conservatism and attachment to traditional systems, the changes which have been brought about can be directly traced to the efforts of her most brilliant classical scholars. There seems to have been a very general conviction that their culture had been disqualifying for their lot in life, their studies misdirected, and their time misspent.

Looking at it, then, as we do, from an outside point of view, it is clearly evident that we have fallen upon a transition-period, when the old is to be in a large degree abandoned, and the new is to be arranged. How far the two shall be united—for it would be eminently disastrous to entirely abolish the first—it is difficult to say; but the unmistakable tendency is toward the scientific studies. The tide has set in so strongly in their favor that it cannot be turned back, and he who opposes it must beware lest he be swept away and overwhelmed in the torrent. The opinion of the people has been taken, and the verdict which they have rendered must be accepted as conclusive. Education is every day becoming more and more a serious matter of training the young for meeting and surmounting the realities and responsibilities of every-day life—the mathematics and the humanities must be subordinated to the physical sciences.

This may be a material and utilitarian view of things, but for this I am not responsible. It is the view which the masses of the people have taken of it, and it is my business now simply to state the case as it forces itself upon my observation, without allowing my predilections to influence judgment of the fact. It may be well, however, to remember that, although the issue is a material one to a certain extent, it is not directly between money-making, on the one hand, and a broad, dignified, and refining culture on the other, as the strict classicists are fond of asserting. The real issue lies far deeper than this, and is to be sought for in the problems and responsibilities of life, which, in a thousand different shapes pertaining to our social and material advancement, are crowding upon us every day, and which can neither be evaded nor postponed. These prob-

lems, "the safe and elegant imbecility of classical learning," as Sydney Smith calls it, is not competent to grasp or solve. From them it must inevitably shrink, to take refuge in its own legitimate sphere—the past. But the man of to-day does not live in the past, nor does he accord to it that veneration which was so long deemed its peculiar prerogative. He lives rather in and for the future, and progress is the high and guiding principle of his life.

I accept, then, this new condition of things, the two striking features of which are apparent and must continue, viz., the philosophical education of the masses, instead of the over-culture of the few, and the tendency toward scientific studies and pursuits—a tendency so strongly marked as to render inevitable the conclusion that the culture demanded by the incoming civilization will subordinate the old method of education to the new, and that the new must henceforth rely for its eminence directly, and in a very large degree, upon the study of the physical sciences.

III.

In this interesting change of policy, a revolutionary and reconstructive period in our mental development, in which all classes of society are so deeply interested, what are the duties of the medical profession? It is their prerogative and their duty to take the lead in the movement. This unqualified and somewhat startling assertion calls for the reasons on which it is founded; the claim must be substantiated before assent can be given to what, at first sight, and to many, will seem an entirely gratuitous assumption.

In man there is an instinctive knowledge of the superior power which superior education and intelligence confer on its possessors. This is continuously though unconsciously admitted in the every-day conduct of life; for it is a matter of simple observation that the masses of the people rely for instruction and guidance upon the educated classes. Reciprocally, these classes are bound, as it were, in certain duties to the people, and sustain to them certain peculiar relations. It is these relations in the matter of general education that we have to deal with. For our purposes it will be sufficient to

consider three classes only whose culture and attainments are closely allied to each other, and therefore comparable, and whose education *as classes* has been so liberal and complete as to have earned for them the title of "the learned professions" —a title, however, to which they can no longer exclusively lay claim.

True education itself is becoming more and more a recognized profession, and classes are trained for the details of this work in the matter of teaching; but teaching, as such, is not the only or even the most important part of education. Unless teaching be based on a proper conception of the objects of education, and on a thorough understanding of the nature of the being taught, it may prove not only useless, but injurious. And, besides, however perfect and complete may be the culture of the instructor, and however correct and exact the methods of doing his work, his relations to the other learned professions must, from the very nature of the case, ever remain unchanged.

Looking more in detail at the relations of these so-called learned professions to this question of modern education, it is easy to perceive that these relations grow out of the nature of their respective studies, which stamp upon each profession certain broad and obvious peculiarities. Of these three professions, then—clerical, legal, and medical—the medical profession alone has a training and a culture which are in harmony with the tendencies of modern thought and modern civilization, and on this is based the argument that they are to assume a leading part in the coming education.

The clergy are our traditional teachers. They have not only personally engaged in the work of education, but have directed the method and dictated the studies to be pursued. They practically, even at the present, monopolize all the high posts of learning. But a reaction has set in against their authority, and the unquestioning readiness with which assent has been yielded to their guidance is giving way to a positive refusal longer to submit to their control. Why is this? Not because they are clergymen, as has been flippantly asserted by some, and ignorantly supposed by others. The office of the clergy is no disqualification for the office of the educator. It is because they have failed to take into account

the changes which the advance of civilization has forced upon education, and have neglected to so alter their own education as to make it conform to the growing demands of science. "Content," says Dr. Draper, "with such a knowledge of Nature as might have answered a century ago, the imposing and ever-increasing body of modern science they decline. And yet it is that science and its practical applications which are now guiding the destinies of civilization." The training of the divinity-student for the highest functions of his office excludes much of that training which is so important an element in the new education. Having ultimate reference to the fitting of man for another life and another world, it overlooks in a measure the fitting of him for this life and this world. The languages are the predominant elements in this training, for they are the foundation of all his knowledge, the means which enable him to read and expound the revealed word; the keys which unlock for him the stores of patristic and scholastic literature; the media which acquaint him with the body of contemporary philosophy and of doctrinal and Scriptural exposition, which are such prominent features in his education. The sciences are unessential in his work and his culture. He derives no aid from them, takes no account of them, does not even recognize them.

But, independently of the fact that the culture of the clergy does not compass the scientific studies, the profession has, in the past, protested against the cultivation by others of these studies, and has strenuously opposed them. Time was, when science, such as it was, was confined almost wholly to the priestly order, and the alliance was conducive neither to the spread of true religion, nor the advance of science. Then, as science began to be studied apart, and to unfold itself and assert its claims, the profession looked on with distrust and suspicion. They estimated those claims by their own conceptions of truth. They assumed that the teachings of science would invalidate the trust in divine revelation. Hence arose that stupendous folly, which so long held sway, and for which the clergy were mainly responsible, that science and religion are incompatible, and which has compelled wellnigh every branch of modern science to put itself into an unsought-for attitude of

defence against this opposition. It is quite unnecessary to go back to the time of Galileo to find instances in point. To-day furnishes traces enough in the dread of free inquiry into the origin of races and species generally, a question which is prominently exercising the mind and engaging the attention of the scientific world. As science was largely engaged in searching out the secrets of Nature and unfolding her laws, it had to deal with material things. Thence arose the cry that the tendency of the study was materialistic. But in those very laws which science expounded, was it not more rational and more religious to recognize the simple yet grand expressions of God's will, rather than sink the prime moving cause in the mere working of law? In fact, science has furnished that great argument of natural religion, which deduces a First Cause from the evidences of design with its most striking and convincing illustrations. "Science," says Prof. Youmans, "is the revelation to reason of the policy by which God administers the affairs of the world." And every discovery which science has made only furnishes additional proof of the constant and overpowering control of a Supreme Being. Rightly interpreted, then, science, so far from fostering skepticism, is the most powerful agent in dispelling it—the strongest support which true religion can bring to its aid.

Happily for the world, this intolerance of science is rapidly passing away, and it cannot be said of the body of the clergy of to-day that they participate in it. But the legitimate result of this old opposition remains to some extent, and in it is found another explanation of the decreasing influence of the clergy in educational matters.

By these considerations, then, it seems to me apparent that the high position which has hitherto been accorded to the clerical profession, in their relations to education, cannot be maintained. In their capacity as conservators of learning, and as teachers under the old order of things, where a large part of their duty was to train up candidates for their own calling, they have accomplished a vast good, and they are entitled to all honor for it. But the qualifications which fitted them for this important office, in a former state of things, are no longer sufficient. The direction of their studies is faulty,

so far as relates to the new education, and the tendency of their studies is not in accord with the spirit of the age. Science has at length organized a revolt against their authority, and control in the educational field.

Now, consider for a moment the relations of the legal student to this question. He is engaged in the study of *human* laws which are made and unmade by legislation, and which many times are only the reflex of prevailing social or political necessities, assumed or real. Although the eternal principles of truth and justice are the basis of the superstructure which it is his business to build, precedent and authority are controlling and insurmountable conditions in that work. To quote the words of one who is himself a distinguished member of this profession: "He contributes little or nothing to the stock of human knowledge. He has given himself to the study and application of a science, if indeed it be a science, which as often deals with artificial principles and dogmas as with great abiding truths. In grasping at the philosophy of jurisprudence he is fettered, even in this day and generation, by precedents of scholastic absurdity which date back before the Wars of the Roses, and by statutes the very records of which were lost before the Reformation. The scientific aim and effort of his professional life are simply to show that '*thus it is written.*'" *Evidence*, than which nothing is more deceptive, is the material from which he must sift the truth, while *experiment* is the absolute and unmistakable test of truth in science. Science and its laws, which are not made and unmade, only interpreted by man, form no part of his education. And when, as is frequently the case, he is compelled to bring science to his aid in determining controversies or adjusting disputed questions, he very shrewdly relies upon the expert in science. As a class, the legal profession has never evinced any of that opposition to the claims of science which, as has been shown, emanated in former days from the clergy. No body of men have a keener perception of the truth that, while the exercise of private judgment is an unquestioned inherent right, the most precious, perhaps, of all our civil rights, such judgment, when exercised on subjects in which we are uninstructed, may put us all in false positions. They have therefore wisely

refrained from taking part in a work for which the peculiar nature of their studies and mode of thought is unfitted. And yet it cannot be denied that they have contributed to perpetuate the traditional systems of education by the very respect which their study compels for precedent and established custom. As a class, however, they have never taken any active part in the work of education. They have never in this relation had any recognized status, not even that which the breadth of their culture and the powerful influence accruing to them as incumbents of the highest executive and legislative positions clearly entitle them to, and there is no reason to hope for any change in this respect.

How stands the case now with the profession of medicine? It is the only one of the learned professions which does not plant itself on the dogmas of either authority, precedent, or tradition. Its doctrines are based upon the eternal and immutable laws of Nature, and are estimated by high scientific standards. Precedent and authority carry no weight here, except in so far as they accord with the principles which science has proven, and has established as reliable guides. There is none of that blind devotion to old ideas and methods which has so hindered progress in other callings, and which has rendered our educational systems so inadequate and unsatisfactory. The *old* is valued only as it squares with the *new*. The *past* is estimated solely by the standard of the *present*.

Not only does medicine thus discard authority, precedent, and tradition, but, first, its methods of study are purely scientific; and, second, its studies comprise the whole range of the physical sciences.[1] The knowledge of these sciences, which has so often and ignorantly been condemned as unnecessary to the practising physician, has of late years far outstripped all other branches of human learning. It is the application of these sciences in biology which has given the physician that truer insight into the nature of the living body with which he has to deal, upon which depends the proud eminence

[1] "Medicine, in its original and comprehensive sense, as one of the great divisions of human culture, must be considered as taking in the whole of physical science."—W. Whewell.

of the profession to-day. "The essence of science," says Prof. Acland, "lies in observation, comparison, and classification; in precision of data and precision of argument." This is precisely what is required in the study of medicine. Indeed, it may safely be affirmed that there is scarcely any thing true or valuable in medicine, beyond some of its therapeutical applications, which has not been wrought out and approved by scientific research. Observation, of course, is the basis of all knowledge; but, unless we do something more than observe—no matter how large may be the accumulation of facts—we can lay no claim to scientific method. There is not a single one of the physical sciences which is not contributory to medicine. On them the physician relies, and an understanding of, at least, the principles of them is absolutely essential in his study and his practice. Chemistry and mechanics, acoustics and optics, electricity and galvanism, the production and action of heat, the indestructibility of matter, the correlation and conservation of forces—these and all the other physical sciences are required to explain the many and varied healthy phenomena, or to correct the unhealthy phenomena, which are brought under the notice of the physician.

Covering thus, as it does, the whole range of physical sciences, and doing its work in strict accordance with scientific methods, medicine is entitled to rank as a science. It is constantly objected to this claim, that it is not an *exact* science. There is a very general, though vague, impression abroad that, while medicine is somewhat indefinitely scientific in its bearings, it is neither one thing nor another—a sort of a hybrid, entitled to no consideration whatever. Now, this objection can lie, to use a legal phrase, only against the *methods* of study and investigation which are employed, or against the *results* attained. It does not apply to the methods, for the methods are the same, as has been seen, that are employed in all other sciences, and as much nicety and precision are requisite and manifested here as elsewhere. As to the results, the objection at the present time is true to a certain extent. It arises from the great diversity of the study—including all the sciences—and the enormous number of interfering conditions met with in so complex a structure as man, the principal object

of the physician's study. But, as we advance in our study and perfect our methods of investigation, we are able to appreciate more accurately the value and significance of these disturbing conditions, and make allowance for them, just as the astronomer allows for the aberration in the movements of planets or for the effects of the refraction of light. Thus, we are, one by one, eliminating these sources of error, and gradually our results will approximate the accuracy of the fixed sciences. In its *essence*, therefore, both so far as concerns the methods of study and the results attained and attainable, medicine is an exact science. The study is only in its infancy when we take into consideration the period during which it has explicitly and directly called science to its aid, or, in other words, has had a scientific basis. Therefore, many of its laws are imperfectly elaborated, and many of its old errors are yet uncorrected. But the incorporation with it of advancing science is every day adding certainty to its results, overcoming former prejudices, and dissipating error. And in this very fact are founded the high hopes we entertain of the continued progress of Medicine, for she does not hesitate to acknowledge her error when new truth has convinced her of a mistake, and, however devoted she may be to-day to any theory or system, if to-morrow advancing science proves that theory or system incorrect, she will not let it encumber her progress, but will sweep it from her path as remorselessly as the whirlwind crushes down the forest in its destroying track. Hence the unnumbered remains, dead and dying, of erroneous doctrines that may be found scattered along the wayside of the historic march of Medicine.

It is apparent, then, that the medical profession, although trained for a specific occupation, must have a scientific education, and we have above seen that the tendency of modern education is in the same direction. "Scientific education," says Mr. Mill,[1] "apart from professional objects, is but a preparation for judging rightly of man, his interests and requirements." Now, if this assertion may be accepted as a postulate (and no one, I believe, can justly take exception to it), it

[1] Inaugural Address at the University of St. Andrews, February 1, 1867.

forms a strong point in our argument, that the physician must take control of the coming education; for his culture, and his alone, enables him to judge rightly of man, his interests and requirements. This is his peculiar office, the highest and most ennobling of his duties, and, in the use of the term education, we have expressly extended its application to the broadest limits, and have excluded its subordinate and narrow features.

The physician's studies were undoubtedly entered on with the professional aim of restoring the body to health when broken or disturbed by disease, but the very knowledge which enables him to do this is that which, according to Mr. Mill, is the aim of scientific education, and which is, therefore, indispensable to the educator. A knowledge of the being to be trained or taught,[1] it is evident, must underlie the whole subject of education, and form the basis of all intelligent culture. The physician alone is competent to supply this knowledge, which can only be acquired by a study of the laws governing the evolution and action of both mind and body, and which, as science has demonstrated, are determinate. This study, comprising psychology and physiology, is the peculiar province of the physician. Theology and law are powerless and utterly unavailing here. They cannot help us to this necessary knowledge, for they know nothing of it: their education has been directed in different channels to different ends. The physician has, therefore, in reality, to precede the educator, and determine and enunciate for him the laws upon which the healthful and vigorous development of mind and body depends. Thus is furnished a true physiological basis for education, and no system can be held faultless or complete which loses sight of this truly scientific study of human nature.

Then, as we proceed from the understanding of man, the

[1] "Man, as a problem of study, is simply an organism of varied powers and activities; and the true office of scientific inquiry is to determine the mechanism, modes, and laws of its action."—Prof. Youmans, *on the Scientific Study of Human Nature.*

"If there is any thing that deserves to be studied by man, it is his own nature and that of his fellow-men; and if it is worth studying at all, it is worth studying scientifically, so as to reach the fundamental laws which underlie and govern all the rest."—Mr. J. S. Mill, *loc. cit.*

being taught, and endeavor to judge of his requirements and interests, what a wide range of considerations is forced upon us here, wherein the medical profession alone can give an intelligent judgment! Apply these considerations to the body politic, rather than limit them to the individual, for thus their significance as objects comprised within the aims of scientific education becomes more apparent, and the importance of an acquaintance with the principles underlying them the more evident. There is scarcely a problem in sociology which does not bear upon this point, and which therefore comes within the legitimate scope of education. Thus we may instance the comfort and health of the community; the influence of the occupations on life; the deterioration of the race from residence in large cities and crowded districts, from inherited or transmitted diseases, from unhealthy occupations, from insufficiency or impropriety in food, from any cause whatsoever, affecting the capacity of a population for labor which alone is productive; the prevention of disease, endemic and epidemic, and the consequent saving of life, by the rigid application of the established principles of sanitary science; the proper equilibrium between work, both mental and physical, and repose; the care and training of the feeble-minded and insane; the management of criminals; the recognition of the influence of habit in developing mind and body, and therefore as an aid or a hinderance in education; the restraint or correction of the social evils; the explanation of the gross and wide-spread superstitions and ruinous mental and moral epidemics that sweep over our land;[1] the generally-recognized but illy-defined influence

[1] "The country is flooded with trashy and idle notions, taking on philosophical names, which owe their contagious spread to the fact that the widest interest in truth and the most active-minded curiosity exist in America, and is the prey of its own unscientific education, and of the pretenders, enthusiasts, and fanatics, that live by pandering to it, or are themselves spawned in its marshes of rank fertility. Now, it is only medical men who have much power to correct this perilous tendency, by their influence over popular education, their acquaintance with the sources of credulity, and the causes of mental epidemics, and their own rooted habits of cautious and precise investigation and slow and measured inference. Let the people be taught by medical men the unreliableness of their own senses out of the immediate sphere in which they are wont to use them; let them

of hereditary descent in producing certain aptitudes for good or for evil, and the means of correcting or restraining these tendencies when illy directed, or of developing them when pointing in a proper direction, as well as the uselessness of contending against them, except to protect the body politic from harm, when so far pronounced as to indicate organic irremediable defect. It is impossible almost to overestimate either the importance of the problems arising out of this single question, or the value of a knowledge of the limitations and modifications of this one item of inherited capacity in the mental, moral, and physical organization and development of a nation.

But it is unnecessary for our argument to continue these illustrations. These, and a host of other public objects and duties, are confronting us on every side, and we cannot escape from them. It becomes, therefore, a matter of some moment that our education should at least include a basis of training which, when carried out, will fit men to grapple with these serious responsibilities. The medical profession alone is the one whose training fits them for this work; they alone are competent to advise and guide the people in these matters; and in this we find another and powerful argument in support of the claim "that medicine," to use the words of Mr. Eliot, "as the science embodying, and as the art applying the laws of our existence, has a sort of a natural right to lead the way in the advancement of education."

Taking, then, into consideration all the arguments adduced, it seems to me that in some degree at least the startling claim for the relation of the physician to the educational problems of the day and of the future, has been made good. And yet, I do not entertain the opinion that this relation is to be speedily and suddenly assumed. This must be a matter of slow

understand the tricks of their own nerves and all the delusions short of insanity which the imagination plays on unscientific humanity . . . and just so far as they will labor and strive to disseminate these facts, the reality and force of which none but medical men fully appreciate and understand, may we hope to free our country from the bad reputation and the evil effects of the grossest medical superstitions and the most ruinous mental and moral epidemics."—Rev. Dr. Bellows, *Address at Commencement of the College of Physicians and Surgeons*, New York, March 14, 1867.

development, according as the appreciation of the propriety and necessity for the change enforces itself, not alone on the so-called educated classes, but upon the masses. Again, even supposing that this change should take place to the fullest extent, and should there be accorded to my chosen profession the position which I fondly anticipate for it, it does not follow that our physicians are to turn teachers, or that our teachers must have the special and technical training of a physician. They have failed entirely to appreciate the argument who take this narrow view of the case; they have wholly lost sight of the grander and more extended relations which have been constantly and expressly claimed as the function of the physician in this matter of *education in its broadest sense.*

Hitherto the medical profession has had but an indirect influence in education, but that influence, by the constant perfecting of their own studies, and the supplying of an essential knowledge, has undoubtedly contributed to the change which is now taking place in our educational systems. The state of things, to which they have thus indirectly contributed, now invites their direct guidance and control. It may be objected that the education demanded of the profession themselves in this country falls far short of the high requirements which have thus been set upon their office. Science and civilization it is said are advancing, and yet you demand but a little more culture in medicine than when its alliance with science had not been established. There is some truth in this objection, and it is deplorable that it should be true, as well as humiliating to make the confession. But this does not invalidate the force of the argument, which is based not on the *degree* but the *direction* of the culture. And besides, this is an evil which will rectify itself in due time. The exigencies which called for the establishment of medical schools in this country, allowed a very low degree of culture, and demanded very inferior qualifications on the part of the student. The influence of this state of things has been perpetuated, and is to-day evidenced in the manifestly-inadequate requirements for entrance into the profession.[1] Our thinking men have long been

[1] "The great evil of modern medical education," said the late Prof. Syme, in the concluding lecture of his course on Clinical Surgery, delivered

convinced of the necessity of reform, and this conviction is spreading over the minds of the entire profession; and it is no prophecy to assert that the day is not far distant when the standard of qualification must be raised and made to accord more closely with the important responsibilities of the office. The corrective must be applied in two ways: 1. By demanding a high scientific education before admitting the student to the study of medicine proper; and 2. By lengthening the time of that study, and taking up the separate branches in their natural and progressive order. The present system of medical teaching is more senseless even than superficial; but we may confidently expect, in view of the progressive spirit of the age, that we shall yet establish a more reasonable and adequate curriculum of medical studies.

With no disposition to "magnify mine office," but with a clear conviction of the necessary and inherent relations which must obtain between the studies of the physician and the coming education, the assertion is reiterated that it is his prerogative and his duty to take an important part in the movement. And, as between the clerical and the medical profession, for it is plainly here that the question lies, the latter must assume the place which has so long been occupied by the former. A great responsibility, then, rests upon the profession, and the young men who go forth from our institutions must be prepared to accept it, and they must find in this an addi-

at the Royal Infirmary of Edinburgh in 1867–'68, "is, that it has become a preparation not for discharging the duties of a profession, but merely for passing examinations which, for the most part, imply neither an accurate knowledge of facts nor the possession of sound principles, being simply affairs of memory loaded with dry terminology, to be thrown overboard at the earliest opportunity."

When so candid a confession as this comes from a representative man like Syme, and from a country where the requirements for entry into the profession are confessedly far higher than with us, we may well blush for the average standard of our own medical attainments. But my faith is firm and abiding that the time will come when this manifest evil will be corrected, and when it will no longer be possible, without fear of contradiction, to fling squarely in our faces such a bitter taunt—all the more bitter because true—as that uttered by Prof. Eliot, now President of Harvard, in his article on the new education, *Atlantic Monthly*, February and March, 1869.

tional incentive for carrying up their own culture to its highest completeness, a new motive for keeping constantly abreast the advancing waves of science and knowledge.

More than two centuries ago, Descartes, one of Europe's keenest thinkers, said: "If it be possible to perfect mankind, the means of doing so will be found in the medical sciences." With a far-reaching prescience, he anticipated the influence which these sciences, then in a crude, almost chaotic condition, would inevitably exert. We, to-day, have only to look around us, to see this influence manifested in a thousand different ways and directions. And, although we are yet far from perfection, and may never reach it, it cannot be denied that the influence of these sciences is tending toward that end, toward man's improvement, mental, moral, and physical—the most ennobling duty and privilege, perhaps, of the new education.