

# Association of American Medical Colleges

PROCEEDINGS OF THE EIGHTEENTH  
ANNUAL MEETING HELD AT  
CLEVELAND, OHIO  
MARCH 16-17,  
1908



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American Medical  
Colleges*



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## CONTENTS.

	PAGE.
Officers and Committees for 1908-09.....	7
<i>Address of President, Henry B. Ward.....</i>	9
<i>Standards of Admission to the Medical Schools, W. L. Bryan.....</i>	36
Discussion on Dr. Bryan's Paper.....	38
<i>The Question of Academic Seniors in Absentia in Professional Schools,</i> A. R. Baker.....	40
Discussion on Dr. Baker's Paper.....	46
<i>The State University and the Medical School, Geo. H. Hoxie.....</i>	49
Discussion on Dr. Hoxie's Paper.....	56
<i>The Equipment of a Medical College, Fred C. Zapffe.....</i>	60
Discussion on Dr. Zapffe's Paper.....	70
Minutes of 1908 Meeting.....	73
Report of Committee on Syllabus.....	74
<i>The Teaching of Histology and Embryology, F. C. Waite.....</i>	74
<i>Materia Medica and Pharmacology, Egbert Le Fevre.....</i>	85
<i>Chemistry, R. D. Coale.....</i>	88
<i>Gross Anatomy, C. M. Jackson.....</i>	90
<i>Bacteriology, H. Albert.....</i>	91
Report of Committee on State Examining Boards.....	98
Address of Welcome, H. W. Rogers.....	99
Report of Judicial Council.....	102
Resolution on American Medical Missionary College.....	105
Report of Secretary-Treasurer.....	106
Reports of Reference Committees.....	108, 111, 112
Standard of Equipment.....	109
Resolution on Higher Entrance Requirements.....	111
Action on Amendment to Constitution.....	112
Committees for 1908-09.....	113, 114
Report of Nominating Committee and Election of Officers.....	114







## ADDRESS OF PRESIDENT.

HENRY B. WARD, LINCOLN, NEB.

Custom decrees that the annual address of the president of this Association shall be, in one form or another, a survey of conditions in the field of medical education, of the line of advancement and change of policy, as well as also a summary of recommendations for the Association which shall aid in formulating its future policy. The practice which has thus grown up is distinctly in the interests of the work which this organization is endeavoring to advance. Even though it be true that whatever may be said in any individual address is merely the opinion of the speaker, his own estimate of the conditions which exist, his own judgment with regard to the future, even though to most of his auditors his address is but the mere repetition of well-known facts, including as it does matters generally known to the thinking men in the medical profession, and even more thoroughly familiar to those engaged in directing and advancing medical education today, none the less it is always of importance to stop and in formal manner to take an account of the work of the past. Even those things which are most familiar often by virtue of their gradual development fail to impress us with the amount of progress achieved or the line of change followed. It is still more striking that the gradual growth of a movement frequently leads its followers to positions which, considered independently, have a very different aspect from that which impressed their minds as the matter progressed. These general considerations have impelled me to follow in the track of my predecessors, even though I appreciate most genuinely my own inability to speak with the authority that is generally conceded to the long list of distinguished men who have occupied this position in previous years. My own inexperience and lack of standing in the professional field make me as strongly conscious of the doubtful value of my discussion this evening as the most critical of my hearers can possibly be. Nevertheless there are some things which by virtue of different training and different environment I may be able to see at a different angle from many of you and thus to present in a way that will at least draw your attention to a side of the question less frequently emphasized. It is evident that naturally I shall tend to lay emphasis on the pedagogic side of the questions discussed.

The mere reading of the mass of material which has been published within recent years as contributions to medical education and its problems, provokes the query whether there is in reality such a

thing as medical education. The public, no less eager in this field than in its general treatment of medical work and methods, is ever ready to formulate opinions and give decisions on the more involved matters with a confidence which indicates its assurance that the problem has been finally solved. Yet not only has the public at large been ready to pass with finality upon the question in all its details, but even some who are engaged in other lines of education have felt a freedom which is neither warranted by their position nor justified by the results of their expressions.

The amount of erroneous information which is disseminated by educated and high-minded people in this fashion is so great that I wish to present in contrast two citations, both from the pens of distinguished men and college presidents. The first speaks as follows: "The traditional college course of study should be pursued before entering upon a medical education. This will not only give the physician all the general information he needs, but it will furnish him information and general training that he will find helpful to him while he studies his profession, and will put him in the way of acquiring useful information during his subsequent years of practice." Now the opinion of this gentleman seems to be that the primary purpose of a physician's education is to secure general information. No doubt it is true that all of us could attend college for years and devote ourselves to intellectual work at once delightful and profitable. He seems to have forgotten the tremendous rate at which knowledge has expanded so that it would take forty odd years to hear all the work offered in the Harvard catalogue, none of which is without its high value to the race and to the individual who pursues it. He seems to be thinking of the time when individual men controlled the entire field of knowledge or when the scientist was equally an authority in every branch of science as then known.

The mental myopia of this speaker becomes even clearer if we compare his vague generalization with the words of another college president, who says: "The practice of medicine is no longer a trade but a profession. It is an art having its basis in science—an art of the greatest delicacy resting on science the most exact and the most profound. The time is past in which medicine can be taught as a trade, even in free America, which has no statutory provisions to compel professional men to be enlightened or honest or competent. But the nature of the subject and the necessities of the people demand that this work be done in the best possible way. Medicine must be taught by the methods which science teachers have found most effective and the study of its practice must follow a thorough knowledge of the sciences on which its art depends." This opinion goes straight to the heart of the question; because it manifests an adequate conception of medicine today, it forecasts what proper medical training must

be. When the educational world takes cognizance of these facts, medical education may hope to be held in proper esteem and receive fitting consideration at the hands of educated men in general.

Equally unfortunate for the status of medical education is the attitude assumed by many members of the medical profession itself. Their indifference and ignorance of the possibilities of advancement which lie ready at hand is one of the most serious problems to be faced in medical education. So long as the medical profession tolerates schools organized for mere advertising purposes, it confesses publicly its ignorance of educational standards and methods.

The elimination of the unfit who often pose as critics and guides in medical education brings us face to face with the real problem of who is entitled to speak with authority in this connection. In other fields of education the opinion of the teacher is taken as authority and yet not all such opinions have equal weight. The student and investigator who is constantly in touch with the newest and best in the field and who at the same time shares the privilege of imparting this to his scholars, has elsewhere the right to speak with greater power than those who merely pass on to others their own views of the results attained in fields of investigation. So it should be in medical education. The opinion of the teacher is worth more than the opinion of the practitioner, and the view of the investigator is broader and his grasp more comprehensive than that of the mere pedagogue. The man who has studied the problems of the situation, who knows the lines of work demanded to prepare for his own branch and has thought out the relations in which it stands to other branches, who has endeavored to correlate his work with that of his colleagues, who devotes his time to the development and extension of his own field, is the man whose opinion is primarily valuable. The profession at large must recognize medical teaching as a distinct and responsible specialty and must lead the public in granting to it that respect and deference which is ever due devotion to a special field.

Strange as this may seem to some and out of keeping it certainly is with past practices in our own country, yet I have only to call your attention to the fact that the pre-eminent position of Germany in the field of medical education is due primarily to the observance of this reasonable demand. The well-balanced development of the German system and the high quality of its product, whether trained in the great school or in the smaller institution, is due to the recognition of university work as a specialty in medicine, to the organization of the field by university men who are primarily teachers and investigators, and to the acquiescence on the part of the public and the profession in their leadership.

To be sure, medical education is not isolated in this country in its lack of standards; there is in our whole educational system so-

called no institution to which one may assign a definite value. The meaninglessness of a name is equally evidenced in high school and college and professional school. The inalienable rights granted each American citizen by the Declaration of Independence have led us to recognize anything which anyone wished to present before the public under the name with which he chose to baptize it. At present, however, definite standards are being sought in all fields of education, and medical men are awake to their responsibilities in endeavoring to determine what in their professional training is open to criticism and what is worthy of imitation.

One prominent difficulty in every discussion of standards comes from a fondness for glossing over one side of the case and emphasizing the other. So, for instance, a certain college professor, in recommending what seemed to him to be a wise course of procedure in perfecting medical education, used the following expression: "A college degree stands for something definite and the world knows in general what that is." Such a statement sounds very nice, but it is as potentially untrue as any remark which could be made. The requirements for a college degree have varied radically within the lifetime of the present college teacher; even in New England, where an association of such institutions has endeavored to standardize conditions, there are still distinct differences in the demands of different institutions. Such a system of inspection and control as has been elaborated by New York state may succeed ultimately in standardizing its literary colleges, although at the present day they are very far from equal. But certainly no one will question that Montana is not Massachusetts, that Nevada is not New York, and that New Mexico is not equal to New Jersey, and even in the state in which the gentleman quoted is at work there exist differences between college degrees, which as evaluated by outside institutions equal in the extreme not less than three years of work.

Thus there has arisen a general demand that some attempt should be made to set a uniform standard and to pass upon the attainment of the individual who offers himself to the community as a practitioner. There are of these agencies four which have taken a prominent part in establishing standards for medical education and it is worth our while to consider briefly each of them together with the part it has played and the part it may be expected to play, both in the establishment of a legal standard and in the molding of public opinion. In a country like our own, public opinion is after all far more important than the mere standard of legislative enactment, for the striking thing in the average American community is that the law which fails to appeal to the good sense and to command the support of the community in general, always fails of enforcement, however laudable its purposes or proper its requirements.

## AGENCIES FORMULATING MEDICAL STANDARDS.

The four agencies to which I have referred are the American Academy of Medicine, the Councils on Medical Education, representing the various national medical associations, the State Boards of Licensure, both individually and collectively in their associations, and our own organization, the Association of American Medical Colleges.

The *American Academy of Medicine* was founded more than a third of a century ago with the expressed intention of raising the standard of medical education by requiring for membership in the body that the element of liberal culture represented by a college education must precede the professional training. During its history a prominent feature in the meetings of the Academy have been the symposia on medical education in its various phases and stages. The Academy deserves the honor of having first pointed out clearly and definitely that there was no system in the relations between the literary college education and the professional course and that by virtue of this lack of correlation grave injustice was frequently done to the student having the better preparation. The object of the Academy may well be described in the words of its secretary as "not on a quest for a course of minimum requirements nor for a concession course to reduce eight years to seven. We wish to determine the educational process most likely to produce at once an educated man and a student prepared to become a skilled physician, and to adjust the two courses so that everything will tell and no time be lost." Accordingly the Academy may fairly be said to be seeking after the ideal course through which the student may become at once a man of culture and of affairs, the English gentleman of leisure and the German student of medicine, "the scholar in the profession" of which indeed we are so much in need that the aim of the Academy may be said to be "a consummation devoutly to be sought."

There are, however, two conclusions which follow inevitably from this statement of the case as affecting the part which the Academy is to play in solving the problems of medical education. These need to be set forth clearly. In the first place the Academy will necessarily have no official influence; its power is the weight of public opinion; its influence will be measured by its ability to form and control public opinion. That influence will undoubtedly be great because it is working with the leaders and among the leaders of American life, the college graduates; and yet the purely ideal conditions which it sets forth are a necessary limitation to the scope of its influence. One may anticipate that its discussions will be read with great interest in a constantly increasing circle, and yet it will become ever clearer that it paints the ideal rather than that which it is possible for the average man to achieve.

It is also fair to say that even among its most recent publications there is much that is open to criticism from the pedagogical standpoint. First among the results of the discussion at its last meeting stands the following: "The expression of the required qualification of an applicant for licensure in terms of definite hours, months, and years in any specific educational institution, is unwise, faulty in its philosophy and a tyrannical exercise of the police power." In criticising the establishment of minimum time requirements in educational training, the speakers have certainly failed to voice the results of the best educational systems and the views of the best educational theory that the world has yet produced. Time is an all important element in education and the advertisement that one school is enabled to do in six months by greater application, longer hours, or any other hocus-pocus what is achieved by another institution in a standard period only is a product of the race and the brain that has evolved goldbricks and patent medicines. So long as we are content to accept those thread-bare generalities such as "a general education," or "a high school course," or even, "a college education," in the place of something specific, both in time and amount we shall continue to find the cheap schools running over with men who have met every requirement and yet turning out a product which is a disgrace to the nation and to the profession.

The various medical associations have each appointed a *council on medical education*. In this movement the American Medical Association led the way and its council has achieved publicly the greatest prominence as well as accomplished the most work. By virtue of its organization and financial condition this association has been able to give its council opportunities which have never been shared by any body of the type in this country. Under the auspices of the council there have been held thus far three annual conferences on medical education and there has been published a series of approximately thirty pamphlets setting forth the records of these conferences, the reports of committees organized under its auspices, and the results of inspections it has made as well as of examinations held throughout the country by various official boards. One must recognize the great importance of its work. No other organization could have carried out so extensive an investigation or have brought together and published for the estimation of progress in medical education such comprehensive statistical comparisons as it has given. It is to us a compliment of the highest character that the council has reprinted so much of the results which have been obtained by our committees and reported to our Association. It is equally a matter of felicitation that various officials of this organization have been so generously welcomed in the conferences of the council and that the reports by the chairman of our Judicial Council, presenting much that has been deduced from our

experience, have received such favorable consideration at the hands of these conferences.

Even though it must remain a purely advisory body and have no legal status, the Council on Medical Education will undoubtedly exercise a strong, indirect control over medical schools by its schemes of reports and inspections and by scattering broadcast the results of these inspections. It is sure to be a potent force in the development of medical education and yet I may be permitted to point out one or two features which as now conducted involve great responsibility and furnish genuine possibility for doing injury in individual instances. The policy of the council is formulated by a small number of individuals. One could not ask for any modification of this plan. The Association having placed upon the shoulders of a committee the responsibility, that committee would not be justified in shirking it or in failing to formulate and push with vigor such plans for the advancement of medical education as seem to it wise.

The annual conference gives opportunity, to be sure, for the presentation of all types of opinion, but there will necessarily be a considerable personal element in issuing invitations to this conference and furthermore even those who are invited to participate naturally feel themselves as guests somewhat constrained in the expressions of their individual views. It is easy to see, consequently, that the publications of the council represent very largely an individual trend of opinion and it would be strange if certain aspects of some question did not fail to receive their full representation; it would be remarkable if all points of view were equally well represented; it would be almost inconceivable that a certain line of development in medical education would not be preferred above others and while the process of evolution should be influenced in the right direction, it is questionable whether the limitation of the process should be left in the hands of so small a group of individuals, however broad and impartial these persons themselves may be. More than this, it would be strange indeed if in the development of a line of action the committee did not some time or another come in conflict with so strong a force or one so related to themselves or their organization by personal or official ties that their judgment or their action would be modified or restrained thereby. We must accept as a reasonable excuse for any shortcomings the tremendous scope, geographically and philosophically, of the questions with which they are seeking to deal, the large responsibilities which rest upon them in other ways, the wide separation of individual members from each other and the necessity that most of the work be done by subordinate officials.

It has been said that in some instances they have failed to meet questions with absolute frankness, to apply the same rules to all institutions and sections, and to safeguard with the same care the interests

of all schools. These minor difficulties are in no way chargeable to individual prejudice, inefficiency, or inattention, but rather are inevitably connected with the tremendous task they have undertaken.

Last year, on the recommendation of President Kober, this Association appointed a committee to confer with the council and to seek a plan for co-operative action. Such a move cannot be too strongly commended or too vigorously prosecuted. The Association should strengthen this committee by adding to its numbers and its powers and by such expression as will indicate to the public and the profession that we at least are unalterably committed to co-operation with all influences for the advancement of medical standards.

*State Boards of Licensure* under various names and with radically different powers and privileges represent the agencies in the various states which are seeking to enforce legal standards of medical training. They represent a distinctly higher average opinion than that of their own locality and they differ from each other as widely as the geographical and temperamental differences of the states they represent. In a legal way they embody the results of a series of some forty odd experiments, amended from one to one hundred times under the influence of unnumberable factors, political, professional, and social; and the real wonder is that they have been able to get together with as much of uniformity and energy as has been displayed by the American Confederation of Reciprocating, Examining, and Licensing Medical Boards.

It is no injustice to say that individually the state boards are given the minimum possible requirements and are enforcing them with the maximum energy compatible with the conditions of their particular environment. This is the inevitable result of their political establishment and control. They have uniformly succeeded in accomplishing more than other political agencies in the same territory. They have ruled with fairness and freedom beyond that which is practiced in legislative assemblies generally, and if there are striking exceptions to this rule let it be remembered that those exceptions have been generally discountenanced, both within the state and without it, and that State boards are continually seeking and exercising reasonably strict control of local conditions. Yet since opportunities for local jealousy and for the establishment of limitations which accrue to the advantage of local interests, are constantly present, they are unfortunately sometimes employed. It is evidently difficult for such boards to maintain a membership constant enough to insure maximum efficiency or to act as conditions demand in the face of strong popular pressure.

In spite of local jealousies and legislative limitations, state boards have organized a powerful national association. They have established a mutual basis of qualification for interstate recognition and endorsement of licenses and have introduced reciprocity to a considerable ex-



tent. Their work has disclosed many often serious difficulties in the way of a uniform system and of co-operative action, but good sense and able leadership are demonstrating the purely temporary character of these obstacles to progress. It is a matter of general commendation that the Confederation has a basis of requirements covering the preliminary education which is practically identical with our own and has adopted our requirements for graduation and our standard curriculum as its schedule of an approved medical course. Harmony and co-operation in action between the Confederation and this Association have already led to important advances in medical education, and should be encouraged in order to promote uniformity of standards and to relieve medical schools as far as possible of the unjust burdens imposed by "many masters of many minds."

The record blanks of this Association were last year ordered placed at the disposal of state examining boards and it was further decided to extend every possible assistance to them in order to utilize to the fullest extent the work done by the Association. Our conference committee should now be instructed to inquire further as to ways and means by which we can co-operate more fully and to present to our next meeting specific recommendations for just such participation on our part. The Boards are the ultimate and only legal authority in enforcing standards. We need their help in rating colleges and they will welcome our co-operation in the future as they have in the past.

It is not necessary to discuss in detail the relations of our Association to medical education. It has always included in its membership the large majority of the better medical schools in this country. At one time the lax enforcement of standards had raised a temporary doubt as to its position with reference to the better things in medical education; but the vigorous campaign of recent years has left no doubt of its present sincerity and activity in behalf of high standards. Such institutions as have felt that local conditions did not warrant their joining in the general advances of the Association have been considerate enough to retire from membership and to avoid embarrassing inquiries so that it has been necessary but twice to suspend schools from membership pending an investigation into their actions. From the prompt response made to personal inquiries concerning possible violations of our standards I am individually impressed with the desire of college authorities to live up to present regulations and not only to correct accidental infractions of our rules whenever they occur, but also to prevent if possible any recurrence of such mistakes.

In many ways the Association is proving itself to be a potent factor in advancing standards of medical education and in benefiting thus every school of high ideals. While its membership includes colleges of different grades in many particulars, it is possible to assert that no distinctly low-grade institution is now on its list of members. I con-

fidently maintain that all its colleges are self-respecting and law-abiding and are seeking the best in professional education. There are still a few high-grade institutions in the United States which are not in membership and the Association should instruct its Judicial Council to extend a cordial though dignified invitation to these colleges to join with us in the work of advancing medical education on this continent. While heretofore the membership of the Association has been confined to the United States, yet the high grade of work done by some Canadian medical colleges is ample justification for extending to them a similar invitation in order by joint effort to give greater breadth and strength to the movement.

The position of the Association in the search for standards in medical education is found at neither extreme. It recognizes that an ideal is attainable only by the favored few, and also that no doubt always some colleges will set standards below its own. It is seeking the average standard, available for all institutions, even though some choose to cut under its minimum. It encourages advance above the limits it sets and has always had in membership institutions demanding much more than its minimum standards. In all its discussions it seeks not the optimum of limited attainment, but rather the reasonable minimum, below which standards are possible but not rational at the current stage of evolution in professional education.

#### ACTUAL STANDARDS NOW PROPOSED.

A striking feature in casting up the record of work which has been done previously, is the noticeable amount of mere discussion that is not only of no influence but really arrives at no definite conclusions. As a matter of fact it is of little use to outline the advisability of a project. No amount of such discussion will bind anyone and those institutions or individuals that are weak and ignorant, not to say indifferent to standards, are the very ones which are entirely unaffected. It is necessary to establish definite standards and to use these in measuring the position of medical schools. The constants which need to be determined in fixing such standards are, first, those of the preliminary education; second, those of the professional training, and in both there are three elements to be fixed: the number of years required, the length of each course which is acceptable, and the amount and kind of work which should be demanded. Now these factors are to be considered, not from the standpoint of the maximum or of the optimum, but with a view to determining the reasonable minimum. This does not in any way limit an improvement upon the conditions outlined, it does not hold down the stronger schools to the level of the weaker, it merely sets a standard for recognition below which the institution may not be regarded as acceptable. The fixing of such standards will unquestion-

ably serve greatly to clarify the atmosphere and to advance the quality of medical education.

Our Association has already contributed in marked degree towards this end by having established a standard course for the preliminary education in conjunction with the efforts of the state boards already referred to, and a standard curriculum for the medical college itself. The latter we owe primarily to the careful work of our past president, Dr. Kober. In addition to these two there must be established a measure for standard equipment which is the subject of consideration at the present meeting. The college Association has also expressed itself definitely regarding such detail as concerns the length of the teaching year in the medical college, the interval between the original registration and graduation, the record to be obtained by the individual student, both in attendance and scholarship, and certain other special details which are important in formulating conditions so as to assure to the student the best possible training in his professional course.

There really remains but a single element for consideration and standardization; and that is the medical teacher. I appreciate that the time has not yet come for the agitation of this matter, and yet it can do only good to state a problem which must soon be recognized and met frankly and fully if medical education is to deserve the name. Not everyone who chances by influence, inheritance, or purchase to secure a portion of the stock of a medical school, can actually justify thereby his selection to a professorial position. In certain quarters much has been heard even before this date in support of the view that the teachers of the general branches, the foundation subjects in the medical course, must be men who are trained in those subjects and who are devoting their entire time to the work rather than bestowing upon it the surplus hours of a practitioner's life. This demand is amply justified and indeed has met with no objection of any moment. On the other hand, it must be further recognized that actual knowledge of the field and aptitude for presenting a subject to the student are as important conditions for the medical teacher as they are for the teacher of scientific branches. In the latter field such shortcomings are evident and become decisive in terminating the work of the unsatisfactory teacher as soon as the plan outlined above is put into operation. While it may be some time before such means will be applied to determine the right of clinical teachers to hold their positions yet no one will question that through lack of the application of such a measure in the past much injustice has been done to students in individual instances.

A marked contrast with educational conditions in other fields is indicated by the fact that there exists only one local association of medical teachers. In the organization and upbuilding of a body so virile and effective as its discussions show this association to be, its

members, the medical teachers of Ohio, have done great service to the cause of medical education everywhere in our country.

Even before the question of standard equipment is so far settled as to afford a basis for ranking colleges when inspected, the still more important problem of methods will demand attention. The first subject is brought up for consideration at this meeting by the presentation of a preliminary outline for a standard medical college equipment, formulated by Dr. Zapffe. Methods of teaching individual subjects were admirably presented at our Washington meeting by several men of authority in this field. At most they treat only a small part of the entire course and do not touch upon questions affecting the minimum standard which we can recognize. It is none too early to establish a committee which shall investigate the methods now actually in vogue and present to subsequent meetings reports and recommendations. The inspection of colleges must also soon come to include the element of methods in order that the general movement for improvement on which we have embarked may not make shipwreck at the start.

#### ASSOCIATION ENTRANCE REQUIREMENTS.

With regard to standard requirements for entrance to medical colleges there is as little agreement as in other matters. In the place of the meaningless expression a "high school course," this Association was the first to advocate the introduction of further regulations specifying the length and character of such a course. In the working out of this problem our present standard owes much to the splendid work done by the New York Board of Regents in systematizing and formulating the general scheme of public school education. Their results are as applicable to any other state as they are to the commonwealth for which they were formulated. We are also greatly indebted to the vigorous work of the education and state board authorities in Michigan. The result of these efforts finds its expression in the standard minimum entrance requirements of this Association. They guard the time element in providing for a full four-year high school course and protect against cheap work and insufficient training by specifying the fundamental portion of that course. As pointed out by Dr. Vaughn of the University of Michigan, Dr. Harison of Detroit, and Dr. Wheelock of Albany, this clearly unequivocal and thoroughly pedagogical standard is far in advance of any yet put into effect by any other agency controlling general medical standards. It is practically in accord with the well enforced requirements of New York, Michigan and Ohio, which represent the leading influences in regulating medical entrance requirements today and also with those of the American Confederation of Reciprocating, Examining and Licensing Medical Boards. It is certainly far ahead of the actual requirements in force in many sections of this country. There has been reason to think in the past that some

of the colleges in the Association have applied these regulations with a mercy that was primarily characterized by its disregard of justice. Today the matriculation records are open to general inspection and colleges in membership invite scrutiny of their practices. It is not too much to say that no such clear or well enforced standard has ever existed in medical education in the United States as the preliminary education requirements of this Association.

PRELIMINARY COLLEGE YEAR PROPOSED.

The new standard proposed in 1906 by the Council on Medical Education of the American Medical Association provides in addition to the four-year high school course a year of college work devoted especially to physics, chemistry, biology and language. According to latest information published in the *Journal of the American Medical Association*, there are now 54 colleges which by the first of January, 1910, will require for entrance one or more years of preliminary college work in addition to the full high school training. The test of any proposal is always not the preliminary opinions of those to be affected by it, but its performance when in actual operation. Consequently it is rather early now to speak definitely regarding this plan; but an examination of the list of these colleges discloses certain interesting features. In the first place the list includes a group of institutions which now require two years or more of preliminary college work and which have evolved a rational adjustment of the general training in the collegiate department and of the professional training in medicine. They are the leaders in medical education, are distinctly bidding for the best students, and have expressed themselves by their general action as well as in their publications as desirous of educating the leaders in the profession.

When we consider the remaining institutions, namely, those which have announced that at this future date they intend to require one year of college work to be devoted especially to physics, chemistry, biology and language, we find a rather peculiar condition. In the first place, some of them do not even yet require the full high school course for entrance, and in at least one of these it is proposed to advance the time standard of preliminary requirements by a total of five years while this advance is to take effect within three years. We also notice among the institutions which have set this standard that there are some which have dropped from membership in our own organization, avowedly or tacitly, because they were unable or unwilling to abide by the standards which we had set, and to furnish documentary evidence in the form of a detailed certificate by the college authorities covering the entrance requirements of all students matriculated within the year. There are further among the number of those which have announced their intention of requiring this year of preliminary work such institutions as have been openly charged by various authorities with having vio-

lated previous standards of entrance requirements. In the face of these facts it is but natural to think that the announcement of their conversion to the doctrine of advanced entrance requirements is not altogether disinterested.

On the other hand we find that certain most conservative and most stable standard medical schools have refused to consider this new limit of entrance requirements and some of the reasons which have been adduced for their refusal are thoroughly tenable. The medical institution which is a part of a great university and which is thus intimately associated with a department of arts and sciences can set such an entrance requirement and can enforce it; for it has the means ready at hand to provide for the additional training of those who would enter and yet who are deficient either in whole or in part of the required college work. The isolated medical school, however, finds itself necessitated to adopt one of two courses: either it must accept anything in the way of college work which bears that label and have in its classes even a greater hodge-podge than it has at present, or it must itself provide facilities for one full year of college work. The second option is, I believe, most earnestly deprecated by all who have at heart the interests of general education. Conditions in the medical school are not such that the training of the literary institution can be given in any other than purely formal fashion. The distraction of the large amount of professional work and the lack of associated general courses will inevitably tend to dampen the enthusiasm and divert the attention of the student from his elementary studies. Furthermore, adequate provision for such a course is expensive, and unendowed institutions can not hope to offer it in any other than a perfunctory and superficial manner. In the hands of the isolated medical college the additional year would become an obstacle to real progress, a disadvantage both to the institution and to the student. Most probably the plan would result merely in diluting the present work of the course and if anything was really added it would be at the clinic end of the curriculum.

The other option presents practically equal difficulties. As I have already indicated, there is no possible question that many so-called colleges are not above the level of city high schools, and a year of college work would not really give the prospective medical student any training superior to that which would be indicated by a well enforced requirement of such a specified high school course as this Association has now established. The most serious difficulty, however, is that the colleges will naturally protest against being made a convenience for giving a limited amount of specified training. Although this effect was distinctly outlined in the report of the committee printed by the Council of the American Medical Association, yet the attitude of the colleges was somewhat obscured and possibly unrecognized through

the manner in which the statistical results were presented. The literary institutions at both ends of the scale were alike in their statement that such work could be obtained under their auspices and would be performed to the satisfaction of the medical authorities. The reasons for approval in the two cases were, however, radically different. The stronger institutions offer larger elective courses, in many cases they have their own medical schools, and as these schools in general are turning toward higher requirements they do not hesitate to indicate that they will comply fully with conditions. On the other hand, the weaker literary institutions are exceedingly anxious to attract students and are often over-sanguine of their ability to give such work as may be asked for.

The careful examination of the report of this committee, however, shows more distinctly that many of the Eastern colleges and also of the strong Western colleges are united in opposing any such plan, holding it to be unfair, and furthermore entirely foreign to the purposes of their foundation and the ideals they are seeking to attain. It is also true that the proposed year's work is almost exclusively in the scientific field and hence antagonistic to the historic conception of the New England literary college where science studies are largely elective and are introduced later in the course. An additional objection was put by President Hadley of Yale in the following words: "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 to letting them leave us at the end of that time. We must, I think, arrange our courses for men who expect to stay longer." President Hadley's attitude is said to be shared by more than a dozen of the most prominent Eastern colleges.

There is no doubt that the influence of all such colleges will be exerted to hold students not merely one or two years, but for the full four-year course, and any such proposed standard as this must recognize frankly that such colleges are permanent obstacles in the way of its practical realization.

The actual working out of the problem is indicated by the conditions which prevail with reference to another option that has been tried by institutions at various points. Certain university medical schools have solicited and obtained from a few literary colleges a provision which is publicly announced in their catalogue permitting any student of senior standing to take his senior year in absentia at an approved professional school, and on proper certification at the close of that year to receive his diploma with his class as if he had remained in residence. This provision is entirely analogous to that in vogue at several of the strongest Eastern universities where a senior student in arts and sciences is allowed to enroll as a freshman student in a professional school of the same institution and thus qualify for the fourth

year of academic standing and the first year of professional training within the same period of time. In these universities the opportunity is embraced by a reasonable percentage of students who are seeking both degrees. Many of the literary colleges in the central and western states have most vigorously opposed the granting of such a privilege, though the intensity of the opposition is often indirectly proportional to the strength of the institution. At the same time when we come to consider how the plan has worked in actual experience it must be confessed that there have been practically no results. In two widely separated conferences of college presidents representing such institutions in the central and western states the privilege was made the subject of discussion this past winter and at both of them the actual experience as reported was identical. Students who have completed the junior year in a literary institution are not willing to forego the pleasures and privileges of senior standing and despite strong pressure will stay in the literary college for their last year's work.

A final rather serious objection to the practical working of the plan appears to be the question of what college work should be accepted. The report of the committee speaks unequivocally in favor of insisting on high grade work; it even goes so far as to state openly that "the preliminary college year must mean more than a year of actual work in many cases. But we believe the medical schools should stand rigidly for that and insist on this amount of work whatever time it may take." Such a position naturally commands general approval, and yet the actual enforcement of this provision is open to the same grave abuses which led to the abolition of the time credit granted to college graduates supposably on the basis of work done. The adjudicating body is prejudiced and there is no absolute standard to be followed. The English Medical Board method by which any literary college may be approved on examination for one year medical credit involves authority and expense for which our system does not yet provide.

All of this evidence seems to my mind to indicate clearly that in actual practice the single year of college preparation is not a feasible, *general* standard for entrance to the medical schools, or rather perhaps let us say that if adopted it will tend more strongly than ever to emphasize the advantages of the schools possessing genuine university affiliations and to curtail radically the opportunities of the independent medical schools. Such medical faculties as are connected with state institutions or endowed universities will still announce and enforce one year of college work as a preparatory requirement, but this will be merely a preliminary step towards the introduction of two years of college work, which is the natural minimum requirement, in my opinion, for university schools. I have already pointed out that a considerable number of institutions of the university type have



adopted this two-year requirement. It is not my purpose here to discuss this. The line of distinction between the first two years of college work and the later years first drawn distinctly by Dr. Harper, that master of university organization, has long been recognized as marking a natural line of cleavage in the real university.

Much earlier, also, President G. Stanley Hall called attention to the fact that this period marks in intellectual development reasonably closely the line between the German gymnasium and the German university. It constitutes, then, the natural point of transition from the more or less prescribed foundation education to the optional professional training and many years of experience have demonstrated the success of the German organization, or, in other words, the sound pedagogical basis for selecting this point in intellectual development as a line of separation between the general and the professional education. When the German student passes from the gymnasium to the university he makes positive choice of a future vocation, and although there has been some general shaping of his studies in earlier years to accommodate or develop a natural bent, yet this is the first point at which he is called upon to decide finally between classes of opportunities for professional life.

In stating thus my own opinion that this line of cleavage in college work indicates the point at which the student should pass from the general to the professional training, I would not be understood as expressing also the opinion that the requirements for entrance to all medical schools should include at least two years of college work. It seems to me clear that in professional training in medicine, as in all other sorts of preparation for life work, there are and are bound to be different classes of schools. There will be those that set before the man of marked ability or of more than average opportunity facilities for securing a high type of professional training, but were all men to be trained on this basis we should lack for those content to occupy the smaller fields in professional work. In discussing the standards of this Association I have already spoken of the reasonable minimum. While personally I shall strive all the time to raise the real standards of our medical schools, I do not see any gain, but rather a real 1 in adopting a standard which will exclude the majority of schools and force the respectable middle class institution to consort with cut-rate colleges and gold brick diploma mills. All my own influence shall be exerted to raise the standards in the institutions with which I may be connected, and to keep it well above the minimum requirements of this Association; yet the medical college less advantageously situated, which does honorable work and honestly lives up to the letter and the spirit of its professions, has a claim on general respect second to none in the land. Medical education has nothing to fear

from uncompromising allegiance to the published standards, and smooth work has not been confined to the cheapest institutions.

#### STATE BOARD ADVANCED STANDARDS.

The advance in preliminary requirements beyond the four-year high school course has been participated in by certain state boards. Thus Minnesota and North Dakota have established, to take effect in 1910, a requirement for preliminary education, embracing two years of college work above the four-year high school course. Connecticut and South Dakota have set the standard for the same date to include one year of preliminary college work. In his presidential address last year, Dr. Kober pointed out the injustice of the isolated action by Minnesota, but there is another feature which also deserves passing mention. It may be wise for a state which is already well supplied with physicians to raise the standards of professional education beyond those obtaining in less favored commonwealths.

But this policy is not so clearly justified in such a state as North or South Dakota, where the number of physicians is radically less in proportion to the population than in the average of the country, and where at the same time the inhabitants are scattered over so large an area as to require a relatively greater number of physicians as compared with other states, provided a medical helper is to be equally accessible to its inhabitants. The emoluments of a physician are naturally less in a sparsely settled community, the hardships of pioneer life add to the difficulties of the situation, and from the theoretical standpoint one would expect in natural evolution to find such new communities establishing relatively easy conditions for medical licensure, whereas in the older, more crowded commonwealths, where the organization of society is more highly perfected, and all opportunities more accessible, the natural tendency would incline towards the establishment of severer standards. This has proved true in the history of the Old World and in almost all parts of our own country hitherto and it would be interesting to know precisely what influences have brought about the distinctly abnormal conditions indicated. Personally, I cannot see that such a movement is favorable to the elevation of medical standards. Evidently it may easily emphasize the spirit of local antagonism which, as already noted, certainly hinders real advance. For the sake of fairness, it is to be hoped that the regulation will be applied to individual graduates and not to institutions. Any effort on the part of a single state to coerce honorable and self-respecting colleges is to be deplored. Such action has led in the past to retributive measures and has engendered bitterness which persists long after the cause is removed. The advance desired will come not through coercion, but through co-operation. The action of any considerable number of state boards will naturally constitute

a most powerful influence in introducing generally the year of college work advocated by the Council on Medical Education. If there is any real demand for such a standard the educational system of our country will be compelled to adjust itself to the demand, even though the division proposed does not accord with the natural lines of cleavage in our educational system as at present constituted.

#### TIME CREDIT FOR COLLEGE GRADUATES.

A much discussed question is that of time credit for college graduates in medicine, which deserves brief attention at this point. It is well known to the Association that I have always been in favor of granting proper credit to proper schools. The contention of the colleges is pedagogically unassailable, that so far as their work is of the required standard and so far as it does prepare a man specifically for the higher work of a medical course, just to that extent it should be accepted in the professional school. It is pedagogically absurd to place the college graduate with thorough training in general science subjects, such as is given even in our standard, old-style New England colleges, on the plane of the mere high school graduate. It is, however, perfectly apparent that the credit should not be a blanket allowance, made to any holder of any degree, and careful examination of the possibilities has brought to light some facts in this connection which may be of interest to this audience. When discussing in detail the conditions in different states with certain members of our Association, who have an unusually wide personal acquaintance with educational institutions, I found we reached practically a unanimous conclusion, namely, that within the entire range of colleges in the United States there were in all not over thirty which give scientific work of a character and with an equipment such as to justify its acceptance by a reputable medical school. These thirty institutions are variable in type in that they include some of the smaller state universities as well as denominational and privately endowed colleges. It appeared reasonably clear that they were not likely to work together on any uniform plan for the achievement of the end sought and that the majority of them were neither seeking for such credit nor apparently interested in the proposition, so that whatever might be done would affect in all probability only ten or a dozen colleges, a very small fraction of the total number in the United States.

Supposing, however, a larger number could really be interested in the proposition, one might expect, on the basis of their past history, that not over 100 to 125 of their graduates would apply each year for entrance to our medical schools. This figure is only 2 per cent of all graduates from medical colleges last year and less than 15 per cent of the college graduates granted medical degrees last year, as there were approximately 5,000 graduated in 1907 from the medical col-

leges of the United States, and among them were 903 holding other degrees.

It is of more than passing interest to note where these 903 college graduates were found. Hopkins, Harvard and Western Reserve furnished 150, or just one-sixth of the total number, and practically all of the graduates from all of these schools held an academic degree. Michigan, Chicago, Minnesota, Iowa, Nebraska, and California furnished 155 degree holders out of a total of 300 graduates from those schools, so that in a total of only 9 per cent of the medical graduates of the United States the institutions named furnished 33 per cent of the men holding other college degrees. Evidently college men will enter the profession of medicine through those institutions which are working out a pedagogical relation between the college course and the professional training, and such institutions have in the past year furnished nearly three times as many students as could be gathered from literary colleges under any probable system of co-ordination. This does not, in my opinion, excuse the injustice in refusing reasonable recognition to the work of high grade literary colleges. It does show that the obstacles of various sorts which have been placed in the way of such institutions by the unthinking and unpedagogical objectors in the ranks of medical teachers are serving to force the solution of the problem along another line. Educational evolution, like any other phase, follows the line of least resistance or of easiest adaptability.

It is evident, also, that the further advance in entrance requirements will tend of itself to settle the question with regard to possible time credit for literary colleges. Meantime this Association should follow closely the results obtained in New York, where, under exceptionally able auspices, there is being conducted by state and college authorities a most thorough investigation of the situation. The conclusions reached will assuredly possess a sound pedagogic basis and should be utilized by this body in formulating rules of procedure for itself. In fact, whenever educational authorities of standing arrive at positive findings in considering any phase of medical education, it becomes the duty of this Association to take prompt advantage of such expert opinion in revising, if need be, its previous policy.

#### STANDARDS WITHIN THE MEDICAL COURSE.

The earliest movements towards the establishment of standards for the professional training in medicine concerned the time element and found official expression in the constitutional requirements of this Association governing the minimum length of each annual session and of the entire course. Much later the content of the course was brought under discussion and finally the report of a Committee on the Medical Curriculum led the Association to adopt the general outline of work widely known as Kober's curriculum and subsequently adopted as standard by other organizations, also. This plan of med-

ical studies has been shown to possess considerable flexibility and consequently to be adaptable to varied conditions, while it serves to limit some of the abuses due to the omission of essentials or over-emphasis of single branches which have been so strongly and justly criticised by various writers.

A practical advance of great importance is that which was undertaken a year ago in appointing a committee to prepare a syllabus covering the subjects in the early part of the medical curriculum. The discussion of the apportionment of time to individual subjects and of the order of the work as well of the period to be devoted to subsidiary sections is sure to yield most valuable results, especially so since the gentlemen who have agreed to lead in the discussion are men of wide experience and unquestioned standing in their respective fields. Any conclusions which they reach will command the support of the educated world and will constitute a most valuable contribution to the subject of medical education. It is to be hoped that the Association will continue and extend the work of this committee with a view to embracing not only the portion of the curriculum originally assigned to them, but ultimately the entire course of study in the medical college. Isolated complaints of the lack of co-relation, of the method of treatment in different departments, and of the position assigned to individual subjects, are constantly seen in the medical press or heard in meetings like this. Such criticisms may be right or wrong, but they certainly are without much practical effect in medical education, though unfortunately most potent in arousing popular prejudice when quoted by the public press. Even without intentional misstatement, errors are almost inevitable when such remarks are reported through the medium of the individual unfamiliar with the field and read by the still wider circle entirely uninformed as to the original setting of the remark and the circumstances which called it forth.

Until the outline of the standard curriculum, which has been constructed by Dr. Kober with a success quite unusual among original attempts of this character, has been subject to some discussion and criticism in detail, and it is too much to expect that a final judgment can be passed on the most desirable content of the professional course or on the relative balance to be held by the different subjects which make up this curriculum. Especially since the majority of men who are engaged in clinical teaching are specialists rather than teachers, the general tendency will naturally be to over-estimate the specialties and to pass by general features so thoroughly familiar to the teacher. After the fixed curriculum has been somewhat clearly established, it will be possible to discuss the introduction of elective features and modifications pointing towards special training. Until we have determined, however, the type of training which will yield the best product for general professional work it is a little premature to discuss the question of elective work for special purposes.

The plan of dividing the examination for medical licensure, presented so admirably by Dr. Means, affords a basis for more thorough and more practical tests for eliminating the meaningless work of quiz schools and measuring properly the results of all medical colleges by introducing a searching inquiry into the fundamental scientific branches. It will also weed out more fairly those students who cannot meet requirements and save them time and expense, which may be profitably employed in some other field of work.

The plan has proved successful in other countries under the test of time. This Association, in my opinion, should take positive action looking towards the adoption of such a method, and should seek co-operation from the American Confederation of Reciprocating, Examining, and Licensing Medical Boards in attaining this end.

#### PEDAGOGICAL DEFECTS.

Permit me now to recount briefly some features in the situation which appear to be unpedagogical and unworthy of a place in medical education. Indirect effort has been undoubtedly exerted by persons singly or in organizations to adjust legislation and standards so as to favor one locality above another, or to bolster up a local institution which was inherently too weak to meet standard tests. No fair-minded man will ever support such movements publicly, and fortunately the private instances have been so insignificant as to exert comparatively little influence on the general situation. The success of the National movement for the elevation of standards demands that all exert their full influence to counteract such movements at their very inception.

Apart from these, however, there has been, I am convinced, in some cases far too great insistence upon minor technical detail. The educational authorities in control of medical standards in one region have introduced requirements and stipulations in detail which are difficult of realization under the educational system of another region, and each one of the agencies noted above as influencing general standards throughout the whole country have with great vigor insisted upon its own construction of certain trivial details which in no wise affect the real basis of the standards set. On the other hand, each one of these agencies has sought to gloss over the defects in its proposed plan. Our own Association is by no means free from blame in this matter. Let us attack the problem in a broad manner and with the spirit of mutual concession and co-operation. We are all aiming to secure the same end and there should be a reasonable willingness to waive the stipulation of minor, conflicting details and to join hands in achieving the solution of the problem along the best and broadest possible lines.

A real difficulty of more serious character is the difference in the perfection of educational organization and work in different sections of our country. There is no doubt that the newest states are

inferior to the oldest, and there is also little question that the educational advantages in the North are more abundant and more highly developed than in many parts of the South. This renders it exceedingly difficult to adopt a plan of action which shall apply to all sections of the country. Only the frankest recognition of these differences, however, can be of any avail. The situation is not alleviated by applying quietly different standards to institutions which lie in different sections; possibly one may find in these differences a justification of different standards for two regions, but these standards must be widely and thoroughly known.

Another element in the situation, which personally I deem to be distinctly unfortunate, is the effort to reduce all things to a statistical basis. Not only are so many of the facts stated in statistical tables of doubtful importance, but some of them are entirely incorrect, and yet these very items are cited from one end of the country to the other as evidence of perverse tendencies in medical education. A single instance will suffice to explain what I mean. Some years ago an indefatigable statistician published the statement that at the University of Nebraska College of Medicine, 780 hours were devoted to orthopedic surgery. When I inquired the source of his information, since this did not correspond with any at my command, he apologized, explaining that it was a stenographer's error in tabulating college reports. He courteously promised to make prompt and full public explanation of the error. I have also endeavored to run down this statistical freak, but thus far the explanation has never caught up with the original statement, and twice within the present year I have seen his stenographer's error printed in large-sized type as a demonstration of the inefficiency of medical education.

But the real fault in the statistical method is of another type. Men prove from the same set of figures the clear superiority of every life insurance company which enters into the consideration. The man who is wedded to mathematics can add, subtract, multiply, and divide until he has adjusted his computation to any conclusion that he desires to reach. The conditions of any institution can be, in truth, only very imperfectly represented in statistical fashion, and the conclusions very generally drawn from such representations are often only partly true or even entirely unwarranted. This was pointed out clearly by Dr. Dodson in comments published a few years ago on the statistical tables printed in the *Journal of the American Medical Association*.

I cannot help feeling also that the statistical data thus far published deal remotely if at all with the real educational side of the question. They show absolutely nothing regarding equipment and facilities, they cannot enumerate or measure educational organizations and methods. They assign clearly overweight to a series of examinations and encourage unpedagogic methods introduced for the sole purpose of obtaining unnatural results in such tests. In one

instance described before this Association last year by Dr. A. D. Bevan, they have induced a fake institution to reduce its entire education to a series of memorites exercises in cramming for examinations, and have given foundation to its widely heralded boast of securing results which surpass institutions of high character and educational worth. In another instance, a glib graduate of a cheap school has toured the country taking examinations with great success in many states and imparting to his alma mater a cosmopolitan character in the statistical summary. The advertisement was no doubt well worth the expense, and the incident indicates a new specialty in the medical field which, properly cultivated, will yield good results—in a statistical way.

To meet this difficulty some change of policy is necessary, and that change should be in the direction of emphasizing the character of work which the better schools are doing. We are led thus naturally to the introduction of practical features into the tests, since by means of these alone is it possible to measure the adequate use of laboratory work in the training of the candidate. I hope that it may be possible for this Association to take some definite action at this meeting recommending the introduction of practical tests into the licensure examinations and instructing its committee on co-operation with state examining boards to urge the early incorporation of such features into state examinations.

#### THE ADVERTISING TENDENCY.

The defects which have been mentioned are largely outside of the colleges themselves, but there is one to which I would call attention here which is inherent in the present organization of many institutions. It is the advertising tendency that is utterly unworthy a place in the training schools of a profession that places a ban upon the advertiser in its ranks. This tendency is manifested in many ways and was discussed at length by Dr. V. C. Vaughan in his presidential address before this Association in 1902. I fear there has been little if any change since then. The spirit is still plainly marked and a single instance will suffice to indicate the trend of the current. So far as I know, in no other educational institutions are free banquets furnished at the expense of the faculty to all the alumni who will put in appearance on stated occasions. Now it is even proposed to extend such a custom to the annual meeting of the American Medical Association itself. Personal relations between faculty and students cannot be closer or more disinterested in medical colleges than they are in literary or scientific schools where such tendencies do not exist. Those institutions which have accomplished the most for their students and for the world have held themselves aloof from the suspicion of advertising in any form. So long as medical college professorships are regarded in the light of desirable means for advertising, just so



long will the taint of the smoke cling to the garments of the institution. Fortunately the day is passing rapidly away when a group of medical men can found a new medical college for mere publicity's sake. Public opinion is slowly but surely being educated to the point where it will insist that all medical colleges shall be in fact as well as in name educational institutions.

The movement which has resulted in the amalgamation of many independent medical schools with universities has been in the direction of progressive evolution, and has resulted in mutual advantages. These have been so evident that other institutions looking for their own advantage only have to secure the same end by mere paper affiliations. Such mergers in name only are abundantly familiar to us all. They are essentially pretences and will fail at the crucial moment when in the process of advancement the medical school finds real need of the support of a faculty in arts and sciences to meet further increase in entrance requirements. The presence of a University president on Commencement Days to hand over the medical diplomas will not create a University atmosphere or add to the pedagogic power of the professional faculty. Unless the medical school can become really an integral part of an institution which is potentially a university and can gain the moral and financial support which comes with real university control, it had better retain its independence and self-respect rather than encounter the criticism and danger of a sham union.

The serious problem in medical college standards is not the existence of schools possessing dignity and character which have promulgated entrance requirements differing in amount; it is the presence in all parts of our country of institutions which pretend to offer the professional training and yet which, in evaluating entrance requirements, in providing courses of study, in conforming to regulations of all types, deal in promises rather than realities, and leave the student at the end of his course entirely unfit for the work in which he is to engage. The danger lies not in any honest difference of opinion, but in dishonest pretense, in the advertisement of opportunities which do not exist, and in the adoption of standards which the college has no serious intent of enforcing. For the improvement of the situation we need the fearless and uncompromising enforcement of the same principles which are so much discussed in public life today as the cure for official and corporate abuse. We need a square deal and absolute publicity. Consequently we are justified in believing that our Association and the state licensing boards have contributed most prominently to the advanced conditions during recent years in establishing definite standards in entrance requirements, in college curricula and in equipment and clinical facilities, for all colleges that wish to be recognized as reputable. These standards cannot be too definite, they cannot be enforced too impartially, for on their definiteness and enforcement depends all real advance.

On the other hand, let it be said equally frankly that such standards should be based on the comparison of the average conditions. They should not be so outlined for entrance requirements as to represent the possibilities of the few splendid city high schools which do credit to our hundred most progressive municipalities; they should not be so stated in terms of college work that only Harvard, Hopkins or some institution equally fortunate in endowment and opportunities can attain. Fortunate for us it is that such splendid institutions for professional training exist in our land. They afford the ideal toward which the less favored colleges are always striving. They set a mark which all of us hope to attain, and, though we fall short, we yet reach the higher because we have striven to attain such an ideal.

Absolute publicity of standards and of records would have avoided many of the difficulties into which the Association has fallen in the past. In my opinion, measures should be taken to make its inspections more frequent and to make known to the membership and to the country the result of such visits. The record blanks now filled should be subjected to official scrutiny by some committee of the Association or by some educational authority which is willing to co-operate, to the end that the attention of colleges may be called to many cases where allowance is made students beyond the actual basis of their own credentials. This country might well be divided into a certain number of districts or regions within which there should be a committee on inspection and control to assist individual schools in ascertaining their weak points and strengthening themselves where necessary. The interests of each in this Association involves the good of all. Concealment rather than frankness tends to degrade an institution, and the only hopeless feature of any college is its knowing pretense to possess that which it has not. By the co-operation of all, the work may be advanced in an educational way much beyond anything that has yet been attained in medical training. It should be the first duty of every institution and every member to work for such co-operation with the consciousness that it serves not only the general advance but also the highest good of his own institution.

#### MEDICAL ENDOWMENT.

The greatest single difficulty in the way of progress in medical education is undoubtedly poverty. Beside it all other difficulties appear trivial. Modern medical training is expensive. Rich gifts have provided for general education and for technical schools of all classes, while medicine still awaits its benefactions. The situation is tersely described by President Dabney of Cincinnati as follows: "All medical instruction given here at present is at the expense of the profession. This is no more reasonable than if we were to require the present engineers to educate the future engineers, or the present teachers to educate their successors in the schools. The education of physicians is as much a public duty as the training of teachers or engineers.

It is perfectly apparent that great scientific institutions of this modern type cannot be built and supported without endowments."

This description applies equally to all parts of our country, and President Dabney's words furnish the key to advance in medical education. Whenever and wherever adequate financial support is furnished by public or private munificence, medical institutions will be enabled to make genuine progress. One welcomes many signs of an incoming tide of benefactions in the establishment of research institutes, and in the foundation of splendid hospitals. Money for instructional purposes will come next and with financial independence other reforms follow quickly. The recent acquirement by Tulane University of a splendid endowment for its medical department has been promptly followed by a radical advance in standards as well as facilities which places Tulane in the forefront among Southern schools, and assures the participation of the South in the movement for the elevation of standards in medical education.

The value of such endowments is two-fold, since they affect other institutions as well as the recipient of the funds; for in the struggle for existence other schools must increase their own efficiency or retire from the field. In these times of progress it will not do for any school to sit idly watching the advance of neighboring institutions. It must find the means to continue the struggle or stop work. The latter fate has come to a few schools recently and is threatening imminently even more. All the evidence at hand indicates a surplus of medical schools in our country, and all agencies join in demanding the elimination of the unfit. No action will add greater strength to the forward movement in medical education than weeding out such as cannot justify their existence.

In closing let me emphasize the fact that in all cases I am discussing views rather than persons, and if at any point criticism was advanced, it was directed solely against opinions and never against individuals. I have endeavored to point out clearly that in the unsystematic mixture sometimes called the American educational system, medical education is not more involved in contradictions than some other phases, and that it manifests distinct tendencies towards the evolution of a more orderly form; that in discussion of its problems greater discrimination should obtain in evaluating the weight of opinions expressed; that the four great influences which are molding the medical education of today each have their own limitations as well as their spheres of influence; that the highest interests of society demand more perfect co-ordination of their aims and the fullest co-operation to the exclusion of all matters of distrust or difference between them. The work is worthy of the best efforts of the most talented and most devoted of laborers. On it depends ultimately the health and happiness of the human race in the greatest nation the world has yet known.

## STANDARDS OF ADMISSION TO THE MEDICAL SCHOOLS

W. L. BRYAN.

President Indiana University, Bloomington.

I wish to speak very briefly concerning standards of admission to the medical schools. In general, I agree with the growing consensus of opinion that the standard of admission to the schools of medicine should represent the equivalent of two years work in a standard college. The high school standard is not high enough. It may be that state boards are right in giving chief attention at present to bringing the standard everywhere up to this level. But the level is too low.

The high school boy cannot take in the sciences that underlie medicine as the modern physician needs to know them. Those fundamental sciences represent the most difficult as well as the most important achievement of the human intellect within the past century. They determine the development of all reliable medical theory and they establish themselves from day to day by a succession of triumphs in medical practice. The boy who goes from the high school to the medical school and who gives but two years to the excessively heavy courses in chemistry, anatomy, physiology, histology, embryology, pathology, bacteriology, etc., cannot assimilate the dose. He cannot retain the essential facts. He cannot grasp the circle of essential ideas. He cannot master the essential methods. He may, by grace of a youth's memory, pass his examinations, but if nothing further is required or done, then as a practitioner he will have only a vague and ineffective memory of matters which lie at the roots of his daily business.

On the other hand, the college graduation standard is too high as a general minimum requirements. It is doubtless desirable that many men should have the complete college course preceding the complete medical course. This is desirable not only upon strictly professional grounds, but also in order that there may be many men in the profession who have a wide non-professional, liberal education. But it is not wise to impose four years of collegiate work as a minimum requirement. Waiving other reasons, we are not justified in imposing a higher minimum requirement in America than is found anywhere else. One sometimes hears the opinion that the graduates of the German gymnasium or of the French lycée are better trained than the American college graduates, and that even with the requirement of four years of collegiate work we are not up to the best European standards of admission. The difference between the European and the American school training is important, but has been exaggerated. The European boy has the advantage and the disadvantage of being driven hard year after year by a stern master. But if the difference were as great as has

been claimed, we should not assume that this will always be so. We should not fix and legalize our system of entrance requirements upon the assumption that our schools will always be poorer than the corresponding European schools and our boys always less well trained than European boys of the same age and of the same amount of schooling. There is plainly a much wiser course. If we are to take account of European standards, we should learn definitely what the European universities exact, not in terms of time, but in terms of knowledge and capacity. We should then confront the schools which prepare men for the medical schools with these standards of knowledge and capacity. We should then discover whether it is not possible for American schools to fit American boys for the medical profession in approximately the same time that is required in other countries.

I wish now to say a word about entrance by certificate and entrance by examination.

It is convenient to define entrance requirements by specifying so many years of work in a preparatory school which has been certified as coming up to a certain standard. In my opinion, however, it is of the highest importance that a candidate for admission to a medical school should have the option of showing that he has the knowledge and capacity required by the above standard, no matter when or where or how he has obtained his training. If this is not done, if we fix it in the law that a man must have spent twelve, or fourteen, or sixteen years in schools which have been accredited, before he can enter a medical school, we shall get a certain good result. We shall bring into the medical schools many boys, better and worse, who have money enough to go steadily to school and wit enough to pass the examinations term by term, and we shall shut out of the medical school many ignorant and incompetent men. But at the same time, this procedure rigidly carried out will shut out of the medical schools thousands of men who are not ignorant nor incompetent. It shuts out a large proportion of those whom poverty and other hard conditions have kept from regular attendance at school. The temper of the medical profession is not to give any consideration whatever to the personal interests of candidates as such. I make no plea for the interests of these young men, though it is certain the only hope of this country for salvation from anarchy is in keeping the doors of higher opportunity open to the poorest. But I make my plea for the medical profession. The history of civilization shows that no profession can afford to do without the men who have come up into it out of poverty.

I would not lower real standards on behalf of any one. I would omit artificial, non-essential standards for everyone. I would give men a chance to show what they know and can do, with the assurance that here, as throughout the history of civilization, a stern, but just, rule of selection will bring to the front the fittest men.

## DISCUSSION.

Dr. RANDOLPH WINSLOW, University of Maryland: The sentiments expressed by President Bryan are much to my liking, especially the statement that we cannot afford to ignore those men whose opportunities are limited, but I cannot agree in the demand for a college degree preliminary to the study of medicine. It is not required from any other calling. It is not asked of the President of the United States, nor of the Chief Justices of the Supreme Court, senators, governors, or those in highest authority everywhere. While it may be well for heavily endowed institutions to make such a requirement, it is undemocratic to demand that persons wishing to study medicine must have a degree in science or art. This is a burning issue at this time and it must be considered carefully before any action is taken. The stand taken by President Bryan is a most conservative one and the Association surely appreciates his valuable paper.

Dr. EGBERT LEFEVRE, University and Bellevue Hospital Medical College: I wish to speak on two points raised by President Bryan from the basis of personal experience. According to the laws of the State of New York, any individual may earn his medical student's certificate by passing the necessary and prescribed examinations without any previous preparation in a college or school of liberal arts. There is one danger in this, namely, that while the high school course stands for certain subjects, and a certain amount of credit is given for each year of work, that credit does not tell the whole tale. It is a systematized course; men are systematic in their work, so that it means more than merely getting the necessary number of points. On the other hand, a man who earns his certificate by individual work has a certain amount of information, but is he an educated man; has he the culture, and all that goes to make an ideal medical student? Of course, he deserves great credit for the work he has done to prepare himself, but he is handicapped by deficiencies which can never be overcome entirely.

We also have an unfortunate condition of affairs as far as the arrangement goes, namely, the subjects are not specified, so that there is a wide range of subjects a man may take without securing a general education. A man with a knowledge of language can secure much credit in the language courses and yet be absolutely deficient in English, mathematics and history, subjects that are necessary in a proper preparation for the medical course. While I agree thoroughly with Dr. Bryan that no man should be debarred from professional life merely because he did not have opportunities to go to school, certain definite limitations should be imposed on him, as definite as a man gets in high school.

As to the preliminary requirement of one year of college work, that is, that a man in order to be admitted to the medical school, should have a preliminary year in certain sciences, I think we should take a leaf from English experience. The English journals criticize severely that preliminary requirement, where a student must take three years before he can appear for a preliminary examination. If we require that in this country, we will be on a par with the on account of subject matter. When a man has taken that one year and two subsequent years, he finds that the remaining two years in the technical course are too short in time, and the consequence is that the English student is unable to qualify in five years. He must make six or seven years of work before he can qualify for his degree. In the preliminary year, the two years of the academic course and the two years of the medical course are not sufficient to prepare him properly for his life work. That must be considered. We are not demanding a degree in my school, and according to the present temper of the faculty, we will not demand a degree for admission to the medical course, although we consider that a degree is very desirable. However, until the educa-

tional system of New York and other States is such that every man may acquire a degree as readily as he now does a high school degree, we have no right to demand a higher requirement. I believe that institutions that are well endowed ought to do their full duty by all those who go into medicine. If we demand a degree from everyone, we will turn over to inferior institutions men who are well qualified but who lack this artificial requirement. We should attempt rather, and it is our duty to do so, to train these men properly and make up their deficiencies during the first and second years of instruction. It would be a delightful condition if we could receive only men with degrees, but until the educational system of this country gives to every man the opportunity to get a degree, we must adhere to our present requirements.

## THE QUESTION OF ACADEMIC SENIORS IN ABSENTIA IN PROFESSIONAL SCHOOLS.

DR. ALBERT RUFUS BAKER, CLEVELAND, OHIO.

It is difficult to determine the relative number of medical students holding the bachelor's degree at the present time, as compared with twenty-five or thirty years ago. Dr. McIntire found, in 1880, that of something over 9,000 students, 18 per cent held degrees in arts and sciences. The statistics of the Department of Education of the state of New York show that there has been no increase in the number of literary college graduates entering medical colleges during the past fifteen years.\* In Massachusetts, in 1898-99, there were 4,911 graduates, 480 of whom held the degree of A. B. or B. S.—a little less than 10 per cent. In our own school, during the past seventeen years, the following percentage of each graduating class had some handle to his name, of more or less value, probably some of them not as good as a first-class high school graduate:

	Per Cent.		Per Cent.		Per Cent.
1891.....	20	1897.....	19	1903.....	19
1892.....	19	1898.....	11	1904.....	30
1893.....	31	1899.....	19	1905.....	40
1894.....	4	1900.....	80	1906.....	23
1895.....	20	1901.....	39	1907.....	28
1896.....	13	1902.....	55		

This gives an average of 27 per cent for the seventeen years.

Of the present entire student body, only 7 per cent held college degrees on matriculation, although 47 per cent had one or more years of college training in addition to their high school work, and a few of them are taking extra work during the vacations, and will receive their bachelor degree before they complete their medical course. According to the report of the Commission of Education for the year ending June 30, 1906, the number of medical students having literary degrees, as far as reported, is 8.7 per cent.\*

Notwithstanding the greatly increased requirements for entrance into medical schools, it is quite safe to say that there are not as many graduates in medicine today holding bachelor degrees as there were fifteen, twenty-five or even fifty years ago. There is no medical

\*Dr. LeFevre's address to American Medical College Association, May, 1907.

\*Bulletin of the American Academy of Medicine, February, 1908.



college faculty but that would prefer that all of its matriculates were graduates in arts and sciences.

During the recent years there has been a great increase in the number of literary college graduates. Why do not more of them enter medicine? They do enter the literary school in increasing numbers, but why does not the college hold them? Huxley pointed out the reason many years ago; it is the limitation of time. As the songs runs:

“If a man could be sure  
That his life would endure

For the space of a thousand long years——”

he might do a number of things not practicable under present conditions. Methuselah might, with much propriety, have taken half a century to get his doctor's degree; and might, very fairly, have been required to pass a practical examination on the contents of the British Museum before commencing practice as a promising young fellow of two hundred or thereabouts. As a matter of fact, literary colleges have gradually increased their entrance requirements until it is impossible for the average man to enter before eighteen or twenty years of age, while twenty-five and fifty years ago it was possible for a bright student to graduate from many of our best institutions at the age of eighteen. The present requirements for entrance are about the same as that of graduation fifty years ago. The discussion of this subject at the recent meeting of college teachers in Columbus prompted me to make some further inquiries along this line.

The registrars of only a few of the colleges responded to my inquiry as to the average age at which freshmen enter college. In the Ohio Wesleyan, class of 1911, the total number of men enrolled is 145; the average age is 19 years 5 months. The total number of women enrolled is 140, and the average age is 18 years and 5 months. The average age of both men and women freshmen in the 1910 class was a trifle over 19 years.

In Marietta college, in the class of 1910, there were 21 men enrolled, the average age 19 years and 4 months; total number of women 11, average age 18 years 4 months. Class of 1911, total number of men enrolled 29, average age 19 years and 4 months; total number of girls enrolled 18, average age 18 years 4 months.

In the Cleveland public schools (which I presume are typical of the average city in this country) I find that children are admitted at six years, and the course is twelve years, so that the earliest possible time at which they can graduate is eighteen. I also found that a graduation from the Cleveland high schools does not admit into many literary colleges. But one of the most startling discoveries was that last year over 34,000 pupils in the Cleveland gram-

mar schools were from one to four years behind their grades, and of course, in the high schools, the conditions are much worse. The significance of this is that our public schools have established a standard that is impossible of attainment for the average child. It is only the precocious, abnormal child, with a hydrocephalic development, myopic eyes, and an unusual faculty in committing by rote, fortunate enough never to have been ill or changed residence (for a child that changes residence always loses one year in the Cleveland schools), that is able to complete the curriculum in the allotted time.

How much of this unfortunate condition can be placed at the door of the college of liberal arts, whose entrance requirements are so high that the high school is compelled to put the pressure on their students to enable them to meet the demand of the college, and the high school hands down to the grammar school the same impossible task, and so on down through the primary grades?

Professor Butler, of Columbia College, offers the following excuse for the high entrance requirements; he says: "In 1898 only one-third of the nearly twenty thousand boys who were graduated from the public high schools were preparing for a college course of the old type. If they had to depend on the college alone for their liberal studies, they would have known nothing of them. Moreover, secondary school teaching nowadays compares very favorably with college teaching. The best secondary schools have scholarly teachers, well-furnished libraries, and well-equipped laboratories that many a college might envy. Some of the newer subjects are, on the whole, taught better in the high schools than in many colleges. These are my reasons for believing that the change which has raised the requirements for admission to college is a good one and a permanent one."

In discussing the paper I read at the Columbus meeting of the Ohio Medical Teachers' Association, one of the college presidents said that the colleges were not to blame for the standard of entrance requirements, and yet in a circular that is issued by the president of the University of Wooster, soliciting an additional endowment, the first point to which he calls attention, "Why Should the Christian College Live?" is, "That it set the standard of American education and has maintained it." I doubt if few would question that proposition.

I can best illustrate the perniciousness of this system by a conversation I had recently with one of the principals of one of our best grammar schools. One of the grade teachers had just left my consulting room as the principal came in. The grade teacher was an uncultured girl, of either foreign birth or parentage, speaking with a broad dialect, and showing in every detail of dress and manner the lack of refinement one would expect in a teacher. I was constrained

to remark on the difficulties a principal must contend with in securing good results from such teachers. The principal was embarrassed, but after a little fencing said, "That is one of my best teachers. She is a perfect disciplinarian; she does not waste any time in telling the children about the flowers that bloom in the spring; she never hears the angels sing; she wastes no time on frills and feathers that are not prescribed in the curriculum, and by devoting her entire time to drilling her pupils in the assigned tasks, she accomplishes wonders, and no other teacher in the school succeeds in passing so large a percentage of her pupils."

It would take me too far afield to discuss this phase of our educational system, but I am sure there are many who are thinking along the same lines, and if I mistake not, there will be a shaking up of the dry bones of our pedagogues ere long. The persistent effort to make all children like so many peas is not, unfortunately, confined to the primary and grammar schools.

If I were to prepare a curriculum for students intending to enter into professional schools, I would cut down the entrance requirements of the academic schools at least two years. If necessary, re-establish the old preparatory schools, so that pupils could take a short cut and enter college from sixteen to eighteen years of age, instead of eighteen to twenty, as at present. I would then require three years' residence in the academic school, and then on the completion of one or two years in the professional school, confer the bachelor degree upon those who deserve it, and make the degree a reward of merit.

I think that college men, especially college presidents, are already beginning to see that the time required is too long, and President Butler of Columbia has suggested a two years' academic course. Harvard has adopted a three years' course, with certain restrictions; Ann Arbor and Chicago University have adopted a combined six years' course, leading to the bachelor degree, as well as the medical degree; Western Reserve has similarly adopted a combined seven years' course. The trustees of Ohio Wesleyan have adopted the following: "That any student who has completed the required work of his course and has 135 hours of college credit (90 of this to be above grade D) may, upon completion of one regular year of work at the Cleveland College of Physicians and Surgeons, receive the degree of Bachelor of Science." This means that a man who has properly completed his junior year, including all the prescribed work for the full course, can get his bachelor degree at the end of his freshman year at the medical college.

This seems to meet the approval of President David Starr Jordan, who said at the recent meeting of the Academy of Medicine, at

Pittsburg: "We may turn our senior year over to pre-medical science, or we may require a degree with chemistry or physiology as major subject before beginning on medicine at all, or we may begin all professional work with the third or junior year of the present American college, in which case we may strengthen the medical course with another year of further scientific requirements and further clinical experience at the end. On the whole, the last plan seems to me most nearly in the line of the development of the American University system."

Dr. Roland G. Curtin, of Philadelphia, at the meeting presented a plea for the "impecunious medical student." After stating that the medical student, who first took a literary degree, cannot hope to commence to practice before twenty-eight or twenty-nine years of age; it will then take him five years before he is able to make a living; he will then be from thirty-three to thirty-five years old; his most active period of life is almost over.

It is almost impossible to induce a man to practice in the country who has had a college education. From 1892 to 1901 there graduated from Harvard Medical College 487 men; 191 settled in cities over 100,000; 229 in cities between 10,000 and 100,000; 29 are in the army or navy, or unlisted, and only 38 are in places less than 10,000 inhabitants, that is, in country practice.\* Where is the future country practitioner to come from?

The late Dr. Pepper, Provost of the University of Pennsylvania, used to say that a man ought to be engaged at the business of his life before he is twenty-five years of age. "The statement recurred to me," says Dean Howland, "when reading an article by Professor Minot, professor of anatomy at Harvard, in which he gives biological reasons for this act. He says that the proper course of education is to get a boy into school, into college, into professional or business life as quickly as possible. He reasons from the fact that the power of learning quickly is greatest at an early age. An infant learns something every minute of its waking hours, and the older a child gets, the more difficult becomes the achievement of his study. He contends that the great majority of men lose the power of learning at twenty-five, and these conclusions are based upon biologic data. Says he, 'It would be better to have the young man get to college earlier, graduate earlier, get into practical life of the professional schools earlier, while the power of learning is greater.' The moral is that some part of this impressionable and plastic period should be given to acquiring the art which is to be the basis of his life work. To carry out highly elaborate schemes for preparing a man to begin medical study would often be to consume the most precious period in studies of secondary importance."

\*Medicine in America, Munford, p. 476.

The course of study in the medical schools will never be less than four years. It will be lengthened. It is longer in other countries. Already it is in the air. Creighton University, Omaha, Neb., has already adopted a five years' course; other schools will follow.

An additional year as hospital interne before commencing practice is essential to every practitioner, and should be made obligatory. Medicine is an art as well as a science. Beyond a certain age the mind, as well as the hand, loses flexibility; there are many things that must be learned early in life, if learned at all. Osler knew what he was talking about when he said no new things could be expected from a student over thirty years of age. I do not know the average age at which students graduate in medicine. I do know that in one of our recent classes the average age was twenty-nine years and seven months, and then nearly every member of the class took a hospital assignment for a year or two longer. If this tendency continues to lengthen the time required to enter on the study of medicine, we will soon be in the condition of the Chinese, where all progress stagnates. History repeats itself; the medical lore of the ancient Egyptians was contained in the forty-seven hermetic sealed books, and anyone who dared to step outside of its teachings did so at the risk of his life. For ten centuries no physician ever questioned the authority of Galen, and we, too, if we permit our medical students to be tied hand and foot in college halls, and held in leading strings and coddled and pampered, until all possibility of making original discoveries are impossible; until the fingers are stiff, the eye dim and the hearing dull; what more can we expect than that they become automatons, like the present Chinese, or the ancient Egyptians, or the medieval monks?

While I am heartily in accord with the resolution of the Ohio Wesleyan in granting degrees to academic seniors in absentia, and believe it the most sane and rational thing to do under the present conditions, and that all academic schools ought to hasten to adopt it, yet I do not think that it is a panacea for all the ills of under-graduate students. The time requirements of academic schools should be made so that it is possible for the student to get into medical college at twenty or twenty-one and it should be made obligatory upon all such students.

#### DISCUSSION.

PRESIDENT HERBERT WELCH, Ohio Wesleyan University: I should like to reiterate a few of the interesting facts made evident during the last 25 years. First of all, as Dr. Baker suggested, and as others have suggested, there is a tendency to raise the requirement for admission to the medical schools. Twenty-five years ago, as I understand it, no preliminary educational requirement was made. Today, high school graduation, or its equivalent, is commonly required. Some colleges demand a college degree; some three years, some two years of college work, and I presume that the time is close at hand when one year of

college work will be required of all those who wish to enter on a medical course. In spite of all this, it would appear, from Dr. Baker's paper, that the number of college graduates coming from the medical school is smaller than it was twenty-five years ago. This means that the minimum and probably the average preparation for entrance to the medical school is better now than it was twenty-five years ago. It means, on the other hand, that the maximum preparation, the college degree, is found in fewer cases now than twenty-five years ago. It seems to me, however, that that is not altogether a cause for discouragement. There has been a leveling up. If there are a few who have the maximum preparation, there are more with a moderate preparation for the medical course. As Dr. Baker stated, there are but seven per cent of the students in his medical college who have a college degree, but forty-seven per cent have had one or more years of college work.

With regard to the matter of age. I fail to see that the age of graduation from college is higher than it used to be. High schools are responsible for that, as well as the colleges. It is an unquestionable fact that our high schools do not any longer, if they ever did so, regard themselves as preparatory schools for college. They regard themselves, first of all, as schools which give the greatest service to the largest number. A greater number of students go from the high school to the college now, and the high school feels that its mission is to fit its students for life rather than to fit a few for college.

I am disposed to question somewhat the implication of Dr. Baker's paper. I am not inclined to believe that the average age of college graduates is much, if any, higher than it was twenty-five years ago. I have looked at some of the old class pictures of classes graduating twenty or thirty years ago, and as I viewed those serious and bearded faces, it was difficult for me to believe that they were the youths of sixteen and eighteen. It may be that it is their dress that makes them look older, or that the style of wearing the hair is changing, or that the dress of the average college man of today would make him look older, or perhaps beards grew better in those days. I remember twenty-five years ago, when I was a college freshman with Mr. A. W. Harris, now President of Northwestern University, and then tutor in mathematics. He secured the average age of that freshman class and it was twenty. However that may be, if the age of the beginning medical practitioner of today is greater than it was then, it is the medical school that is responsible.

Twenty-five years ago, the medical student spent three years with the preceptor before he went to college, where he spent two years in study. Then the course was lengthened to three years and then to four. Now, we want him to spend an additional year in the hospital and some are advocating a five-year course and a year in a hospital. If the age for beginning practice is too high, the medical school must accept at least a part of the responsibility and not turn it all over to the college of liberal arts or even to the high school.

Suppose that the age is more advanced, is that so serious a matter? Take the figures given us as a basis for consumption. The average student is nineteen years old when he enters college. He spends four years in college and four years in the medical school and one year in the hospital. He is then twenty-eight. We are told that a man should begin his life work at twenty-five, and that after that age he has lost much of the flexibility of mind and body that will enable him to learn quickly, easily and well. I am not yet ready to subscribe to Dr. Osler's dictum. I recall the remark made by one of the highly successful business men of New York. He said that what a man did before thirty did not count; that a man did his real work after thirty. I am sure that this practical observation is as valuable as the theory of Dr. Osler. If a man is a practitioner at medicine for five years before he can make a living, he can be making some other things, some discoveries and develop his skill before he

has lost his flexibility. So that I regard the present situation with a greater degree of complacency than Dr. Baker.

I want to refer here to one or two general aspects of the question. One is, that the course of study must be arranged so as to yield the greatest good for the greatest number. The graded school, the high school and the college all play a relatively small though important part in fitting a man for the professional school. I happened today to see some statistics concerning the public schools of New York city. It was said that the maximum number of students do not attend beyond the fifth grade; that after that, there is a steady decline in attendance. Of those graduating from the eighth grade, about two-thirds enter the high school, but half of these do not go beyond the first year in the high school. Of those who enter the high school, not more than one-seventh graduate, and only one-fifth of these go to college. I take it that these figures are not representative the country over, but taking them as an illustration, it means that about three per cent of those who enter the high school enter college, and a comparatively small percentage of those who graduate from college enter the professional schools, and it seems obvious that the percentage of these men is so small compared with the whole number of students, that it must not be made a determining factor in shaping the entire course of study.

If there must be cutting away somewhere, where ought it to be done? We cannot go back to the old preceptorial system, whether in medicine, law or theology, allowing men to get their professional training in actual practice. We must give the professional training in school, but there are dangers here. The old methods made impressionists, but there is danger in the new method making mere theorists. Too long continuance in theoretical studies endangers the practical efficiency of the man. On the other hand, I believe that we must have for the highest professional success, in this day of strenuous demands, of expert knowledge and of specialists, the broadest possible preparation. I do not hesitate, for example, when a student comes to me to say that if he must choose between going into college or a professional school, by all means choose the professional school. It seems to me that the case of Dr. Baker's teacher gives us an admirable illustration of the insufficiency of a merely technical preparation in order to make one broadly useful in his chosen profession. The physician must be a man among men, a scholar among scholars, a citizen among citizens, as well as a practitioner, and not only the medical teacher, the specialist and the research man, but the general practitioner needs for his highest efficiency that broad knowledge of the underlying sciences, that habit of consecutive and logical thought, that readiness to learn, that teachable spirit, that broad knowledge of things in their relation to one another that makes for general culture.

I should, therefore, be ready to say that if a man had but six years to spend beyond his high school course for preparation for medical practice, it would be far wiser for him to spend three years in college, and three years in the professional school, than five years in the professional school, with one year of hospital training, and no college training. Our arrangement in Ohio Wesleyan University is a compromise that we felt we could make for several reasons. One is, that we grant the privilege only to our own medical department, and we thought that if we lost some of our students in the senior year, we might be able to hold some a year longer, students who would otherwise have left at the end of the freshman or sophomore year if there were no such arrangements in force. I believe that most colleges feel that to give their seniors to the medical faculty is too great a sacrifice to make. We made it because we were face to face with a practical demand, straining a point in theory to meet conditions in practice.

PRESIDENT W. L. BRYAN, University of Indiana: I have learned that Cornell University has adopted the plan to which reference was just made. Their medical school will receive men from the college of liberal arts after three years of work, and these men will be given bachelor's degree on account of work done

in the medical school. Not long since, I conversed with President McIntosh of Wabash College, Indiana, one of the best small colleges in the country, a college of high standards. Some years ago, they adopted this plan, not only with reference to medicine but also other technical subjects. This is called the Wabash plan throughout Indiana, and I was very anxious to know how many men had taken advantage of it. I was told that not one had done so. So that, as far as Wabash is concerned, the plan does not work at all. Either the men who intend going into professional subjects have not gone to Wabash, or else they have remained there until after the conclusion of their course.

DR. GEORGE H. KRESS, University of South California: The additional year for admission into medical colleges is being advocated by many, and I believe that it is desirable, but I doubt very much whether the plan is feasible at this time and whether it will really advance medical education. Is this preliminary requirement absolutely essential to the production of good practitioners of medicine? I believe that the ideal standard of medical education must be a four-year course, with perhaps an additional year in a hospital.

DR. E. B. LYON, Saint Louis University: I stand for any sort of a combination. I do not believe that the high school requirement is high enough or that the college requirement is too much. I think that Dr. Welch, like most college men, has been inclined to yield after a hard struggle, substituting medical work for the final year in the liberal arts college. When the college men recognize the scientific value from the standpoint of mental development, and the cultural value of the first year of the medical course, they will be more inclined to let their men go to the medical school. In fact, they will be willing eventually to say, "Take your first two years in the college and the last two in any first-class medical school and we will give you your bachelor's degree." That will be the best situation that can arise.

DR. ELI H. LONG, University of Buffalo: Educators say that the medical school must not ask them to make all the sacrifices, but they lost sight of the fact that medical educators have little choice in the matter. The State demands a certain grade of preparation of a physician, and that preparation cannot be made in less than four years. Therefore, we must keep the medical student in the medical college for four years and to ask the medical school to make a sacrifice of time is not in keeping with conditions. If any compromise is to be made, it seems to me that it must come from the liberal arts college, by allowing the student to enter the medical college in his senior year, and after he has done the prescribed amount of work, he will be given his bachelor's degree.

DR. A. R. BAKER (closing the discussion): As Dr. Long stated, it is not a question of what we would like to do but what we have to do. The medical student must have a hospital training; that means, five years before he gets any credit, and, therefore, it is not fair to ask that he shall spend two or three years in college without getting any recognition for the work done. He is labeled an uneducated man just the same. I believe that in the interest of all concerned it is not asking too much of the college of liberal arts to give us her seniors, and then confer the degree on them at the completion of the first year of medical work.



## THE STATE UNIVERSITY AND THE MEDICAL SCHOOL.

GEORGE HOWARD HOXIE, A. M., M. D., ROSEDALE, KANSAS.

The state university is a logical result of the belief of the Anglo-Saxon race in popular education. This belief of the race develops first the common schools, and then with the increase in prosperity and intelligence the high school, and finally as a capstone to the structure of the education of the whole people, the state university. The duties and responsibilities devolving upon such university are somewhat different from those resting upon a private institution. In the first place, its government and control lie with the common people rather than with a select few representing moneyed power. But even so, some of these institutions have considerable liberty, for if the people are thoroughly awake to the need of higher culture they give great power, wide scope of action and enthusiastic support to the state institution. If, on the other hand, the people are poverty stricken or penurious or unacquainted with the blessings of popular education, then their state university is rarely anything more than a high school and a poor one at that. Thus, the state university represents in its work the character of the people; and as a river can never rise higher than its source, so the state university cannot rise very high in any community where the people are not sufficiently evolved to appreciate its possibilities.

As a necessary conclusion, then, we must recognize the fact that the state university is not granted unlimited powers of leadership. It cannot put in as instructors men who are not in sympathy with the people, nor courses of study the value of which are not recognized by the people. Hence, in such a matter as that of professional education, which of course constitutes a phase of the highest development of education, we find only such universities able to take it up as are situated in states where the people are very far developed in the line of popular education. In medicine, this is particularly true because the people must realize that to have good medical attendants, places for training the attendants must be furnished, and where there are not already adequately endowed institutions for such training in the state, the people themselves must see to it that such training is brought within the reach of all their children.

On the other hand, on the state university there does devolve a real duty of leadership. The state university must strive to prepare the people of its state to take up more advanced work from year to

year; therefore it becomes the duty of the heads of such institutions to watch out for the public welfare and note what phases of education and training would benefit the people of that particular state. The work of leading the people to recognize their needs and opportunities, if performed rashly and rudely, will throw the administration of the university out of sympathy with the people of the state and lead only to disaster; but if the work is done patiently, tactfully, and above all persistently, the gradual recognition of greater possibilities, greater needs for a system of popular education will become a vital influence among the people.

The revolution that has taken place in medicine during the last fifty years is now beginning to be noted by the people, and communities are demanding a different type of physician from that which their fathers demanded. They ask that their physicians be trained in the best laboratories and the best hospitals; and the communities are becoming fewer every year wherein the people are satisfied with a physician who follows "rules o' thumb"—with a physician who has no broader training than that which he has acquired from his preceptor and his practice. But such an education is very expensive both in time and money, and the men who have taken such a course are unwilling to settle in the country where they are condemned to relative poverty and isolation. In fact, today it is almost impossible for us to supply young physicians to many rural communities applying for them. Hence this is a time when the various state universities are finding themselves called upon to establish courses in medicine which shall be equivalent to those in the best schools but shall be open to the poorest in the state. This is particularly true of the western half of the United States, where there are practically no great endowed universities so supported and so led as to be able to see this demand for better training in medicine and give that training. Hence practically every state university in the middle west is planning for a department of medicine, and the question of its administration becomes a vital one.

Our state universities are rarely located in large cities and therefore to establish medical schools they must seek a new location for that school in some nearby center of population. This gives opportunity for a freedom of choice of men and methods not available were the university to open a medical school in its own town. It also brings some additional problems, but nothing of such a nature as to make such an extra-mural location hazardous.

Probably the first problem that meets the university authorities at the establishment of the medical department is that of the standard to be adopted by their institution. The question may come to them in this way: Will they choose the standards which they find in actual practice in the private schools now existing in their section

of the country, and by carrying out these standards better than the private schools gradually elevate the taste, if you please, of the people until they can easily dispense with them for something better? Or shall they at once choose what they know to be the right standard in medicine for this day and age and put it at once boldly into force and then go to the people of the state and demand their support for this higher type of training? The man with an inclination toward politics would unhesitatingly choose the former course. The laboratory worker and the scientific man who feels that he has not much to lose by losing his position would unhesitatingly choose the latter. But probably the great majority of the administrators of our state universities are neither the one nor the other, but merely average men with the average wishes, desires and purposes. A great number of such average men would find themselves unable to settle the matter clearly in their own minds as to just what would be the better thing to do, and will probably be swayed by the pure accident of juxtaposition by the more powerful and positive spirits in their midst—toward either the political or the scientific standpoint.

My own experience with the people of the middle West has led me to believe that they are more readily reached by a campaign for high standards and noble ideals than they are for a continuance of present standards. They would justly argue, Why is it necessary for a state university to put in a medical department at all if its standards are not any higher than that of the private schools now in existence? They could say, too, that the very purpose of the medical schools being subsidized by the state is to enable that school of medicine to establish standards and arrange curricula that could not possibly be a commercial success.\*

The only argument that might be brought against such questioning is simply that if we go beyond the limit of popular understanding and appreciation we shall not get the support of the people and the number of students will not be sufficient to make our work seem worth while, and that there is then a liability to a reaction carrying the whole work back to the niggardly basis of a self-supporting medical school. But as far as I know this has never happened—and probably never will happen, because state pride will keep the legislators spurred on to maintain their state institution on as high a level as that found in the neighboring states.

This brings us face to face with the question as to who shall administer the schools of medicine and who shall be the instructors therein; and right here comes one of the hardest practical problems connected with the university. Every public institution is more or less under the control of politicians, and a man must be more or less

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\*President Schurmann, of Cornell, states that Cornell expends \$500 for every \$100 received in tuition fees.

of a "good fellow" to obtain a place therein. But the history of medicine and the history of education have plainly demonstrated to us that many of our best leaders and the very men who do the most to advance civilization and the public weal have not been popular men or "good fellows." On the other hand, some of the strongest men we have in medical research and advancement would be the poorest administrators. Hence there must come at once to the state university the problem of securing as leaders in the school of medicine men with high ideals and strength of purpose, and yet with sufficient savoir-faire to make the institution something of a success.

I think the greatest danger, perhaps, in the choice of men for a school of medicine in a state university is that of choosing the home-grown product. We find many such men who are absolutely brilliant in some particular line of work, but whose own experience and education have been so one-sided as to make them almost impossible for the administration of any considerable department. For this reason, I believe that the state university does well when it seeks and encourages the co-operation of men from outside the citizenship of its own state.

There is another reason for this. Wherever a state university starts up a school of medicine, it will find already existing certain standards of medical education, if not already established schools. Every man of power, of prominence in that community will be more or less partisan, more or less hedged and hemmed in by likes and dislikes—prejudices which make his work of less influence in that community and which prevent him from doing his best for the state institution. Furthermore, if leaders (in order to avoid being confined to a clique) are chosen from the various groups, then we find that they soon become dissatisfied because, first, they do not have their friends about them, and, second, because they cannot make enough out of the institution in either glory or money to satisfy their ambitions. My own experience has been that a new man, fresh from other fields, comparatively unknown to the community, has fewer obstacles to success and meets with greater enthusiastic support than does any man (no matter how brilliant) who has grown up in the community.

Moreover, it is not every man who believes himself fit for a position on a faculty of a medical school that is really useful there. Success as a practitioner is also no criterion of a man's ability to teach medicine—in fact, the best teachers seem to be rather slow to win a popular following. Nor is financial success to be taken as the standard for selecting a faculty. But it was by such standards that the instructors in most private institutions were selected, so that the fact that a physician was a member of a medical faculty was no proof of his fitness for a place on the faculty of a state university. Hence,

instead of trying to select the leaders of the various medical factions of the state to take the principal chairs in the school of medicine, it seems to me more advisable to go outside of all the factions of the state and find men who by their absolute merit can demand and obtain the respect of every high-minded medical man in the state. In my opinion every school must depend upon the younger men to make it enthusiastic and give the work vim. Therefore the state university does well to seek young men trained in the best teaching laboratories for the key positions.

This makes necessary the salarizing of the instructors; and I think it is a great mistake for the state university to start in its work without being ready to grant to such men as it calls from other fields of labor a sufficient recompense for their time, labor and sacrifice. Such men must be more or less independent of local patronage, and for that reason cannot expect to obtain as much, at first at any rate, from private practice or local conditions as they could if they were allowed to pull every wire which might lead to financial gain. Moreover, I believe that the state university does wrong if it tries to mix in politics and recompense its instructors by giving them political positions. For instance, I know of one private school that recompenses one of its chief laboratory instructors by making him the city chemist at a good salary. This, if done by a state university, would only serve to raise the envy and hatred of the men who would like such a position for themselves or their friends, and would more or less embarrass that particular instructor by keeping him tied up to a political appointment. On the other hand, the compensation for the instructors in a school of medicine of the university standard need not be so high as to bankrupt the exchequer of the university, because such men will obtain sooner or later (because of their own merit, as shown in their teaching and research) additional income from the outside which will make their positions very desirable. Of course, when the institution is newly founded such men will have a hard time making both ends meet; but unless a young institution secures young men enthusiastic for the cause of education rather than for the money they are going to get out of it—young men whose future is practically tied up with that of the institution—such medical schools will not succeed.

The next great problem that confronts the university is the matter of clinical material. Since the state university aims at the best type of medical instruction, it must have its own hospitals and dispensaries, wherein its salaried instructors may demonstrate fully the best methods of therapy. Logically considered, this ought to be one of the easiest things for the state university to provide, because every line of argument would make it seem proper for the state to utilize its pauper and invalid classes for the instruction of its medical stu-

dents. In other words, there should be an exchange of absolute values; and when we realize that such an exchange of values is of mutual benefit (because the patients thus cared for are better cared for than they would be in ordinary public institutions) we can hardly restrain our impatience with those people who are attempting to block the exchange. The opposition to such an exchange, it seems to me, comes from what may be termed vested interests—that is, in the growth of every state the state institutions for the care of the paupers, the blind, the imbecile, and the insane, have been scattered over the state in order to satisfy political patronage. Once there, the communities claim that their right to possess such institutions is a positive one and that it would be entirely unjust to make any change. Of course, considered in the abstract, we would not hesitate to say the power to decide whether or not such an exchange could be made lies entirely with the state; and if it be more profitable for the state to change the locations of institutions and alter the character of work in these institutions, it should be done at once, regardless of the feelings of the grocers, the butchers, and the politicians who are living off those institutions in their present locations. I believe, therefore, that the solution of this problem of clinical facilities for a state institution will be obtained only by active propagandism that brings to all the people the realizing sense that state institutions should be conducted for the best interests of the state as well as of the inmates.

To refer to one matter of particular flagrance: We learn that insanity is on the increase in the United States, and yet we know that in our student days almost no attention was given to the study of insanity in the medical schools; that no particular facilities for studying the pathological phenomena of mental diseases was provided us; that very few practitioners have anything like the grasp of psychiatry that they have of the diseases belonging to the department of internal medicine. The fact is that the greater number of physicians do not recognize cases of incipient insanity in the outer world when they see them. Hence, little or nothing is being done to prevent insanity or to check it in its incipient stages. It seems to me, therefore, the wise thing on the part of the sovereign state to build in connection with its university a psychiatric clinic and put into that institution all the cases of insane that would be useful in training the physicians of that state to recognize insanity, its method of treatment and its method of prevention. Only by such a procedure can we hope to better the condition of the people in this country with regard to nervous and mental diseases.

We might argue again with our people that we have only to look abroad and see the result of such a co-operation between the state institutions and the universities to see its immense benefits. Take the University of Heidelberg for an example. Situated in a city of

only 30,000 to 35,000 population, nevertheless this university has exercised an influence in medicine that is world-wide. Its influence is derived from the fact that the instructors in that school were given an opportunity to study the sick and ailing of half the state of Baden; that not only Heidelberg but all the outlying cities and villages were called upon to support the university clinics and hospitals. I think that no one has ever dared maintain that the people sent to those university clinics were a whit less better treated, or in any degree injured by being sent there.

The relation of the state university to the pre-existing schools of medicine in the state and vicinity requires delicate and tactful handling. Some of the men in the private schools, realizing that the coming of the state or endowed school is inevitable, will welcome its establishment and co-operate in its effort to raise the standards. The majority, however, will mourn their own loss of prestige and seek to utilize the last years of their institutions to promote their own glory and gain. It will take many of the adherents of the unendowed schools some time to learn that the state school does not have to keep up the old tricks to win students—that a state institution must not descend to underhand methods even for apparently justifiable ends. When, however, this realization does permeate them, they will gradually lay aside their attitude of suspicion and hostility and may at last (if their personal interests are not too greatly involved) support the higher standards. Hence the men in the state school must be possessed of great patience and forbearance, and by showing a oneness of aim both in the laboratory and clinic, win to their side all who are really interested in the betterment of the sciences and the profession of medicine.

I have often been asked as to the success of the method of dividing the clinical from the scientific department, which usually occurs whenever the university seat is in a small town, unless the university duplicate its laboratories in the preliminary sciences. This need not always occur, for I believe that the general problem may be solved in either one of two very different ways. First, the entrance requirements may call for at least two years of college and thus eliminate from the curriculum of the medical school all necessity for laboratories in chemistry and physics. Then all the university laboratories in anatomy, physiology, bacteriology, etc., may be grouped in the city where the clinical material is to be found—and the whole four years' work done in that city. This has the advantage of making anatomy, physiology, etc., definitely technical subjects, to be taught in a definitely professional way—a decided advantage over the pseudo-scientific teaching of the subjects now advocated by many members of non-professional faculties. [This method of establishing the school of medicine calls for laboratories costing as a minimum

\$100,000, grouped in at least two buildings, each the dimensions, say, of 50x100, and three floors high.]

The other method of solving the problem is to give the work of the first two years at the seat of the university and then the last two in the city. The advantages of the method are its relative cheapness of establishment, and the singleness of aim given the students of the first two years—for they are not distracted by having clinics to see. Its advantages are a lack of *esprit du corps* and professional ideals and the difficulty of having the students who finish the work of the first two years attend the clinical department. When this last trouble arises, the clinical department is left high and dry, for it cannot accept students from other schools (for they are not trained to meet its standards), and the other department does not feel it. Hence when the work of the medical school is separated, it is essential for success that there be a close relation between the two departments—that as many instructors as possible work in both departments—that the school be regarded as one—and that the headship be one and indivisible. That this division may be successfully accomplished and carried on, I firmly believe, but it requires more tactful administration and closer union on the part of the faculty than does the other scheme, and should not be attempted unless absolutely necessary.

#### DISCUSSION.

DR. WM. H. EARLES, Marquette University: It is very plain from the paper that Dr. Hoxie is a university man. If we could go back to the point where we could establish State universities to take up the question of medical education and wipe out all private schools, it might be a good thing to do, providing we got the same results, but any man with a knowledge of medical schools and their products knows that the university product does not equal the product of the private school. In the university school the work of the first two years is done by men who are not doctors, except in name. They could not practice medicine and therefore are not the proper persons to teach medical students. The man who teaches anatomy ought to teach it with reference to its application to medicine, and so with every other subject in the curriculum. The teacher in the private school works harder and more in the interest of the student. That is the only way he can maintain his position. He must "deliver the goods." The university man teaches a few hours each day or only a few hours a week and the remainder of the time he talks about research work in order to keep alive the interest in this work, because on that interest depends his position.

I question the right of the university to devote part of the state's funds to the education of doctors. When the state has given the student a liberal education in the arts and sciences, it has done its duty. If its graduates want to become exponents of the gospel, doctors or lawyers, let these men go out and pay for that special education. I do not believe that all the people of state should be taxed for the few.

Speaking of the selection of the faculty, Dr. Hoxie says that it may be necessary and perhaps better to go outside of the state. That reasoning seems fallacious. Have we not in every state men competent to fill the chairs in a college? The Board of Regents ought to have intelligence enough to select the faculty. If not, then it is the duty of the state to displace them.

I also believe that it is the man with the experience who is capable of im-



pressing on his students the things they should know in order to become valuable practitioners in medicine. No man is as safe in the lecture room as he who can tell from experience what may be expected and what should be done to meet an emergency. He knows it and he can tell it. I am identified with a university. For many years, I was identified with a private school. If we must have university schools, then, in the interests of our profession, let us have practical men to educate the students. Wipe out the theorists, and give us men who know from experience, because only the man who knows can impress his personality on the student. We all need a little bread and butter, and the average doctor has to work for it. Therefore, prepare him to do so. Let us be careful to adhere to that which we know to be reasonable and not try to go after something of which we know nothing or little.

DR. W. H. WARREN, Washington University: I appreciated Dr. Hoxie's paper very much. I represent a school which is the result of the union of two very old schools, the St. Louis Medical College and the Missouri Medical College, now united as the Medical Department of Washington University. We have four or five surgeons on the faculty and there seem to be two methods of teaching surgery. One method is this: The senior class, and whenever possible the third year class, assemble in a large operating amphitheater, listen to a lecture and witness a demonstration. The students have nothing to do, but to sit and watch and listen. The other method is this: The class is divided into small sections of six or eight men each, and these sections are taken into the hospital. The men are taught how to prepare themselves to take part in an operation, because they take part in the operation. This same method is also employed in the Department of Medicine. I have asked the students from which teaching they get the most benefit. Without any exception, they expressed themselves in favor of the second method. They not only take part in the operation but they follow the patient through the illness. In other words, it is surgery taught in a scientific way, so that it seems to me that the scientific method is not to be despised entirely.

DR. C. M. JACKSON, University of Missouri: The question has been raised as to the right a state has to appropriate money raised by public taxation for the support of the professional school, particularly the medical school. It seems to me that the justification, in a broad way, must be this: The state demands of candidates wishing to practice medicine within its borders certain qualifications, therefore, the state ought to provide the necessary facilities for affording an opportunity to meet these requirements. If private institutions are giving sufficient instruction, well and good; but if not, it is not only the right but the duty of the state to see that this instruction is given and brought within the reach of every one in the state. That is the justification for the existence of state schools of medicine.

The second point, raised by Dr. Hoxie, as to whether it is better for the university which has to deal with the question of separating the first two years from the last two, to put all of the work in a large city or only the last two years, leaving the first two at the seat of the university. Advantages may be derived from both plans. I believe it would be better to keep the first two years with the university, in a small town, rather than to put it with the clinical work in a large city. My reason for this belief, strange to say, is the conviction that we need more scientific men who devote their entire time to teaching and investigation, in the medical sciences, and as it is easier to do that in a university atmosphere, it is better to keep the first two years of medical work with the college of arts and sciences, rather than to place it in the professional school.

I believe that a fair and thorough examination of the history of medicine will show that the great advances have come from institutions in which this investigation has been encouraged. That spirit, in the end, is the most practical

one and, even on purely practical grounds, it ought to be encouraged. There are only two classes of institutions that can do this. One class is the endowed private institution. There are only a few of these that are doing excellent work, but there are not enough of them to do anything near the amount of work that ought to be done. The other class of institution that can do this work is the state university. The state university ought to encourage scientific investigation, and that is the strongest justification for the existence of a medical department.

The first two years of work have been put on what might be called a university basis, in charge of men who do nothing but teach and investigate, men who have devoted their lives to this work. I do not believe that anyone will deny the great improvement made in the teaching of these subjects, or that they are taught more practically now than when men had to hustle for a living and teach at odd moments. The same spirit ought to be carried through the clinical work. The clinical teachers ought to be specially prepared for their work and proper clinical material and equipment should be provided for their work. Finally, pay these men a salary which will enable them to give up the time necessary to do this work properly, rather than to compel them to earn a living in private practice and sacrifice some of their own time to do the teaching necessary. These are general problems in medical education which face us and which must be solved.

DR. A. R. BAKER, Cleveland College of Physicians and Surgeons: If a state demands certain qualifications of men to practice medicine, it ought to furnish the necessary facilities to meet these demands. In our school we have had some experience with students coming from other colleges. We had a record of graduating thirty per cent more men than we matriculated in the freshman class. These students came largely from two sources. One source was a university school where the teachers in the first two years were laboratory men. The students from the second source were educated by men who were practitioners in medicine. These students were better men and made better doctors.

DR. D. C. BRYANT, Creighton Medical College: It has been claimed that a man should possess a broad foundation in education in order to study medicine. Why should not the same rule hold good in the case of the teacher in medicine? Why should he not have the broadest medical education so that he may be fit to teach, as well as the student to learn. All the subjects of the medical curriculum are so intimately connected that unless the teacher is educated broadly, he cannot do justice to the student. The men who teach the subjects of the first two years are university men. They receive a fixed salary. They are not the best teachers because they are not interested in getting the best results, and the best result to the medical man is the saving of life. The best result to the scientist, who does not depend on the patient for his remuneration, is to see what the nature of the pathologic process is, and he sees that best when the patient dies.

DR. EDWARD J. WILSON, Ohio State Board of Medical Registration and Examination: In my judgment the teaching of medicine naturally resolves itself into the teaching of the fundamentals and the teaching of clinical medicine. Any person who does not feel the movement going on in medicine all over this country is blind. The private medical school is disappearing, for obvious reasons, because the cost of teaching the first two years of a course is too great. It is for this reason that the university school or the endowed school can do the work so very much better than the private school has done in the past or can do in the future. The private school depends for its income on the fees of its students; this is not true either of the university school or the endowed school.

I believe, too, that the clinical work must be done in the great medical centers, by men who are in touch with the sick, the men who achieve the results,

not the theorists. That which we inveigh against and which Dr. Hoxie proposes to do, import men to do good work, is what every great medical school has done and is doing. They import men not only from other cities, but from other countries, not men who are better fitted to do the work, but men who come here with a reputation.

I have been especially interested in this question and I have felt that any literary school that equips itself to do the scientific work of the first two years ought to be allowed to do that work. It will overcome, in a way, the reluctance of that school to give up its students at a certain time. I believe in the combined force and I also believe that the work should be done by men who are equipped to do it, whether indigenous to the college or an imported article.

DR. J. R. GUTHRIE, University of Iowa: One thing seems very clear—that we need not go far to understand that the problems of university education are many and diversified. The idea expressed so well by President Bryan is one which appeals to every one, and that is, in the valuation of our educational system. An educational system that springs essentially from the people ought never to lose sight of the source of its power, and the object of its greatest aim and ambition—the common good. In discussing the question of preliminary education, one should keep in mind the idea that the boy from the farm, from the workshop, has an inherent birthright in the privileges of the educational system. Who are the men who have won renown in science, literature and art? They are, in the main, the men who sprang from these modest homes, and let me remind you that the men who have the ability to carve their names high in science and art, on the field of battle, in the world's greatest achievements, will not be excluded by the preliminary requirements now in vogue and at present advocated. These men possess inherent power that will overcome these difficulties and add new luster to the renown won by the humble home. This preliminary requirement comes not alone from the idea that we want to elevate our standards of medical education, but from another source as well, namely, that in the development of our medical education we have discovered that the curricula are overcrowded, and as the result of this overcrowding it seems to be wise and better, from the academic standpoint, that we have not only the preliminary requirement of a four-year high school diploma, but an additional year of college work which will relieve somewhat the congestion in the medical curriculum.

Another point that came to me in the discussion of this problem is that of the advanced age of the graduates in medicine. I think that the judgment of medical men will bear me out that in the younger years the ability to learn facts and repeat them is great, while in the advancing years there is developed sound judgment, the crux of education. The main object of medical education is not the building up and the making of the expert, but the making of the well prepared, well rounded out, general practitioner.

DR. GEO. H. HOXIE (closing the discussion): Nothing that has been said contradicted what I said. The matter of the State going into professional education is inevitable, and in any part of this country where there are not endowed institutions to do this work, the state university must come. The State has a perfect right to do this, if it wishes to do so, and it has the right to regulate it. I said that the instructors should be taken from abroad for the key positions. There are positions in every department that must be filled by men who will do research work. Those men should be selected with very great care, and if they are not to be found at home, then you must get them from abroad.

## THE EQUIPMENT OF A MEDICAL COLLEGE.

FRED C. ZAPFFE, M. D.,  
CHICAGO.

Since this association and others have been engaged in the inspection of medical colleges, the question has often been asked: What is a sufficient equipment for a medical college? On several occasions state boards of medical examiners have been haled into court to defend themselves for withdrawing their recognition from what they considered to be an insufficiently equipped college, and yet this judgment was based not on actual figures, nor on any definite statement of equipment, but on the opinion of the person or persons who inspected the college and intuitively, as it were, felt that the equipment was insufficient. Rules have been laid down as to the buildings of the college, its laboratory rooms, hospital, etc., but nothing has been said about equipment. Of course, many factors must be considered in attempting to say what constitutes a sufficient equipment. A college may be splendidly equipped, so far as apparatus, charts, models and other teaching accessories are concerned, but of what good are they if not put to use? I have often found that teachers have failed to make use of splendid and most expensive apparatus, because they were unfamiliar with it, or their teaching did not seem to necessitate the use of the apparatus. A good teacher may do more without apparatus than a poor teacher with it.

Some colleges seem to run to equipment. It certainly does make a good impression on the visitor to see all kinds of flasks, test tubes, balances, reagent bottles, autoclaves, stereopticons, etc., but these are valueless unless use is made of them by the teacher.

No two colleges, that is, of the well-equipped, are equipped alike, because every teacher in time works out a plan for his department for which a certain equipment is required. He finds it impossible to do his work with less equipment, and, therefore, any college possessing less in that particular department is frowned on. For the same reason, it is extremely difficult to make a list of equipment which can be considered sufficient, and yet something of the sort is needed for the guidance of those who are expected to pass judgment on the efficiency of a medical college as a teaching institution. A minimum ought to be provided, a reasonable minimum, and any college or teacher who wishes to exceed this minimum is at liberty to do so.

It is known to be true that some colleges have brought about their demise by purchasing elaborate equipment and apparatus for which they had no use; or having purchased more apparatus than was needed, it became necessary to engage the services of a teacher

who knew what to do with it. In either case, the result was the same, the college became bankrupt.

There are still many men in the profession who scoff at equipment, believing that the student is in need of instruction rather than demonstrations of physiologic and pathologic processes. I have seen such colleges—schools where the men in charge favored a practical education rather than a theoretical one. I fear that this belief was based on a shortage of funds which prohibited the purchase of equipment.

In passing on the equipment of the college, one must never lose sight of the size of the school; that is, the number of students in attendance, because otherwise a mistake is easily made in classing a college as among those insufficiently equipped, when in reality it is exceedingly well equipped in proportion to the number of students who attend it. The principal difficulty in passing judgment on equipment is met with in the first two years of the medical course. On the other hand, however, the inspector may err by overlooking the fact that some equipment is necessary for the last two years of the course.

In order to make a fair comparison between what I consider to be an adequate or sufficient equipment and that provided by colleges in all parts of the country, I placed myself in communication with many teachers of the studies embraced in the first two years of the medical curriculum. What I am about to present may, therefore, be considered as a composite. It is impossible to lay down an exact requirement. Some latitude must be allowed; that is, there must be some elasticity, as there is in the schedule of requirements. It would be useless to demand that each student in chemistry must have one dozen test tubes of a certain size; or that each student in histology must have half a gross of slides and cover glasses to match, because the teacher of chemistry may do good work with five test tubes, better work than is done in some schools equipped with twelve tubes, and the professor of histology may provide the student with an excellent set of specimens, less than half a gross in number. Therefore, I believe that it would be sufficient to demand that the student must have test tubes and glass slides for his work in chemistry and histology. For the same reason, it is sufficient to demand that a group of students be supplied with one oil-immersion lens rather than to give one such lens to each student, even though the latter would be the more desirable. Doubtless the appended list is open to much criticism, but I am sure that the result will be a good one because no one man can ever make out a list that will prove satisfactory to everyone.

#### CLINICS.

To begin at the end of the course rather than at the beginning, let us consider the matter of clinics. Clinical material is always eagerly sought after by all college authorities, largely because of the

fact that there is so much diversity of opinion as to how many patients the student ought to see. Excellent clinics may be had with little clinical material, and, on the other hand, thousands of patients may pass through a college dispensary annually without having contributed anything to the student's knowledge of medicine. Some colleges give to each patient a thorough examination, sending him from one department to the other, if for no other reason than to show the student how an examination must be conducted and to make him thoroughly familiar with normal conditions. Unfortunately, too much stress is often laid on pathologic conditions without having grounded the student in normal conditions. One state examining board has passed a resolution to the effect that colleges located in towns of less than fifty thousand population are not to be recognized, believing that the clinical material in such a small place is insufficient. Of course, from the standpoint of diagnosis of disease, it is absolutely necessary that the student study pathologic conditions. This can be done only in places where a sufficient variety of conditions can be seen, as in a large city.

Every college must be in close touch with, that is, must have control of a hospital with a capacity of two beds for each senior student. It is preferable that the hospital be owned by the college, although a hospital controlled by the college is acceptable. It is not sufficient to have access to one or more hospitals by reason of the fact that a member of the faculty is a member of the staff of the hospital, because in such a case the instruction is not so thorough as it ought to be. Then, too, it is quite likely to be one-sided, because, as a rule, the departments of surgery and pediatrics are usually well represented on hospital staffs, whereas other departments, such as the eye and chest, have to take what is known as "pot luck."

In university hospitals care is taken that each department receives its proper share of patients, and for that reason a hospital owned by the college is to be preferred to one controlled by the college. Private hospitals run very heavily to surgery, as that pays well. They have major operations to burn.

If each senior student is given the opportunity to study a case thoroughly, under the direction of an instructor, he receives far more benefit than from general amphitheater clinics. And it is better to be able to enforce a requirement within the reach of the college than to demand one that cannot be enforced. Therefore, I believe that two beds for each senior student is a sufficient requirement in the way of hospital facilities. Of course, it goes without saying that these beds must be occupied by patients, so that two beds means two patients. If a college has fifty senior students, these students must have access to at least one hundred beds. Figuring that a patient will occupy a bed for one month, the class would have an opportunity of seeing

eight or nine hundred patients. If these eight or nine hundred patients present a variety of conditions, and if the diseases with which they are afflicted are well studied, the clinical showing is a very good one.

Aside from the hospital patients, the students will see many more dispensary patients, the class of patients who come and go and who constitute so large a percentage of the medical man's work during his early years of practice. It is well nigh impossible to lay down any requirement as to the number of dispensary patients the students ought to see, but the very fact that it is to the interest of the college to have ample clinical material will insure a large dispensary clientele. Colleges always avail themselves of the opportunity to advertise the size of their dispensary clinics, so that the matter of having sufficient clinical material in the dispensary really may be left to the college authorities. However, there ought to be at least fifty dispensary patients to every senior student. Of course, these fifty patients must be distributed proportionately among the various departments of the dispensary.

#### OBSTETRICS.

In the department of obstetrics, each student should be required to attend at least five cases. Most colleges have organized an outdoor obstetric clinic for this purpose. In the larger cities, it is comparatively easy to arrange for sufficient material in this department, but in the smaller cities some difficulty is encountered. It is customary to divide the class into groups of from three to six students, and in this way each group of students can easily attend the required number of patients. A few colleges require attendance on ten patients, while in some colleges the requirement is only three patients, and in one college it is only one patient. If proper attention is given to this phase of the work, the requirement of five cases can easily be enforced.

#### EQUIPMENT OF CLINICAL DEPARTMENT.

As to the equipment of the dispensary, and the medical and surgical clinics, it is almost unnecessary to lay down a definite requirement because the clinicians usually furnish such instruments as are necessary for the proper conduct of the clinic, and the apparatus needed may be obtained from other departments of the college. A better impression is made on an inspector by a well-equipped clinic room than by a bare room. I believe that this question may safely be left in the hands of the clinicians.

#### MUSEUM.

A properly stocked museum, containing anatomic, embryologic and pathologic specimens, as well as models, charts and drawings, is nowadays an absolute necessity for teaching purposes, but it is not sufficient to have a few jars and charts locked up in a small room

called a museum. The museum ought to be provided with shelves and other facilities for storing the specimens, and these should be carefully labeled and catalogued. Teachers will differ as to the size of the museum, but what is true of other departments in the college is also true of the museum—everything depends on how much use is made of it.

The embryologic section should consist of models and slides showing an embryo in various stages of development. Lantern slides are also useful.

The anatomic collection should contain specimens of normal bones, injected specimens, preserved in Kaiserling's solution, or any other fluid, and dissected specimens of brains, joints, and other parts of the body.

The pathologic section must include specimens of all kinds, in bulk, showing disease conditions of the viscera and soft and hard tissues. In estimating the value of the museum, much must be left to the good judgment of the valuator because one can not make up a list of all the various diseases that should be represented in the museum.

#### LIBRARY.

An equally troublesome problem is that of laying down a requirement for a library. It is conceded that a library is a very necessary part of a medical college. Nearly every college has a collection, good, bad, or indifferent, of antiquated text-books and periodicals, which is advertised as a library. A few colleges have excellent working libraries in charge of a librarian. Of course, this is rather expensive, but for that matter any sufficient equipment is costly. The medical courses of today are so arranged that students have some time during the day which may be devoted to study, and many teachers urge their students to do collateral reading. A few teachers require the preparation of these on assigned subjects, so that the students will become familiar with current literature and will learn how to find articles needed for the preparation of papers. While it is very desirable that the library should contain text-books on subjects taught in medical colleges, it is more advisable to invest the library appropriation in current periodicals. Each department should be allowed to select at least one publication devoted to its work, and the whole field of general medicine should be represented by at least one publication. Thus, in time, a splendid working library will be established, without any very great outlay.

If the college can not afford to engage a professional librarian, one or more students, who are familiar with library work, may catalogue the library, and make it available for use. Of course, the library should be housed properly in a well-lighted and well-ventilated room. The stack room may be dark, but the reading room must be well-lighted.



## GENERAL EQUIPMENT.

As a general requirement for all the departments, there may be demanded charts and drawings, although I have known teachers whose skill as artists stood them in good stead in their work. Their chalk drawings were far more effective than any well-prepared chart. The museum specimens will also come under the head of general requirement. In many colleges the attempt is made to displace the chart, so far as possible, by the living specimen—the patient—which is most commendable. Models of various kinds also add very much to the equipment—when proper use is made of them. Nearly all the departments may be provided with models or anatomic specimens, such as sections through the ear, eye, nose and throat; serial sections of the brain and spinal cord for the department of nervous and mental diseases, and casts and specimens of abnormal conditions, such as deformities, used principally in the department of orthopedic surgery.

In the department of surgical anatomy, charts and models may be useful, but it is absolutely essential that the teacher is provided with sufficient fresh anatomic material.

In the department of operative surgery, cadavers and animals, usually dogs, should be provided.

## ELECTROTHERAPEUTICS.

Within the past few years medical colleges, in general, have established chairs of electrotherapeutics, and inasmuch as the Roentgen ray plays a not inconsiderable part in medicine today, this step is a commendable and a necessary one. In fact, it will be remembered that in the curriculum of studies adopted by this association in 1905, provision is made for sixty hours in this department. Therefore, an equipment is necessary, but the size and scope of the equipment will depend largely on the individual requirements of the professor in charge. The ray is used not only for therapeutic purposes, but also as an aid in diagnosis, so that a well-equipped dark-room, with the necessary reagents for developing plates, must be arranged for. The equipment ought to include either an induction coil, of standard make, or a static machine, a high frequency resonator, fluoroscope, electrodes, mercury turbine interrupter (or other interrupter of standard make), rheostat, x-ray tubes (therapeutic and diagnostic), and a tube rack and stand.

## CLINICAL DIAGNOSIS.

In this department the student is taught the application of the principles of diagnosis by means of the microscope, and chemical tests. A considerable amount of apparatus is necessary for this work, but it may be drawn from other departments, such as histology, pathology, bacteriology, chemistry and physiology. It is hardly necessary, therefore, to demand special equipment for this department, although it

is advisable to make provision for it, on account of the possibility of a conflict of hours which may necessitate the use of the apparatus elsewhere. The equipment needed is that used in the examination of exudates, secretions, excretions and tissues, including the blood. The work may be done with groups of students, and four or five students to each group is best.

#### ANATOMY.

The anatomy acts of the various states regulate the supply of working material in anatomy, and, as a rule, this is sufficient so that not more than eight students need to be assigned to each cadaver for work in dissection. Each student should be required to dissect at least a lateral half of the body. Of course, it is understood that the department is provided with suitable apparatus and facilities for preparing and storing the cadavers. These should also be an ample supply of bones; that is, unmounted, disarticulated skeletons, and at least one mounted skeleton. Charts and models are helpful, but not absolutely necessary. On the other hand, it has been found advantageous to have on hand dissected specimens of joints and cross sections made through various parts of the body and extremities, such as a cross section of the upper, middle and lower third of the humerus, of the upper, middle and lower third of the forearm, thigh and leg, cross sections through the neck and thorax; injected specimens of the venous and arterial systems, and dissections of the nervous system. These specimens can be obtained easily in view of the fact that the teacher of anatomy devotes all his time to this work, and a sufficient number of assistants is supplied.

#### MATERIA MEDICA.

The work in materia medica usually is divided into materia medica proper and pharmacology. In the former, the teaching is usually purely didactic, while in the latter the work is done in the laboratory. The scope of the laboratory work varies considerably, depending on the teacher, who may confine himself to teaching compatibles and incompatibles, and the making of various mixtures, or he may also enter largely into a consideration and demonstration of the physiologic action of the drugs most used in therapeutics. A good collection of drugs, in the crude state, is a necessity, and it is advisable to have on hand such preparations of drugs as are used most, so that the student may familiarize himself with them. In the laboratory, it is well to divide the class into groups of five students each. Each student should be provided with test tubes and rack, beakers, graduates (four ounce and eight ounce), glass funnel and filter paper, filter stand, mortar and pestle, spatula, glass slab for making ointments, and one balance per group of students. The general apparatus should include an induction coil, mercury manometers, vein manometers, cannulas, blood pressure apparatus, a drum cylinder, an aspirating syringe, a cardio-my-

graph, and such other apparatus as is necessary to study the effects of drugs on the muscles and nerves. This may be obtained from the department of physiology. Drugs and their preparations are also to be supplied.

#### HISTOLOGY.

The general apparatus for this department should include the paraffin bath and its accessories (thermometer, tubing and gas regulator) for embedding purposes; two microtomes, one for cutting celloidin sections and one for cutting paraffin sections, or an interchangeable microtome will do; either an opaque projection or a projection lantern and an adequate collection of slides of tissues and organs, or an adequate set of charts to illustrate visually the structures of tissues and organs (to be used in the lecture room); an injection apparatus and such re-agents and materials as are required for the preparation of bulk specimens for study by the students. These will include paraffin, celloidin, alcohol and other fixing, hardening, clearing reagents and stains; teasing needles, scissors, knives, camel's hair brushes, beakers, staining dishes, etc.

The individual student's equipment may be provided in part by the student and in part by the college, or entirely by the college. It should include one microscope for each two students, the instrument to be equipped with two objectives and two oculars. For the study of blood and other tissue cells, one oil immersion lens, Abbe condenser and diaphragm should be provided for each two students. Further, each student should have slides and covers, labels, stains, and staining dishes, suitable reagents for mounting specimens, drawing material, alcohol lamp or Bunsen burner, teasing needles, camel's hair brushes, lifters, medicine droppers.

#### EMBRYOLOGY.

The equipment in this department is practically the same as for the department of histology, except that the general requirement should include a set of models, as has been mentioned elsewhere.

#### PHYSIOLOGY.

Inasmuch as most of the teaching in physiology is done largely in the laboratory, little need be said as to the apparatus to be used in the lecture room. The teacher of physiology usually illustrates his lectures by means of demonstrations, using for this purpose the apparatus supplied to the department. In the laboratory the class is divided into sections of four or five students each, and the equipment provided may be used in succession by each of these sections, so that if the class consists of fifty students, ten sets of apparatus at most are necessary, and not as much as this if the sections are not at work at the same time.

For hematology there should be hemacytometers, hemometers, spectrosopes, fully equipped compound microscopes and reagents and apparatus as used in histology. For muscle and nerve work, the equipment should include myographs, including muscle clamp, muscle lever, supports, recording surfaces of a clockwork kymograph, chromograph, and stimulating apparatus, including an electric battery, keys, induction coil, electrodes, and a rheostat or rheochord; a moist chamber with accessories for nerve work, and a double cylinder for heating and nerve work, and a double cylinder for heating and cooking tissues. For circulation experiments there are needed a heart lever, manometer with accessories, tonometer with accessories, apparatus for studying capillary circulation, and such other accessory articles (rubber tubing, cannulas, wire, etc.) as are needed for carrying on the experiments.

The general equipment of the department which is used for class demonstration and in the elective special courses, ought to include a polariscope, galvanometer with accessories, capillary electrometer, mercury pump for gas analytical work and accessories, thermostat or incubator, analytical balance, assorted tambdaurs, assorted cannulas, chemical reagents and chemical apparatus, hydrometers, thermometers and induction coils. For work on the special senses: Artificial eye, perimeter, ophthalmometer, ophthalmoscope, lenses, esthesiometer, color mixer, phorometer, ear model, tuning forks, Galton whistles, and resonators.

#### PATHOLOGY.

This department should be supplied with charts and abundant gross specimens obtained from postmortems and the surgical clinics. The remaining general equipment and the individual equipment of the student is the same as in histology, so that by duplicating the histologic equipment the department of pathology may be considered as well equipped.

#### BACTERIOLOGY.

In this department the apparatus also is to be classified as general and special. As in the other departments, it is preferable to divide the class into groups of four or five each, and for each group there should be provided one steam and one hot air sterilizer, one compound microscope with oil immersion lens and condenser, and all the apparatus necessary for preparing the culture media, such as a set of double boilers, cork borers, a stand with rings and clamps, a potato cutter, gelatin, agar agar, cheese cloth, cotton, filter paper and litmus paper. An autoclave and a serum oven are sufficient for each twenty-five students. The working material needed may be supplied to the student, if the teacher prefers, as are cultures of bacteria, and special media used in the study of the biology of micro-organisms.

Each student must be provided with test tubes, rack, wire baskets,

test tube brush, petri dishes, flasks, platinum needle, Bunsen burner and tubing, fermentation tubes, forceps, and, unless provided by the college, each student must be required to supply himself with slides, cover glasses, labels, stains, slide boxes, and mounting materials. The department will be supplied with such apparatus and materials as are necessary for the study of bacteria, including animal cages, etc., for experimental work. The list of apparatus in this department, and in every other department, for that matter, might be continued indefinitely, but the aim is to supply only an adequate equipment.

#### CHEMISTRY.

*Organic and Inorganic.*—Much of the equipment in this department comes under the head of "general," that is, it is used for demonstration purposes, and by the students in groups. The work done by the student in the laboratory necessitates, in the main, only special equipment unless the course in organic chemistry is unusually complete. As students come to the medical college better prepared in chemistry, the course in inorganic chemistry will be shortened, and the equipment will become less in quantity, although more expensive. The department must be supplied with balances, centrifuges, fume chambers, drying ovens, a polariscope, spectroscope, Kjeldahl nitrogen apparatus, apparatus for analyzing milk, microscopes, and a good stock of chemical materials, reagent bottles and reagents.

Each student should have an outfit containing beakers, blowpipe, litmus paper, flasks of various sizes, funnels, test tubes, pipettes, plain and graduated, mortar and pestle, filter stand, iron wire triangle, wire gauze, Bunsen burner and hose, porcelain crucibles, platinum wire and foil, glass stirring rods, glass tubing, test tubes and test-tube rack, test-tube brush, filter paper, tongs, graduated burette, pipettes, water-bath, sand-bath, rubber stoppers, set of reagent bottles, gas generating flask, small pair of druggists' scales, and such other materials as may be needed from time to time for doing special work and which the student receives on making requisition for them.

#### PHYSIOLOGICAL CHEMISTRY.

Much of the material used in this department may be obtained from the departments of chemistry and physiology, and it is not necessary to make any special requirements. If the departments mentioned are well equipped, the department of physiologic chemistry is sure to be supplied with all needed apparatus.

This list of apparatus for the departments mentioned is not so extensive that every college can not be supplied accordingly, but it will be conceded that it is no more than sufficient. If the teacher is one who has prepared himself to teach a given subject, he naturally will see to it that he is provided with sufficient equipment. The day has gone by when a practitioner of medicine can teach the subjects of the

first two years adequately without giving to the work a good share of his time; therefore, more equipment is needed today than could be found in a college fifteen or twenty years ago.

#### CONCLUSION.

This paper is merely intended to open up for discussion the question of what shall be considered an adequate equipment. The only way that this ever can be settled satisfactorily is to appoint committees for each department in the college and then have these committees compile a list of equipment. The equipment presented here is by no means an ideal one, nor will it in all probability please the majority of teachers, but if discussion is excited the paper will have served its purpose.

#### DISCUSSION.

DR. W. J. MEANS, Starling-Ohio Medical College: For a number of years we have been asked to say what constituted a standard medical college; what equipment should be required. We have always been unable to answer that question. The question has come into communication as to what shall be the equipment in various laboratories and departments of a college, and I have always been unable to answer the question definitely. I had in mind a general idea as to what constituted a standard medical college. In talking the matter over with Dr. Zapffe a short time ago I suggested that he present a paper on equipment looking toward the adoption of a minimum standard of equipment for colleges in membership in this Association, or who are applying for membership. Some of these latter colleges have the laboratory for bacteriology, pathology and histology, and even chemistry, all in one room, and it has always been a question in my mind whether such an equipment was sufficient, estimated from the present standards of education. This question has interested not only this Association, but it has developed very largely from the inspections made by Dr. Zapffe and myself, and also by the Council on Medical Education of the American Medical Association. You are doubtless familiar with the different grades that were given to colleges all over the country by the American Medical Association Council, and perhaps you are also familiar with the criticisms that followed these men, some of them just and some of them unjust. Nevertheless, we have here now an outline that will be presented at the meeting of the Council in April, and I feel that this Association should take the initiative, which it has always done in medical education, in setting minimum standards. This Association established the present standard for entrance requirement, the standard curriculum and standard graduation requirement. Now, we should look into the material equipment of a college, and I hope that it will not be only the presentation of this paper, for it has plenty of meat in it, but I believe in the substance as well, and if we go away from this meeting without doing something, we may be accused of doing too much talking. I hope that the paper will be referred to a committee for action on what shall constitute a minimum equipment for a medical college.

DR. A. R. BAKER, Cleveland College of Physicians and Surgeons: The inspection of colleges by this Association dates back eighteen years and not six, as stated by Dr. Zapffe. The Judicial Council has always inspected every applicant for membership in the Association and, personally, I did enough of this work to appreciate its difficulty and to thoroughly appreciate the value of a paper of this kind. While much must be left to the judgment of the teacher, we ought to have some minimum standard so that we may know to a certainty that there is something there.

DR. GEO. H. HOXIE, University of Kansas: The Missouri State Board has attempted to set a standard for equipment, but I am quite sure that it is not as comprehensive as the one made by Dr. Zapffe. This is a very important subject, and I believe that the Association ought to adopt the paper as a standard. Therefore, I move the appointment of a committee of three with this end in view, the committee to report tomorrow. (Such a committee was appointed and reported. See minutes.)

Dr. C. M. JACKSON, University of Missouri: As Dr. Hoxie said, the Missouri State Board of Health has adopted a list of equipment necessary in the various departments which is the minimum requirement for a reputable medical college. The list is not nearly so complete and does not include so many branches as does that of Dr. Zapffe; so that this paper is a good start in the right direction.

Dr. B. D. HARISON, Michigan State Board of Registration in Medicine: I consider Dr. Zapffe's paper a very timely one. Our Board has often been called on to make some statement as to detailed equipment, but we have hesitated to say much about it, because thus far nothing has been published bearing on equipment. It has also been a matter of some embarrassment to be asked by colleges exactly what we wanted in the way of equipment. I believe that from a legal standpoint it is better not to say anything about it because some colleges have something which they can substitute for almost anything. I think that in the future, owing to Dr. Zapffe's excellent work in this direction, we will be able to fortify ourselves before we go into details in answering these questions. To us the paper is of much value.

Dr. A. W. ALVORD, Michigan State Board of Registration in Medicine: I wish to emphasize what Dr. Harison has said. It has been a great pleasure to me to see Dr. Zapffe examine a medical college. I have been accustomed to seeing others make these examinations, but I have rarely seen any one with such an insight to the real requirement of an up-to-date medical school as Dr. Zapffe. His paper is just such a paper as I would expect of him, and I know that it will be of immense value to the State Boards in regulating the equipment of medical colleges.

Dr. EDWARD J. WILSON, Ohio State Board of Medical Registration and Examination: It gives me much pleasure to subscribe to what has been said by the previous speakers. It certainly is a source of satisfaction to know that we now have some unit of measure by which we may judge what ought to be a fairly well equipped medical school and I believe that Dr. Zapffe's standard constitutes such a unit and it cannot fail to be of great service to the Board.

Dr. J. A. WITHERSPOON, Vanderbilt University: I believe that this is one of the most important things that can be done. It is difficult to explain what trouble the Council on Medical Education of the American Medical Association have to get information. Some colleges, however, absolutely refused to permit us to make an investigation. The explanation why men pass State Board examinations without having had sufficient laboratory training is that the State Boards do not give practical examinations; however, they are now adopting such a plan and it will certainly prove effective. The standard of equipment laid down by Dr. Zapffe is valuable because some standard should be adopted. The standard he has mentioned is not too high and we, as an Association, should take the lead, and I am sure that the Council on Medical Education of the A. M. A. would be much gratified if this Association would publish this standard, because it would aid the Council in its investigation of medical schools.

Dr. W. J. MEANS: I am exceedingly gratified to hear Dr. Witherspoon speak as he has, because I am a member of a committee of the Council on medical education, to formulate a schedule for a standard medical col-

lege. That was the thought I had in mind when I suggested to Dr. Zapffe that he prepare a standard of minimum equipment on which this Association could take action. If we adopt this, I am sure that the Council will receive it with pleasure and gratification.

Dr. E. P. LYON, St. Louis University: I listened to this paper with much pleasure. While Dr. Zapffe has led us through the Red Sea, he must, before we reach the promised land, teach us not only with regard to the material equipment of a medical college, but also what might be termed the immaterial equipment, and yet a most essential one. Dr. Zapffe stated that more depended on the teacher than on the material equipment. I believe that is true, and also, as he said, that it is possible for the examiner, with some little training, to evaluate the teacher, as well as the material equipment. This Association should hesitate emphasizing material equipment too much and overlook the equipment, training and ability of the teachers in the medical schools.

Dr. ELI H. LONG, University of Buffalo: It seems to me that this Association has reason to congratulate itself on the results it has achieved. The question is sometimes asked, what is this Association for; whether its existence is worth while. It is evident, however, that the work done by this Association has achieved good results. The past five years have shown decided results. These results have been in the direction of acquainting ourselves with conditions and the outcome has been a detailed standard of entrance requirement and a uniform curriculum. Now we are discussing a syllabus and, finally, the material equipment of a college. This Association surely stands for something and has a right to its existence and to recognition as a great factor in the medical education of this country.



## ASSOCIATION OF AMERICAN MEDICAL COLLEGES.

*Minutes of the Eighteenth Annual Meeting Held at Cleveland, Ohio, March 16-17, 1908.*

### FIRST DAY—MORNING SESSION.

Pursuant to call, the Association convened in the auditorium of the Cleveland Medical Library, and was called to order at 10 a. m., by the president, Dr. Henry B. Ward.

### ROLL-CALL.

The roll-call was taken, and the following colleges were represented by delegates:

College of Medicine, University of Southern California—*Geo. H. Kress.*  
University of Colorado, Medical Department—*Wm. P. Harlow.*  
George Washington University, Department of Medicine—*W. F. R. Phillips.*  
Howard University, Medical Department—*Robt. Reyburn.*  
American Medical Missionary College—*J. H. Kellogg.*  
University of Illinois, Medical Department—*Fred C. Zapffe.*  
Indiana University, School of Medicine—*W. L. Bryan.*  
University of Iowa, College of Medicine—*J. R. Guthrie.*  
University of Kansas, School of Medicine—*Geo. H. Hoxie.*  
Kansas Medical College—*W. S. Lindsay.*  
Baltimore Medical College—*D. Streett.*  
College of Physicians and Surgeons, Baltimore—*Chas. F. Bevan.*  
University of Maryland, School of Medicine—*R. D. Coale.*  
St. Louis University, Medical Department—*E. P. Lyon.*  
University Medical College—*J. N. Jackson.*  
University of Missouri, Department of Medicine—*C. M. Jackson.*  
Washington University, Medical Department—*W. H. Warren.*  
John A. Creighton Medical College—*D. C. Bryant.*  
University of Nebraska, College of Medicine—*Henry B. Ward.*  
University of Buffalo, Medical Department—*Eli H. Long.*  
University and Bellevue Hospital Medical College—*Egbert LeFevre.*  
Cleveland College of Physicians and Surgeons—*A. R. Baker.*  
Starling-Ohio Medical College—*Wm. J. Means.*  
Western Reserve University Medical Department—*F. C. Waite.*  
Meharry Medical College—*Geo. W. Hubbard.*  
Vanderbilt University Medical Department—*J. A. Witherspoon.*  
Marquette University, Medical Department—*W. H. Earles.*

There were also present: B. D. Harison and A. W. Alvord, of the Michigan State Board of Registration in Medicine; Edw. J. Wilson and H. H. Baxter, of the Ohio State Board of Medical Registration and Examination; Christopher Tompkins and T. Hazen, of the Medical College of Virginia; B. D. Millikin, Torald Sollmann, F. E. Bunts, W. H. Humiston, Geo. W. Crile, C. A. Hamman, M. W. Blackman, of the Western Reserve University Medical Department; Randolph Winslow, of the University of Maryland; S. A. Kelley, of the Cleveland College of Physicians and Surgeons; R. H. Harris and C. Colver, of the American Medical Missionary College; Herbert Welch, president of Ohio Wesleyan University; H. Albert, of the University of Iowa; Park Myers, A. Dickey and W. L. Gillette, of the Toledo Medical College; Fred C. Zapffe, Chicago; H. W. Rogers, chairman Cleveland Medical Library Association.

### Minutes of Previous Meeting.

On motion, the minutes of the 1907 meeting were accepted as printed.

The chair, at this juncture, appointed the following *nominating committee*:  
F. C. Waite, W. F. R. Phillips and J. R. Guthrie.

### Reports of Committees.

*Committee on Syllabus*: The committee, consisting of F. C. Waite, Egbert LeFevre, R. D. Coale, C. M. Jackson, P. M. Dawson and Henry Albert, reported as follows:

#### THE TEACHING OF HISTOLOGY AND EMBRYOLOGY.

F. C. WAITE.

#### A. HISTOLOGY.

In order to get some first hand knowledge as to the extent of the teaching of histology in the medical schools of the United States, I sent out during the past year to the teacher of this subject in each of the medical schools of the United States a letter and a blank asking a series of questions in regard to this subject. Although the answers have not been as many as I had hoped, yet most of the better schools are represented. The following paper is chiefly a tabulation of the answers to these questions, together with certain minor comments:

I received answers from fifty-seven medical schools. Of the members of the Association of American Medical Colleges, twenty-seven have answered. To these twenty-seven I have added the answers from thirteen other medical colleges which, while not members of this Association, are generally recognized as being of equal rank. This gives a group of forty better medical colleges which is fairly representative of the higher medical education in this country. I have also answers from seventeen other medical colleges.

#### PLACE OF HISTOLOGY IN THE CURRICULUM.

To get information on this point I have asked the following question:

1. In what year of the medical curriculum and in what part of that year do you believe histology should be taught?

TABLE I.

	40 better colleges.	17 other colleges.
Throughout first year.....	24	15
First half first year.....	10	0
Second half first year.....	4	2
Second year .....	1	0

We see from the above table that there is practically unanimity of opinion that histology should be taught in the first year of the medical curriculum. When one considers the fundamental nature of this subject, and its relation to pathology and physiology, it must certainly be considered essentially a first year subject. Whether it should be confined to one semester or distributed over the entire first year, depends largely on one's opinion as to the advantages or disadvantages of concentration in teaching, and also very largely on the preparation demanded of the student for entrance.

My own opinion is that it is best to carry the subject through the year, because the first year student, even when a college graduate, fails to get into the spirit of medical study for the first few weeks. If, therefore, the subject is concentrated into the first half year, it must suffer the disadvantage of being for a considerable time taught while the student is in a less receptive

mood than he is later in the year. If the student is admitted without previous preparation in biology, as is the case in certain schools in the country, it may then be well to defer the subject of histology until he has had some work in elementary biology; but when, as will soon be the case, all of the better schools in the country demand biology for entrance, the student certainly will be able to go directly into histology.

In several answers it has been urged that it is more advantageous to teach the microscopic anatomy of the central nervous system and sense organ in connection with the gross anatomy of these organs, under a separate course of neurology, and further that it is best to give this course in the early part of the second year.

This time for neurology has many advantages and may well improve the teaching of this part of the subject, which, as we shall see by later tabulation, is in some places very largely neglected at present. The chief application of neurology is as a preparation to physiology, especially the physiology of the senses. Physiology of the nervous system and sense organs is, in most schools, given well along in the second year; and if the neurology is given in the first year, the distance between the preparation and application becomes too remote for the best results, since the application of neurology to physiology demands of the student an accurate and detailed knowledge of the anatomic conditions. Further, microscopic neurology is the most difficult part of microscopic anatomy, and if it is put in the second year, the course is relieved of those members of every freshman class who prove unfit for the study of medicine and who usually drop out by the end of the first year. Hence, the subject can be taught more effectively, because the average ability and added training of the second year class is always greater than that of the first year class. It would therefore seem wise to teach this part of microscopic anatomy in the second year.

One of the chief difficulties that first year men have with microscopic anatomy of the organs is due to their lack of first hand knowledge of the macroscopic structure of these organs. Ordinarily, the viscera are not dissected until well along in the first year or even in the second year, long after these organs must have been taken up from the microscopic point of view.

There is a great variety of usage in overcoming this difficulty. In some schools—and some of these are the best in the country—it is customary for the instructor to take up the gross anatomy of the viscus, and in some cases include the embryology as a preliminary to the work on the finer structures. There are arguments in favor of this procedure, but it has certainly disadvantages as to the division of teaching in a department, and if it is done in the time assigned to histology rather than that assigned to gross anatomy it, of course, diminishes the amount of time that should be put on the finer structure.

Another method is suggested by several, namely, to give a course in mammalian dissection preceding the course in histology. In such a course, a rabbit, dog or cat may be dissected and the student thus given a preparatory working knowledge of the structure of the various viscera. Such a course, if given at the outset of the freshman year, may precede the human dissection, and if given carefully may serve as a very excellent preparation for human dissection since the student can be taught the technic of dissection as effectively on well prepared dog cadavers as on human cadavers; but if carelessly given, allowing the student to hastily cut and slash, it is worse than useless because it gets him into habits of haste, carelessness and inaccuracy that greatly hinder his accomplishments in human dissection.

A third procedure, and one that works very effectively in several institutions where it is followed, is to give a course in splanchnology separate from the work in microscopic anatomy and in the time assigned to gross anatomy.

Such a course may well come early in the first year either before the microscopic anatomy of the organs is reached in the course in histology, or running parallel to this. In such a course may be studied the anatomy of each excised viscus *per se* without any reference to its position in the body or its relation to other organs. Human material, both fixed and fresh, which may easily be obtained from autopsies, can be used, and where it is lacking other mammalian material may serve. In such a course all of the principal viscera can be covered in a comparatively short time since the details of dissecting out nerve and blood supply, exterior to the organ itself, is obviated. Such a course is an excellent preparation for the work in the microscopic anatomy of the organs and later saves much time in the work of the dissection of the thorax and abdomen.

THE AMOUNT OF TIME THAT SHOULD BE DEVOTED TO HISTOLOGY AND MICROSCOPIC ANATOMY.

The question of proportional time for each subject in a medical course must rest on percentages of the total time in the curriculum, and in the case of a standard curriculum of 4000 hours, we must consider the percentage rather than the absolute number of hours. The question as to whether 4000 hours is sufficient, does not enter here. To gain opinions on this point, the following questions were asked:

2. In the 4000-hour schedule now in force in the Association of American Medical College, histology is given 90 hours (30 didactic, 60 laboratory). This is  $2\frac{1}{4}$  per cent of the total time. Do you believe this is the correct percentage, too great or too small?
3. If you believe this percentage should be changed, what percentage would you assign to histology? (Please remember the claims of other subjects on the total time of the curriculum.)

TABLE II.

	40 better schools.	17 other schools.
Correct .....	17	7
Too small .....	29	10
Average of suggested percentages.....	4.0	3.2

It is to be expected that the teacher of histology will consider that there is too little time assigned to this subject. Such is the feeling of almost every teacher in his own subject. If we average the opinion of the fifty-seven schools represented in the above table considered together (not an average of the above two averages) we get a result of 3.3 per cent. This on the basis of the 4000-hour schedule of 132 hours. No instructor would give a less per cent than  $2\frac{1}{4}$ , and some would go as high as 6 per cent, or 240 hours.

In connection with the opinions as to time allowed for embryology, which is now given the same as histology in the 4000-hour schedule, it is clear that an error has been made. In spite of all the claims of embryology—and it is certainly an important subject—to the medical student it is surely not equally essential with histology, and if the total percentage for these two subjects must remain  $4\frac{1}{2}$  per cent, i. e., 180 hours of the 4000-hour schedule, then this percentage should be divided in a different proportion. The most convenient division seems to me to give 3 per cent (120 hours) to histology and  $1\frac{1}{2}$  per cent (60 hours) to embryology.

THE AMOUNT OF TIME NOW GIVEN TO HISTOLOGY.

To ascertain whether it is the common practice to adhere to or to exceed the minimum schedule for this subject, the following question was asked:

4. What is the total scheduled number of hours you now devote to (a) laboratory work; (b) didactic work?

TABLE III.

	40 better schools.	17 other schools.
Average hours (laboratory).....	124	81
Average hours (didactic).....	48	41
Average total .....	172	122

These results bring out several interesting points. In the first place, there is but one of the better schools and but five of the other schools that are giving the minimum time only, viz., 90 hours. Of the better schools, one is giving 412 hours to the subject, another 300 hours. In about 20 per cent of the better schools, the microscopic anatomy of the central nervous system is given as a separate course, which is not taken account of in these averages. Were this condition averaged into the above table, it would certainly raise the average total of the better schools to at least 180 hours, possibly higher.

It would be possible, had I the time, to compile from the catalogues the average amount of time devoted to this subject in all of the medical schools of the country. I believe that if the time were compiled for the better 60 schools of the country, we should find the average time spent is somewhere between 180 and 200 hours, or more than twice the minimum of 90 hours in the 4000-hour curriculum. It is evident that this minimum is too small to secure efficient teaching of the subject.

This brings up the entire question as to whether 4000-hours is sufficient for the medical curriculum. When all of the schools require inorganic chemistry, physics and a good knowledge of biology for entrance, this amount of time may serve; but the better schools of the country are now spending from 10 to 20 per cent more than this minimum time.

Another interesting fact in the results of this table is the percentage given to didactic instruction. It varies in different schools from 13 to 54 per cent. In the better schools of the above table it is 29 per cent, in the others it is 34 per cent, which indicates the fact which we all know, that more attention is given to laboratory work in the better schools; although there are some differences of opinion among medical educators as to the value of laboratory work, it seems clear that in this subject from two-thirds to four-fifths of the total time available should be devoted to the laboratory.

#### DIVISION OF TIME AMONG DIFFERENT PARTS OF THE SUBJECT.

The information secured in this paper thus far could be compiled from catalogues, but one of the purposes of this investigation is to enable us later to frame a syllabus for this subject, and to do this it is necessary to get the opinions of teachers in the subject as to the best proportional division of time. The division of the subject into five headings, as indicated below, seems to me logical, although by some teachers the blood is put under a different classification. It, at least, gives a basis for comparison. The following questions were asked:

5. Of the total time available for the subject, what per cent approximately do you devote to each of the following subdivisions:
  - (a) Technic, including mounting of sections.
  - (b) Laboratory study of fundamental tissues, including blood.
  - (c) Laboratory study of microscopical anatomy of organs except those under (d).
  - (d) Laboratory study of the organs of the central nervous system and sense organs.
  - (e) Recitations and lectures.

TABLE IV.

PRESENT DIVISION OF TIME BY AVERAGE PERCENTAGES.

	(a)	(b)	(c)	(d)	(e)
40 better schools.....	8.8	22.5	31.3	11.6	28.5
17 other schools.....	10.6	15.0	33.3	10.6	33.5

6. What do you believe the ideal percent of the course to be devoted to  
(a) (b) (c) (d) (e)?

TABLE V.

IDEAL DIVISION OF TIME BY AVERAGE PERCENTAGES.

	(a)	(b)	(c)	(d)	(e)
40 better schools.....	9.0	21.0	33.0	11.0	26.0
17 other schools.....	10.0	16.0	34.0	12.0	28.0

These two tables bring out several interesting facts. In the first place, the averages show that the present amount of time given to didactic work seems greater than the ideal and that it should be reduced and more time given to laboratory work. We see that, roughly, three times as many hours should be given to laboratory as to didactic. There is, however, great variation in the different schools, ranging from 5 to 45 per cent.

Another interesting feature is the amount of time given to the central nervous system and sense organs. There can be no doubt of the importance to the medical student of an intimate knowledge of this division of the subject in order to understand the physiology of the organism. There are, I believe, two reasons for this relatively small amount of time now given to the nervous system. The first is, that histology is considered largely as a preparation for pathology, and, in fact, in many places the instruction is under the department of pathology. In the teaching of pathology, relatively little time is given to the nervous system, and so the preparation for the other organ systems is relatively emphasized more. The second reason is the difficulty of obtaining and preparing good human material for this division of the subject, also the difficulty in teaching this subject, and finally the fact that it comes at the end of the course and so is robbed of its due proportion of attention. This seems to me to be a very strong argument why this part of the subject should be given as a separate course and, as I have indicated before, should preferably be given in the second year.

Another interesting feature is the great difference between the amount of time given to histology of the tissues in the better schools and in the less good schools. Variation here is also in the extreme, some giving but 2 per cent, others giving 40 per cent. I think these variations may be explained somewhat by the usage in regard to the teaching of the histology of the blood. In some cases it is efficiently taught in this course, while in others it is here hastily gone over, depending on the instruction in clinical microscopy given to the subject.

We see a practical unanimity of opinion in regard to the amount of time that should be devoted to the laboratory study of the organs, exclusive of the central nervous system and sense organs. One-third of the total time is and should be devoted to this.

The usage as to technic is rather surprising. The fact that as much time should be given to technic as to the central nervous system and sense organs seems hardly a fair division. When we shall be able to require a considerable amount of biology for entrance, the technic can largely be done as a pre-medical subject. It would also seem possible to do the work on the tissues as a pre-medical subject. The study of organ systems is essentially a function of the medical school and should be, at least in large part, done on human material; but there seems to me no good reason why the technic and study of the tissues, as distinguished from the organs, cannot be

well done in undergraduate colleges before the student enters his medical course. This would allow the medical instructor to devote relatively more time to the organs, and especially to the central nervous system, which seems now to be somewhat neglected.

I hope at a future time to suggest a division of the entire subject, based on data already collected and other data which I shall collect, which will allow us to speak of histology in such a way that there shall be a preliminary and an advanced course, the former being devoted to microscopic technic and the study of the tissues considered separately. In connection with this, the consideration of the present work in the undergraduate colleges, as discussed on the following page, is of interest.

#### THE REQUIREMENTS IN LABORATORY RECORDS.

To gain knowledge on the usage in the method of taking notes in the laboratory, the following question was asked:

7. To what extent should students make record of their study of sections by (a) descriptive notes; (b) drawings?

TABLE VI.

	Descriptions Labeled and Drawings	
	Drawings.	Only.
40 better schools.....	25	15
17 other schools.....	3	9

There is much variation of opinion as to the desirability of requiring the student to make laboratory records of his preparations in the way of written descriptions. There can be no doubt as to the necessity of requiring the student to make drawings, although in a very few schools such a requirement is not made. If efficient drawings are secured and carefully labelled, written descriptions become superfluous, but every teacher of this subject knows that there are certain men who are unable to present good drawings. This is due largely to lack of instruction in preliminary education on the principles and practice of drawing. The medical school cannot presume to give instruction in this subject with its present full curriculum, although it would be extremely desirable if a certain amount of efficiency and more especially of knowledge of drawing could be required for entrance; but such a requirement is hardly to be hoped for in the immediate future.

To the student who cannot draw, the option of making his records in the way of descriptions offers an opportunity which seems to me desirable; but at the same time several of the ablest instructors in this subject in the country believe that all the time should be devoted to drawings, in spite of the fact that it is very discouraging to the student who lacks ability in this line. By ability I do not mean artistic ability but merely the power to represent things as they are and as he sees them.

The great temptation in laboratory note taking is for the student to be unduly influenced by textbook figures and text, and this may be said to be the chief objection to the writing of descriptive notes. It requires the utmost vigilance on the part of the instructor to keep the student from copying or paraphrasing textbook statements instead of recording in good English his own observations.

What I have said in regard to the teaching of histology in this paper, is only preliminary. The data from which my tables have been made is certainly not as extensive as I could wish, and it will require the assembling of additional data to give my opinions the desired proof.

#### THE TEACHING OF HISTOLOGY IN UNDERGRADUATE COLLEGES.

I have asked of the instructors in this subject in certain undergraduate colleges questions similar to those that have been discussed in the foregoing.

I have received replies from twenty representative colleges and find that in these the following is the present usage:

Average time devoted to didactic work.....	32 hours
Average time devoted to laboratory.....	98 hours
Average total time.....	130 hours

It is seen that the average amount of time devoted in these schools to the subject is much less than in the better medical schools; but is greater than in the less good medical schools. In a few instances the time is sufficient to give a course fairly equal to that of the better medical schools. In one school, 284 hours are given to the subject.

The question arises whether in this time the division of attention to parts of the subject is practically the same as in a medical school, or whether the subject is taught on different lines. The following tabulation of the proportional amount of time devoted to the divisions of the subject, as considered under Table IV, will give us some light on this question.

TABLE VII.

(a) Technic, including mount of sections.....	19.4 per cent
(b) Laboratory study of fundamental tissues, including blood..	23 per cent
(c) Laboratory study of the microscopical anatomy of organs except those under (d).....	25.3 per cent
(d) Laboratory study of the organs of the central nervous system and sense organs.....	11.5 per cent
(e) Recitations and lectures.....	23.1 per cent

A comparison between this and the work in medical schools, as shown in Table IV, brings out the following points of interest:

1. That relatively more emphasis is placed on laboratory work in the undergraduate colleges than in the medical school, in the proportion of 77 to 72 per cent.

2. That much more emphasis is placed on technic in the proportion of 19.4 to about 9 per cent.

3. That relatively more emphasis is placed on the tissues as distinguished from the organs in the undergraduate colleges.

4. That about the same proportion of time is devoted to the central nervous system and sense organs in the two classes of institutions, but that

5. Relatively less time is given to the organs, aside from the central nervous system, than is given in the medical colleges.

These are simply statistical proof of what most teachers in medical schools have long believed, viz., that the technic and the study of the fundamental tissues is done as well or better in the undergraduate colleges than in the medical colleges, but that when it comes to the study of the organs, the efficiency of the course in the medical colleges is not equalled by that in the undergraduate college.

This is, I believe, as it should be. The course in the undergraduate college has a different purpose from that in the medical school, and this purpose is best accomplished by putting emphasis on technic and on the study of the cell and the fundamental tissues. If we can devise two courses in this subject, one preliminary and one advanced, it seems to me that the undergraduate college will be able to give the preliminary medical course without disturbing the nature of its courses as given at present and without serious inconvenience in the matter of material, since for the preliminary course on the fundamental tissues, mammalian material is usually superior to human material, as it can be secured in a fresher condition and be fixed better. I shall hope to discuss this question more at length in a subsequent paper.



## B. EMBRYOLOGY.

I have pursued the same method with embryology as with histology, viz., I sent certain definite questions to the teachers of this subject in all of the medical schools of the country. I received answers from 36 of the better schools and from 14 other schools.

The question as to whether embryology has a place in the curriculum would seem to be pretty definitely settled, but I have asked the following question:

1. Do you believe embryology should be a required subject for the medical curriculum?

The results of answers were as follows:

TABLE VIII.

	Should be Required.	Should not be Required.
36 better schools.....	33	3
14 other schools.....	14	0

This represents, it seems to me, the feeling in the country, although of the three instructors who would not require the subject, some are the best known men in the country. When one takes into account the help which embryology gives to the student in the understanding of anatomy, both gross and microscopic, and also its importance in the appreciation of certain pathologic conditions, and especially its close correlation with obstetrics, it seems to me clear that every medical student should have instruction in this subject.

**CORRELLATION WITH HISTOLOGY.**—The question as to how the subject should be taught, whether as a distinct course or as a part of a general course under the title of histology and embryology, is open to discussion. To gain opinions on this, I have asked the following question:

2. Do you believe embryology should be given as a distinct course or combined with histology?

The opinion on this are shown in the following:

TABLE IX.

	Distinct Course.	Combined Course.
36 better schools .....	30	6
14 other schools .....	10	4

The method of combination is, of course, a matter of opinion. One very well known instructor would combine embryology not only with histology but also with the systematic instruction in descriptive gross anatomy. There seems, however, a general opinion that embryology can best be taught as a separate and distinct course. This procedure involves a certain amount of repetition, but the final results are rather more concrete. Recently a textbook has appeared which treats histology and embryology together. It is primarily a histology with an embryologic basis, and lacks the systematic and correlated statements of which embryology is capable. This textbook has not been largely used as yet, but it has many points of excellence. One of the great hindrances in the efficient teaching of embryology, is the lack of a modern, accurate, well-balanced textbook in English. The best American textbook has in it many inaccuracies and some of these have continued through three editions.

*Place of Embryology in the Curriculum.*—A question which admits of still greater discussion is concerning the point in the curriculum at which embryology should be introduced. The following question was asked:

3. In what year of the medical curriculum and in what part of that year do you think embryology should be taught?  
The answers are shown in the following:

TABLE X.

	First half first year	Second half first year.	First half second year.	Second half second year.	Later.
36 Better schools.....	6	20	5	3	2
14 Other schools.....	1	4	7	2	2

We can see in this the effect of the less good preparation on entrance in the poorer schools. The instructors in these schools evidently feel that the first year man is not capable of carrying this difficult subject. Embryology requires close attention from the student and logical sequence of work and thought. We all know that the first year medical student takes some time before he is doing the best work of which he is capable. The medical curriculum is new to him, and the methods of study are strange. It, therefore, seems to me unwise to give embryology until part of the freshman year has been passed. Moreover, the study of tissues in histology, is excellent training for the embryologic work. I believe, therefore, that it is clear that embryology should not come in the first half of the freshman year. The application of embryology is largely upon the descriptive anatomy of the viscera and certain phases of pathology. These subjects ordinarily come in, the second year and it seems to me that a man should have his embryology as a preparation for these. I believe, therefore, that the correct time for this subject is in the second half of the first year. With higher entrance requirements, including a considerable part of biology, this may possibly, later, be moved into the first part of the first year.

*The proportionate amount of time that should be devoted to embryology.*—

In order to get opinions as to the proportionate amount of time due this subject, I have asked the following questions:

4. In the 4,000-hour schedule now in force in the Association of American Medical Colleges, embryology is given 90 hours (30 didactic, 60 laboratory). This is  $2\frac{1}{4}$  per cent of the total time. Do you believe this percentage is correct, too great or too small?
5. If you believe this percentage should be changed, what percentage would you assign to embryology? (Please remember the claims of other subjects on the total time of the curriculum.)

The results of these questions are expressed in the following table:

TABLE XI.

	$2\frac{1}{4}$ % is correct.	$2\frac{1}{4}$ % is too small.	$2\frac{1}{4}$ % is too great.	Average of sug- gested per cents.
36 Better schools .....	12	4	20	2.0
14 Other schools .....	7	1	6	1.8

We must consider these percentages in connection with those under Table II, with regard to histology. The correlation of the time for histology and embryology has been discussed there. I believe, myself, that consideration for the other subjects of the curriculum demands that not much, if any, more than  $1\frac{1}{2}$  per cent should be devoted to a distinct course in embryology. This does not mean that 60 hours is sufficient to give the subject in an adequate manner and when we shall be able to eliminate inorganic chemistry from the first year, part of the time devoted to that subject may be given to embryology so that it may be raised to 1.8 or 2 per cent.

*The amount of time now given to Embryology.*—To learn as to the total amount of time devoted to the subject, the following question has been asked:

6. What is the total scheduled number of hours you now devote to (a) laboratory work; (b) didactic work?

The average amount of time devoted to each of these phases of the subject is given in the following table:

TABLE XII.

	Hours laboratory	Hours didactic.	Total hours.
36 Better schools .....	54	24	78
14 Other schools .....	38	30	68

The extremes are very marked. In the better schools for laboratory work they range from 30 to 140 hours, and in didactic work from 8 to 64 hours. In the poorer schools, the laboratory work ranges from 0 to 60 hours, the didactic from 16 to 60 hours.

The table shows, as in the case of histology, that the better schools are giving more work in this subject, and that this excess is chiefly in the line of laboratory work. The striking fact is that, on the average, in neither class of schools is the total any where near the minimum required in our 4,000-hour schedule; but by comparing this with the work in Histology, we see that the total for Embryology and Histology together is for the better schools 250 hours and for the poorer schools 190 hours; in both cases in excess of the  $4\frac{1}{2}$  per cent (180 hours) assigned to these two subjects in the 4,000-hour schedule. This shown conclusively that the present proportion by which embryology is placed on a par with histology in the 4,000-hour schedule, is not only inadvisable, but is not being followed.

*Division of time in the course.*—To get some idea as to how the subject is treated, the following question was asked:

7. Of the total time available for this subject what percentage approximately do you devote to each of the following subdivisions: (a) Embryologic technic and preparation of series; (b) laboratory study of maturation, fertilization, segmentation and gastrulation; (c) laboratory study of development of forms below mammals; (d) laboratory study of development of mammals; (e) laboratory study of fetal membranes; (f) lectures and recitations.

The answers to this question are expressed in the following table which shows the average percentages devoted to the parts of the subjects as noted:

TABLE XIII.

	Laboratory work on technic.	Laboratory work on forms below mammals.	Laboratory work on mammals and fetal membranes.	Didactic work.
36 Better schools .....	6	35	32	27
14 Other schools .....	10	30	20	40

There are several points of interest in this table.

(1) In the better schools, the amount of time devoted to technic varies from 0 (in 12 schools) to 50 per cent (in 1 school). If we exclude from the averages this one school with the abnormal amount of time devoted to technic, the average becomes 5 per cent or exactly one-half of that devoted in the poorer schools. It is evident that the teachers of this subject in medical schools do not believe that much time can be devoted to the time consuming procedure of cutting sections and mounting series and that there are far more important things to the medical student in the course than working with the microtome. We shall find a striking difference in the uses in the undergraduate colleges.

(2) The amount of time devoted to the forms below mammals is approximately one-third of the course. To the medical student whose later studies

are almost exclusively confined to mammals, this, at first sight, would seem disproportionate; but it must be taken into account that the obtaining of good material for the earlier stages of mammals is extremely difficult, and further, that the earlier developmental stages in birds and amphibia are so nearly like that in mammals that for the purposes of instruction these forms are nearly as satisfactory.

(3) The difference in the time devoted to the work on mammals in the better and in the poorer schools is almost inversely proportional to the emphasis on didactic work in the two classes of schools. This is partially accounted for by the difficulty in securing and the tediousness of preparation of large mammalian embryos; but at present it is so easy to get pig material, either directly from the abattoirs, or by purchase from dealers in this sort of material of whom there are now several in the country, that I feel that this neglect of laboratory work on mammalian forms is largely due to lack of effort.

(4) The percentages devoted to lectures and recitations in the better schools and in the poorer schools shows the expected results, viz., that the better schools are stronger on laboratory work. Several of the poorer schools give no laboratory work whatever, but the highest percentage devoted to didactic work in many of the better schools is 40 per cent. We thus see that the better schools believe in teaching this subject chiefly from a laboratory standpoint.

*The teaching of the subject in undergraduate colleges.*—I have asked similar questions of the teachers of embryology in the better undergraduate colleges of the country which are not connected with medical schools. I have received answers from 24 representative colleges scattered all over the country. The average amount of time devoted in these schools to the subject is as follows:

Laboratory work .....	93 hours
Didactic work .....	33 hours
Total .....	126 hours

It is interesting to compare this with the time given to embryology in medical schools, as shown in table XII. We see that the undergraduate schools are devoting 12-3 as much time to embryology as are the better medical schools, and nearly twice as much time as are the poorer schools.

It is also of great interest to find how the subject is treated in the undergraduate school. It is as follows:

Laboratory work on technic .....	16½%
Laboratory work on forms below mammals .....	42%
Laboratory work on mammals and fetal membranes.....	16½%
Didactic work .....	25%

This shows that a very much greater amount of time is put on the embryologic technic than is given in the medical schools. The same is true of the laboratory work on forms below mammals, but the work upon mammals and fetal membranes is relatively much less although the absolute difference is not great, due to the fact that the total amount of time in the undergraduate colleges is much greater than in the medical schools.

The object of the course in embryology in the undergraduate college is quite different from that in the medical school. It may be said that the majority of the undergraduate students who take this work are looking toward a teaching career. It is absolutely necessary that they have a good training in technic and further that they have a comprehensive knowledge of those parts of embryology which may be called, in a word, philosophic. These phases include those facts of embryology which, largely, are the material on which are built the theories of evolution and of relationship of animal forms. There can be no doubt as to the importance of this phase of the subject to the medical student

as well. The forms below mammals offer better material for the discussion of problems which lie in this realm than do the mammalian forms. This is because it is in the earlier stages of development that the major part of the material for the solution of these problems is to be found, and early stages of mammalian material is difficult to obtain and handle.

On the other hand, the medical student is more largely concerned with organogeny and to secure his knowledge on these points he needs largely mammalian material. He is also concerned with histogenesis and the material for this part of the work is largely in the later stages of development, and since he desires to know the histogenesis of mammalian tissues, it would seem best to do this work on mammalian embryos.

I think we may say that embryology is capable of being divided into two parts, the first, includes technic and the study of early stages, which are chiefly emphasized in the undergraduate colleges, and is undoubtedly better taught there than in the average medical school. We may speak of this as a preliminary course. The second division of the subject concerns chiefly the development of the organs up to adult conditions, the development of the tissues to their adult conditions, and especially the relations of embryonic membranes, more particularly of those membranes which are confined to mammals. We may speak of this as advanced embryology, and it is this part of the subject that the medical student needs and the medical schools emphasize. This is what is applied in obstetrics, and in teratology. If we can arrange two parts of this course, and have the second part given by the medical school and the preliminary part given in the undergraduate college, we shall certainly get better results from the study of the subject, than if the entire subject is taken in either one place or the other.

In a comparison of the work in medical schools and in undergraduate colleges as regards the two subjects of histology and embryology, I believe it may be said that histology is relatively better taught than embryology in the medical schools, while embryology is relatively better taught in the undergraduate colleges than in the medical schools.

The foregoing tabulations and discussions in regard to these two subjects represents a feeble effort to et some knowledge as to the efficiency of instruction. There are several factors that enter into efficiency; of these subjects and hours and percentages are not by any means the most important. The questions of laboratory equipment, of personal equation of the instructors and finally, of the general tone and ideals of the work are far more important than the mere question of hours; but these abtruse qualifications are hardly capable of mathematical expression and so we are compelled to resort to one of the less important factors to arrive at some comparative notions of the work done in the various institutions of the country.

Finally, I wish to thank the many gentlemen who have so kindly answered my questions and thus helped me to get together the facts which I have presented.

MATERIA MEDICA AND PHARMACOLOGY.

Egbert LeFevre.

The proper place for materia medica and pharmacology in the medical curriculum can be settled only when there is a general agreement as to the scope of the teaching in these subjects. That there is at the present time no such agreement is amply shown by an inspection of the curricula of the different medical schools. Until recent years materia medica was considered from the pharmaceutical standpoint chiefly, but now the physiological action of drugs is rightly receiving greater attention and pharmacology should be a required subject in every curriculum.

In order to decide what should be included in the medical curriculum, it is necessary to determine (1) what is essential for the proper training of all

medical men; (2) what portions of the subject, through important and valuable to those making a special study of the branches, and necessary for the pharmacist, is non-essential to medical men. It may be objected that all knowledge that is useful should be introduced, but the curriculum is now so overloaded that the point has been reached where it is necessary to consider definitely the utility of knowledge alone; (3) what portion of our present materia medica as such is obsolete and should be omitted?

In attempting to arrange a syllabus in materia medica it is difficult to meet the great diversity in the requirements of the various examining boards and so include too much in attempting to meet these varied requirements. On the other hand, if changes should occur in the medical law so that the subject of materia medica and therapeutics is not included in the licensing examination, as it now is in the State of New York, there is danger that the students and teaching body will consider these subjects as unimportant and so curtail them. Where materia medica and therapeutics are not included in the licensing examination, the reason for omitting them was that the state had nothing to do with sectarian beliefs in medicine, and that the examination should be based entirely upon that portion of medical science and practice that was accepted by all. Under such conditions it is the duty of the medical schools to keep alive the therapeutic belief and our duty is to look to our teaching in these subjects and put not only the teaching but also our therapeutic practice on a sound physiological basis. This can only be done by giving an efficient course in pharmacology.

Probably no subject in the curriculum has been so severely criticised as the teaching in materia medica and therapeutics. It has been stated that with the lengthening of the course and increases in its scope these subjects are receiving less attention than others and that the students of the present day on graduation, while thoroughly prepared in much of the theoretical knowledge in medicine are poorly equipped to apply their knowledge in treatment. This same criticism is applied to other technical schools and the statement is made that the student who has taken a scientific and theoretical course in any of the applied sciences on graduation does not have the arts of his profession as well as those who have their knowledge through the corresponding years of apprenticeship. Technical schools, including the medical, do not aim to turn out a finished product. Our object is to thoroughly prepare the men in the principles of his profession so that he can, after graduation, continue his education. One of the great problems in teaching the applied portion of medicine is to determine the proper relationship that should exist between the science and the art of the different branches. It is in the medical college that the student must get the theoretical knowledge upon which to build in after life.

#### MATERIA MEDICA, INCLUDING PHARMACY.

*Pharmacognosy.* This portion of the subject which is essential for the pharmacist is of little use to the medical student and therefore might be omitted entirely from the course, or only a short time devoted to it in relation to those substances which are important in containing active principles and in common use.

*Metrology.* Every student should have a definite knowledge of this subject. If they already have it, either as a part of their preliminary education or from their work in chemistry, it may be omitted from the course. Every student should be able to readily convert the values of one system to those of another.

*Pharmaceutical Chemistry or Methods.* The student should have a knowledge of these methods and not from the commercial or pharmaceutical standpoint. He should have a general knowledge of the methods used so that he will be able to understand what is meant when their names occur in literature. The same should apply to the special pharmaceutical preparations.

The instruction in this course could be given by descriptive lectures or by recitations from books especially prepared for the course and the principles involved can be taught in a laboratory course in elementary pharmacy, which course should consist of:

(1) The making by students of at least one preparation of each pharmaceutical type contained in the pharmacopeia, e. g., aquae, decoctions, solutions, pills, tinctures, emulsions, liniments, etc.

(2) Extraction and chemical tests of alkaloids.

(3) Tests for glucosides; relationship between plant ferments and glucosides, etc.

(4) Making and methods of application of poultices, stupes, plasters, peptonized milk. This if taught elsewhere as in applied therapeutics of the third and fourth year, could be omitted.

There is a great difference of opinion as to what extent the drugs and pharmacopial preparations should be taught. Many teachers of pharmacology claim that this is a waste of time and that the students rapidly forget it. The same objection could be made against much of the detailed knowledge that is required in anatomy and chemistry and yet it is conceded that this training is absolutely necessary for the student. I think the same applies to a limited degree in certain knowledge of the pharmacopeia, although the student may forget much of it, that which is of use to him will be retained and what is most important, he will become familiar with those drugs and preparations which are in common use and have stood the test of time.

I think that at the present time we err in giving too little and do not insist upon sufficient exact knowledge of nomenclature, important pharmaceutical properties, and dosage of the drugs that are used in the practice of medicine and incompatibilities, chemical and physical. A large part of this work is memorizing and in the early years of his course the student can do this with greater ease than later. If he does not get it in the early years of his course, he never gets it. Lectures on these portions of materia medica, except to emphasize certain principles, are useless. Rigid recitation work is necessary. This portion of the work could be given in the first year. If given in connection with a systematic course in pharmacology, it could be included in the second year.

*Pharmacology.* A more extended and definite course in pharmacology than is at present given in most of the colleges should be insisted upon. The student is not sufficiently prepared to get the greatest benefit from the course until his knowledge of physiology and physiological chemistry has made him acquainted with the essential facts of these sciences, as the course of pharmacology is practically the application of physiology and physiological chemistry to drug action. To what extent this course should be given is still a matter of opinion. When it is correlated with physiology it is possible for time to be saved in both courses as the teacher in pharmacology takes up certain physiological processes in relation to the teaching.

The instruction should be given by didactic lectures, including demonstrations, approximately 75 hours; by recitations, 30 hours, and by laboratory exercises, 45 hours, as follows:

Didactic lectures to include demonstration not possible in laboratory work. Lectures to cover actions of drugs and general indications for uses. The drugs are to be taken up as far as possible in general groups. If a number of drugs possess very similar actions, the action common to all is discussed and then differences in the different members of the group pointed out. With more important or special drugs (like strychnine, opium, etc.), the drug is described in detail as to action, although the main action which groups it is emphasized. By means of lectures and demonstrations certain text-book matter can be emphasized, or if merely of biological interest, omitted. With the grouping of drugs according to some characteristic action on some definite organ, the physiology

of the organ can be first briefly reviewed and the different ways in which its function can be altered by drugs pointed out.

The *laboratory course* consists of:

A. Experiments on animals showing the main actions of the more important drugs. The students to be divided into groups of two or four (no larger) and to perform the whole experiment themselves. *Enough competent assistants are necessary for the best results, but they themselves should not do any part of the experiment* (with the students looking on). *An assistant not thoroughly familiar with the subject is worse than useless.*

B. At least one exercise should be devoted to the effects of common poisons and their antidotes on intact animals; phenol, strychnine, etc. For obvious reasons this should be of the nature of a demonstration and its purpose fully pointed out.

C. This laboratory course should be given at the same time as the lecture course, as each stimulates interest in the other.

The course in *prescription writing* consists of:

A. Lectures: 5 hours. The elements and principles are taught in this manner. This should be given after the first one-fourth or one-third of the lecture course in pharmacology is completed. Thus the student knows enough then about the action and preparations of a sufficient number of drugs to prescribe them. This would not be the case if this came first. Thereafter at each recitation a part of the hour, 10-15 minutes, can be spent in writing prescriptions for the drugs on which the recitation is held.

B. The last three periods of the laboratory course in pharmacology can be spent in putting up prescriptions, studying incompatibilities, flavors, etc.

During the third or fourth year an additional and subsequent lecture course of about 12 or 15 hours could well be given in which the important drugs could be grouped according to effects on some organ, cardiac or nervous stimulants or depressants, diuretics, diaphoretics, etc., and the differences in effects and corresponding differences in usage pointed out.

The principles and practice of prescription writing are to be continued under the head of applied therapeutics and materia medica in the third and fourth years.

#### CHEMISTRY.

R. Dorsey Coale.

A comparative study of the details of the courses in chemistry given in a large number of medical colleges as constituting a required part of the course in medicine shows that while, as would naturally be expected, there is a close general resemblance between most of them, there are at the same time certain wide discrepancies.

Among these discrepancies one of the most striking is in the amount of time devoted to instruction in chemistry in the curricula of different schools.

I have found this time to vary from 576 or more hours, to somewhat less than the minimum standard of 300 hours as prescribed in the constitution of this Association. This variation is, of course, in some measure to be accounted for by varying length of sessions, but only to a slight degree; it is chiefly due to the varying number of hours per week devoted to the subject.

In the system of treatment of the subject, and in arrangement of the course, however, there is a very close general similarity. Instruction in chemistry usually extends through the freshman and sophomore years of the course. The work of the first year usually consists of instruction in general inorganic chemistry, with possibly some discussion of the simpler carbon compounds, and corresponding laboratory exercises leading to qualitative analysis, with possibly some instruction in the simpler processes of quantitative analysis, usually volumetric. The work of the second year is usually divided between



advanced organic chemistry and physiological chemistry, with corresponding laboratory work.

In a few schools no instruction is offered in inorganic chemistry, it being assumed that the student has already acquired an adequate knowledge of the subject in his pre-medical education. While this assumption may be, and undoubtedly is, justified in special instances, and with schools having exceptionally high requirements for admission, in the great majority of cases I do not believe that it is so, and, in my opinion, the time has not arrived when the medical school can depend upon the possession by students seeking admission of a thorough training in elementary chemistry acquired in pre-medical education in the high school. To use the words of Dr. J. W. Holland: "It cannot be taken for granted that all beginners in medicine have an adequate training in elementary chemistry. While the number of those unprepared diminishes annually, it will be years before the assumption will be safe that the teacher of physiological chemistry and toxicology can proceed at once to the consideration of these practical applications of the science."

In this opinion I fully concur, and therefore believe that for the present at all events the medical school exacting what we may call "standard" requirements for matriculation should continue to offer a course of instruction in general chemistry.

At the same time I would not be understood as depreciating the great advantage to a beginner in medicine of some preliminary training in chemistry, and particularly in physics, and I think it exceedingly desirable that an intending matriculate in medicine should have a knowledge of chemistry and physics at least equivalent to the matter covered, in chemistry, for example, by Remsen's Briefer Course, and in physics by Gage's Elements, or other text books of similar scope.

In the arrangement of the syllabus which I have to submit, I have endeavored to devise what may be called an "average" course which shall combine, as far as possible, the essential features of the courses now given in most medical colleges. In the arrangement and division of the course I have followed the system which, as I have said, I find to be in very general use, and to the treatment of each division of the subject I have assigned what appears to me to be a sufficient number of hours to cover the ground suggested, without undue encroachment upon the time which must be devoted to other branches of the medical course, and what represents approximately an average of the varying amounts of time now given to the subject in different schools.

#### SUGGESTED SYLLABUS OF COURSE IN CHEMISTRY.

##### First Year.

##### *Inorganic Chemistry and Toxicology.*

Lectures and Recitations: Three hours a week throughout the session to include:

(a) Physical Physics, as leading to chemistry. Constitution of matter; physical measurements; physical properties of solids, liquids and gases; heat; electricity, etc.

(b) Inorganic Chemistry—General chemistry, including theories and laws relating to chemical action; discussion of the properties of the elements and their compounds, including the toxicology of the inorganic poisons.

(c) Introduction to Organic Chemistry.

Laboratory Work—Six hours weekly throughout session, to include:

Training in the various manipulative processes used in the laboratory; the experimental study of typical elements and compounds; instruction in qualitative

analysis, including the identification of inorganic poisons; the elements of volumetric analysis, including acidimetry and alkalimetry.

Lectures .....	90- 96 hours.
Laboratory work .....	156-170 hours

Total .....246-266 hours

#### Second Year.

##### *Organic and Physiological Chemistry and Toxicology.*

Organic Chemistry and Toxicology—One lecture a week, one-half session.

Brief review of course (c) of first year, proceeding to the discussion of such of the more complex compounds of the fatty and aromatic series as are of medical importance, such as the synthetic coal tar derivatives, etc., with their toxicology.

Discussion of the more important alkaloids, with toxicology.

Physiological Chemistry—One lecture a week, one-half session.

Instruction in the chemistry of the sugars and proteids and of the various secretions; the chemistry of the food stuffs and its practical bearing upon diet; ferments and enzymes; saliva; gastric juice; bile; blood; milk; urine, etc.

Laboratory Work—Six hours weekly, one-half session.

To include as far as possible practical instruction in the matters treated in the lectures, including the chemical examination of urine.

Lectures .....	30- 32 hours
Laboratory work .....	90-100 hours

Total.....120-132 hours

Total for entire course:

Lectures .....	120-130 hours
Laboratory work .....	246-270 hours

Total.....366-400 hours

#### GROSS ANATOMY.

C. M. Jackson.

With reference to the arrangement of the work in gross anatomy in the medical curriculum, we have to consider (1) the character of the work and the amount of time which should be the minimum requirement in each phase of the subject; and (2) the correlation and consequence of subjects giving the best results.

A thorough dissection of a lateral half of the human body is universally recognized as indispensable. It is also desirable that this work should come as early as possible in the course, in order that it may precede physiology and pathology. A knowledge of structure is necessary before function can be understood, and a knowledge of the normal must precede that of the abnormal. The dissection of the body should therefore be completed, if possible, during the first year of the medical course. The-time required by the average student for this dissection is not less than 400 hours (including osteology and gross neurology). This does not include provision for didactic instruction, a limited amount of which (about 80 hours), is desirable, if closely correlated with the laboratory work. The work in gross anatomy should also be correlated as closely as possible with the work in Normal Histology and Embryology.

A single dissection of the human body by the ordinary method is insufficient, however. Especially does it fail to give the student an adequate idea of topography, which is of fundamental importance in clinical work, both medical

and surgical. Following the ordinary course in dissection, therefore, the student should re-study the entire body from the topographic standpoint, by means of topographic preparations of the various regions, and particularly by a careful study of serial sections of formalin-hardened bodies. A satisfactory course of this character requires a minimum of about 100 hours of laboratory work, with about 20 hours additional for lectures, quizzes, etc. The course in Topographic Anatomy should be placed in the second year of the curriculum, thus leading up naturally to the clinical work of the third and fourth years.

In addition to the foregoing courses, all of the clinical work involves more or less instruction in *applied* anatomy. This work should be reckoned with the instruction in the clinical branches, however, and should be taught by the various clinicians rather than by the anatomist.

The necessary work in gross Anatomy as outlined above thus requires a minimum of about 600 hours. This does not include any work in Zoölogy or Comparative Anatomy, which should be required for entrance. In case it is not required for entrance, a brief course in the dissection of a mammal should precede the human dissection in the first year of the medical curriculum. Judging from the responses received in reply to a circular letter of inquiry sent out by me concerning this matter, anatomists are practically unanimous in their opinion that it is impossible to cover satisfactorily the necessary work in gross anatomy within the 450 hours assigned by the present minimum schedule of the Association of American Medical Colleges.

#### PHYSIOLOGY.

P. M. Dawson.

1. Physiology and physiologic chemistry should be preceded by chemistry (including organic chemistry), physics and histology.
2. Physiology should follow or accompany physiologic chemistry.
3. The time devoted to laboratory work in physiology should not be less than 100 hours.
4. In the laboratory work the ratio of instructors to students should not be less than 1/20 and a "student assistant" is not to be regarded as of more than 1/5 of the value of a regular member of the staff.

Under the title physiology, as used here, are not included histology, physiological chemistry, clinical chemistry, clinical microscopy and pharmacology.

#### BACTERIOLOGY.

Henry Albert.

The subject of bacteriology has been included in the work of this committee, since it was and is the belief of some that this subject or a part of it should be placed in the first year of the medical curriculum. If, after having presented some statistical data, it is believed and agreed that it should not be taught in the first year of the medical course, then this report may be used in connection with the framing of syllabi in the work of the second and subsequent years of the medical course,—the consideration of which will no doubt soon be undertaken by this Association.

To secure the data on which this report is based, a copy of the following letter, accompanied by data blanks, was sent to the professor of bacteriology of every medical college in the United States.

My Dear Sir:—

At the meeting of the Association of American Medical Colleges held at Washington, D. C., May 6, 1907, a committee was appointed to report at the next meeting (to be held in Cleveland, March 17, 1908) on the question of the framing of syllabi in the subjects of the first medical year.

It is the purpose of this committee to gather information and opinions as to the best practicable arrangement of the work in each of the courses of the first medical year with the hope that we may be able to get more uniformity in the medical year with the hope that we may be able to get more uniformity in the medical curriculum and then to frame an elastic syllabus in each subject which shall assign (suggest) a certain definite proportion of time to the various divisions of the course and mention seriatim the chief headings which shall be considered.

To this end I enclose herewith blanks in duplicate (one to be retained by you) for bacteriology. May I ask you to fill these out and return one copy to me as promptly as possible in order that the material may be tabulated and put in form for our report?

I hope to have my report exhibit the composite opinion of the teachers of Bacteriology in the United States, but this cannot be attained unless the hearty cooperation of the men teaching this subject is received. The subject of Bacteriology is considered because, in the opinion of some, it should be placed in the first year of the curriculum of the medical college. At the present time it is placed in the first year by some schools, in the second by others, and by some in the third year.

The standardizing of the curriculum by the issuing of elastic syllabi is certainly a desideratum and I trust you will feel that you can give the time necessary to fill out these blanks and return them at your earliest convenience, and thus do your part in this movement.

Very sincerely yours,

HENRY ALBERT.

The following questions were asked in the data blanks which were inclosed:

1. In what year of the medical curriculum is Bacteriology now taught in your institution?
2. In what year of the medical curriculum do you believe Bacteriology should be taught?
3. In case a medical college places the minimum entrance requirement at two years of college (Liberal Arts and Science) work, do you think that the subject of Bacteriology or any part of it should be taught in the "two years" premedical course?
4. In case a medical college places the minimum entrance requirement at the completion of the course in a college of Liberal Arts and Science, do you think that the subject of Bacteriology or any part of it should be taught in the premedical course?
5. Do you think that the course of Bacteriology should be given throughout an entire college year or be limited to one semester or to one term (one-half of one semester)?
6. In the 4,000-hour schedule now in force in the Association of American Medical Colleges, 140 hours (40 hours didactic and 100 hours laboratory) are given to Bacteriology. This is 3½% of the total time. Do you think that this is the right percentage? If not, what percentage would you assign to Bacteriology (considering of course the claims of other subjects in the total time of the curriculum)?
7. What is the total scheduled number of hours (per student) you now devote to Bacteriology? (a) Didactic work. (b) Laboratory work.
8. What do you think should be the total number of hours (per student) to be devoted to Bacteriology? (a) Didactic work. (b) Laboratory work (considering of course the claims of other subjects on the time of the student).
9. Of the total time given to Bacteriology, what percentage approximately do you devote to each of the following subdivisions: (a) Lectures. (b) Recitations. (c) General laboratory technique (making of media, study of characteristics of bacteria in general, etc.). (d) Laboratory study of nonpathogenic bacteria. (e) Laboratory study of the higher forms, molds, streptothrices, etc. (f) Laboratory study of the phenomena of immunity. (h) Laboratory study of protozoa, if included.
10. What do you believe to be the ideal percentage to be devoted to (a), (b), (c), (d), (e), (f), (g), (h).
11. Is the didactic subject matter given by lecture or are the recitations based principally on lesson assignments in text-books?
12. Are students required to make drawings and keep detailed notes of all preparations of bacteria studied? If so, to what extent is such required?

In order that the data might be of the greatest possible service they were recorded under several different headings as follows: 1st, data from all medical colleges in the United States; 2d, data from the members of the American Association of Medical Colleges; 3d, data from (what are in the writer's opinion) the thirty-two leading medical colleges in the United States.

Of the 156 medical colleges in the United States (as given in Table No. 1, statistics of medical colleges of the United States, published in the Journal of the American Medical Association during the past year), data was received from eighty-six. Of the fifty-five members of the Association of American Medical Colleges reports were received from forty-two. It may be taken for granted that the colleges which are members of the Association of American Medical Colleges should be recognized as standard colleges. Whether or not the present requirements for admission to the Association are too low, or perhaps not properly enforced, is, I believe, a question upon which many may legitimately differ. Certain it is that the trend of medical education at the present time is toward greater facilities and higher requirements. I thought it most appropriate, therefore, to consider in a class by themselves the data from what the writer believes to be the thirty-two leading medical colleges in the United States. This list of the leading medical colleges was framed only after consultation with several, whose work especially qualified them to render such opinions. Reports were received from twenty-four of these colleges.

The data received from the various institutions have for convenience been tabulated. These tables, with explanatory notes, are as follows:

TABLE I

	In what year of the medical curriculum is Bacteriology now taught in your institution?							In what year of the medical curriculum do you believe Bacteriology should be taught?							
	1st	2nd	3rd	4th	1-2	2-3	Other Combinations	1st	†	2nd	3rd	4th	1-2	2-3	Other Combinations
All Medical colleges of the U. S. (156). (Data from 86) . . . . .	3	38	6	1	3	6	1-3 (4) 1-2-3 (4) 3-4 (1)	6	1	50	4	1	3	5	1-3 (3) 1-2-3 (1) 1-2-4 (3) 2-4 (1)
Members of the Assoc. of Amer. Med. Colleges (55). (Data from 42) . . . . .	1	28	1	1	1	3	1-3 (1) 1-2-3 (1) 1-2-4 (1) 3-4 (1)	4	1	25	2		2	1	1-3 (1) 1-2-3 (1) 1-2-4 (1)
*Leading medical colleges of the U.S. (32) (Data from 24) . . . . .		17	1			3	1-3 (2) 1-2-4 (1)	1		14	1			3	1-3 (1) 1-2-4 (1) 2-4 (1)
Recommended for adoption															

\*According to writer

†If premedical course of four years is given.

According to Table I, it will be noticed that in the vast majority of medical schools bacteriology is now being taught in the second year; likewise it is recommended by the vast majority that it remain in the second year. It was the expressed belief of the majority from whom data was secured that it would be a serious mistake at present to place the study of bacteriology in the first year of the medical course. A number of the schools, as will be noticed from the tables, would place general or technical bacteriology in the first or second year and the special study of pathogenic bacteria or applied bacteriology in the second or third year. There are some, such as Dr. Coplin of Jefferson, who believe that practical bacteriology should be placed in the third in order that the student may corrolate his bacteriology with his course in morbid anatomy, hematology and post-mortem work.

TABLE II

	3			4		
	In case a medical college places the minimum entrance requirement at two years of college (Liberal Arts and Science) work, do you think that the subject of Bacteriology or any part of it should be taught in the "two-years premedical course?"			In case a medical college places the minimum entrance requirement at the completion of the course in a college of L. A. and S, do you think that the subject of Bacteriology or any part of it should be taught in the pre-medical course?		
	No	Yes (unqualified)	Yes* (qualified)	No	Yes (unqualified)	Yes* (qualified)
All medical colleges of the U. S. (156). (Data from 86). . . . .	38	8	21	23	12	27
Members of the Assoc. of Am. Med. Colleges (55). (Data from 42) . . . . .	22	2	10	14	7	13
Leading medical colleges of the U. S. (32). (Data from 24) . . . . .	7	2	9	6*	3	10
Recommended for adoption						

\*Elementary or general course may with profit be given, but the special or medical aspects of the subject should be given in the strictly medical course.

Table II. It will be seen that the vast majority of the teachers of bacteriology in the United States are opposed to placing the subject as a whole in any premedical course. About half of them are in favor of placing the general, elementary or technical work of bacteriology in the premedical course if the minimum entrance requirements are placed at two to four years of work in a college of Liberal Arts and Science, more especially if the entrance requirements are placed at four years, as will be noticed by comparing the answers to question 4 with those of question 3. With but very few exceptions, however, it is the opinion that the medical aspects of the subject should be given in the strictly medical course.

Table III. Question 5 reveals the fact that there is considerable difference in opinion as to whether bacteriology should be taught during an entire school year or only during one semester or a single term (one-half semester). Being essentially a laboratory subject it is held by the vast majority that it should be taught continuously and crowded into as short a time as possible—the majority agreeing that a period of one semester or one-half of the school year being a proper length of time. The intervals between laboratory periods should be such that the student may be able to keep close watch on the development of the bacteria on the various culture media, as well as the effects of the bacteria on laboratory animals, etc. This would suggest that the session should be held at least every other day. Many believe that the best results are obtained if laboratory sessions are held daily until the course has been completed. The professor in charge of the work at the University of Minnesota suggests that it be given every day—all morning, or all afternoon, or all day five times a week for the required time. However, some of our leading bacteriologists, such as Dr. Ernst of Harvard, believe that the subject should be taught during the course of an entire year.

The vast majority of our teachers of bacteriology believe that the giving to bacteriology the percentage (3½) of the total time as now recommended in the 4,000-hour schedule now in force in the Association of the American Medical Colleges as being about right. (See 6, Table III.) A number be-

TABLE III

	5 Do you think that the course of Bacteriology should be given throughout an entire college year or be limited to the semester or to one-term (one-half of one semester)?				6 In the 4000 hr. schedule now in force in the Assoc. of Am. Med. Colleges, 140 hours (40 hrs. didactic and 100 hrs. Laboratory) are given to Bac. This is 31% of the total time. Do you think that this is the right percentage? If not, what percentage would you assign to Bac. (considering of course the claims of other subjects in the total time of the curriculum)?		
	Entire year	One semester	One term (one-half semester)	Other time	Right	More	Less
All medical colleges of the U. S. (56). (Data from 86).....	20	37	8	1½ yr.	46	12	4
Members of the Assoc. of Am. Med. Colleges (55). (Data from 42)....	9	14	3	1½ yr.	21	8	
Leading medical colleges of the U. S. (32). (Data from 24)....	3	16	2		11	6	1
Recommended for adoption							

lieve that the percentage should be raised and but few believe that it should be diminished. It is of course conceded, as expressed by many in answering this question, that it would be desirable to devote more time to the teaching of this subject, but considering the claims of other subjects on the total time of the curriculum it is believed that the percentage recommended by the association is about right.

That not only the percentage of time, but also the division into didactic and laboratory hours, as recommended by the association, is about right, in the opinion of most of our bacteriologists is indicated by the figures in Table No. IV, which represents the average number recommended by the various institutions from which data was received. There is a tendency to slightly increase the number both of didactic and laboratory hours, more especially in our better colleges,—such, too, is recommended after the consideration of the claims of other subjects on the time of the student. Thus, for instance, the average number of didactic hours recommended by thirty-two of our leading medical colleges is 53, and of laboratory hours 136. Dr. Ernst of Harvard recommends that there be about sixty hours didactic and ninety hours of laboratory work. Dr. Zeit of Northwestern believes that there should be sixty-four lectures (hours) given twice a week during two semesters, sixteen hours of recitations given once a week during one semester, and 256 hours of laboratory work given three hours daily for one semester. Thus he would recommend that the total number of hours devoted to bacteriology be 336. Dr. Hill of the University of Minnesota recommends that there be fifty hours of didactic and 180 hours of laboratory work in general bacteriology and forty hours of didactic and 100 hours laboratory work in special bacteriology—making 370 hours in all.

The professor of bacteriology in one of the southern colleges calls attention to the fact that with colored people it seems important that there should be more didactic work with black-board demonstrations and less laboratory work. The bacteriologists of several institutions, among which may be men-

TABLE IV

	7		8	
	What is the total scheduled number of hours (per student) you now devote to Bacteriology? a Didactic work,— b Laboratory.		What do you think should be the total number of hours (per student) to be devoted to Bac?—(a) Didactic work (b) Laboratory work, (considering of course the claims of other subjects on the time of the student)?	
	No. Didactic hours (aver)	No. Laboratory hours (aver)	No. Didactic hours (aver)	No. Laboratory hours (aver)
All medical colleges of the U. S. (156). (Data from 86).	44	104	46	121
Members of the Assoc. of Am. Med. Colleges (55). (Data from 42)	44	112	44	118
Leading medical colleges of the U. S. (32). (Data from 24).	46	113	53	136
Recommended for adoption				

tioned Western Reserve, believe that no lectures apart from laboratory exercises should be given.

The figures found in Table V represent an approximate proportion indicated by percentage of the entire time for bacteriology, devoted to the various subdivisions such as lectures, recitations, general laboratory technique, etc. It is obvious that it is quite difficult to present accurate figures. Thus time devoted to bacteriological technique may at the same time be devoted to the study of non-pathogenic bacteria, etc. Many of the teachers of bacteriology

TABLE V

	9								10							
	Of the total time given to Bac., what percentage approximately do you devote to each of the following subdivisions: (a) Lectures, (b) Recitations; (c) General Lab-technique (making of media, etc.); (d) Laboratory study non pathogenic bacteria; (e) Laboratory study of pathogenic bacteria; (f) Laboratory study of higher forms; (g) Laboratory study of phenomena of immunity; (h) Laboratory study of protozoa, if included.								What do you believe to be the ideal percentage to be devoted to (a), (b), (c), (d) (e), (f), (g), (h).							
	a	b	c	d	e	f	g	h	a	b	c	d	e	f	g	h
All medical colleges of the U. S. (156). (Data from 86).	22	13	16	10	33	4	3	1	19	12	15	9	36	5	4	1
Members of the Assoc. of Am. Med. Colleges (55). (Data from 42)	20	15	16	11	36	5	3	1	18	13	11	8	43	6	5	1
Leading medical colleges of the U. S. (32). (Data from 24).	22	10	12	10	38	4	4	1	20	8	16	9	39	5	4	1
Recommended for adoption																



and the majority of those in the leading schools believe that the study of protozoa should not be included in the course in bacteriology. The percentages as now given in the various colleges compares very favorably with the percentages recommended as the ideal.

TABFE VI.

	11			12			
	Is the didactic subject-matter given by lectures or are the recitations based principally on lesson assignments in text-books?			Are students required to make drawings and keep detailed notes of all preparations of bacteria studied? If so, to what extent is such required?			
	Lectures	Text-books	Both	Drawings		Notes	
Yes				No	Detailed	Not detailed	
All medical colleges of the U. S. (150). (Data from 86) . . . . .	30	15	22	41	17	47	8
Members of the Assoc. of Am. Med. Colleges (55). (Data from 42) . . . . .	11	8	12	21	7	23	3
Leading medical colleges of the U. S. 32). (Data from 24) . . . . .	9	2	5	12	5	13	1
Recommended for adoption							

The figures of Table VI are self-explanatory. It will be noticed that the majority of our teachers of bacteriology present the subject matter by lectures; many, however, base recitations on lesson assignments in text books. It will be noticed in the figures of question 12, that it is quite universally agreed that the student should keep detailed notes of all bacteria studied. The majority also believe that the student should be required to make drawings of his preparations. There are a number of leading bacteriologists who do not require drawings to be made; such, however, are especially insistent that careful and detailed records should be kept. Many of the teachers who are not requiring the making of drawings at the present time believe that such should be required.

This report on the subject of bacteriology serves to indicate:

1. That the subject of bacteriology is more properly presented in the second than in the first year of the medical course.

2. That where the proper facilities are at hand, a general course in bacteriology may be given with profit in a "premedical course" if such consists of four years' work in a standard college. The special or medical aspects of the subject should, however, in all cases be given in the medical course proper.

3. That bacteriology is best taught as a continuous study, and crowded preferably into the space of one semester. This refers to the course as a whole. It is, of course, quite evident that special phases or problems of bacteriology should be considered in connection with the work in pathology and the clinical branches.

4. That, although the majority of bacteriologists believe that the percentage (3½) of the entire time of the medical curriculum to be devoted to bacteriology as recommended by the Association of American Medical Colleges is approximately correct, they consider, however, that the number of hours for both didactic and laboratory work should be somewhat increased.

5. That the student should be required to make drawings and more especially keep detailed notes of all bacteriological preparations studied.

This report will also, we trust, do something to stimulate those of our medical colleges which have been somewhat delinquent in the raising of their standards. One of my colleagues from the South writes that "with two or three exceptions, laboratory work of southern medical schools is a farce." It is true that the value of a course in bacteriology depends more upon the ability of the teacher and the facilities for teaching than upon the number of hours and percentages of time, nevertheless much will be gained if all of our colleges would adhere a little more strictly to the "figure requirements" as suggested by this report.

*Committee on State Examining Boards:* This committee, consisting of Fred C. Zapffe, Wm. J. Means and J. R. Guthrie, reported as follows:

Your conference committee has been diligent in attending meetings of different organizations interested in raising the standard of medical education.

The chairman of the Judicial Council and the secretary attended by invitation the annual meeting of the organization known as the Confederation of State Medical Examining and Licensing Boards, held in Atlantic City during the meeting of the American Medical Association, June 5, 1907. As this organization is composed of delegates who are connected with the state medical boards, and, therefore, are directly interested in the bodies that have the power to enforce statutory provisions governing medical education, and indirectly in a position to take the initiative in new legislation, the session had more than passing interest to your representatives.

This Association has been in close touch with the organization representing the state boards for several years, and, we might add, without fear of being charged with egotism, that the Association's influence has set the standard for legislation in the majority of states. One of the principal features brought out by this meeting was the existing defects in the medical laws in a number of states that have posed as representing the high standards and the tendency of students and colleges to take advantage of them. The discussion was largely directed to criticisms, and undoubtedly impressed many of the delegates with the lines of Burns, "O that some power the giftie gie us, to see ourselves as ithers see us." Since that meeting at least one state that was represented has amended her medical law by correcting the loose methods that had prevailed in entrance examinations and matriculation to her medical colleges.

The chairman, with Dr. Zapffe, attended the meeting of the executive committee of the American Confederation of Reciprocal Examining and Licensing Medical Boards held in Chicago, December 19, 1907. This was a very successful meeting, and was attended by representative educators from various universities and by delegates from the different schools of medicine. One of the principal topics that was discussed was inspection of medical colleges and the method of evaluating them. The consensus of opinion seemed to be that a uniform minimum standard for colleges should be established. Through the efforts of this Association there now prevails a standard for minimum entrance requirements that is almost uniform among the better colleges and that has been adopted by the legislation as a standard in a number of states. But little has been done, however, by way of establishing a standard of equipments, facilities for teaching and a teaching faculty. With this sentiment prevailing among the organizations interested in medical education, it behooves the Association to get busy and take the initiative and adopt a schedule by which colleges may be measured.

The Educational Council of the American Medical Association has had no meeting since the last meeting of the Association.

The committee desires to acknowledge great indebtedness to the American Confederation of Reciprocating Examining and Licensing Medical Boards and its officers for much valuable assistance in furthering the work of the committee, for which thanks are hereby tendered. The Confederation has always been ready to advise and to promote, as much as it could, the work of this association. This coöperation has resulted in great good and has furthered medical education more than any other factor entering into the work of the committee. It is greatly desired that these pleasant relations continue. The committee is especially indebted to the secretary of the Confederation, Dr. Harison, who has done so much for the cause of medical education.

FRED C. ZAPFFE,  
Chairman.

WM. J. MEANS,  
J. R. GUTHRIE.

Action on these reports was deferred until the business session held the morning of the second day.

The association then adjourned until 2 p. m.

#### AFTERNOON SESSION.

The association reassembled at 2 p. m., and was called to order by the president.

#### Reading of Papers.

DR. W. L. BRYAN, president of the Indiana State University, read a paper entitled, "*Raising of Standards,*" which was discussed by R. Winslow and Egbert LeFevre.

DR. A. R. BAKER, Cleveland College of Physicians and Surgeons, followed with a paper entitled, "*Academic Seniors in Absentia in Professional Schools.*" The discussion on this paper was opened by Herbert Welch, president of Ohio Wesleyan University, and was continued by W. L. Bryan, Geo. H. Kress, E. P. Lyon, P. Myers, Eli H. Long and A. R. Baker.

DR. GEO. H. HOXIE, University of Kansas Medical Department, read a paper on "*The State University and the Medical School.*" The paper was discussed by W. H. Earles, Warren, C. M. Jackson, A. R. Baker, D. C. Bryant, Wilson, J. R. Guthrie and Geo. H. Hoxie.

DR. FRED C. ZAPFFE, Chicago, read a paper on "*The Equipment of the Medical College.*" This paper was discussed by W. J. Means, A. R. Baker, Geo. H. Hoxie, C. M. Jackson, B. D. Harison, A. W. Alvord, Wilson, J. A. Witherspoon, E. P. Lyon and E. H. Long.

On motion, the following committee was appointed to consider Dr. Zapffe's paper, with a view to adopting the standards of equipment laid down, and to report at the business session: Eli H. Long, C. M. Jackson and Wm. J. Means.

A vote of thanks was extended to Presidents Bryan and Welch in appreciation of their coöperation in the work of the Association.

The Association then adjourned until 8 p. m.

#### EVENING SESSION.

The Association convened at 8 p. m., and was called to order by the first vice-president, Dr. W. F. R. Phillips, who introduced Dr. H. W. Rogers, Cleveland, chairman of the evening.

Dr. Rogers addressed the Association as follows:

## ADDRESS OF WELCOME.

Mr. Chairman and Gentlemen:—I am not unmindful of the honor and I assure you it affords me great pleasure to be invited to preside at this meeting of your Association, an assemblage as it is of medical educators representing some of the important educational institutions of the United States. Allow me also to assure you that it is with an equally great pleasure that I am permitted to extend to you, in behalf of the medical profession of Cleveland, through the academy, as its presiding officer, a most cordial welcome. It is earnestly desired that the occasion of your meeting here may be reciprocally beneficial to the interests of scientific medicine. Medical education is a large problem, involving as it does so many allied sciences, not alone to mention the necessary and best means of a preliminary training. There is no science with which it does not correlate, no language in which its principles are not taught in some form or other, and I trust to assume no undeserved commendation when advancing the suggestion that our own English speaking race is, and always will be, in the advance guard.

If my memory serves me correctly, the credit is due this Association through its early influence that medical schools increased their entrance requirements and the length of time of study before graduation, and that such advanced requirements were in a measure instrumental in the enactment of laws in some of our states regulating the practice of our profession. It is very evident to those of us who have been in the service a quarter of a century and even less that material progress has been made, that a wholesome atmosphere pervades the field of medicine and the future looks bright. There are, however, some noticeable conditions existing which might give food for thought by those most intimately related to the training of the coming medical man, referring to the subject of therapeutics, theoretical and applied, in which there is such a marked deficiency of knowledge on the part of the new doctor.

The alleviation of pain and suffering, the cure of disease and the prolongation of human life have been for centuries the aim and purpose of our profession, and by whatever means we seek the end, whether by drugs or agents other than these, it all implies therapeutic training, materia medica, and pharmacology, the very essentials and preliminaries of thorough therapeutic knowledge are not alone sufficient except as a ground work for the fulfillment of the ultimate end.

Thorough drill in the principles of drug administration, keen observation and interpretation of resulting phenomena empirical in a large measure though it was, certainly marked in no small measure the success of the practical medical man of the past, the present self-evident, the future God alone knows. While a more scientific foundation is to be desired, based upon a clear knowledge of disturbed function and a well fixed conception of the physiological action of remedial agents, it can never be accomplished by our present trend of therapeutic nihilism. None can realize better than myself the grand opportunities offered the medical student of the present time; none with more regret the (in many ways) inefficient training of the past from the perspective of the present.

Scientific medicine of the future will be built on a thorough knowledge of the primary branches of anatomy, chemistry (especially physiologic), histology and physiology, materia medica and pharmacology, and I cannot refrain from again suggesting the almost forgotten branch, "therapeutics," and a preliminary training in the biological allied sciences is equally as important. The opportunities in most medical schools for acquiring thorough knowledge of these foundation stones is golden, and shame to him who does not grasp and improve the opportunity. If there is one branch of study which more than all others illumines the medical horizon of the future it is physiology.

Quoting from a recent article by Dr. Ernest H. Starling, "The whole of medical science is but a struggle for control of the processes which determine the life of man." "A knowledge of the whole field would place us in command of the means employed by Nature herself for determining the activities of most of the functions of the body, drugs and hormones," which effect their purpose and are then destroyed. What a glorious outlook to the coming medical man; what a rich harvest to him who may toil in the field of experimental medicine, and what a golden crown to him who may ever be living to witness the consummation. Perhaps it may not come, but the growth and development of the past decade marks an advancement toward the goal, the correlation of organ to organ, the relation of secretion to the functioning of distant parts, and the adaptability of one organ for the destroyed function of another, and our present knowledge of these opens a most intensely interesting and broad field to him who will work. A knowledge likewise of normal structure and normal function will materially aid in the solution of problems which are now beyond our comprehension. We are, however, in all this never for a moment to lose sight of the information to be derived from bacteriology, pathology, physical and clinical diagnosis. As particularly important aids, not infrequently the most important in fixing an opinion or in solving questions which arise in our work.

Medical politics have so insidiously crept into our society organizations, and if I dare suggest it, a slight shadow casts its presence into the management of some of our medical schools, favoritism, not always based on efficiency or ability, sometimes determines unwise appointments, but it is to be hoped and we believe the reformation is in a measure in sight, and that these abuses will cease to exist. Wholesome medical politics are a necessity, but are most certainly to be avoided, except in so far as they contribute to a sturdy and progressive growth material to the good of the whole profession. It is certainly undesirable nor has it been my aim or intention of giving you a fixed address upon a subject much better known to you than to myself, but to indicate in a very brief manner the opportunities and some of the pitfalls which seem to confront us.

Medicine takes rank among the foremost of sciences. How noble the calling of him who makes a study of her truths, how glorious the work of him who practices her art.

True, there are many loopholes which furnish easy access to those who would prey upon human credulity, but there is a very substantial growth toward a requirement of truthful knowledge. Let us then be firm and unwavering in an earnest effort to weed out the undesirable, to build up the adamant walls of our noble calling, so strong that no storms however fierce, no army however great, can shake the foundation stones of medical education. Thanking you for this opportunity, again I bid you thrice welcome to our city.

#### President's Address.

Dr. Rogers then presented the president of the Association, Dr. Henry B. Ward, who delivered the presidential address. (See page 9.)

On motion the following committee was appointed to consider the recommendations made by the president, and to report at the business session: Geo. H. Hoxie, R. D. Coale and A. R. Baker.

The Association then adjourned to meet on the following day at 9 a. m.

#### SMOKER.

After the adjournment the delegates and visitors were entertained at a smoker arranged by the local committee, F. C. Waite and A. R. Baker.

#### SECOND DAY.

The Association reassembled at 9 a. m., and was called to order by the president, Dr. Ward.

### Report of Judicial Council.

Wm. J. Means, chairman of the Judicial Council, presented the following report:

The work devolving on the Judicial Council during the last year has been interesting, in some instances perplexing, and in others unpleasant.

In connection with the secretary, the chairman has kept in touch with the medical colleges and the trend of medical education throughout the country. The inspection of the medical colleges of the United States by the Council of Education of the American Medical Association brought the colleges to a full realization of the sentiment for higher medical education and the danger of being short in their equipments, facilities for teaching and a general concurrence with the demands of the present time. No other organization could have undertaken such a universal inspection of the colleges of the country, and, while many criticisms, some of them just and some unjust, have been made as to the methods of this inspection, the result has been beneficial. It has given the state examining boards a line on medical colleges that aids them greatly in estimating the value of credentials presented by applicants for licensure.

As mentioned in the report of the conference committee, we have found that the various organizations of the country interested in higher medical education are active in pressing for advanced entrance requirements, better equipment of colleges and a higher grade of teachers in the scientific branches. In looking over the colleges in membership in the Association we have found a few that do not measure up to the standard that this organization demands. We have been exceedingly careful in our inspection not to do an injustice to the independent and weak colleges, but where there seems to be no hope of betterment, we have advised against continuing them as members of the Association. In other instances, we have advised consolidation of colleges in cities where there are two or more dependent on the income from the student body for existence.

#### APPLICATIONS FOR MEMBERSHIP.

*The University and Bellevue Hospital Medical College*, of New York City, made application for membership. The college was inspected and found to meet fully in every particular the standard required by the Association. The Council, therefore, recommends that the college be admitted to membership.

*The University of Wisconsin* made application for membership to be recognized as giving the first two years of a medical course. Only the laboratories were inspected and found fully equipped to give the scientific subjects in the curriculum of the first and second years of a medical course.

The Council, therefore, recommends that the Medical Department of the University of Wisconsin be accepted for the first two years of a medical course.

*The Maryland Medical College*, of Baltimore, made application for membership. The college was examined by Professor Waite of Cleveland at our request. His report was submitted to the Judicial Council. After a careful consideration of the report, the Council advises a postponement for one year.

The college has many points in its favor, but in our judgment lacks some facilities for teaching the scientific branches in a proper manner. We anticipate that by another year these shortcomings will be corrected.

#### TWO SUSPENSIONS.

*The Flint Medical College*, of Louisiana, as you perhaps are aware, is a school for negroes. It gained membership some years ago largely through a desire to help these schools, but the sentiment that led to this recognition has not borne good fruit. The college cannot with its equipment and income,

and its environments, comply with the entrance requirements of the Association. It may be able to complete a curriculum in a medical course that is comparable to that of many colleges of the southern states, but until the medical laws of Louisiana are more definitely for a higher standard, it is doubtful whether this college will be able to compete with other southern schools and meet the Association standard.

The Council, on evidence presented by the matriculation schedule, recommends that the Flint Medical College be suspended from membership in the Association.

The *Illinois Medical College* filed a schedule of its matriculants for 1906-07. The record indicated considerable irregularity in entrance requirements. The college refused to submit another schedule for 1907-08, and also refused to submit credentials for inspection. The Council insisted on the privilege of an examination, but the officers of the college preferred to withdraw their membership by non-payment of dues. We wish to congratulate the Association on the withdrawal of this college.

The schedule of matriculates of the Medical Department of the *Willamette University*, Oregon, showed considerable irregularity in matriculation. It was very evident that students were being admitted below the standard of the Association. Considerable correspondence was carried on with the Dean, who very frankly admitted that it was impossible, located as the Willamette school is, to comply strictly with the technical requirements of the Association.

In view of the irregularities in the schedule and the admission of the Dean, a suspension was ordered by the Council. In the meantime the college withdrew from membership by non-payment of dues.

*College of Physicians and Surgeons, Los Angeles.* The completion of the application of this college has been held up for some time. The Council has made every effort to get at the merits of the institution. The officers are insistent that the college complies strictly with the minimum requirements of the Association. There come to us, however, from unbiased sources reports that seem to reflect somewhat on the college and the professional standing of its principal officers. Until these matters can be definitely settled, the Council will ask postponement of definite action for another year.

*Bucknell and Ohio Universities.* The applications of Bucknell University and Ohio University, that were before you one year ago and postponed, have been under consideration during the year. The Council does not see its way clear to recommending admission at the present time, and recommends postponement for another year.

The *Toledo Medical College* failed to pay its membership dues last year and was suspended under the rules of the Association. Application was made for reinstatement. The chairman made a personal inspection of the college, and found that the college building was small and equipments limited, but he was satisfied they were sufficient to give proper facilities for teaching the students in attendance, the number being about twenty-five in all classes. The college building is located in the heart of the city and was built for college purposes. It contains recitation rooms, a first-class dissecting room, an amphitheater and chemical, pathologic and bacteriologic laboratories equipped with modern apparatus. The hospital facilities are ample to give a thorough course in bedside teaching to a much larger number of students than are in attendance. The teachers of the scientific branches are young men well trained and enthusiastic. The clinical teachers are men of reputation.

A favorable report was made to the secretary recommending reinstatement. Since that time there have been rumors calling in question the standing of the school. It was stated by the Dean at the time of inspection that a fixed income was received from the University of Toledo. This matter is now

in dispute, and will have to be settled by the courts. It is admitted that the income from the student body is not sufficient to meet the expenses. The Council of the American Medical Association on a recent inspection rated the college below standard and reported the same to the Ohio State Medical Board, which now has the matter under consideration.

After a careful consideration of these facts, the Council feels that it is best to defer reinstatement for one year. In the meantime the question of lack of facilities and income will no doubt be definitely settled.

*American Medical Missionary College.* A few months ago the Illinois State Board of Health inspected the medical colleges of Chicago and found several of them below standard and refused to recognize their graduates. Among these was the American Medical Missionary College, a member of this Association.

You are perhaps aware the college proper is located at Battle Creek, Michigan, but that a part of the course is given in Chicago. This fact brings the college under the direct purview of the Illinois Board. On receipt of this report it was thought best by the secretary and the chairman of the Judicial Council to inspect the college and see if there was any foundation for the degradation placed upon it by the Illinois Board.

The Chairman made a personal inspection of the college in February. He was there as a patient in the sanitarium and had ample opportunity and time to inspect the school. It was found that students were admitted only under the requirements and supervision of the Michigan State Board of Registration. The records of matriculation, credentials and subsequent scholarship were carefully kept and subject to inspection. The school is in session from September 18 until June 17, giving, exclusive of holidays, almost thirty-six weeks of actual teaching. The student body is composed of young men and women who contemplate doing missionary work in foreign countries, and are socially and intellectually of a high class.

The facilities for conducting a medical college are exceptionally good. The college building is large, commodious and well adapted to college work and separate entirely from the sanitarium. The laboratories are large, well lighted and well equipped with apparatus for conducting various lines of instruction. The pathologic museum is ample to furnish students material for study. The specimens come largely from the surgical clinic of the sanitarium, and are classified so as to make every specimen available. The physiologic, bacteriologic and histologic laboratories are well furnished with modern apparatus.

The laboratories connected with the sanitarium and located in the college building afford extraordinary opportunity for students to become familiar with all the technical details required to become expert in examination of urine, feces, stomach contents, bacteriologic studies, blood and pathologic specimens.

The anatomic laboratory is located in Chicago. The students spend six weeks there of their freshman year and six weeks of their sophomore year. This is on account of material being much more easily obtained than in Battle Creek.

It seems the clinical facilities have been criticised more than any other feature of the school. The sanitarium furnishes a large number of patients of all kinds, and, inasmuch as many of the students are nurses and attendants, they have unusual opportunities to study the different phases of disease and to familiarize themselves with the management and care of sick people. Their graduates, therefore, are not only educated physicians in all that pertains to the science of medicine, but are trained in handling and observing sick people.

An obstetric ward is maintained in an adjoining building where the students receive practical instruction.

Dr. Kellogg gives a surgical clinic once a week that is not surpassed by



any similar clinic in the country. His assistants and helpers in the operating room are junior students who have been trained to the highest art of modern asepsis. The technic of the operating room and management of the patient is as near perfect as human ingenuity can dictate. From twelve to fifteen patients are exhibited and operated in this clinic.

In Chicago a regular staff of teachers is maintained, and instruction is given in a well attended dispensary in the college building, in St. Luke's Hospital and the Cook County Hospital.

It is our judgment that the schedule published in the college announcement is carried out in its entirety. The college has an income of \$20,000 a year, independent of tuition from students. It is our judgment the college deserves recognition by the State Board of Illinois and is worthy of membership in this Association.

In closing this report we wish to call your attention to the purpose of the officers to keep the College Association above criticism in the professional and educational circles. It is our aim to keep the Association on a plane that is of such high standing that membership will be honorable and beneficial. To do this requires the coöperation of the colleges themselves. Each college should make an effort to maintain a high standard of efficiency and adhere strictly to the minimum entrance requirements for matriculation, and should carry out fully its published curriculum.

It should not be necessary for the officers to inspect any of the schools members of the Association. It is their duty, however, to examine applicants for membership with proper care. This they have done, as their report shows.

It is also their duty to defend any college a member of the Association against unwarranted criticism such as has been placed on the American Medical Missionary College. The motto of the Association should be "Onward and Upward" in its work of education. Its past history is one of honor and credit. Its future should cast no reflection on this honorable career.

WM. J. MEANS,  
*Chairman.*  
RANDOLPH WINSLOW,  
F. C. WAITE, *Pro tem.*  
GEO. H. HOXIE, *Pro tem.*

On motion of Dr. Phillips, the report was adopted.

#### American Medical Missionary College.

W. J. Means here presented the following resolution:

WHEREAS, The Illinois State Board of Health has withdrawn its recognition from the American Medical Missionary College on account of insufficient equipment and clinical facilities, and

WHEREAS, The officers of this Association have carefully and thoroughly investigated the college, and found its equipment not only sufficient in every department but excellent, its clinical facilities ample and used to the utmost, and its instructors competent, so that the college ranks among the best medical colleges of the country,

*Therefore Be It Resolved,* That this Association place itself on record with the investigating committee of the Illinois State Medical Society as endorsing the fitness of the American Medical Missionary College and deprecating the action of the Illinois State Board of Health.

Dr. Means said: I certainly coincide with the remarks of the secretary, that when one of our own members is attacked, we should, in all fairness, come to the rescue and ascertain the truth. There has been a request made with reference to the American Medical Missionary College, not by Dr. Kellogg, but by the Michigan State Board of Registration in Medicine. The

Michigan Board feels keenly that a college of the state should be attacked as the American Medical Missionary College has been attacked. It seems that the Illinois State Medical Society has appointed a committee to investigate some of the inspections that have been made,—and I suppose it includes the reports that have been made on the other Chicago medical colleges; therefore, it has been suggested that this resolution be presented.

On motion the resolution was concurred in by the Association.

#### Report of Secretary-Treasurer.

The secretary-treasurer reported as follows:

The general business of the Association has assumed a scope which bids fair to prove overwhelming. It is evident that colleges, state examining boards and others, concerned with medical education, look to this Association for assistance in their work. The information which has accumulated in this office during the past five years is of such a character as to be of the greatest importance. Hardly a day passes without bringing one or more letters of inquiry demanding more than a casual or off-handed reply. Then, too, the routine work of the secretary's office is increasing each year as greater demands are made by the preparations for the annual meeting and the continuance of the work outlined at these meetings.

Unfortunately the work has been handicapped a little by reason of the lack of funds, a condition which ought to be remedied, either by increasing the annual dues or by reducing the salary of the secretary. The annual income has been lessened considerably by the suspensions of colleges that have failed to live up to the requirements and by a few withdrawals from membership. It is not at all probable that the income will be increased very much by additions to the membership, because these cannot, in the nature of things, be very great. On assumption, it may be said that not more than fifteen colleges seem to be eligible to membership at this time, although the number may be greater. Therefore, some action should be taken to increase the revenue.

#### 1907 TRANSACTIONS.

Shortly after the close of the 1907 meeting, copies of the transactions for that meeting and of the constitution and by-laws were sent to all the delegates, to the colleges in membership, to colleges not in membership, to officials of state examining boards, college presidents, libraries, and other individuals and organizations interested in medical education. These transactions are becoming more valuable each year, and a careful perusal of the reports contained therein will elicit much valuable information. Because of lack of time at annual meetings heretofore, these reports have been read hurriedly or presented without reading, an occurrence which the two days' sessions will obviate hereafter. Numerous demands for these publications have been met during the year and they have shown that a larger number of copies of the transactions ought to be issued, but this reverts again to the item of expense.

#### QUARTERLY BULLETIN AND INSPECTION.

The quarterly bulletin was not issued during the year because of the lack of funds, and for the same reason none of the colleges in membership was inspected by the Committee on Inspection, although in 1903 an annual appropriation of four hundred dollars was made for this work. These inspections are of the very greatest importance and are productive of much good, not only to the Association but to the College inspected. The work ought to be continued and pushed vigorously and for this reason, more than for any other, an increase in the receipts ought to be provided for at once. As the matter stands now, the annual receipts are about \$1,250.00, and the expenses \$1,800.00. By omitting the inspection work and curtailing the office and printing expenses a deficit has been avoided, although it is very imminent.

## EDUCATIONAL CONFERENCES.

The meetings of state board confederations, committee meetings and conferences were attended by the secretary in his official capacity and the results will be reported by the Conference Committee. The Association is proving itself continuously more useful to the state examining boards, and is cooperating with them to the greatest possible extent. Each year the number of boards who are working under the Association's requirements is increasing, but there are still many boards which might adopt the Association standards profitably. Texas is one of the states in which these standards are now operative and it may not be out of place nor wrong for the Association to claim some credit for the recent legislative enactment in the state of Virginia creating an official four-year high school course.

## MATRICULATION RECORDS.

The matriculation record blanks have been in great demand during the year and for this reason it is essential that the colleges fill out these blanks carefully, stating the number of points of credit in each subject and giving such other definite information as is called for on the blank. Sometimes there is some question as to the method of procedure adopted by a college for passing on entrance requirements, and in one instance the blank of a college proved immensely useful in connection with recognition by a state board, although this college is not aware of this. These blanks must be in the hands of the secretary before the annual meeting, and if the colleges will bear this constitutional requirement in mind, it will make unnecessary much correspondence.

## MEMBERSHIP.

The membership has undergone some changes during the year. Four colleges—Sioux City College of Medicine, Illinois Medical College, Flint Medical College and Willamette University—were suspended for failure to comply with the laws of the Association. The University of Oregon without draw from membership when hard pressed for the matriculation record blank. The State College of Physicians and Surgeons, Indianapolis, merged with the Indiana University, and the Minneapolis College of Physicians and Surgeons (Hamline) merged with the University of Minnesota.

Applications for membership were received from the University and Bellevue Hospital Medical College, New York; University of Wisconsin, Toledo Medical College, and Maryland Medical College. These applications are in the hands of the chairman of the Judicial Council, as are also the applications of several other colleges on which action was deferred last year.

The question is often asked of the secretary why some good colleges are not in membership. Of course there is a reason for this, and often the college is unwilling to give this reason or it does not care to do so. It may be assumed, however, that these colleges have deferred taking any action with reference to applying for membership, preferring to wait and watch developments. The Association is on a firm footing; it has proved itself worthy of trust and confidence, and the members have shown their willingness to comply with the requirements. The membership is beyond reproach and it is earnestly desired that before long the membership will be increased. It may not be out of place for the members to do a little missionary work and solicit the membership of those colleges that can comply with the Association requirements. Often a personal interview or the presentation of the present status of things by one who has the confidence of the college executive will result in an application. It must be understood, however, that it is quality and not quantity that must be sought, because membership in the Association stands for something definite and it is neither wise nor possible to countenance retrogression.

The membership is representative and by keeping it so the Association will continue to receive the support and coöperation of those in authority in the various states.

The secretary wishes to take this opportunity to extend his thanks and appreciation of the valuable assistance given him by the members of the Association and also by the officials of many of the state examining and licensing bodies.

The treasurer reported as follows:

Balance on hand April 1, 1907.....	\$ 199.58
Received since .....	1,300.00
<b>Total .....</b>	<b>\$1,499.58</b>
Disbursed as per bills rendered.....	1,359.15
<b>Cash on hand April 1, 1908.....</b>	<b>\$140.43</b>

Respectfully submitted,  
FRED C. ZAPFFE.

The Association discussed the financial report and amendments were proposed to increase the dues. It was pointed out, however, that any such action, without thirty days' notice, as required by the constitution, would be illegal. The suggestion was then made that the secretary should print the transactions in effective form and add to the bill for dues a second item to include pro rata the cost of printing. This suggestion met with general approval and by unanimous consent was announced by the chair as the action of the Association.

The following *Auditing Committee* was appointed by the chair to audit the accounts of the treasurer: David Street, D. C. Bryant and Geo. W. Hubbard.

#### Committee on Syllabus.

Dr. F. C. Waite, chairman of the committee on syllabus, moved that the committee be continued, and that the chairman be empowered to increase the membership of the committee as may be necessary in order to consider all the subjects embraced in the medical curriculum.

On motion, the report was adopted and ordered printed and the recommendations of Dr. Waite were concurred in by the Association.

#### Committee on Dr. Zapffe's Paper.

The chairman of this committee, Eli H. Long, reported as follows:

Your committee, appointed to consider the paper by Dr. Zapffe, would emphasize the value of the work represented in the summary of college equipment presented. Viewing the outline given as indicating what should be the necessary minimum equipment of colleges of this Association, we recommend the adoption of the same as a tentative working basis for further development of a standard equipment.

We further recommend that a special committee of five be appointed to pursue the work to a point of greater definiteness, and to coöperate with other organizations working toward the same end.

We urge the consideration also by this committee of the matter of college buildings and their adaptability to efficient teaching, and suggest that this committee should also report what qualifications should be possessed by the various laboratory instructors.

ELI H. LONG,  
C. M. JACKSON,  
W. J. MEANS.

On motion of Dr. Hoxie the report was adopted and ordered printed for circulation so that the matter may be studied by the colleges in membership in the Association, and the chair was empowered to appoint a standing committee to be known as the Committee on equipment.

### EQUIPMENT.

The following schedule of equipment was adopted by the Association, March 16, 1903, as a tentative working basis for further development:

#### CLINICS.

Two beds per senior student (16 patients).

#### DISPENSARY.

Fifty patients per senior student.

#### OBSTETRICS.

Five cases per senior student.

#### MUSEUM.

Anatomic, pathologic and embryologic specimens; charts; models; drawings; shelves and other facilities for storing specimens, which must be properly labelled and catalogued.

Anatomic Section: Normal bones; injected specimens preserved in Kaiserling's or other fluid; dissected specimens of various parts of the body.

Pathologic Section: Bulk specimens showing disease conditions of viscera, hard and soft tissues.

Embryologic Section: Models and lantern slides, showing embryo in various stages of development.

#### LIBRARY.

One publication on general medicine and one publication devoted to the work of each department. Text-books. Library must be catalogued and available for use.

#### GENERAL EQUIPMENT.

For All Departments: Charts; drawings; models; anatomic specimens.

#### OPERATIVE SURGERY.

Cadavers; living animals.

#### ELECTROTHERAPEUTICS.

Well equipped dark-room; induction coil or static machine; high-frequency resonator; fluoroscope; electrodes; mercury turbine or other interrupter; rheostat; x-ray tubes (therapeutic and diagnostic); tube-rack and stand.

#### CLINICAL DIAGNOSIS.

Equipment for examining exudates, secretions, excretions, blood and tissues (may be taken from other departments).

#### ANATOMY.

Each student to dissect at least one lateral half of the human body; facilities for preparing and storing cadavers; unmounted, disarticulated skeletons; one mounted skeleton; dissected specimens of joints; cross sections through various parts of the body and extremities; injected specimens of venous and arterial systems; dissections of nervous system.

#### PHARMACOLOGY.

Collection of crude drugs and standard preparations of drugs. Laboratory; test tubes and rack; beakers; graduates' glass funnel and filter paper; filter

stand; mortar and pestle; spatula; glass slab and one balance per group of students.

**General Apparatus:** Induction coil; mercury and vein manometers; cannulas; blood-pressure apparatus; drum cylinder; aspirating syringe; cardiomyograph, and such other apparatus necessary to study effects of drugs on muscles and nerves.

#### HISTOLOGY.

**General:** Paraffin bath and accessories (thermometer, tubing and gas regulator), for embedding purposes; two microtomes for celloidin and paraffin sections, or an interchangeable microtome; projection lantern or opaque projection apparatus; adequate collection of slides of tissues and organs or set of charts; injection apparatus; paraffin; celloidin, alcohol and other fixing, clearing and hardening reagents and stains; teasing needles, scissors and knives; camel's hair brushes; beakers, staining dishes and apparatus necessary for preparing specimens for class-room study.

**Individual:** One microscope (two objectives and two oculars) for each two students; for study of blood and other tissue cells, one oil immersion lens (1-12), Abbe condenser and diaphragm for each two students. For each student: Slides, covers, labels, stains and staining dishes, reagents for mounting specimens; drawing material; alcohol lamp or Bunsen burner; teasing needles; camel's hair brushes; lifters; medicine droppers.

#### EMBRYOLOGY.

Same as for histology.

#### PHYSIOLOGY.

Students in groups of five. Hemacytometers; hemometers; spectrosopes; compound microscopes; reagents and apparatus as in histology; myographs, including muscle clamps, lever and supports; kymograph; chromograph and stimulating apparatus, including electric battery, keys; induction coil; electrodes; rheostat or rheocord; moist chamber with accessories for nerve work; double cylinder for heating and nerve work, and one for heating and cooking tissues. Heart lever; manometer with accessories; tonometer with accessories; apparatus for studying capillary circulation; rubber tubing; cannulas; wire; clamps.

**General:** Polariscope; galvanometer; capillary electrometer and accessories; mercury pump for gas analytical work and accessories; thermostat or incubator; analytical balance; assorted tambours; cannulas; chemical reagents and apparatus; hydrometers; thermometers; induction coils; artificial eye; perimeter; ophthalmometer; ophthalmoscope; lenses; esthesiometer; color-mixer; phorometer; ear model; Galton whistles; resonators.

#### PATHOLOGY.

Same as histology.

#### BACTERIOLOGY.

For each group of five students: One steam and one hot air sterilizer; one compound microscope; double boilers; cork-borers; filter stand; clamps; potato cutter; gelatin; agar-agar; cheese cloth; cotton; filter paper; litmus paper; autoclave and serum oven for each twenty-five students.

**Individual:** Test tubes; rack; wire basket; test tube brush; Petri dishes; flasks; platinum needle; Bunsen burner and tubing; fermentation tubes; forceps; slides; cover glasses; labels; stains; slide boxes and mounting materials.

#### CHEMISTRY.

**Organic and Inorganic:** Balances; centrifuges; fume chambers; drying ovens; polariscope; spectroscope; Kjeldahl nitrogen apparatus; apparatus for analyzing milk; microscopes; chemical materials; reagent bottles and reagents.

Individual: Beakers; blowpipe; litmus paper flasks; funnels; test tubes; pipettes, plain and graduated; mortar and pestle; filter stand; iron wire triangle; wire gauze Bunsen burner and hose; porcelain crucibles; platinum wire and foil; glass stirring rods; glass tubing; test tubes and rack and brush; filter paper; tongs; graduated buret; pipettes; water and sand baths; rubber stoppers; reagent bottles; gas generating flask; small pair druggist's scales.

Physiologic: To be taken from general chemistry and physiology.

#### Committee on President's Address.

Dr. Geo. H. Hoxie, chairman of the committee, reported as follows:

Your committee recommends:

1. That the Association continue the committees appointed to confer with the councils on medical education of the various national medical associations and the American Confederation of Reciprocating Medical Licensing and Examining Boards, and that these committees be enlarged to five members and given the largest scope in their powers of suggestion and recommendation.

2. That the officers of this Association be empowered to invite high grade medical schools, both in Canada and the United States, to unite with us in our work to advance the cause of medical education on this continent.

3. That the Association respectfully recommend to the state licensing boards that they permit medical students to take examinations in the work of the first two years of the course immediately on the completion of such work, thus splitting the examination and making practicable more thorough tests of the student's real ability.

4. That the officers of this Association be instructed to use every opportunity to promote the wider publication of the results of the deliberations of this body and also of its findings as to the condition of the individual medical schools investigated from year to year.

5. That this Association respectfully recommend to the state licensing boards the adoption of some practical tests of the ability of the candidates for the right to practice, to show a mastery of the art of medicine, as well as of its theory.

6. That a committee be appointed to investigate the methods of teaching in the American medical schools, and to report at the next annual meeting.

7. That the committee on syllabus be enlarged and empowered to make a thorough study of the entire medical curriculum and report at the next meeting.

On motion of Dr. Phillips, the report was adopted.

#### Report of Auditing Committee.

Dr. David Streett, chairman of the committee, reported that the committee had audited the accounts of the treasurer and found them correct.

The report was adopted, on motion.

#### Resolution on Higher Entrance Requirements.

Dr. W. J. Means here presented the following resolution:

WHEREAS, In the evolution of medical education during the last decade it has become apparent to those interested in the problem of higher and broader attainments for graduates in medicine, that more time should be devoted to a liberal education before beginning the study of medicine; therefore be it

*Resolved*, That the Association of American Medical Colleges, recognizing the growing need and sentiment for extended entrance requirements, earnestly advises and recommends that the present minimum standard be increased as soon as practicable; and be it further

*Resolved*, That a standing committee of five be appointed to be known

as Entrance Requirement Committee, whose duty it shall be to take this important subject in hand and report to the Association at each annual meeting; and be it further

*Resolved*, That the Association calls attention of the state boards and the educational organization to the fact that the standard of entrance requirements of the Association is now higher than that of many states and respectfully urges that such state boards meet the Association standard.

On motion, the resolution was concurred in by the Association.

#### Committee on Medical Research.

At this juncture, F. C. Waite moved that a committee of three be appointed to be known as the Committee on Medical Research, to confer with similar committee to be appointed by other scientific organizations, on the question of methods, ways and means of combatting any legislation that seeks to limit medical teaching and research.

The motion was carried, and the chair appointed on this committee Egbert LeFevre (chairman), University and Bellevue Hospital Medical College; C. W. Greene, University of Missouri; and A. S. Warthin, University of Michigan.

#### Amendment

The proposed amendment, as printed in the official call for the meeting, was then discussed, and finally was adopted, as follows:

(c) An examination in the following branches, totaling 30 points. counts.

A. *Required*, 16 points.

	Points.
<i>Mathematics</i> —(minimum, 2 years; maximum, 3 years).....	4
Algebra and Plain Geometry.	
<i>English</i> —(minimum, 2 years; maximum, 4 years).....	4
(a) English Grammar.	
(b) Rhetoric and Composition.	
<i>Latin</i> —(minimum, 2 years; maximum, 4 years).....	4
(a) Latin Grammar.	
(b) Latin Prose Composition.	
(c) Reading four books of Caesar or equivalent.	
<i>Physics</i> —(1 year).....	2
With laboratory work.	
<i>History</i> —(minimum, 1 year; maximum, 3 years).....	2
Including Civics and Political Economy.	
Total required .....	16
B. <i>Optional</i> , 14 points.	
<i>English Language and Literature</i> —(2 years).....	4
Only if taken after the required English.	
<i>Language</i> —German, French, Spanish or Greek (4 years).....	2
Not less than one year in any one.	
<i>Advanced Mathematics</i> —Solid Geometry and Trigonometry (one-half year each) .....	1
<i>Natural Science</i> —(1 year).....	2
Biology, 1 year, or Botany and Zoology, one-half year each.	
<i>Physical Science</i> —(1 year).....	2
Chemistry.	
<i>Earth Science</i> .....	1
Physical Geography and Geology, one-half year each.	



<i>Physiology and Hygiene</i> —(one-half year).....	1
<i>Astronomy</i> (one-half year).....	1
<i>Drawing</i> —(one-half year).....	1

Two points equal 5 counts, or 1 unit, or 2 credits.

In the table, 5 counts indicates one full year's work in a single subject, reciting daily.

In accordance with resolutions and motions, the chair appointed the following committees:

#### **Committee on Medical Education.**

WM. J. MEANS (chairman), Starling-Ohio Medical College; GEO. H. HOXIE, University of Kansas; W. F. R. PHILLIPS, George Washington University; WM. P. HARLOW, University of Colorado; FRED C. ZAPFFE, University of Illinois.

This committee is charged with the duty (1) of conferring with organizations having particular interest in matters concerning medical education, and (2) of considering the entrance requirements to medical colleges.

#### **Committee on Medical Examining and Licensing Boards.**

FRED C. ZAPFFE (chairman), University of Illinois; W. J. MEANS, Starling-Ohio Medical University; J. R. GUTHRIE, University of Iowa.

This committee will consider all questions pertaining to uniformity of standards, to licensing examinations, and to such other matters as concern this Association and the examining and licensing boards.

#### **Committee on Medical Curriculum.**

F. C. WAITE (chairman), Western Reserve University; EGBERT LEFEVRE, University and Bellevue Hospital Medical College; R. D. COALE, University of Maryland; C. M. JACKSON, University of Missouri; P. M. DAWSON, Johns Hopkins; H. ALBERT, University of Iowa; A. S. WARTHIN, University of Michigan.

This committee is entrusted with the formulation of the course of study in the medical college or such part as they may choose to consider from time to time. It is actively engaged in the preparation of a syllabus indicating the minimum for the work of a standard medical college.

#### **Committee on Medical Research.**

EGBERT LEFEVRE (chairman); C. W. GREENE, University of Missouri; A. S. WARTHIN, University of Michigan.

This committee is organized to stimulate investigation in medical colleges and associated institutions (hospitals, laboratories, institutes, etc.), and to combat tendencies or proposed limitations which will be inimical to the advance of medical science.

#### **Committee on Medical Teaching.**

HENRY B. WARD (chairman), University of Nebraska; E. P. LYON, St. Louis University; CHAS. R. BARDEEN, University of Wisconsin; J. A. WITHERSPOON, Vanderbilt University; H. O. WALKER, Detroit College of Medicine.

This committee is charged with consideration of the pedagogic elements in medical education, with especial reference to the training of medical teachers, methods of instruction employed, and allied topics.

#### **Committee on Equipment.**

FRED C. ZAPFFE (chairman), University of Illinois; WM. P. DUDLEY, Vanderbilt University; DAVID STREETT, Baltimore Medical College; A. R. BAKER,

Cleveland College Physicians and Surgeons; W. H. WARREN, Washington University.

This committee will formulate a minimum standard of equipment in all the departments of a medical college, including the college buildings, based on the paper read by the chairman of this committee, which was adopted as a tentative working basis at the last (1908) meeting of the Association.

#### Report of Nominating Committee.

The nominating committee reported and on motion the secretary was instructed to cast the unanimous ballot of the delegates for the election of the nominees, which the secretary did, and the following nominees were declared duly elected to office for the ensuing year:

*President*—ELI H. LONG, University of Buffalo.

*Vice-Presidents*—E. P. LYON, St. Louis University; CHAS. F. BEVAN, College of Physicians and Surgeons, Baltimore.

*Secretary-Treasurer*—FRED C. ZAPFFE, Chicago.

*Judicial Council*—RANDOLPH WINSLOW (term expires 1911); HENRY B. WARD (term expires 1911); C. M. JACKSON (term expires 1911); EGBERT LEFEVRE (term expires 1909).

The president-elect was escorted to the chair and presented to the Association by Dr. Ward, who then delivered the gavel to Dr. Long. Dr. Long responded with a few well chosen words.

#### Next Place of Meeting.

On motion, New York City was chosen as the place for holding the next annual meeting, March 15-16, 1909.

On motion of Dr. Phillips, a vote of thanks was extended to the Cleveland Medical Library Association for the courtesies extended to the Association, and to the local committee, Drs. F. C. Waite and A. R. Baker, for the excellent arrangements for the meeting and reception of the delegates and visitors.

The Association then adjourned.