

Original Articles.

CHANGES IN THE SYSTEM OF MEDICAL EDUCATION.¹

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I DEEM it a rare privilege, Mr. President and Fellows of the Society, to be permitted to ask your attention to changes of great importance, already effected, or in process of adjustment, in the system of medical education.

I shall attain the high object I have in view, if I shall present clearly and concisely the defects of the old, the advantages of the new, and some of the causes contributing to the modifications noticeable in the scheme adopted by the most progressive of our modern schools.

It is not needful for the purposes of this paper that I should seek outside the limits of this Commonwealth material for illustration. In all that pertains to education, academic, technologic, collegiate, in law, in divinity, or in medicine, the Massachusetts standard is the highest.

The defects of the earlier schemes were most conspicuous in the lack of method in imparting instruction, in the absence of any effort well sustained and continuous through the whole time given to medical pupilage, and, in the control exerted over the students, by interests conflicting with medical education, during the months intervening and between the winter sessions; work preparatory for the lectures was in most instances wholly neglected or poorly directed; the embryo physician cast off at the end of the fourth month of intra-medical life, sought the farm, the work-shop, or the bench, or "plodded his weary way" through the mazes of anatomy, physiology, and chemistry in "regions remote, unfriendly, solitary, slow," or he again became the pupil of a physician already overtaken by business, and by that reason, even if generously qualified, but little inclined to act as preceptor.

It was a sign full of promise, where three years' study and attendance on two winter courses were prerequisites to an examination for the degree of doctor in medicine. Possession of two sets of tickets was deemed good and sufficient evidence of the one and the certificate of a physician in good standing of the other of these primary qualifications for a degree.

I need not remind you of the various methods adopted to evade these preliminary requirements; of the herding of classes, of professorial ambition better gratified by proceeds than by products, or by quantity rather than by quality of attendance; of the dread array of examiners, when ten minutes to each chair was an ordeal better qualified to evoke evidence of fullness from the presence of an as yet undigested mass of medical facts than to determine what was likely to be retained, digested, and absorbed.

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MASSACHUSETTS MEDICAL SOCIETY.

ROXBURY, July 7, 1883.

MY DEAR DOCTOR, — Your paper, read before the Society at its recent meeting, was, in accordance with custom, referred to experts.

The subject of the paper not being of the nature of those usually published by the Society, I regret to inform you that their verdict was not favorable for its publication. I herewith return the paper to you.

Very truly yours,

F. W. Goss, Recording Secretary.

DR. E. N. WHITTIER.

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Under such conditions degrees must have been given more for what men were believed to be capable of acquiring, rather than for what they could have already acquired.

For instance, one of the most distinguished surgeons of modern times, whose name was a household word in this community two generations ago, had, to my knowledge among many others, as a pupil for three long years, one of whom he asked no questions, for whose advancement he made no effort to impart instruction. In a neighboring city I entered the office of a physician famed for his acquirements, widely known for his skill, of great ability, and possessed of a large and exacting practice. I left at the end of the first half year. I had been asked no questions, I had been given no instruction. I had my certificate and little else. Facts such as these, old to the oldest, but new to the youngest here present, controlled the educational efforts of fifty, thirty, and even twenty years ago.

The strongest influences antagonizing the system of medical pupilage as it formerly existed were the very defects alluded to. The founders of the Tremont Medical School determined upon a course of study in large degree supplementary to, but in a larger and more important sense essentially a part of, the winter session. Individual medical instruction became almost an impossibility, for the best medical talent of the community arrayed itself at once by the side of coöperative medical education, the custom of medical apprenticeship was quickly and practically ended, and the gracious influences continued to increase, in power and effect, forcing by their own intrinsic merit the union of the summer and winter sessions, the blending of conflicting interests into harmonious and well-directed efforts continuous throughout the academic year, and perfected a scheme "to carry the student progressively and systematically from one subject to another in a just and natural order." The advantages of the continuous course in the newer system of medical instruction, have fully justified the sound judgment of the promoters of the scheme.

Broken, disjointed, and fragmentary efforts must of necessity give but imperfect results. The study of the various branches of medicine, entered upon with a high appreciation of the value of a systematized and carefully planned scheme, whose various elements are judiciously and logically arranged, must needs be followed by the highest attainment, and the best preparation for an honorable and useful career.

Division into classes, rigid scrutiny of individual members, restriction to the work assigned to the class for the year, and examinations conducted with the utmost fairness, and adjusted in accordance with the experience of the examiner to the capacity of men of average intelligence, are the salient features of the plan now adopted.

The value of the habits of study, and of the mental discipline acquired by men of collegiate education, is nowhere seen to greater advantage than in the classes composing the medical school of to-day; and the relative increase in the number of men who, by their scholarly habits, easily reach the highest grade as medical students is particularly noticed in the matter of hospital appointments, into which of necessity to a considerable degree scholarship now enters. The present difficulty is not to find a sufficient number of good men well prepared, but to select out of the very large

number of desirable men those best qualified for these honorable positions.

Competition, which in medicine now begins with its study, and in the matter of these appointments is sharp from the outset, is thus felt through the whole of a medical student's life, and the immediate goal of his ambition, a hospital appointment, is with good reason believed to be dependent in large measure upon good work in the school. The rapid growth of our hospitals, calling for corresponding increase in the number of undergraduate appointments, offers advantages of the largest practical value to the students. The lengthening of the term of service in the Boston City and Massachusetts General Hospitals to eighteen months, considered with reference to the class of men appointed, may impair in no small degree the success of the fourth year course, so long as it remains optional; for the hospitals must always be regarded as dangerous competitors for the time of the very desirable grade of students able and wishing to extend their studies beyond the three years now prescribed, and hospital experience will always be found in the opinion of undergraduates to outweigh the advantages of the instruction in the special and general subjects assigned to the fourth year. But at the present time no convincing argument can be offered for a more intimate relation between the school and the hospitals. Practically, and through the courtesy of the hospital management, all the material desirable for instruction while in the control of the hospital authorities is freely at the disposal of the Board of Instruction. It is not from lack of material, nor through any obstacles created by hospital authorities, that a large percentage of the cases in indoor and out-door service fails to be of value for the purposes of medical instruction. Nor can it be said that the subjects themselves are unwilling. The more intelligent, and because of their greater intelligence the more desirable patients, are the quickest to appreciate and to avail themselves of the great personal advantages arising from the most critical analyses of their various diseases. At no time are such examinations carried to a greater degree of excellence than during the hours devoted to clinical instruction. The supply of material for all branches of practical surgery and medicine, and for most of the special branches, is in excess of the demand, and is increasing rather than diminishing; and through the intelligent and cordial efforts of the able executive officer of the Massachusetts General Hospital, Dr. Whittemore, a new out-patient building has been so planned as to quadruple the conveniences and opportunities of the old, and to place clinical advantages of the most desirable character more directly than ever before, essentially at the disposal of the school.

An important question bearing upon the relative value of the instruction given by hospital physicians and surgeons here suggests itself.

It is not true that the men having control of the largest amount of clinical material are, by reason of this or any other single fact, the best teachers, nor can it be said that the best teachers are constantly so situated that they can control and select cases such as shall be suitable for illustration of the subjects they desire to demonstrate, and the defect bids fair to be perpetuated; for there are no indications of a change from the present system of a few months on duty and many months off to what is known as the continuous service.

It will be a fortunate day for the cause of medical

instruction when the gentlemen prominently connected with the clinical departments of the school shall have an opportunity to follow, in a regular and systematic manner, the didactic exercises, or when, in harmony with a properly controlled and previously arranged plan, cases can be presented which shall demonstrate clinically the important facts illustrated in the lectures, and at the same time reinforced by text-book instruction.

Yet the advantages are not wholly on the side of the new system, for while the tendency of the present day is strong in the direction of conscious, systematized, and selected knowledge, it leads the student too far from the realm of practical knowledge and applied power. It may with some show of reason be claimed that the error is not in the scheme so much as it is in the limitations placed upon its development by the short time given it by the student. Yet it is true that "the ancient and serious diligence of Sydenham," by which he achieved so much, his master principle in practice and in thought, has given place to the study of essence and of cause, of structure more than of function, of the varying phenomena rather than of the natural progress of disease, and thus the need of cultivating the powers of observation and the art of medicine is lost sight of in the desire to impart the largest possible knowledge of the science of medicine.

The older system permitted the more immediate, the newer system adopts the mediate, cognizance of disease, and is inclined to reject as of too little value the governing principle of the old, that it is by their own eyes, and their own ears, and their own minds that students must observe, and learn, and profit.

In his grateful tribute to the memory of his old master, Dr. Holyoke, whose name appears as the first among the incorporators of this Society, Dr. James Jackson wrote, "After a time he allowed me to walk with him, and to see his patients." Dr. Latham checked his pupils on the threshold of St. Bartholomew's, saying, "In entering this place, even this vast hospital, where there is many a significant, many a wonderful thing, you shall take me along with you, and I shall be your guide."

The strength of the old method was in this intimate relation between master and pupil, and any violation of this governing principle in medical instruction will impair the power of the new system. But there will be found on careful inspection a marvelous increase in the facilities afforded students in that they are placed as never before in direct immediate contact with cases assigned them for their instruction, and while the master and pupil may not now as formerly walk side by side, in a better and more important sense they walk hand in hand in their allotted and chosen studies.

From a somewhat extended opportunity for observing the influences exerted and the results attained by the systems adopted for the instruction of medical students, I may lay claim to the privilege of presenting and of discussing some of the features of the more advanced methods.

The aim of the best school is not to graduate large classes fairly fitted for the active duties of professional life, but classes, whether they be large or small, eminently qualified for the practice of the art of medicine, and in the present advanced and rapidly advancing condition of the knowledge which it is needful to impart to undergraduates, two methods of solving the vexed question, how to compress the needed knowl-

edge into the short time to be allotted to its acquirement, present themselves. One plan, as yet *sub judice*, extending the time to four years, and another, the discussion of which has already begun, is to include in the preliminaries such knowledge of anatomy, chemistry, and physiology that men shall be fitted for immediate practical work in the laboratory and at the dissecting table. In this way didactic exercises and text-book instruction could in great part be finished during the second year, and the third-year students, having already acquired the requisite knowledge of theoretical and scientific branches needful for the purpose, could be assigned exercises, and be frequently examined on subjects more intimately associated with the art and practice of medicine; for though in all that pertains to the science of medicine graduates of to-day are wonderfully proficient, yet it is evident that under the present crowded condition of the third year, and from the scanty time allotted to clinical exercises, limitations are placed upon the best results, and these limitations are so great that comparatively few undergraduates have acquired adequate knowledge of the art of observation, or have been sufficiently drilled in the application to the practice of medicine, of its science and theory.

In clinical exercises the student has his only opportunity of proving, and the professor his best method of testing, the theoretical and practical value of the instruction imparted. Unfortunately for the best interests of the students these exercises are associated with so much that should precede, and, in the latter part of the year, with the pernicious process of "cramming" for the final examinations, that great difficulty is experienced in getting the men most needing clinical instruction sufficiently well to the front so that they are brought immediately under the supervision of the instructor. This difficulty is, however, likely to be removed by the rapidly increasing tendency to divide and subdivide the class into sections, and to thus bring individual students more directly and more frequently in contact with patient and instructor.

The effect of close proximity, quick questioning, and ready response, the breaking down of barriers thrown up in class work, and the substitution for these hindrances of many familiar aids, the influence which a judicious instructor can exert in the direction of implied coöperation and interdependence, the exercise of the power which lifts the work of the hour up to the level of the student's ideal, and carries straight home to his heart and understanding a vivid, realizing sense of the importance of his work, these are a few of the many advantages which division into sections has over the old method of class exercise for the detail or for the routine of clinical instruction.

It is not sufficient for the best results of a clinical exercise that it should rest with the announcement of the diagnosis, and yet it too frequently happens, from a defective application of the rules for conducting the exercise, from the limitations placed upon the time to be given the case, or from other and not easily controlled conditions, that but little or no time is given to the consideration of the other and very important element, the treatment, "for the observation which does not teach the art of healing is not that of a physician, it is that of a naturalist," and one of the strongest claims to the success attained by the new system should be that it teaches men more and better things of the art of healing.

Again, if it be that students are better prepared than formerly by their more extended preliminary education to grasp and comprehend both the difference and agreement in symptoms, the instructor ought to work in a manner not possible under the older system, for devices not applicable formerly, from lack of suitable material or from the want of the present conveniences, can now be constantly employed.

Among these devices none deserves higher rank than the use of the blackboard, and no clinical exercise can be held to be complete in which this important aid is unemployed, for by this the instructor appeals to both the sight and hearing of his class, and places plainly before them in such way that it need not escape the observation of the most superficial the various stages and steps of the mental process pursued by accomplished clinicians in their passage through the labyrinth of rational and physical signs out into the region of diagnosis and treatment. For instance, the use of the blackboard enables the instructor to so collect and display the rational and physical signs that no material fact can escape or be forgotten, to so present the arrangement or grouping of symptoms that the points of agreement or difference can be more readily seen, to adopt the systematic and logical placing of symptoms by employing the device of juxtaposition ("for orderly juxtaposition is requisite in matters of complexity") so that both agreement and difference in the value of signs are made plainer, and to sum up the case by the constant, undistracted iteration and reiteration of the points of agreement.

For instance, the history of a case when written on the black-board should present the signs or symptoms in the order in which they were given by the patient, and whether this order be systematically, chronologically, or logically correct or not, it should be written down as given.

Then the various signs should be rewritten or re-numbered, so that the points of agreement or difference can be more plainly seen, and at the same time so grouped that those signs which by proximity impart value to each other and strengthen the group, as suggestive of some disease or of kindred diseases, are placed (by employing the device of juxtaposition) side by side.

The final stage is entered upon, in the effort made by the instructor to increase the diagnostic value of the group of signs, by iteration and reiteration of the points of agreement undistracted by any allusion to the points of difference.

And I believe that these are the most prominent and promising of the methods now employed to impart requisite knowledge of the value, when applied to individual cases, of the great general truths of the art of medicine.

It is not profitable in the limited time assigned this paper to present more than a brief sketch or to touch upon more than one of the various branches of medical education in which marked advances have been made.

The illustration which I shall employ may serve to show that the proper study of the art of medicine includes that of the art of observation, and that the greater worth of the new system resides in the fact that by this method, better than in any other way, students are taught how they can best employ the knowledge they possess; that it gives them safe rules for the analysis of cases, so that at the time, for the time, and in the time at their disposal they can give an immediate value

to the efforts they may make for the relief of their patients; that it teaches men the great advantage of systematized thought, and enables them to apply to diagnosis and treatment a method which shall add to their equipment yet another thoroughly tested instrument of precision. The intent of the system is that the early part of the year is to be employed by the instructor in teaching his class, by his examinations of patients, the rules they should adopt in their examinations, and in the remaining part of the year the exercises are to be conducted by the students under the supervision of the instructor, who holds the student closely to the use of the rules which long experience and many trials have proved to be best calculated to apply to his theoretical and scientific knowledge the most satisfactory test of its real worth.

Briefly stated the method is this: The rational signs, including heredity, age, sex, occupation, mode of living, hygienic influences, locality, previous illnesses, history of present illness, and all that may be learned by questioning (and in this the art of a skilled examiner is plainly set forth), are written on the blackboard, in the presence of the class, and, if need be, carefully rearranged or numbered according to the relative importance of the signs; then the diseases, of which these rational signs are suggestive, are placed in such order, or so grouped, that they are given position in the order of their values. The same course is followed with the physical signs, and, last of all, the conjoint use of rational and physical signs is employed for the purposes of elimination, diagnosis, and treatment.

It has been my very good fortune for a number of years to be so placed that I could follow a considerable number of the exercises in clinical medicine under Professor Ellis, and since his deplored illness many of the exercises in this department of instruction under Professor Minot.

The illustration which I have already alluded to, and have placed on the screen, is wholly, in all its particulars and details of arrangement, a transcript from the note-book of a third year student, his copy of an exercise conducted and written on the black-board in the presence of the class by one of his classmates.

Let us for a moment consider the circumstances under which this exercise was begun.

A woman brought her child to the Out-Patient Department of the Massachusetts General Hospital seeking relief. She was taken into the amphitheatre, where the third class had already assembled, and one of their number was called down from the seats and told that the case was his to examine, governing himself by rules with which he was believed to be familiar. The defective intelligence of the mother and the extreme youth of the child offered many obstacles to securing a satisfactory history of the case. But upon these meagre facts, gained only after much and careful questioning, he based his work. How well he did it is best shown by the fact that one of his classmates, intelligent and observing, obtained for his note-book, and possibly for future use, this outline of the case, and I place it before you just as it was handed to me:—

MEDICAL CLINIC, FEBRUARY 21, 1883.

History. { Girl, age six years. Family history good; previous history good; five weeks ago noticed cough, with pain in left arm (?) and region of stomach; feverish; scanty-muco-purulent expectoration; violent action of heart; loss of flesh and color; appetite poor; no diarrhoea; no vomiting; no evidence of shortness of breath (?); was in bed two weeks; no constipation; does not sleep well; urine negative.

RATIONAL SIGNS.

Cough.	} Acute. Thoracic. { (1.) Pulmonary. (2.) Cardiac. (3.) Pleural.	
Pain in left side.		
Muco-purulent expectoration.		
Violent action of heart.		
Fever.		
Epigastric pulsation.		
(1.) Pulmonary.	{ Catarrhal pneumonia. Croupous pneumonia. Capillary bronchitis. Bronchitis.	{ General. Circumscribed.
(2.) Cardiac.	{ Congenital. Eliminated by history. Acquired. { Endocarditis. Myocarditis. Pericarditis. { With effusion. Without effusion.	
(3.) Pleural.	{ Acute pleuritis. { With effusion. Without effusion. Empyema.	

PHYSICAL EXAMINATION. (SIGNS.)

Inspection.	Pallor.	{ Right side larger than left. Left side deficient in motion and contracted. Intercoastal spaces on left side not seen.
	Emaciation.	
{ Of back. { Of front.	Lack of symmetry.	{ Contraction of left side not so marked. Pulsation at right nipple. R. auricle. R. ventricle. { Congenital pleurisy of left side. Old pleurisy of right side.
Lateral curvature to right side.	{ If dependent on pleurisy curvature would probably have been towards left side.	
Palpation.	{ Vocal fremitus absent on left side. Apex beat felt in fourth intercoastal space near right nipple.	
Percussion (back).	Left side flat.	
Auscultation (back).	{ Left. Respiration absent at base. Broncho-vesicular at top. Right. Broncho-vesicular throughout.	
Diagnosis.	{ Fluid in left pleural cavity; and because of the tendency to purulent effusions in children, and the delicate condition of the child in question, probably, purulent or sero-purulent rather than a serous effusion.	

The occasion was one of many opportunities seized by the instructor to test the quality and the quantity of the knowledge of clinical medicine possessed by the student, and to determine whether or not that knowledge was so classified and catalogued that it was available for the purposes of, and in the time allotted to, this exercise, and although it may seem to some that a better plan could have been adopted for the proving of this paper (for the demonstration is defective in many important particulars), and that I should have procured for you an example elaborated, worked out in detail, and finished in all its parts by an instructor, I have chosen rather to rest my case upon the unimpeachable testimony of the instructed; to place before you the work of the pupil, in which, nevertheless, without doubt and without difficulty, you may trace the hand of the professor, and because I am no longer dealing with the means by which this result has been obtained, but with the result itself.

I have the honor to submit, for your inspection and criticism, this work of a third year student, with a high appreciation of the favorable judgment which awaits it, for it is a competent and willing though not too swift witness of an advance in the system of imparting medical knowledge through recent changes in the methods of medical instruction.

— A correspondent writing to a contemporary makes the astonishing statement that he was told by an older practitioner that it was always the latter's habit to destroy monstrosities. The correspondent having had in his practice two acephalous monsters writes to know what his moral and "ethical" duties are in the premises.