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CONTENTS

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PRELIMINARY MEDICAL EDUCATION[1]

AMONG medical men interested in the advance of their profession few questions are attracting more attention at the present time than is that of the character of their professional education, and going a step farther, it might be said that opinion is now pretty well settled on this point that the important part of the medical education is the beginning of it, or perhaps better, the preparation for it.

Questions of the relations of medical education to medical practise have been discussed by college faculties, medical societies, state boards of examiners and other bodies, and out of all their discussions some tangible results are beginning to follow, as shown by the rapidly increasing requirements for entrance to or graduation from medical schools, which are now insisted upon by those in authority. Recently, through its Council on Medical Education, the American Medical Association has begun to take a very active part in the discussion, and will undoubtedly exert a great influence in shaping opinion. The association has had for years a committee on education, but as the membership changed from year to year, little of real value was accomplished. In 1904, however, a permanent body known as the Council on Medical Education was created, the functions of which are to determine the actual condition of this branch of profes-

[1] Based on a Report to the Council on Medical Education of the American Medical Association, presented April 29, 1907.

sional education in the United States, and make recommendations for its improvement. The council has held three conferences, the last one of which was in Chicago in April.

An important feature of this conference, which was attended by eighty-four delegates from various schools, societies and examining boards, were the reports made by the chairman, Dr. A. D. Bevan, and the secretary, Dr. N. P. Colwell, on the results of a personal inspection recently made of the one hundred and sixty medical schools of the country, with respect to their facilities for doing the work for which they are chartered. Many of these schools were found to be sadly lacking in everything considered essential in an educational institution, and exist merely as commercial ventures. It may be safely said that fully one half of our medical schools have no moral right to exist. Some of these are an actual menace to the public good. The report of the chairman took up also the questions of curriculum and standards in medical education. It emphasized the fact that the most serious problem confronting the schools of medicine in this country to-day is that of the entrance requirements. Various recommendations for the advancement of these were made.

Leaving out of consideration the fraudulent commercial concerns masquerading as schools or colleges of medicine, it can not be questioned that many of the really meritorious institutions are attempting to do more in four years than can be successfully accomplished with the student body as now constituted. In the last two or three decades scientific medicine has made enormous strides, and the majority of entering students are not properly equipped to take advantage of all that is offered them, especially in the newer pathology and etiology. The developments in physiological chemistry and bacteriology have brought new ideas into the science, and to comprehend them, and make practical use of them the young man beginning the study of medicine must bring to his work a far better preparation than was thought necessary ten or fifteen years ago. It has frequently been suggested that in order to give more time for this training a fifth year should be added to the medical curriculum; in other words, the course should be made to cover five years in place of four, and in the freshman year the work should be wholly scientific. In principle this suggestion is not bad, but, unfortunately, few medical schools seem willing to accept it. On the other hand, the great majority of medical teachers insist that the work of the medical school should be in the line of professional, and not preparatory, study, and that all really general or preliminary work should be done before the medical school is entered. The extent of this preliminary work is now the problem to settle.

An ideal condition would seem to be this, that the student should complete a four years' course for the bachelor's degree before taking up the medical course of four years, but few institutions are prepared to make such a requirement, and the situation in Johns Hopkins Medical School and Harvard Medical School can not be duplicated elsewhere in this country for some years. In fact, it is often asserted that the conditions of medical study in these schools are *not* the ideal conditions, and although excellent, are not in every way desirable. This view, which I may say I do not fully agree with, is based on certain facts which must not be lost sight of. These are some of the facts: It is everywhere apparent that the most highly educated physicians are not always the most successful in the practical treatment of disease. Over-education creates in many men a sort of therapeutic skepticism which is a decided drawback in every day practise. In spite of our great

advances in knowledge there is still much in medicine that is empiric, and a quick intuition and sympathetic manner may go further than actual scientific ability. A large part of every-day practise is country or village practise, and among a class of people who do not care for or understand refinement of any sort. Among such people general culture is not appreciated and may even be a detriment to actual success. This may sound paradoxical, but the observation has been made over and over again that the rough-and-ready man who is familiar with the language of the field and shop and who can speak it with the people is successful, where the user of the choicest English may fail utterly, not, of course, because of the English, but because of acquired mental peculiarities which may go with it. The practitioner can not be too far ahead of the people with whom he has to deal. Considering practically the medical man's patrons, it must be admitted that in the United States his income is *relatively* low. Of course I am not thinking here of the fortunate surgeon who has achieved a reputation in a large city and whose fees may be anything he chooses to ask, but I refer to the every-day practitioner of general medicine, the man who has been called the family physician, and who is expected to attend to all kinds of ailments. For the time he spends and the work he does his pay is far from high, and possibly not high enough to warrant a longer time in preparation. From what was intimated above, it does not follow that a longer course of study would bring greater pecuniary reward. Wages of those who work with the hands only have advanced more rapidly than has the somewhat uncertain income of the professional man.

With these and similar facts before him the young man through with the high school hesitates at the outset of a course which may lead him through eight years of work before he begins to earn a living, and, all sentiment aside, that is what most men have to work for. And medical men who have been at the grind for years, also hesitate in recommending such a course of study. What preparation, then, can be made for the medical school which is more in harmony with actual conditions if not with ideals? Is it possible to find a compromise course which will mark an advance, and yet not be so extensive as to be impracticable?

At the present time the best of our medical schools seem to require graduation from a four years' high school course for matriculation, and this, we are all agreed, is not enough. Many authorities are asking that, following the high school course, two years of regular college work should be taken before the regular medical course of four years is begun. This is probably a just requirement, but it appears to be still in advance of what may be insisted upon. As a compromise the Council on Medical Education has recommended a preliminary year of work in sciences and language, in addition to the high school course of four years, as the practical minimum which should be accepted by medical schools in good standing. A very considerable number of the best schools have promised to adhere to this scheme.

In order to work out some of the details of such a plan a special committee on preliminary medical education, consisting of Professors George A. Piersol, of Philadelphia, Charles R. Bardeen, of Madison, and the writer of this article, was appointed last fall, and has since made a brief report with some recommendations. At the outset, it may be said that the members of this committee, as individuals, are agreed that a four-year college course preliminary to medicine is an extremely valuable acquirement, and should be recommended wherever

possible. We are agreed, also, that two years of college work are better than one, when devoted to preliminary scientific study. But in favoring and urging a one-year course as outlined below we are working on a perfectly definite proposition on which the leading medical schools may be able, for the present, to unite. For the moment we are interested in this question: What should be considered as a year of work in science and language, valuable as a preliminary to medical study, and how may this work be taken? Some time before the appointment of our committee the council made a direct effort, through correspondence with a number of the more prominent universities and colleges of the country, to discover the amount of work which should be considered as a year's equivalent in the several topics, and how much of this work in sciences and languages could be completed in a single year at the various institutions addressed. In other words, it was sought to learn how far the usual, or an elective, freshman course would go toward satisfying the requirement of the council with reference to this preliminary year.

The replies received by the secretary, Dr. Colwell, were far from satisfactory; in fact, in many cases they were very misleading and gave no clear idea of what the universities could do in the matter which would be of value in helping on with the plans of the council and the medical schools interested in the proposition of raising the standard of work in medical education. It was even evident that in some of the answers the university and college authorities had dodged the issue.

With these facts in view our committee decided to ask for more definite information, and in such a way as to leave no loophole for misunderstanding. Accordingly, the following circular was printed and sent to all the colleges, universities and technical schools listed in the last report of the Commissioner of Education. There are about 500 names in the list, and the circular letter was sent out in February last.

THE CIRCULAR LETTER

Chicago, Feb. 25, 1907.

Dear Sir:—Because of the rapid advances made in medical science in the last ten years it is becoming necessary to greatly increase the work given to students of medicine to enable them to take advantage of the modern points of view and follow understandingly the many valuable recent discoveries. It is not possible to increase the work within the limits of the four-year courses as now given in our best schools of medicine, as these courses are already overcrowded. On the other hand, it does not appear to be at present possible to lengthen these courses to five years, as has been sometimes suggested. The only remaining alternative is to require of students beginning the study of medicine a broader preliminary training than is usually called for from young men or women entering the medical school. This training should embrace some of the work now given in the medical school in the first or freshman year, with certain subjects in addition, and may be outlined as follows:

1. A year's work in general biology.
2. A year's work in chemistry.
3. A year's work in physics.
4. A year's work in a modern language, preferably German.

All of this work is supposed to be of the grade given in the freshman or later years of our best colleges. It may be and should be preceded by elementary high school work in the same subjects, especially in the languages. It is understood that a year's work which may be counted toward the bachelor's degree is the equivalent of four recitations or lectures a week in each of four subjects through the usual nine months' course.

The following statement may make clearer what is understood by a year of college work in the several subjects:

Biology.—The course here should include lectures or recitations, and laboratory exercises amounting to about six hours of work a week through one college year. In the laboratory the following types, or their equivalents, should be studied: (*a*) a protozoon (a ciliate and ameba); (*b*) a celenterate (hydroid, hydra or sea-anemone); (*c*) an annelid (earthworm); (*d*) an

arthropod (preferably a decapod); (*e*) a vertebrate (preferably a frog or fish), with a view of a general comparison of the plan in internal structure with that of the human body. When possible a study of tissues should be made, first with the unaided eye and then with the microscope, to demonstrate the relation of cells to intercellular substance, as in epithelium and connective tissue. It is desirable that the students should study other fresh typical specimens of elementary tissues, as muscle, nerve and blood.

If the college work in biology is wholly or largely of a zoologic character, as outlined above, it is desirable that it should have been preceded by some work in botany in the high school.

Chemistry.—The student entering the medical school should have completed a substantial course in general inorganic chemistry, with experiments, elementary qualitative analysis, an outline, at least, of volumetric analysis, including the theory of the fundamental processes, and finally, a short course in organic chemistry sufficient to serve as an introduction to physiological chemistry. All this work in chemistry should consume, at least, about ten hours of recitation and laboratory work per week through a year.

Inasmuch, however, as few freshmen courses cover as much ground as is here indicated, the work in general inorganic chemistry, with laboratory experiments and qualitative analysis, may be taken at present as the minimum amount which would satisfy the needs of the medical schools under the new requirement.

Physics.—This college work is supposed to be preceded by an elementary or preparatory course in the high school or academy. The subjects here of the greatest importance for the study of medicine are heat, light and electricity. Satisfactory work in these branches should cover probably three recitation hours and five or six laboratory hours through a college year. The student should acquire some practical knowledge of the microscope, the spectroscope, of thermometry and specific heat, and some familiarity with simple electric measurements.

Languages.—In addition to the work of the high school or academy in these subjects the student should have enough college training to enable him to read one foreign language, preferably German or French, with some degree of ease.

Up to the present time most of our medical schools have drawn their students from the graduates of the high schools. A few medical schools have required college graduation for entrance, but it is recognized that this relation is not yet, in general, realizable. It is hoped, however, that in order to meet the urgent demand for better preliminary education now being made by the leading schools of medicine, the colleges of the country will be prepared to furnish in the first years of their courses to prospective medical students such a curriculum as is outlined above.

This letter is sent out by a committee of the Council on Medical Education of the American Medical Association in an effort to discover just what the colleges of the country can do for the instruction of this class of students who usually do not enter college at all, but who now, under the press of changing conditions, must do some college work before being considered properly prepared to enter upon the study of medicine.

Will you kindly answer the following questions:

How much of the work outlined above is your institution prepared to give in *one year* to students who have a high school training?

How much of this work can you give in *a year and a half*, that is to the middle of the sophomore year, to students equipped in the same way as above?

If not at present able to furnish the courses in the specified time, can you, in view of the apparent demand, give such courses beginning with the college year 1908–9?

The point to be kept in mind is that the college should be able to furnish this desired instruction within a period corresponding to the freshman and perhaps a part of the sophomore year. A blank is enclosed for a reply, which will be greatly appreciated, as will also any comments or suggestions which you may make.

In presenting its report the committee desires to prepare for publication a list of those colleges which are or will be able to offer courses substantially like those outlined above.

Yours truly,

C. R. BARDEEN,
G. A. PIERSOL,
J. H. LONG,
Committee

The phrase "preliminary year in biology, chemistry, physics and languages" is somewhat vague, and the committee, after much discussion, undertook to define it to some extent, as appears in the wording of the circular letter. To be of real value the courses taken in a preliminary year should

make it possible for the student to begin a higher grade of work immediately after entering the medical school. At the present time most of our medical schools teach the elements of biology, chemistry and physics, and it is probably no exaggeration to say that two thirds of the time of the medical freshman is taken up with work which may be, or in fact should be, done elsewhere, and better, too.

It was this consideration which led our committee to outline in a general way what should be covered in the several preliminary courses. It will be seen that the suggested exercises in biology cover work which would serve as a beginning in histology and physiology as well as in comparative anatomy; the chemistry work would cover that given in our usual medical freshman year, while the courses in physics would take the place of work now given in a perfunctory way in many of our medical schools, but which is becoming every year more and more necessary as the many relations of this fundamental science to medicine become more and more tangible.

A modern German classification divides physiology into the two groups of studies comprised under the titles of bio-chemistry on the one hand, and bio-physics on the other. A glance through any one of the larger manuals of physiology in use in our medical schools discloses a justification of this division, and suggests also the desirability of relegating much matter from the class-room in physiology to the class-room in physics. Besides this, it is becoming evident that modern pathology is making every day wider inroads not only into the fields of chemistry, but also into the domain of physics, and taking all things together, the committee felt that it was not going too far in calling for the amount of physics suggested in the circular letter. No explanation of any length was made in reference to the language work, as little difficulty from this direction was expected.

RESULTS OBTAINED

Now as to the results. The replies received were 215, of which the larger number were plain and satisfactory; a few were not as clear as might be desired, from which it follows that a perfectly sharp classification can not be made from the data secured. But the results are close enough for the present purpose. Sixteen of the answers came from state universities, 8 from agricultural and technical schools and 191 from other institutions, some of which include the best-known colleges and universities in the country. The replies from 15 of the state universities and from 7 of the agricultural and technical schools showed a good general agreement with our proposed courses of study. The replies from 78 other institutions were also favorable, although it appears likely in a few cases that the schools in question have not the facilities for properly doing the work called for. On the other hand, about 30 well-known institutions made replies which could not be looked on as wholly favorable.

The situation in some of the older schools seems to be best expressed by the comments made by President Hadley of Yale, as follows:

> The demand for places in our undergraduate courses is so far in excess of what we can readily meet that we can hardly arrange to take men for one year, with a view of letting them leave us at the end of that time. We must, I think, arrange our courses for men who expect to stay longer.

In this list along with Yale we must place Cornell, Princeton, Trinity, Williams, Lafayette, Union, Tufts, Vanderbilt, Bowdoin, Oberlin, Hamilton, Amherst, Syracuse and others of known rank. It is evident that the schemes of instruction in these schools are not flexible enough to

allow a freshman to elect as large an amount of work as our committee suggested. The greatest difficulty seems to be with the work in physics, which naturally presupposes some acquaintance with trigonometry, and which in consequence is usually thrown over to the sophomore year. The work in chemistry, biology and languages could in most cases be provided for.

HOSTILITY TO THE PLAN

The replies from about 80 institutions gave evidence of lack of interest in the matter, lack of equipment for the work, or, finally, a distinct hostility to the plan. As illustrating the last situation the answers from two small colleges, one in Pennsylvania and one in Illinois, may be quoted. The first reads as follows:

> In reply to your letter I would say that we can not justly give the course you suggest in less than two years, except in rare cases. We have found, in our experience, that the students who took a full B.S. course received the best results. We even discourage the short two years' course, because it has so little of general culture work, and the American college stands for culture. If professions will continue to admit men on purely technical preparation and disregard the college, the college nevertheless must stand for the ideals that have made it. Your suggested one-year course is unpractical. You require so much laboratory work in chemistry and physics that none but the exceptional freshman can take them. The number of hours of your proposed course outnumber the hours which educators, knowing the capacity of the human brain and mind, have fixed as a maximum. Should your plan obtain the work must be superficial. *For some time we college men have watched the plans of the medical profession and we are astonished that there is so little appreciation of sound pedagogics.* (Italics mine.)

From the president of the Illinois school the following reply came:

> In response to your inquiry concerning our work in science relative to its value for medical education, permit me to say that we offer all and more than you require, but not in the freshman year. We carry science study through four years of the college course. It appears to us on careful consideration that what you require as preliminary to the medical course could not be well crowded into one year. Three different lines of science study with extended laboratory practise is more than students can advantageously carry in one year, not to speak of the addition of a modern language. Certainly, such crowding could hardly meet the requirements of a good college course. Besides, freshmen are not qualified for the more advanced work in the sciences. Moreover, it seems hardly fair to us that colleges should be asked to do such hurried preparatory work for the professional schools. Why might not law and theology come with similar requests? In what manner could any college do justice to its students under such pressure? Would it not be perfectly fair for the professional schools to adjust their courses to the needs of college graduates? That would certainly greatly improve professional efficiency. We are quite ready to maintain such courses as the professional schools can recognize; but we can not see our way clear to comply with the requests of your letter of inquiry.

It is evident that these men do not fully understand the situation and in addition that their answers are dictated by a somewhat natural self-interest; but in the opinions of other men better able to appreciate our position, we have noticed a similar doubt as to the wisdom of attempting so much work in a single year. In this connection there are two questions to consider: first, the practical one of arranging hours to avoid a conflict of studies, and yet present all the work suggested to be taken, and, second, the possibility of carrying this number of hours successfully. In actual time the scheme provides for about 25 hours of work each week through the college year, divided between class-room and laboratory, and omitting organic chemistry. Now, allowing for a reasonable division of time in the work in the sciences, this is not more than a fair student should be expected to carry, and not more than students carry well in many of our best schools. It must be admitted that students

who are expected to devote a good fraction of their time to athletics and fraternity interests can not carry such courses, but we are far from believing that the present tendency in these matters in some of our schools is a desirable one or one which may be expected to persist.

The writers of many of the replies received by us seem to assume that the proposed preliminary science course is the work of medical practitioners who have devoted but little time to the study of working conditions, and further that the courses involve difficult or advanced scientific studies. Both notions are absurdly wrong and it is evident that the presidents of a few of the colleges are not very familiar with the work of our active medical men on the one hand, or with elementary scientific studies on the other. It may be added that the members of our committee are not practitioners of medicine, but we have drawn many valuable suggestions from practitioners as well as from teachers.

This work may call for more than one year's time from many students who attempt it, we admit, but that it is really more than can be accomplished in one year is not to be admitted yet. Any one who is familiar with science teaching will recognize that we have here merely the elements of such work, and it is a fact well known to many of us who have dealt with medical students for a number of years that some of the state universities actually give such courses, and successfully, to freshman students.

Our committee has been accused of advocating a departure from an "ideal" course. We have admitted all the time that the scheme is not perfect, but we are concerned with the practical question of what we can get, rather than with what we should like to have. I firmly believe that the difficulty is not so much with our proposed course as with the ideas which obtain in some quarters as to what is a fair amount of work for a young freshman who has completed four years of study in a good high school. I believe that with such a training honestly completed our schedule may be carried through in another year of college work. With this as a beginning, possibly in time a second year may be added to the requirement.

But the point of importance is the amount of work and not the name. The Council on Medical Education has spoken of it as a *preliminary year,* but if it actually calls for more than that time the student should be required to spend it, since it seems that little short of this would answer as a preparation for modern medicine. That the applicant for entrance to the medical school has this minimum amount of knowledge should be determined through the examinations of an independent board, and not through the professional school, or by certificate of the college or preparatory school. We all know what such entrance examinations amount to, and an important step forward will be taken when the right to enter upon the study of medicine, as well as the right to practise is passed upon by authorities other than the college faculties. The standard in such entrance examinations should be made as uniform as possible for the whole country, and to aid in bringing about such a desirable situation is one of the objects of the present movement.

J. H. Long

SCIENTIFIC BOOKS

Pragmatism, a New Name for Some Old Ways of Thinking: Popular Lectures on Philosophy. By William James. New York, Longmans, Green, and Co. 1907. Pp. xiii + 310.

Tron de l'air! as I used to hear the Gascons of the *Quartier* exclaim, long ere I knew of