ASSOCIATION OF AMERICAN MEDICAL COLLEGES

PROCEEDINGS OF THE TWENTY-SEVENTH ANNUAL MEETING, HELD AT CHICAGO, FEBRUARY 6, 1917

TABLE OF CONTENTS

LIMITED REGISTRATION IN THE MEDICAL SCHOOL

RICHARD OLDING BEARD, M.D.
University of Minnesota

The domestic experiences of a school may be intruded on such a body as this only when they have a direct bearing on the educational problems we all share. And because some of the problems of registration which the University of Minnesota is seeking to solve are and will be, I believe, in increasing measure, the problems of all medical schools, I desire to present them to you while they are still new. I venture to hope that as we make these problems apparent to you and forewarn you, perhaps, that they are likely to be your problems in the near future, you may not only prepare to meet them, but may help us to their wise solution.

The number of matriculants seeking to enter the colleges has not been a question of particular concern in the past. In a general way, as the medical schools have been too many, so have the students of medicine. Our preliminary requirements, like our other standards, have been lifted from time to time with a view to the better preparedness of men and women for medical training. These advances, whether premedical or otherwise, have always had a temporary effect on the number of students entering a given college; but the matriculation, numerically at least, has reacted quickly to the new demands.

With the progression from a two to a three, from a three to a four, and from a four to a five years' course of study; with the lengthening of the college year; with the addition to the high school requirement of one and two years of academic work; with the demand for a B.S., or a B.A. degree, we of Minnesota have noted, again and again, a regression of numbers, followed by a rapid rebound to full classes.

True, as the schools have diminished in number, their total matriculation has diminished also; but in the colleges which remain it has held at par or has risen to a high tide. As the schools become fewer still, and inevitably they will, the numbers in the schools which survive will continue to swell. The time has come when the number of students seeking medical education is a perplexity; and it is so for new and momentous reasons.

Medical education in the clinical years has become an intensive thing. It is intensive, not so much from the standpoint of

the teacher's task, as from the point of view of the individual student's need. The laboratory method has rapidly extended to the clinical years and the hospital has become the main clinical laboratory. In it the student of today must do as intensified individual work as he does in the laboratories of anatomy, physiology and pathology. No longer can he get adequate training from the books, the rostrum, or the general observation clinic. He must get it at the bedside or in the ambulatory service on the patient himself, and the patient must be available for his needs in adequate numbers. The student must be individually drilled in the taking of case histories and the making of clinical records, in the details of diagnosis, in the subsequent review of his physical findings, in the study of the results of operative or therapeutic treatment. He must take the clinical material the patient affords, work up individually his laboratory investigations, and finally, on occasion, develop reports of autopsy. "The old order changeth, giving place to the new." The schedule which formerly was filled with lecture hours, today shows 50 per cent. of the time in the junior year and 75 per cent. of it in the senior year devoted to practical, and for the most part, individual clinical studies.

It has become a question of the ability of the schools to keep up with the demands of modern medical training in the face of a numerical increase of registration. This ability is fitly measured only by the fulness and availability of the clinical facilities of the school. An adequate staff and teaching equipment in the fundamental laboratory branches is primarily essential, but it no longer suffices. The ultimate test of the fitness of the school must be applied at the clinical end. Clinical sufficiency is the crux of the capacity to teach medicine.

Minnesota is fortunate in that it owns and controls a hospital of 192 beds on the university campus. For that direct ownership and control no effective substitute is to be found. No hospital in which medical education is not a primary function, in which the teaching institution is entertained as a mere guest—no hospital situated at a distance from the school itself, can fitly and fully measure up to the present demands in the training of the medical student.

Realizing this and realizing, too, the inadequacy of its present clinical facilities, in terms of hospital beds, the Medical School of the University of Minnesota recommended to the Board of Regents, a year ago, that the registration of its incoming classes be limited to eighty students. The board approved the recommendation and directed that this limited registration should be put on a competitive basis. It left it to the medical school to decide what the basis of competition should be.

BASIS OF LIMITATION

The problem was a new one. Certain fixed educational requirements were predetermined. The student must present two years of high school Latin and two years of approved collegiate work, contributing sixty credits to his B.S. degree; or preferably, three years of collegiate study, contributing ninety credits to the B.A. degree. These total credits must include twelve credits in chemistry, six credits in animal biology, six credits in rhetoric, eight credits in physics, and a reading knowledge of scientific German. No student can be admitted with more than six deficient academic credits, which must be made up during the first year in medicine.

Since 120 honor points, covering the first four years of work, two in arts and two in medicine, are required for the B.S. degree, the premedical student should earn not less than sixty honor points in his academic courses. In a word, while the required credits test the quantity, the honor points test the quality of his attainments. These honor points in Minnesota are estimated as follows:

One honor point per each credit hour for a Grade of C; two honor points per credit hour for a Grade of B; and three honor points for a Grade of A.

It goes without saying that honor points in arts are more easily earned than honor points in medicine. The student, therefore, whose academic record shows a deficiency of honor points when he comes to the medical school is entering on a road that leads to grief.

These three established criteria, then, were made the initial bases of comparison between the applicants for admission: (*a*) the required premedical subjects; (*b*) the required academic credits; (*c*) the requisite number of honor points. These are important criteria. They stand for three things:

1. The nature of the preparation; 2. the quantity of the preparation; 3. the quality of the preparation.

The most effective of these tests is the last, namely, the attained number of honor points. It has been too much disregarded in the past. A very definite reliance has been placed on this factor in the conduct of Minnesota's limited registration of this year.

These three predetermined measurements of fitness, which are always matters of record in the office of the registrar, were supported by a counter-check on the quality of the applicant's scholarship by way of an inquiry into the number of conditions or failures he had received during his two, three, or four year academic course—a test which is also readily applied through the official records.

To these comparative data have been added the following further requirements:

1. An application in writing, citing the name, age, parentage and residence of the applicant; the date and place of his high school graduation; the dates of his collegiate courses; the name of the arts colleges in which they have been taken; the number of total credits earned and their distribution as to the required subjects.

2. A file of six references; two of these giving the names of citizens at the applicant's place of residence; two being the names of former high school teachers; and two the names of present or past college instructors. To each of these references a letter was addressed and the general tenor of the replies was recorded. Special reliance was placed on the judgment of teachers in the natural sciences.

3. A thorough physical examination, recorded on a provided blank, copy of which is attached; this examination being made by an assigned member of the staff of the Department of Medicine, in which a force of twelve clinicians was employed for this duty.

4. A written examination on a series of topics of general information, specimen sheets of which are available to anyone who may be interested.

5. A psychologic test of the mental ability of the applicant, conducted by the Department of Educational Psychology in the College of Education. This test called (*a*), for the exercise of the student's powers of association and (*b*), for the application of his powers of analysis. Copies of the test papers are attached and may be examined by any who may wish to study their character and scope. Carefully recorded time is an element, of course, in the conduct of these tests. The examinations, corrected by the chief of the Department of Educational Psychology, Prof. M. E. Haggerty, to whom the school is especially indebted, have been standardized and platted to standard.

APPLICATION OF METHOD OF LIMITATION

One hundred and sixteen applications for admission were received for this limited registration of eighty matriculants. Of the total number, the record reads as follows:

Died subsequent to filing application	1
Rejected on account of serious physical disabilities	1
Rejected on the score of deficient scholarship and of physical disabilities	1
Voluntary withdrawal on account of deficient scholarship record	6
Rejected on the ground of deficient scholarship and unsatisfactory tests	17

Students of acceptable scholarship record who were unable to take the required tests on account of distance, of call to the Mexican border, or of financial stress	5
Total number of accepted students	86
On account of physical or financial disabilities students withdrew from registration after acceptance to the number of	7
Students, after acceptance, were ordered to the Mexican border to the number of	5
Number of students accepted and finally entered in the school	74

The students accepted for registration have scholarship records which determine the quantity of their preparation as follows:

Holder of Degree of Master of Arts	1
Holders of Degree of Bachelor of Arts	16
Holder of Degree of Bachelor of Literature	1
Holders of Degree of Bachelor of Science	3
Students credited with three years' academic work	7
Students credited with two years' academic work	58
As bearing on the quality of their preparation, the record shows students carrying the full number of honor points	64
Students showing more or less deficiency in honor points	22
Students having total required credits	77
Students with deficient credits, from one to six in number, in required subjects, but having full total credits	17
Students with deficient total credits and deficient credits in required subjects	9
Students not fully prepared for tests in reading knowledge of German	25
Students lacking one year of high school Latin	7

Of the sixty-four applicants having full credits and full honor points, seventeen had a record of conditions or failures in their academic work, which they had removed—a fact which goes to show how often a student of potential, but perhaps undeveloped capacity, may retrieve his scholarship faults.

Of twenty-two students who showed deficient credits and honor points, nineteen had suffered academic conditions or failures only partially removed, a history which tallies with and sustains their total record.

Attached is a chart which schedules ninety-three students who completed all the required tests. The remaining applicants include some who voluntarily undertook further academic preparation; others who were prevented, by distant residence or by war service, from completing the tests; and a few who were rejected on the prima facie evidence of their low collegiate standing.

In this chart the students are entered by number. They are graded on the accepted collegiate system of A, B, C, D, E and F. Their academic standing is given on total credits, total honor points and length of academic training, with particular bearing on their attainment of a baccalaureate degree. These academic

ratings are set side by side with their grades in the psychologic tests for association and analysis, and the test of general information.

This comparative table goes to show: 1. That the test on general information is of very limited value in its application to would-be medical matriculants at the present time. Of the ninety-three applicants scheduled, only forty-six received a passing grade in this test. Of the twenty-two students, on the other hand, whose scholarship record was clearly deficient, sixteen failed of a passing grade in this examination.

In fifty-two instances the ratings in the general information test corresponded with the students' academic record; in seven cases the comparison is indeterminate; in one applicant of generally low scholarship an excellent examination was presented; but in thirty-three instances a very baffling fact, students of thoroughly good scholarship record and some of them measuring up well in their psychologic tests, entered papers on these general topics of very inferior grade.

The poverty of knowledge on subjects of general or current information which prevails among college students is deplorable. It appears to have its cause rather in a want of interest in public affairs, both domestic and foreign, than in a lack of mental capacity.

These examination papers, in common with the many which medical educators are called on to read, are a sharp commentary on the failure of the schools to teach successfully either penmanship or spelling. Grades were given on chirography and composition, but they showed a lamentably low average.

RESULTS OF THE PSYCHOLOGIC TESTS

2. The psychologic tests employed in this registration have given very interesting results. Prof. Haggerty informs me that they show a good average of normals and a fair proportion of supernormals in the group. In fifty-two cases they definitely sustain the scholarship record both in powers of association and of analysis. In twenty-seven additional cases they sustain it in one or the other, although *not* in both, of the psychologic tests; the curious fact obtaining that in two-thirds of these twenty-seven cases the test depreciates the scholarship record, and in one third of them it raises it. In fourteen instances, both of these psychologic tests are contradictory to the academic standing. It is interesting, further, to note that in associative and analytic powers forty-five students showed practically equal grades, whether high or low; while twenty-three were superior in association and twenty-five were superior in analysis. Of the ninety-three students tested, sixty-four were above the mean level in

the association test, and forty-five were above the mean level in the analysis test.

On the basis of this experience of one year, it would be rash to say whether the discrepancies observed are a reflection on the integrity of the psychologic tests or on the scholarship record. The subsequent history of these students will tend to decide that question. One semester gives hardly time enough to determine it.

Emphasis should be put on the value of the physical examination required. The reports on these examinations showed seventeen cases of physical disability of one sort or another. Desiring to make this requirement a serviceable one to the individual student, as well as to the school, the administrative board ordered that each of these physically sub-normals be placed under the direction of a medical advisor, selected with reference to the character of the disability in each case, to whom the student regularly reports.

On the strength of the experience of the Medical School of the University of Minnesota, in this limited registration, no more can be said than that the school is feeling out the best methods of selecting candidates for the study of medicine. Compelled as it has been to this selection, by the present limitations on its mass of clinical material, available on the campus, for the effective training of medical students, yet I do not doubt that though our clinical development proceed, as proceed it will, we shall have established the merits of this limited registration on competitive principles and will continue it in the future. The really important thing is that the principle of the selection of candidates for medical training has been accepted and applied.

EFFECT OF LIMITATION ON PRACTITIONERS

The time has come when medical educators in the major schools of the country should pause in the increase of the mass of medical practitioners, in favor of an uplift in the quality of the student body. Physicians in the country at large are still too many. In these automobile days the single practitioner can cover a wider territory and serve a larger clientele than of old, a fact which further tends to the diminution of numbers. Moreover, the tendency of today is toward the group practice of medicine; a tendency which is going to gather head. It is destined to prove an effective remedy for the disintegrating influences of specialism; a counter-check to the fractionizing of the medical service now unfitly rendered to the people. It is the answer to the social demand for some efficient mechanism by which once more the varying needs of the patient may be compositely met; as in the past they have been met in the person of the family doctor, whose inevitable passing is a regrettable incident in the operation of the law of change.

Medical schools are likely to feel the growing need to limit their registration. The University of Pennsylvania has just announced a limitation of its registration in the second as well as the first year of medicine. It is to be congratulated on this step, by whatever influences or conditions it has been inspired. It should be made the occasion, not only of diminishing numbers, but of improving the quality of applicants. The limit should be imposed by means of well-worked-out principles of intelligent selection.

It is altogether probable that the exercise of these selective methods at the entrance doors to medical education will do more than anything else to reveal the points both of strength and of weakness in the present preparation of students for medical training. Undoubtedly the schools are suffering from pedagogic and curricular errors both in the secondary schools and the academic courses. Neither the medical course, nor the premedical academic years can be shortened, but it is quite possible that effective influence may be brought to bear on high schools to secure the earlier and better preparation of their students for college entrance.

The average age at which medical students enter the University of Minnesota Medical School is 22. The efficient and related operation of grade schools, high schools and academic colleges should bring them there by the age of 20. The vocational tendency should be earlier discerned. The scientific bent should be sooner fostered. The period of scholastic infancy should be shortened.

As the period of professional training necessarily lengthens, the period of preparation surely should be anticipated at an earlier age. "The life so short," the science, like "the art, so long to learn."

Every medical educator of large experience must have been impressed with the fact that the average student entering on medicine has not well acquired the powers of digestion, absorption, and assimilation of the food principles of his mental dietary. His capacities for dissociative and constructive thinking are alike undeveloped.

Only as we take the opportunity to separate the relatively fit from the unfit shall we succeed in determining the essential elements of fitness for medical training. Limited registration on a well devised competitive basis is a means to this end.

The practice of medicine is today a phase of social service. The state, through the medium of its educational institutions, should strictly supervise the conditions of preparation for that service. It ought not to be true in the vocation of medicine that every would-be candidate has a right to training. Still less should it be true that educational standards are set to the capacity of the average individual, to the mean level of ability. The profession is

primarily an agency of public safety and personal welfare and it should be true that in the preparation for the practice of medicine only the student who is above the average should survive. Society should not be endangered in the slow process of the elimination of the unfit, who too often receive the sanction of the schools and the license of the state.

DISCUSSION

DR. VICTOR C. VAUGHAN, Ann Arbor: This question has perplexed us. We tried to limit the number of our students, but, being a state institution, we met with some difficulty. Our controlling body says that if we limit the number of students preference must be given to the Michigan students, and we are not willing to do that because we want to get the best men no matter where they come from. I was very much interested in Dr. Beard's report. It was an admirable start in the right direction. His method of arriving at the fitness of a student to study medicine seems to be very good. I am very much interested in his psychologic tests. Of course, as he says, we have not gone far enough to warrant drawing any conclusions, but I would like to have every student who enters a medical school submitted to psychologic tests and the findings filed away, not to be looked at again until he graduates or leaves the school. Within a few years we could accumulate some evidence that would be of value. I proposed this plan some years ago to our psychologist, but he was not ready to make such tests. Experiments would be interesting, no matter what the result might be. It is absolutely necessary to limit the number of our students. We can take about one hundred freshman, which would leave about sixty for the junior year. I regard it as highly important to take no more students than we can provide for, and we can take care of one hundred in each of the first two years. Some time ago I went over the failures in our school, beginning with 1900 and ending with 1912. During the first four or five years of that period less than 60 per cent. of those who entered graduated. Then I was interested to learn what became of those who fell out. That is a very important question. Did they go elsewhere and graduate, or did they drop out of medicine? By consulting our general catalogue, which gives the name, address and occupation of every man who ever entered the university, I was much gratified to find that nearly all those who fell out in the first and second years discontinued the study of medicine; they did not go elsewhere. Evidently they were discouraged and went into some other line of work. Since 1900 there has been a constant increase in the percentage of those who finished their courses. Fifty-eight per cent. of those who entered in the first four years graduated ultimately from our school or some other equally good school. From 1908 to 1912 the percentage of those who graduated increased; I think it was about 73 per cent. Whether that is due to the fact that we are getting better students to start with, or whether it is due to the fact that we have smaller classes and can give them better instruction I do not know. This question must be gone into very carefully before we could draw any conclusions on that point.

DR. JOHN M. DODSON, Chicago: I agree with Dr. Vaughan that this is an important matter. Every honest medical school that realizes its limitations as to its equipment to teach medicine in a modern way must

limit the size of its classes. The school with which I am connected has limited its classes for some years. As to the question of selection, I am immensely interested in the experiment of Minnesota. I am not convinced that the plan will prove feasible for general adoption, but it will be interesting to watch the outcome. There are three methods of limitation. One is to take every student as he presents himself until the list is full. The second is to adopt some such plan as in Minnesota of selecting those who, on some basis or other, seem most fit. The third, which has been advocated by some of the very intelligent members of our faculty, is to admit from 30 to 50 per cent. more students than we intend to keep and arbitrarily throw out the excess at the end of the year. I am not satisfied with that plan, although I am told that it is followed at the Massachusetts Institute of Technology. It is not difficult to limit admission of premedical students by the second method if they are from the same institution and one has access to their records, although even in that case I am not sure that it secures the best results. If, however, the entering class comes from a great variety of institutions, with different standards of marking and keeping of records, it is quite out of the question. So far as I see it now, I think the better plan is to admit a *few* students in excess of the number desired with the expectation that diminution will be considerable at the end of the first quarter or semester. We have at Rush Medical College a Committee on Promotions which represents all departments of fundamental instruction. This committee goes over each quarter the list of all students with low grades, not only those with conditions or failures, but those who are poor in their work. This committee naturally is familiar with the work of every student, and knows his limitations. The poor students are either warned, severely warned or requested to withdraw, and finally are refused further registration in the medical course. In that way we eliminate, I imagine, about an average proportion, such as are eliminated at Michigan or other schools with reasonably high standards. But it is getting to be a difficult problem to know what to do with the mediocre student. A student with mediocre marks comes up for consideration, and he is thrown out. He cannot secure admission to any other good school. Once in a while, by making a vigorous plea for him, we can get some other school, usually distant from Chicago, to give him another chance. I imagine that in three or four years from now, if we look over the list of rejected students, very few of them will have continued in medicine; not because they did not want to, but because they could not.

DR. THEODORE C. JANEWAY, Baltimore: With limited classes one cannot carry on men who fail to come up to the standard. These men must either be advised to withdraw from the school or, if they are way below the line, they must be thrown out. There is also a group of students, especially those who come from the various two-year medical schools, who seek admission to the third year. It is desirable to make room for them. Certain students, however, are not hopeless, but on the borderline, and while unsatisfactory in the school, might make creditable practitioners of a different type in another environment. However, men who are advised to leave a school are practically forbidden further medical education anywhere except in a Class C school. The widespread adoption of limitation of numbers must provide some method by which this problem can be met without doing an injustice to men who are

really competent to study medicine, but may need to do four years of work in five or five years of work in six.

DR. J. M. H. ROWLAND, Baltimore: One of the most important things to be considered is the case of the fairly good student who, for some reason has not done well at some particular school. It is unfortunate that such a man has to leave the school with the statement from the dean that he may not return. I think that this man's status might be defined in such a way that some other respectable school might take him, give him a trial, and keep him if he is a good student. It might be sufficient if the dean of the school from which this student comes should, on request, give the dean of the school to which the student goes a record of his grades and let it go at that, without saying anything as to whether he should or should not be admitted to any other school. This year I had a letter from the dean of one of the most prominent schools in the United States. Speaking of a certain student who had been thrown out, the dean said, "Our faculty will not allow him to return to our school, but I think we are doing him an injustice." When the circumstances in the case were laid before me, I agreed with the dean. They had no right to force that student into a Class C school. The dean could not help himself because he was bound to carry out the behests of his faculty. But isn't it unfortunate to be compelled to say that it is felt that an injustice is being done to a student? And what shall the school do to which such a student applies for admission? We should be careful what we say concerning the man who is advised to change his environment. I think many men ought to change their environment, but that we should not kill all the chances of these students by making it impossible for them to go to some other good school and show what they can do.

MR. W. O. THOMPSON, Columbus, Ohio: How can we send a student away for any cause and then say that we feel we are doing him a great injustice? That is beyond my comprehension.

DR. JOHN M. DODSON: The dean who would do that is disloyal to his faculty. The faculty alone has the right to decide. The dean can give the full facts why the student was refused to go further, and he can say that, in his opinion, that student might do well in another environment, and that he be given a fair trial, but to say that the student is done a serious injustice is an insult to the faculty.

DR. J. M. H. ROWLAND: I cited that case to show what a hidebound rule will do. I do not feel that a school should absolutely refuse to take a man simply because he has been requested to change his environment. His case should be disposed of in a most careful way.

MR. W. O. THOMPSON: I have suspended a great many students. I have recommended them to go elsewhere because I thought their environment was not suitable to them. There is an agreement among Ohio schools, where students are in such a plight, to state the facts and say that we have no objection to their being registered elsewhere. We have received students in such form. We recognize that there are always circumstances which must be considered in passing on the fitness of these students to take up their work elsewhere. Many of these students, as has been said, will do well elsewhere and also vice versa. I should not send any student away without assuming the responsibility for having

him go. I would want to assume that responsibility so that there would be no misunderstanding of his case. I want you to know the facts underlying our action so that you will respect us. What we want to retain among institutions is our mutual self-respect and confidence, and the knowledge that we are dealing fairly with you. Very many men have made mistakes and recovered from them. Therefore we should not attempt to deal out everlasting punishment. The student is entitled to a statement of facts. Anybody who comes from the Ohio State University receives a copy of his record, and I file an official copy of that record with the institution to which he applies for admission. I send it directly to the dean, not through the student. In that way everybody knows what the facts are. The school may reject this man without any offense to us; that is their prerogative. It is not a question of expression of opinion, but one of statement of facts. When we accept a student we do so on the basis of certified facts, and our rejections are also based on certified facts.

Dr. Samuel W. Lambert, New York City: At Columbia we have not yet had to make rules for limitation of numbers. We are gradually raising the requirements in the content of two years of college work so that we have not had applications from eligible students in excess of the number we could take care of. However, the question is an important one, and I am very much interested in the Minnesota experiment as presented by Dr. Beard. I feel that all schools must sooner or later face the problem of fitting the size of their classes to their facilities. This applies not alone to the hospital facilities as measured by the number of beds available for teaching but also to the laboratories and the number of chemical desks and bacteriological tables. In New York the size of the classes is controlled by this factor of the size of the laboratories and not by the number of hospital beds.

Dr. John M. Dodson, Chicago: I would like to know the experience of other schools in regard to an observation we have made. It has not been uncommon to see a student with relatively poor grades in premedical work make good grades in his medical work. When he reaches the subjects in which he is keenly interested he becomes a new man; the reverse is also true. I have in mind students with an exceptionally good premedical record who fell down completely in the medical work. A good premedical record is not an absolute guarantee for the future. A certain limited number of students who have done mediocre work are worth while, but they ought not to continue where they are. Their environment, certain associations which they have formed, their social life or what not, has interfered with their study. They need a radical change. Michigan has taken two or three of our students of this type, and we have taken some of theirs; so has Minnesota and Wisconsin. Some of them were men with poor records in the school first attended but they made excellent records after transferring to another school. I think that with this increase in rigidity of standards we ought to be very careful not to do an injustice to those men who are just on the line. Of course the absolutely lame duck ought to be thrown out. We have no trouble with the good men, but some very good men who are just on the line are in danger of being lost to the profession if we are unreasonable in the administration of our standards.

DR. N. P. COLWELL, Chicago: It has been only a few years since most medical schools were anxious to get students. Now, it seems that some colleges are almost as anxious to keep them away. The present trend toward limiting enrolments, therefore, is encouraging and is a positive evidence that commercialism has largely disappeared from medical education in this country.

The limitation of enrolments in medical schools, however, should not move too rapidly. Students are now being advised to enter good schools and every well-qualified student should be able to find room in a medical school the diploma of which is generally recognized as an acceptable qualification for the license—one whose diploma will permit the holder to go wherever he will to practice. The fact that our best medical schools are becoming overcrowded points to the necessity of providing good facilities and ample endowments for a larger number of institutions. Medical students should not be forced into the lower grade schools.

The Council is watching with much interest this tendency to limit enrolments of students, since it has an important bearing on the efforts being made to further develop medical education. It shows that reforms, even though much needed, should not be forced too rapidly. There is no immediate danger that students' opportunities to enter good schools will be seriously restricted, however, since at the present time fifty medical schools could easily take care of all the students enrolled in the ninety-three now existing, and this without the expenditure of another dollar for teachers or equipment, aside from additional income obtained from the larger number of students enrolled. There is a possible danger, however, if the limitation of their enrolments by the well-endowed, high grade schools should proceed too rapidly.

DR. W. H. MACCRAKEN, Detroit: Our experience in Detroit has been somewhat different. We have had students come to us from other schools where they had been unsuccessful, for some reason or other. They have usually brought splendid letters from the deans of these schools. Sometimes they were good schools, and sometimes only indifferent schools. The letters usually stated that the students had not done well in their environment, but that it was possible that they would do better elsewhere. So far as my experience goes, 90 per cent. of these students have utterly failed to justify the beautiful eulogiums passed on them by the deans of the schools kicking them out. We need not waste our energy deploring the sad lot of the dismissed student.

DR. E. P. LYON, Minneapolis: You will all appreciate the immense amount of work Dr. Beard has done. I congratulate him on his paper.

We at Minnesota are fortunate in one or two things. Our board of regents, in passing the rule for the limitation of students, told us that Minnesota men should have preference, other things being equal. We have had no trouble, however, and no complaints have been made, although we were a little afraid because our school is a state institution. We did not wish our school to lose its cosmopolitan character by having its students restricted to Minnesota residents.

With regard to the man who goes to another institution, I am, as most of you know, a strong individualist in education. At St. Louis we had the experience of having migrants chiefly from poor schools, and by means of individual training were usually able to bring them up and make them a credit to the institution. I have no doubt that I could pick out fifty men of that type who are now a credit to the medical profession,

but who would have been ruined by the poor schools in which they began their work and for whom the ordinary rigid curriculum of the better schools would have afforded no means of retrieving their early error. Notwithstanding, I am obliged to state that more recent experience since higher entrance requirements came in has been disappointing. Most of the students received from other institutions where they failed or had poor grades show us that we made a mistake in taking them. It was not environment but heredity that led to their failure. Deans do wrong in stating to another school that environment was the fault in a given case, unless they have definite reasons for believing that it was responsible.

If you drop the lowest 10 per cent. of a class then the next 10 per cent. are the lame ducks. Where is the line? Is there one? There is not. Unless you study the individual and his work you will never even approach justice. Rules are very valuable, but any institution that depends exclusively on rules is mechanical and makes mistakes. A board of promotions, a students' work committee, such as we have, or a general council are things that every school should have. They are especially important in the first two years. It does not matter whether the board is composed of professors or assistants in the laboratories, but its members must be intimately acquainted with the students. I should object strenuously to any effort to run our school on the mechanical basis. Rules are valuable; they may apply in 90 per cent. of cases; the remaining 10 per cent. demand individual exception in the interest of justice and of educational efficiency.

Dr. Richard Olding Beard: The method of admitting the "first come, first serve" up to the limit of the fixed registration of a medical school, or the method of registering all applicants to an excess limit, from which the weak surplus shall be subsequently eliminated, results in a low average of student quality, which puts a millstone about the neck of an entire class from the start.

A notable result of selective registration will be the improvement of premedical training, a result of which we stand today in notable need. It is the point of our apparently greatest weakness. The academic record of the student is not always, at the present time, a safe index to his power. Many a student whose academic training has left him with undeveloped but potential capacity, actualizes his ability after much hard experience in the medical school. He is of the type that is often assisted by migration.

Unfortunately, by the too prevalent good-natured weakness of medical school administrators, this is not the only type of doubtful student who is wished away from one school to another.

I would insist, however, that the question of selective medical registration suggested to you today, is not merely one of individual college capacity in matter of numbers. It is not merely a question of the assumption of a doubtful obligation to educate or to try to educate every student who wants or thinks he wants to be medically trained. It is not a question of the fortunes or the fate of the individual student. It is the vital question of improving the quality of the men and women who enter the profession of medicine. It is the ultimate question of the protection of the public which demands and properly demands that the graduate of the medical school shall bear away with him not only a diploma which certifies to what he has eptly or ineptly done, but which serves as a substantial guarantee of the school from which he comes to the public to which he goes as a guardian of their welfare that in his hands the people will be safe.

MEDICAL RESEARCH IN ITS RELATION TO MEDICAL SCHOOLS

REPORT OF THE COMMITTEE ON MEDICAL RESEARCH

One of the striking features of the phenomenal development which medicine has undergone in recent years is the diminishing emphasis that is laid on medicine as an art and the increasing emphasis that is laid on it as a science. This has come about through a great growth of the spirit of research and a great increase in its achievements. This change is found in all countries, but is especially marked in America, where the development of research had previously been slow. The greater bulk of such research has been, and is still being, carried on in medical schools, although the gradual increase in the number of independent research foundations has resulted in augmenting greatly the mass of original contributions to medicine. This investigative feature of modern medicine naturally raises the general question of medical research in its relation to medical schools. Such a broad inquiry resolves itself into a number of component questions, such as: Shall the schools devote their energies solely to teaching? If not, how and to what extent shall they encourage research? Shall all, or only certain, schools undertake research? If undertaken, by whom shall it be carried on? Shall there be within the schools professorships or other positions devoted to research alone and distinct from teaching positions, and departments of research distinct from teaching departments? What is to be the relation of medical schools to research foundations? It is the purpose of the present report to present this topic in its various relations and afford grounds for its fuller discussion.

CONCEPTION OF RESEARCH

It will be well early in our report to analyze somewhat the conception of research. There are two ways of looking at the phenomena of nature—and here we include all those natural phenomena which constitute medicine in its broad sense—and correspondingly those who engage in the study of natural phenomena may be divided, more or less sharply, into two classes. Those of the one class are content to dwell on present knowledge and to follow the beaten path. For them present knowledge is sufficient in itself. Their whole satisfaction is derived from its acquisition, from the appreciation of the order and the relationships of things as they now appear, and perhaps also from the utilization of present knowledge in the service of mankind. Those

of the other class, while appreciating and utilizing present knowledge, regard it, not as a finality, but as a means to an end, the end being the acquisition of new knowledge. These two mental attitudes toward natural phenomena and their followers may be called respectively the static and the dynamic. The static man of science is the contemplator of the known; the dynamic man of science is the investigator. With the investigator existing knowledge never wholly satisfies. He is ever longing for something beyond the limits of the known. Even the static man of science may go as far as this. He may have aspiration, and aspiration means something beyond the dead level of existence, even if it never achieves. They are numerous who desire to investigate but never make or utilize the opportunity to do so. No one can long conduct a laboratory without meeting with the dreamer, the man who has visions of achievement. The value of his aspiration and his dreams appears when he is set to work at a laboratory table and is made to submit his visions to rigid tests exactly controlled. With the investigator aspiration does not end in dreaming. Imagination he must have—this is one thing that lifts him above the level of his plodding fellows. With imagination there should be the ability to form hypotheses; and then the willingness and the perseverance to submit his hypotheses to actual trial. Thus he is led to institute a systematic search for new things, to undertake a specific inquiry into something that is unknown, and if he is successful, to make known to others the results of his work. The published paper is the tangible evidence of the research. The spirit of research means all of these things, and when it is fully developed in the individual it endows him with a large breadth of outlook and an unquenchable desire to extend the boundaries of knowledge. The spirit of research is a mental attitude, but it is not one that comes to its possessor as only a spontaneous gift of nature. It may, indeed, come thus and it may be transmitted from father to son; but, on the other hand, it may result from training. Whether a man's future outlook is to be narrow or broad is decided, probably with most persons, during the formative period of his scientific conceptions. Whether he shall become a static or a dynamic man of science depends largely on the way in which in his student days he has been taught to look at science. Thus the responsibility resting on his instructors is great. The teaching of even the elements of a science may be either from the static or the dynamic point of view, and the beginnings of the future investigator may thus be laid in the class room. All of these considerations apply equally to whatever branch of science one may elect to follow, to the follower of medical science as to any other.

In the past, science, like all other departments of human learning, has been fostered mainly by the universities, and this is

probably true of medical science as well. Although numberless important discoveries in medicine have been made outside academic circles, it remains doubtless true that the great bulk of medical progress has been made under the influence of the universities. In the United States the medical schools have been slow to appreciate the advantages of university connections; but this is now changing rapidly and the independent school is rapidly ceasing to be. Thus here, as elsewhere, the home of the medical schools will, in the future, be within the universities.

But the question may here be raised whether the schools will continue to be the chief seats of medical advance. The establishment of special research foundations, under the various names of institutes, commissions, laboratories, and other titles, constitutes a notable feature of recent medicine. They have increased greatly in number, especially in America, and have become a powerful agency in medical progress. Their success forces on us the question whether they will not gradually usurp the research functions of the schools and themselves make the chief contributions to future medicine. It is, therefore, desirable to look into the nature and the relations of such organizations.

FOUNDATIONS FOR MEDICAL RESEARCH

There exist in the United States at the persent time, apart from fellowships and scholarships, approximately twenty-six special foundations which are intended primarily for medical research.

A noticeable feature of this list is that a greater number of special foundations for research have been established inside than outside the universities, the proportion in the two groups being about two to one. The most of such institutions have been founded by single individuals and are supported by the wealth of their founders. With few striking exceptions their funds are comparatively limited, and they are not apt to be increased by donations from other than original sources. It seems probable, therefore, that in the future, although here and there very wealthy philanthropists may still establish independent foundations, their considerable multiplication is not great. There are many advantages in university ties for research foundations. Both through an encouraging appreciation and through illustrious examples the university tradition is favorable to research; investigators in science allied to medicine are at hand for consultation and stimulus; large libraries are directly available; but especially important are the facilities for coming into touch with young men whose careers are not yet determined, and consequently the possibility of influencing them in the direction of a scientific career. Medical investigators isolated from university relationships are likely to fail in the important service of discovering and develop-

ing investigators—they must depend on medical schools for the recruiting of their own ranks. There is thus every reason to believe that the medical schools will continue to be not only the chief communicators of medical learning, but the chief promotors of medical advance.

FOUNDATIONS FOR MEDICAL RESEARCH

Location	Name	University Affiliation
New York	William T. Bull Memorial Fund	Columbia
	George Crocker Special Research Fund	Columbia
	Harriman Research Laboratory (Roosevelt Hospital)	None
	Huntington Fund for Cancer Research	Cornell
	Loomis Laboratory	Cornell
	International Health Board of the Rockefeller Foundation	None
	Rockefeller Institute for Medical Research	None
	Russell Sage Institute of Pathology	None
Philadelphia	Henry Phipps Institute for the Study, Prevention and Treatment of Tuberculosis	Pennsylvania
	John Herr Musser Department of Research Medicine	Pennsylvania
	William Pepper Laboratory of Clinical Medicine	Pennsylvania
	Wistar Institute of Anatomy and Biology	None
Chicago	James A. Patten Fund for Medical Research	Northwestern
	Memorial Institute for Infectious Diseases	None
	Otho S. A. Sprague Memorial Institute	Chicago
	Nelson Morris Memorial Institute for Medical Research	None
Boston	Cancer Commission	Harvard
	Nutrition Laboratory of the Carnegie Institution	None
Baltimore	Phipps Fund for the Study of Tuberculosis	Johns Hopkins
	Phipps Psychiatric Clinic	Johns Hopkins
San Francisco	Coffin Research Fund	Leland Stanford
	George William Hooper Foundation for Medical Research	California
New Haven	Francis E. Loomis Fund	Yale
Buffalo	New York State Institute for Malignant Disease	None
Cleveland	H. K. Cushing Laboratory of Experimental Medicine	Western Reserve
Rochester	Mayo Foundation	Minnesota

RESEARCH A DUTY OF THE MEDICAL SCHOOL

But even if they are not so fortunate as to possess special foundations for reseach the medical schools have a much greater duty to perform for the medical profession and the world at large than the routine teaching of medicine as it is. This has been their

traditionary feature; to it everything else has been subordinate. There may be those still existing who believe that a school should be only a teaching institution and that its teaching functions would be imperilled if its teachers should allow themselves to be led away by the desire to investigate. To this it can be replied that never yet has a purely teaching institution in an actively changing science been able long to maintain itself as an exponent of the science of the day. It cannot keep pace with progress and must inevitably be left behind. Moreover, with medical tradition being broken every day and the demand for opportunities for research becoming constantly more insistent, it is daily becoming more difficult for the schools to remain mere teaching institutions. It is not to decry their teaching function if we point out that research has become for them a duty. Indeed, if only we perceive that the inevitable result of greater knowledge of disease will be greater power to control its ravages, we are obviously under a moral obligation to secure more knowledge which is quite as imperative as our obligation to relieve suffering by methods already known to be efficacious. The results of advance in science and the effects of medical and surgical practice are the same—the lessening of disease and suffering and the prolongation of life. The chief difference between the two is that whereas practice by established methods, in the main concerns individuals, the results of investigation are likely to have effects which can be applied by physicians all over the world to innumerable patients through unlimited time. Just in so far as possible, therefore, medical schools have the duty of acquiring new knowledge quite as much as they have the task of teaching knowledge already acquired. Not all medical schools have recognized this obligation for double service, but already those schools that have recognized it and are contributing to medical progress, stand confessedly out from and above those that do not. This is apparently destined to be so more and more; and, unless the purely teaching schools extend their activtities, an undesirable class distinction is sure to arise and the schools that do not encourage, and even go farther and insist on, research will become known as lower grade schools and sooner or later their existence will be imperilled.

We thus come logically to the conclusions that the medical schools of the future must perform both teaching and investigating functions, and that this applies to all schools. It is idle to deny that research, like teaching, is dependent not only on men, but on money, and that, given the men, that school which is the better equipped financially will be able to perform the more research. But quantity is here a matter of little moment. The mere fact that it cannot do as much need not deter the small school from doing what it is able to do. The great discovery often comes from the humble laboratory.

Within the better medical schools at present there may be found various classes of persons engaged in investigation. Almost invariably some of them are members of the regular academic staff, of whom the most are engaged also partly in teaching but a few have purely research positions, giving their whole time to research. Then there may be postgraduate students, some of whom are working for the higher academic degrees, master of arts and doctor of philosophy; there may be those who are primarily practitioners of medicine, but who give a portion of their time to investigative work; and in smaller number there are often found undergraduate medical students, who are impelled by one motive or another to undertake the investigation of minor problems that are of immediate interest to them. The existence of such varied groups and the necessity of providing for all of them raises the question as to the means by which within the schools research may best be encouraged and promoted.

We do not need to dwell here on the matter of research by postgraduate students or by those who are primarily practitioners of medicine and not university officers. More and more are the departments of our medical schools being sought by students who are preparing for purely scientific careers, and we must be prepared to carry such on to the higher academic degrees.

Much honor is due those practitioners here and there who do not allow their ambitions to be quenched by the demands of routine practice, and in the history of medicine their contributions often stand out as shining marks of progress. Edward Jenner was a country practitioner when he studied the relation of cowpox to smallpox and made his first vaccination. Ephraim McDowell was a practitioner when he performed his first ovariotomy. Even the busy army medical officer occasionally finds time to make notable contributions to medicine, as in the case of William Beaumont, when he made his immortal observations on gastric digestion, and of Read, Carroll, and Lazear, who laid bare the methods of transmission of yellow fever and opened the way for its elimination. Medical literature is constantly receiving valuable accessions from practitioners who are at the same time investigators. With the increasing complexity in technical methods and the increasing demands for apparatus of precision, much of it expensive, those practitioners who are seriously ambitious to investigate will seek the laboratories and the hospitals more and more, and, if they are capable men, the laboratories and hospitals should always be open to them.

In the gradual elevation of the standard of medical schools it has come about that research is expected more and more of members of the regular academic staff. This can only be commended. The ability and the disposition to investigate should, indeed, be regarded as an important *sine qua non* of appointment

to an academic position, and not only of appointment but of subsequent maintenance of the position. It should be clearly understood that no holder of such a position is performing his full duty to his school unless he investigates. This is being generally recognized by the best schools in the so-called medical sciences, but it is as true of the clinical, as of the preclinical studies. That in this respect there still remains a distinction between the two groups of studies is due to the fact that the evolution of clinicians and of clinical departments from their traditional position as exclusively teaching branches of the schools has been slower than that of the preclinical branches. Such a distinction is wholly artificial and is destined to pass away as we get farther removed from our early notions regarding the place which the schools should occupy in medical science. The establishment of full-time chairs, already achieved in the preclinical and greatly to be desired in the clinical branches, will help to break down this distinction and, moreover, will help to free the schools from every suggestion of commercialism. The great obstacles will be, as they have been in the past, two types of individuals, of whom our schools possess far too many, who give only a part of their time to the school work, who are not investigators, and who possess little appreciation of and taste for investigation. One of these is the clinician who has acquired a practice that is materially too successful and allows it to command him, while at the same time he endeavors to hold a responsible position of leadership as the head of a department in the school. Although not an investigator himself he may indeed perceive the signs of the times and endeavor to satisfy a sensitive conscience through investigation by his assistants, forgetful of the ethical principle that no man can ever do his full duty vicariously. Rarely, however, is his vision so clear as this, and in his position of departmental leadership he may exert a baneful influence in two directions: first, on his departmental staff by virtually discouraging research; and secondly, on his students by introducing into their receptive minds wholly wrong ideals of the work of the practitioner. The other obstacle is the subordinate instructor who is struggling to acquire a practice and who holds his school position for its salary, or in the belief that a connection with the school will be of future material benefit to him, or because he is thus enabled to continue his training in his special branch, and who does not realize that the performance of worthy research offers the strongest recommendation for his future advancement. We are too prone to put the intimate, elementary instruction of medical students into such hands. Investigation by the staff, from the heads of departments down, should be prominent throughout the whole school and should set the standard for the school's activities. Investigation tinges the teaching itself. Welch

has aptly said: "The power of imparting knowledge, gained secondhand, fluently and even skillfully, is not an uncommon gift and is possessed by many who have never engaged in research and have no especial inclination or aptitude for it; but the teaching of him who has questioned Nature and received her answers has often, and I think commonly, in spite it may be of defects of delivery, a rarer and more inspiring quality."

SEPARATE CHAIRS AND DEPARTMENTS FOR RESEARCH

The question may here be raised whether and in how far it is advisable for medical schools to establish separate chairs and separate departments for research only. That there is a tendency among universities to establish research chairs in both medical and other schools is evident, and there are notable instances where independent departments of research have been instituted with successful results. Such independent chairs or departments may be unlimited in the scope of the researches or may, either by the terms of the gifts of funds which have enabled them to come into being or by the tastes of their occupants, devote their energies to certain specific topics. In so far as they supplement and work in cooperation with other research activities of the school they are to be commended and their multiplication is to be welcomed. But in so far as they assume the sole research functions of the school and afford an excuse for other chairs or departments to refrain from such activities they can offer only an imperfect, inadequate, and, it may be, even harmful substitute for better conditions. The conditions can only be ideal when the whole school is permeated by the spirit of research, when this spirit characterizes all departments, whether preclinical or clinical.

Investigation by undergraduates has been encouraged in the past more in Germany than in other countries, and the inaugural dissertations that are required of all prospective graduates of the German universities represent an appreciable contribution to the sum of human knowledge. In medical history there are striking instances where subsequent leaders have begun their life work as students. Thus, Ehrlich was a student at Breslau when he first studied the dyestuffs and this laid the foundations for his later work on tissue affinities and chemotherapy. In how far is it desirable to encourage the spirit and the performance of research by undergraduates, and if so, by what means may it best be accomplished?

Students on entering the medical school are usually regarded as so much raw material which, under the tuition of school and hospital, is to be worked over and fashioned into doctors of medicine, who are then sent out into the world to pursue their careers, the most of them as practitioners, a few as investigators, teachers or administrators, while still fewer will combine two or

more of these activities. They come to the school with very different mental equipments, inclinations, and capacities. Some are already filled with the spirit of modern science, enthusiastic to learn of its achievements, and eager to follow its allurements. Others know little of it and have never heard its inspiring call. The school has a great opportunity, an opportunity to mold the student mind and determine its attitude toward medicine throughout all later life.

SHALL THE PRACTITIONER FOLLOW THE STATIC OR THE DYNAMIC PATH?

The static mind in medical practice is satisfied to utilize what is already tried and accepted. It becomes habituated to a routine. If the patient possesses certain symptoms he has a certain specific disease; if he has a specific disease he is to be treated in a specific manner. If, therefore, the physician can once get his patient properly labelled, the routine is started. The static mind in medical practice is like the botanist or zoologist who searches for species; he is like the academician in painting, who follows established rules. An exceptional symptom is an anomaly, a thing to be neglected, because it does not fit into the pre-established scheme. Resemblances, not differences, interest him. The static mind in surgery often becomes the brilliant operator whose technic is the envy of his colleagues and is measured by the number of minutes in which he is able to perform a given operation. The static mind is not averse to learning new methods and new points of view, provided they have once been pointed out by others; but, once acquired, the new becomes again the conventional and a new routine replaces the old.

To the dynamic mind in medical practice, on the other hand, a disease is not primarily and solely a pathologic entity, but an indication of a deranged complex physiologic mechanism, and it requires the most careful observation and analysis. Each new case of a disease is not simply the replica of all previous cases, but each presents a problem for investigation, a new topic for research. A different symptom is a thing of interest which is to be referred back to its physiologic basis and may alter the course of treatment fundamentally. The dynamic mind is never closed; it is constantly looking for new points of view and new methods of diagnosis, of prevention, and of treatment; it is the progressive mind, the mind that recognizes medicine, not as an art, but as a science, one that is actively in the making and demands contributions from all of its followers.

Of these two lines of thought and practice unquestionably that of the investigator means more for medical progress and more for the benefit of mankind. It is that which every practitioner ought to follow and it is that which every practitioner can follow

in greater or less degree. Whether or not he shall follow it, depends probably in most cases on the influence which he has received from his medical school. Is it a school which is permeated with the spirit of research? Are the facts and principles presented to the student as finalities, or as steps on the way toward something better, something toward the gaining of which he himself may contribute? Furthermore, is he encouraged, or even allowed, to undertake investigation during his undergraduate days?

UNDERGRADUATE RESEARCH WORK

Here we find that the practice of our American schools varies greatly. As the result of a questionnaire conducted by Dr. Cecil K. Drinker five years ago it was found that of twenty-five selected schools of different grades, but including the foremost schools in the United States and Canada, seventeen allowed undergraduates to undertake research in conjunction with their regular medical work, but of these only nine aided it by a concession of hours in the regular roster. It is doubtful whether any other of the 120 medical schools then existing aided their undergraduates in this manner, and hence the percentage of American schools thus favoring research in 1912 would probably not have been over seven and one-half. It may be that the number has slightly increased within five years, since there is doubtless a growing tendency among the better schools to introduce elective work, a part of which may be devoted to research. Thus, though the encouragement of undergraduate research is small, it probably represents a distinct change if the schools of today be compared with those of twenty-five years ago.

That there should be undergraduate opportunity to investigate is hardly open to question. Deliberately to close the laboratories and hospitals to those students who desire to go beyond existing knowledge cannot be considered. At the opposite extreme and equally inadvisable may be placed the forcing of research on all. But that research should be constantly kept before the student as his ideal hardly admits of discussion. This can be done only when the spirit of research permeates all medical teaching, from the student's entrance to his graduation. There is perhaps no science in which less can be taken for granted than in the science of medicine. No topic here can be regarded as a closed chapter. In the teaching of such a rapidly growing science there is no place for *ex cathedra* statements, or for appealing to supreme authority, whether of doctrine, or person, or fact, for doctrine and person and facts are so frequently dethroned. Such teaching can exert only a pernicious, deadening influence on the pupil's mind; it imposes on his mental processes shackles which can be broken later only with difficulty. The attempt to turn out a finished product, a young doctor crammed to the utmost with

existing knowledge and a familiarity with existing methods of diagnosis and treatment, is fatuous. In a few more years the finished product will be behind the times and much of his knowledge will be useless. The student should be taught to have, not indeed a captious, but a wholesome, hesitation to accept authority blindly. He should be led to seek the conditions of discovery. He should be equipped with the means of progressing after his student days are over. There is no single way to accomplish this more surely than by encouraging him to undertake before he leaves the school some piece of original investigation.

The objection will here be raised that with the enormous mass of material now to be learned and the already excessively crowded curriculum there is no time for the student to do anything outside of his routine studies. Here a glance at the origin of the present curriculum may be of value. When the addition of a fourth year to the former three years' course was contemplated it was believed by leaders in medical education that the student would be given opportunities for research. But the demands, partly for laboratory work in the preclinical subjects, and chiefly for more routine clinical work, were too great to be resisted, and the added time was parcelled out among the departments of the school and devoted to more routine work. From time to time still further routine work has been added, also chiefly clinical, until we have the present four thousand hours of prescribed work, with many schools going beyond this amount, and all schools overburdening their pupils. Although this condition rests on the plausible contention that the enormous volume of present-day medicine requires the present crowded curriculum, it is, nevertheless, contrary to rational ideas regarding educational methods. The present four years' curriculum requires a stuffing of the student's mind, with all too little time for mental digestion. It should be critically and impartially reexamined with a view to the judicious omission of unnecessary matter. The undergraduate ought not to be expected to acquire pronounced technical skill. We must give up too the idea that we can train the specialist during his undergraduate life. We do not even attempt this with him who is to be an anatomist, a physiologist, a pathologist, a bacteriologist, or a pharmacologist; we should not attempt it for the future ophthalmologist, otologist, laryngologist, neurologist, obstetrician, or even the operative surgeon. All such must acquire their special training during their postgraduate years. It will soon be recognized that only the fundamentals should be taught the undergraduate, and the curriculum must be made to include only the fundamentals. A fifth year appears now to be a practical certainty soon to be realized by all schools. Here a warning should be raised. Unless those who favor undergraduate research assert themselves there is a danger that this

new year will meet the same fate as its predecessor. Every attempt to devote it to routine hospital duties or to parcel it out into additional routine instruction of any kind should be resisted. There is every reason to believe that with the curriculum organized in a rational manner, time can be found for many of the undergraduates to test their powers as investigators.

In the gradual evolution of medical schools from humble beginnings we have not yet come fully to realize how great is the part that they may play. They should be the supreme leaders in medical science. They should know its history and be wise in conserving the best and most worthy of its traditions. They should be the chief exponents of the medicine of the day and the teachers of its future disciples. They should be foremost in making the medicine of the morrow and in training its future discoverers. They can do all of these things if they will. It is for them to decide whether they shall rise to the full dignity of leadership.

(Signed) FREDERIC S. LEE.
W. B. CANNON.
R. M. PEARCE.

DISCUSSION

DR. C. R. BARDEEN, Madison, Wis.: Dr. Lee kindly sent me a copy of the report of the committee on medical research that I might have opportunity to read it over with view to its discussion at this meeting. It seems to me an admirable report which covers the ground so well that it leaves one with little to add. I wish merely to emphasize the importance of considering research one of the fundamental duties of our medical schools.

During the past twenty years much has been done to standardize our medical schools. This association has established standards of equipment, record keeping, entrance requirements, curriculum and teaching which schools must attain to be eligible for membership. The Council on Medical Education of the American Medical Association, the Carnegie Foundation and various state boards of medical examiners acting independently and through their associations have all contributed toward the standardization of our medical schools. On the whole, this movement has been beneficial, although sometimes the standards set up as requirements by the state boards have not been wisely considered. Thus it is unwise to specify the number of hours that shall be devoted to each subject in a four-year curriculum.

But it is not enough for a medical school to come up in a perfunctory manner to a set of standards of equipment and curriculum imposed from outside. We have a right to ask of each school what it is adding to medical teaching and medical research. If we take a row of digits the value added by the zeros to the number expressed by the digits depends on their relation to the numbers 1 to 9; 1,000,000 has a different value from 0000001. Medical schools which are merely coming up in a perfunctory manner to standards imposed from outside are like the zeros in the row of digits—their value depends on the standards which they follow,

and too often these are of a relatively low order. We should expect our medical schools to have a positive value of their own.

The best estimate of the positive value of a medical school is to be based on the attention and support it gives to scientific research, on the spirit which it shows toward adding to knowledge. I believe that every member of the medical school faculty should have something of this spirit, although, of course, there will necessarily be differences in capacity or opportunity for making important contributions. I believe that every student should be given opportunity to learn how medical knowledge is advanced, how its advance is recorded in the literature and how to preserve a wisely critical attitude toward facts and theories accepted at the present time. In the crowded medical curriculum we cannot expect to get every student to do a creditable piece of research. If the curriculum were less crowded we should find that many of the students who may be trained to be reasonably good practitioners could not develop much scientific originality. But every student can be brought into some associations with scientific activity, can be taught how to make use of scientific journals and to make an intensive study in some small field of scientific medicine. Students with the requisite talents should be given some opportunity for independent research.

At the University of Wisconsin students who are candidates for the bachelor's degree are required to write a graduation thesis. The medical students who are candidates for this degree at the end of the first two years of medicine take special work in one of the departments of the medical school. Those students who show talent are encouraged to do research in some field, and the results of this research are embodied in a thesis which sometimes is worth publishing. Students who show less scientific originality take a thesis course in which an intensive study is made in some special field; the student is required to look up and summarize the literature in this field and to embody his work in a thesis. I feel that this work, although forming but a limited part of the medical curriculum (5 to 10 per cent.) and seldom leading directly to scientific discoveries of value, is one of the most important parts of the training which our students receive. It is of value not only in stimulating the cultivation of talent in the relatively few who have scientific originality, but also in developing that scientific spirit which all should have who practice medicine.

THE TEACHING HOSPITAL

REPORT OF THE COMMITTEE ON EQUIPMENT

Hospital construction is a problem which your committee has studied with particular pleasure, since the hospital buildings themselves, as medical school equipment, have received far too little of the attention of our teaching faculties. The university medical school hospital, that is, the teaching hospital, which is a department of a university and which bears the same relation to the medical school organization as does the anatomic or chemical laboratory, is in America a rather recent institution. Most medical schools, even the most prominent, have depended for clinical facilities on the friendship of boards of trustees of hospitals independent of the university organization; and, however friendly their relations may be, the result is not the same as it would be did the medical school organization have the same administrative and financial control of the hospital which it has over its other departments. The professor of chemistry may plan the new chemical laboratory and within certain limits will get about what he wants; in the case of but few hospitals, however, has the clinical teacher had any voice in the plans or equipment of the ward buildings.

TYPES OF TEACHING HOSPITALS

In general, we may classify hospitals used for teaching purposes as follows:

1. Hospitals under the direct control of the university of which the medical school is a department, built by the university trustees "from the ground up," and maintained from the same budget and governed by similar faculty committees as are the science hall or the university library. These are the teaching hospitals *par excellence;* in them the heads of clinics are supreme. Of these there are very few in America, and these are small, yet it is this type of hospital which has aided the medical departments of the German universities to gain much of their prestige.

2. Hospitals to all intents and purposes university hospitals, yet built and endowed as independent institutions and designated either by the donor himself or later by the trustees of the hospital to be used by the medical school faculties for teaching purposes. Such are many of our most famous teaching hospitals. This arrangement, however, from our point of view of today, is not equal to the first, since these hospitals were for the most part planned, even built, before they were turned over to the heads of the several clinics.

3. City hospitals or state hospitals, which must of necessity constitute a part of the organization of which the city or state medical school is a part, but in whose administration the heads of departments have little voice.

4. Various city, church or private hospitals, which for different reasons invite, or suffer, the medical faculty to teach in their wards, but which are apt to emphasize in many unnecessary ways their independence of and superiority to university control and influence.

Most of our medical schools must for years to come depend for clinical material on some such arrangements other than the first. Excellent teaching can be and is done under these conditions, and yet our hope for each medical school is that it may in the near future plan, build and run its own hospital or hospitals, support them out of its own budget and maintain them for the sole purpose of medical instruction and medical research, with exactly the same faculty organization which governs the department of anatomy, physiology or chemistry. If their means are not sufficient for this, we would recommend that while they continue to accept such favors gratefully, yet they also obtain by lease the complete control of at least a few beds and care for these patients on the plan of a university hospital, teach from these beds intensively, and in the other hospitals give the students a broad, general survey of many patients.

ADVANTAGES OF UNIVERSITY HOSPITAL

Among the advantages of a university hospital are the following:

First, the hospital staff may, if it wishes, concentrate its attention on a limited number of patients at a large per capita expense, leaving, if necessary, for economy's sake, may other beds empty, while independent hospitals are very apt to spread their budget over as many patients as possible. It requires money, and considerable money, to study, teach and treat a case in just the way we wish our students to see it done, and fortunately a few such patients will keep an active staff quite busy. Second, in the independent institution the staff appointments are apt to be for limited periods, while for the best of ward teaching one man with his staff should be responsible for his wards during the entire year and for many continuous years. Third, the university hospital can appoint and hold young full-time assistants for from one to ten years, while most other hospitals are manned by interns appointed for but one year; and lastly, in the university hospital the professor of each department can, in case a new ward building is to be planned, express his own individuality even in its walls as well as in its equipment.

AIM OF CLINICAL TEACHING

As major premise of our discussion today, we assume, first, that each medical school desires to demonstrate to the student the very best of clinical work done under the very best conditions it can control, and thus give him an ideal toward which he may strive. Second, that whether or not a fifth year in the hospital is required by any particular medical school, the education of the interns of its hospital is as much the responsibility of the medical faculty as is that of the fourth year students; and third—and this is most important since often forgotten—that the higher education and training of young clinical teachers is an important function of the medical school organization. If one grants this premise he must believe that each medical school needs a hospital in which physician, teacher and student are not guests of any independent hospital organization.

The hospital ward is the laboratory of the medical, surgical and obstetric departments, and, for those schools which can afford such extensive plants, for the other specialties as well. It is the logical yet unfortunate result of the evolution of American hospitals that the wards and laboratories are housed in quite separate buildings, and that a distinction has been made between practical, clinical and laboratory research work. The ward itself is the clinician's laboratory, not some room in a building across the street. The ward is the clinician's particular and peculiar field. And yet when the internist or surgeon undertakes a piece of research work he is quite apt to undertake a special problem in physiology, physiologic pathology or chemistry. True, these are the foundation sciences of medicine and surgery, and work in these fields must be done if he is to solve the problems suggested at the bedside. But, unfortunately, it is not always the bedside study which suggests the research problem of the clinician and laboratory work in the medical sciences is not always merely helpful in his real bedside research. If the clinician is as big as his office he should find in the wards his great problems. This separation of ward and laboratory is an heritage of that transition period in American medical history when the medical sciences were taught in a scientific manner by scientists, and the clinical subjects by practical and successful clinicians, many of whom, nevertheless, were quite innocent of any real scientific training. As a result, many a young clinician undertaking a research problem has chosen that field for research in which he received his best scientific training.

CLINICAL RESEARCH

Better trained clinical teachers are inevitable; the students will see to that. They look up to the professors of medicine and surgery as the greatest of the faculty, since other subjects lead up

to these departments, and are disappointed if they find them ignorant of the branches required of themselves. One way, however, to correct this lack of clinical research is by better planned buildings with combined ward and laboratories, and it is this reform which your committee would urge. We must teach the student not the science of medicine, but medicine in a scientific manner. The spirit of research should prevail in the care of each individual case, for the care of each patient presents a research problem. And there is no better way to teach this than for the student to see his teachers, avoiding routine, studying the peculiar problems presented by each case.

DEVELOPMENT OF UNIVERSITY HOSPITALS

The history of the development of university hospitals in America dates back to 1873, when Johns Hopkins instructed the gentlemen whom he had appointed a board of trustees to erect a hospital which, to use his words, should in construction and arrangement compare favorably with any other institution of like character in this country or in Europe. He further instructed them that in all their arrangements they bear constantly in mind that it was his wish and purpose that the institution ultimately form a part of the medical school of that university for which he made ample provision by his will.

Pursuant to these instructions this board of trustees in 1875 wrote to five distinguished physicians, chosen from different parts of the country, who had made hospitals their special study, inviting them to suggest plans for this hospital "which was to furnish a most desirable aid to medical education in the university." The five men chosen as advisers were John S. Billings, brevet lieutenant colonel and assistant surgeon, U. S. Army; Norton Folsom, M.D.; Joseph Jones, M.D., Professor of Chemistry and Clinical Medicine, University of Louisiana, New Orleans; Casper Morris, M.D., and Stephen Smith, M.D.

Since this was the first large hospital in America planned with particular reference to its function as a teaching hospital, and since those who advised in its plan were the hospital experts of that day and were paid to study well all hospitals of America and Europe before preparing their report; since also they were from different parts of this country, we may believe that their combined studies expressed the best ideas of that day, and we may therefore study with particular interest their suggestions and the final plans of this hospital and the influence which these plans have had on the construction of other hospitals in America.

The five plans proposed were so similar in important features that we will show but two, that of Dr. Billings and that of Dr. Folsom. The five reports were then referred to Dr. Billings with

the request that he combine their good points into one set of plan which finally were adopted by the Board of Trustees.

IDEAL TEACHING HOSPITAL OF 1875

Study of these schemes will show what in 1875 was unquestionably held both in America and Europe to be the ideal teaching hospital. First, a group of small buildings, the administration always at one end, arranged as batteries along two parallel corridors, each one story high above a high ground floor reserved for ventilation purposes only, and each building for twenty-six patients. One building did have two floors for patients as a compromise between differing opinions. Elevators were then not efficient, the systems of ventilation were imperfect and heating plants were an experiment; therefore it was held unwise that a building should consist of more than one or at most two ward floors. In the second place, fireproof construction had not then been developed, so for the safety of the patients they should be near the ground. Third, those were the days before pathogenic bacteria had been discovered, and hospitals were swept with epidemics of diseases which we now hold in check. For the sake of the patients, therefore, it was felt that they should be separated into small groups of about twenty-six, each over acres of ground, not over eighty patients to the acre—the idea in England at that time—and that to pass from one building to the next should necessitate a few steps at least in the open air, for the miasma of disease, it was supposed, could travel down a closed corridor, and a few steps in the open air could blow it away from the clothes of the physician or nurse. Fourth, the ward units were nearly all uniform in size and plan regardless of service, disease, age or sex. Evidently it was proposed that the chiefs of the service draw lots for the buildings. And, last, out of deference to American public opinion, there was no hint of laboratories in the ward buildings, and so to examine sputum or to test urine required for the interns of Ward B a walk of six city blocks for the round trip. But we must remember how little advanced laboratory diagnosis was in 1875.

To summarize these points, the accepted ideas were:

1. Small buildings of one or perhaps two floors, connected by long corridors, which scattered the patients eighty to the acre.

2. Small floor units of twenty-six patients, administration of each terminal.

3. Uniform plan and construction irrespective of service, sex or age of the patients. (An exception was made of the diseases known to be contagious.)

4. No provision for laboratory work in the ward buildings.

Now are recommended larger buildings of many floors each, even skyscrapers, and but one building for each entire clinic, including its public wards, private rooms, interns' quarters, laboratories and on the roof even the dog house, rather than several small buildings for each clinic connected by a long corridor. Our construction today is fireproof, our ventilation and heating are fairly satisfactory, our elevators are on the whole dependable. We no longer fear contagious diseases, since we know how, as a rule, to prevent them. The small building plan is very expensive to build and still more so to maintain, and, what is even more important, the older plan necessitated so much walking that doctor and student seldom make the most of their opportunities.

Second, we would recommend a floor unit of forty-four patients rather than the time-honored unit of twenty-six. The smaller unit has been accepted almost as inevitable. When it came into vogue there were no schools for nurses in the modern sense of the term. In America now hospital nursing is done by pupils under the supervision of a graduate, and the floor limit is the number of patients whose nursing by pupils one graduate nurse can supervise. Such a woman can supervise the nursing of about forty-four patients, and she can work much more efficiently if all of these patients are on one floor. Give her but twenty-six and she will not be kept busy; give her two floors of twenty-six each, and, since she can never be in two places at the same time, the work will not be supervised properly. In Europe the nursing is done by nursing employees of the hospital and twenty-six is an easy number for two of these to care for. Again, the space for administration and the equipment necessary for ten patients would serve as well for fifty; therefore the larger the ward unit the smaller the per capita expense for original building, equipment and for maintenance.

Third, the administrative center of the ward floor should be at the center of the building, and not at one end. In this way the nurses' walking is reduced almost one-half, a not inconsiderable amount of work each day.

Fourth, the plan of the floor should fit the problems presented by the service. The best plan for a medical ward is not the best for a surgical service. Wards for men, women and children should show differences suggested by the sex and age of the patients. The ward building enclosing a clinical group of patients may be likened to the clothes which a man wears. Were one to inspect on the river bank the clothes of an individual in bathing he could probably guess, with at least a certain degree of accuracy, the size and weight of the man, perhaps his employment, and might even guess many of his habits. The evolution of the hospital building

in Europe has developed buildings, which, stripped of all equipment, would tell unmistakably to the expert whether that particular building were intended for men, women or children, for medical, surgical or mental cases. And there can be no doubt that a building well planned for its problem makes the problem easier of solution than a conventional type for all problems. For this reason, the chief of clinic who knows his problem should have a voice in planning the building.

The surgeon is now allowed to plan his own operating room and to choose the color of its tiles, its lighting, etc. This is quite proper; but yet it is even more important that the medical man should plan his own wards. The surgical operation will take but about an hour, after which time this patient might, as a rule, be in a hotel or at home. In the case of the medical patient, however, the ward equipment and environment is of considerable importance. No conventional plan could include suitable diet kitchens for groups of patients with diseases of metabolism, facilities for fresh air treatment for cases of tuberculosis, suitable equipment for electrotherapy, mechanotherapy, hydrotherapy, etc., for those who need them, nor the quiet environment for the person with insomnia. In the case of the nervous patient the environment which the hospital wards present is even more important; the sights, the noises, the color of the walls, the construction of windows, floors, etc., all have their importance. It may be objected at this point that the medical student should be taught to treat patients in their homes, and that it would cripple him to learn medical practice under conditions which they cannot reproduce in the home. While this is a good excuse for the inadequate accommodations which medical schools often must offer their students, yet the student deserves to have as an ideal the best we can offer; and it is also true that the hospitals are becoming more and more the suitable place in which to be sick, for rich as well as for poor.

And lastly, we would ask that all operating rooms and laboratories belonging to each clinic be in immediate proximity to the ward and not in separate buildings. Let the clinic be a unit. There is no excuse for surgical buildings without wards or medical laboratories under a separate roof from that of the patients.

EVOLUTION OF JOHNS HOPKINS HOSPITAL

But let us return to our plans. The hospital which the trustees actually did build in Baltimore included but five of the ten proposed ward buildings. Fortunately, their money gave out for a time and the pause in building between 1887 and 1893 allowed new ideas to prevail. The first departure from the original plan was Ward M, with its larger ward unit, thirty-two instead of twenty-six, its central administration instead of terminal, as in

the other wards, and the division of the patients into smaller groups, the largest fourteen instead of twenty-four. It is interesting that these plans were suggested not by an architect, but by the superintendent of nurses and the superintendent of buildings, the persons who actually used the buildings and who had found by experience that the older plans were unsatisfactory. Ward M proved a success. It was an easier ward to run, the distances were shorter, the total number of patients larger, the groups of patients smaller, the ward quieter. In this hospital they have never reverted to the old plan.

Then in 1896 Ward H, the gynecologic ward, was enlarged by an addition which almost doubled its capacity and brought its administrative space nearer its center by increasing the number of beds on the formerly unoccupied end.

In 1912 the Harriet Lane Johnson home for children was added, a splendid unit, planned and constructed with especial reference to the problems for which it was built, yet still built only as a part of a general hospital.

The next step forward was the beautiful Phipps Psychiatric Clinic dedicated in 1913, a complete clinic with wards, the color of whose walls, whose decorations, flowers, furniture, all were planned with the feelings of the insane patient in view. This clinic marks an advance in the group since this was a complete research hospital with wards, private rooms, laboratories, library, gymnasium, bath rooms and rooms for occupational therapy all under one roof.

Finally, in 1914, the Brady Clinic of Genito-urinary Surgery was opened. Like the Phipps Clinic this was complete in itself and carried out to an even greater perfection the unity of a complete clinic in one building.

This is the evolution of one hospital group: the plan of 1873 abandoned in 1893, while the evolution of later buildings produced the one clinical building plan, and yet elsewhere the plan of 1873 has lived on. In 1907 Dr. Billings told me that he had planned sixty-five American hospitals, each along the old lines, while each of these sixty-five has served as a model for we know not how many other hospitals, all stamped with the trademark of 1873. Such is the new Indianapolis City Hospital, such the magnificent Cincinnati City Hospital, and such the Barnes Hospital of Washington University.

PLAN OF A SMALL HOSPITAL

We invite you now to consider a small hospital in the plan of which the head of the clinic had opportunity to express his individuality. You will note that each floor is a unit, is, indeed, a separate hospital of forty-four patients, separated in groups, two

groups of 16 each; two groups of 4 each, and two groups of 2 beds each, all in the arc of a circle, at the center of the cord for which is the administration center. Each floor is a complete hospital and could be run as such were all the rest of the building, except the basement, closed. Each floor has its own admission room suitable also as a dressing room and operating room; each its diet kitchen; each its hydrotherapeutic establishment; each its own laboratory, and finally, each has sufficient porch space for the entire ward. One graduate nurse is busy supervising one floor and many of the pupils nurse cases for these small groups of patients, with from 30 to 50 per cent. less walking than in a ward built for twenty-six.

GREATEST NUMBER OF PATIENTS PER FLOOR

But to discuss more at length certain individual problems, what, then, is the largest practical number of patients for each floor? For America, at least, the largest practical number is the largest number of patients the nursing of which one graduate nurse can supervise, for in America the nursing is done by pupil nurses, all of them inexperienced, under the care of an experienced nurse. It has been found that one supervising nurse can supervise efficiently the nursing of almost fifty patients. These hospitals whose wards have the small ward unit assign two floors to one nurse, which is of itself a considerable disadvantage. In the case of the large ward unit the patients are arranged in almost a semi-circle around the center of this unit; therefore the nurses have the entire work of the ward around them rather than ahead of them. They radiate to their work. Another point in connection with this plan is that there is on this floor everything necessary for a complete hospital, except the heating plant. Its admitting room is built as a clinic room, a room for surgical dressings, and is suitably equipped for practically any major operation. The diet kitchen, while used chiefly as a serving room and for the preparation of special dishes, could prepare the food of the entire floor. The room for hydrotherapy will allow almost any bath, except those requiring a hot room. The laboratory is adequate for all the ordinary clinical examinations. The result is that the nurses and the medical students need not leave this floor. We have observed that even a few steps to another floor level are a psychologic impediment to the student, and if required to make even this extra effort he will not visit the laboratory quite as often as is desirable. Again, the nurses are able to give the necessary hydrotherapy without leaving the floor, a matter of considerable advantage since it is not a small matter that a nurse should leave her work to accompany a patient to another floor or building for a treatment. Again, each ward should have sufficient balcony space. Roof gardens are of little value in a hospital for acute

cases, for the sick patient cannot be accompanied there and left without a nurse with him, and it is a matter of no small importance that a pupil nurse not leave the floor while on duty for any reason.

THE SERVICE ROOMS

The service rooms of this hospital are arranged in duplicate and are built like an operating room and in a conspicuous place. These rooms are the danger points of a hospital; it is here that hospital epidemics are spread. If, therefore, these rooms are conspicuously placed and built with all the care of an operating room they will certainly be less dangerous than the usual service room, small, crowded, dirty and placarded with "No Admission." It is to this room as a center that the nurse caring for a patient must go more often than to any other point of the floor; therefore one service room is arranged at each end of the corridor. There is great advantage in this in case of contagious diseases which so often appear in a public ward. If, for instance, scarlet fever should appear in one large ward, that ward with its service room can be isolated satisfactorily. If measles should appear in the other large ward, this could be isolated, with its service room, and then the twelve beds in the small rooms could be run as a separate hospital with the laboratory as their service room. Thus we would have three isolated wards on the same floor and it would not be necessary to close the whole floor because of one contagious case, as is so often true in the general hospital. The laboratories for research, the chemical laboratory for the nitrogen work, and the rooms for animals of course cannot be duplicated on each floor, but could be located in the basement, or better still, under the roof.

RESEARCH CHARACTER OF HOSPITAL WORK

It cannot be emphasized sufficiently that each case in general practice is a research problem. In the hospital ward, the research character should be even more emphasized. The students are more interested in their work if they feel that the cases are being thus studied, while the interns and younger assistants should hold their positions only on condition that they are ready to do such work and to be productive in the field of research. It cannot be emphasized too strongly that simple ward routine, the medical and operating routine, is technical work and not in the strict sense of the term university work, that is, work which involves a definite intellectual gain. If, therefore, a university proposes to make a fifth-year internship obligatory, it certainly should so arrange the ward work that it may allow mental growth in addition to the increased technical skill. While it is true that the student by studying his cases and by reading about them in a textbook does

gain intellectually, nevertheless we feel that even a small problem of required research would make this year of much more value to him than the usual intern year.

LABORATORIES

The clinic building certainly should contain a chemical laboratory at which Kjeldahl work can be done as well as other more elaborate determinations, a good Roentgen-ray department with apparatus adapted to the group of cases to be treated in that building, and a bacteriologic laboratory for bacteriology and serology. These installations need not be elaborate. The best of research work has been done in the corner of a ward or at a desk in a small laboratory. Our expensive installations for research work have certainly not been as productive as we might hope, for research cannot be done to order, and the best of work has been done by young men with an inquiring mind and energy enough to apply themselves, who will not seek at random for the problems but pick up, with a seeing eye, the interesting point which the ward happens at that time to present. The equipment of such a laboratory depends on the problem at stake. Well equipped laboratories are usually storehouses of useless apparatus, for when a research problem is once begun new apparatus is, as a rule, demanded. Again, our clinical laboratories often make a mistake by doing too much routine work. The student who is asked to count twice a day the leukocytes of every pneumonia patient assigned him will not be likely to count the blood of an obscure case at the time that the blood examination in that case might be particularly valuable or interesting. The Roentgen-ray installation which photographs large numbers of cases will not be likely to spend as much time on the one unusual case as might prove desirable. Each medical clinic should not try to cover too much of the field of internal medicine. It would be much better did each clinic concentrate its attention on some one problem of interest at that time, however small, which problem usually is suggested by the patients which happen to be in its wards at that time, and equip for this, then "scrap" much of the special apparatus used.

EQUIPMENT FOR STUDENTS AND INTERNS

Each senior student should have his own desk, his own locker and his individual microscope, and should sign for other apparatus necessary for the clinical work assigned to him. If possible this laboratory space should be on the same floor as his patients, for then there will be a maximum amount of attention given to the patients and work. Each intern should have either his room or his desk on the same floor as his patients, stocked with all the necessary reagents and apparatus for the routine ward work, for

he must be ready to make or confirm any examination left undone or poorly done. Each intern should also have his own research problem and all the apparatus necessary for this.

EQUIPMENT OF MEDICAL CLINIC

The special installation necessary for the medical clinic requiring special rooms under the care of specially trained men are: A good roentgenographic department requiring four rooms, one for fluoroscopic work, one for roentgenography, one for the filing and examination of plates, and a dark room; a heart station in the basement with room for the electrocardiograph, mounted on a cement pillar independent of the building; a room for the patient, which room contains also the various sphygmomanometers and instruments for polygraphic work (this department may use the same dark room of the roentgenologic department); one large room for clinical bacteriology, serology, dark field work and tissue examination. We would recommend that at least one room should be devoted to physical therapy and one to actinotherapy. If only that apparatus is out which is at that time in use, the room in which it is used need not be large.

THE SURGICAL CLINIC

The operating rooms shall be in the same building as the surgical wards. There is little excuse for an operating pavilion or for the amount of money and space spent on elaborate suites of tiled operating rooms. The days of the old amphitheatre clinics are gone; today the operator surrounded by a small group of assistants and students can do better work in a small, simply constructed room built with two things in view—cleanliness and light. The surgical department should have its own clinical laboratories in direct connection with the wards. It can use the same roentgenologic department, etc., as the medical side.

HOSPITALS FOR CHILDREN

Hospitals for children should be built especially for children—small rooms with glass walls allowing easy inspection of the children from adjoining rooms, decorations interesting to children, low windows and ample porches well screened. All faucets should open by keys. Cupboard space near each bed should allow the isolation of individual toilet articles. Such a clinic will have a floor for the isolated cases, special room for nurslings, a machine shop where braces are altered, and in addition to the receiving ward, the laboratories and the roentgenologic department a gymnasium with physical apparatus for the correction of deformities and for the reeducation of muscles and joints. The experience of the European hospitals has taught this committee that in the

construction of the building for children as little wood as possible should be used. The floors should be of terazzo covered by linoleum, or tiles, since a review of many hospitals shows that such wards have fewer epidemics.

HOSPITALS FOR THE SPECIALTIES

The nervous cases, psychasthenics, and patients with psychoses too mild for closed institutions, especially those with insomnia or anxiety neuroses, cannot be treated in wards in connection with other medical cases. The well-to-do go to sanatoriums provided for such, but the poor have but the general hospitals, and for them there should be special wards with few beds in each, and the beds separated if only by canvas screens. The quiet of these ward should be assured by their location and construction. These wards need unusually ample equipment for hydrotherapy, occupational therapy, and dietetics.

Patients suffering from diseases of metabolism can be handled best in small groups in wards with particularly well organized diet kitchens and laboratories amply equipped for the care and examination of the excretions.

The ophthalmologists have their ideas as to the environment of their patients, the dermatologists ask for continuous baths and equipment for hydrotherapy, radiotherapy, heliotherapy, large dressing room, etc.

The roof garden is alomst altogether a thing of the past. Formerly used for convalescent patients, it now would be much better used for dogs and other animals necessary for the ward work.

EQUIPMENT FOR HYDROTHERAPY

The medical and neurologic departments certainly should be equipped with individual hydrotherapeutic stations, but not in a separate building or even on a separate floor of the building. Expensive installations are more ornamental than useful. One room 18 feet square can contain needle baths, sprays, and all the other forms of hydrotherapy necessary in a ward. Practically none of our hospitals have nurses enough to send off the ward with patients. It is safe to say that much more hydrotherapy would be practiced if a small bathroom were on each floor rather than an elaborate one in the basement. There is no need in a hospital for a hot room since patients needing sweat baths can be better treated in bed. The gymnasium, the rooms for physical therapy, those for occupational therapy, must, of course, be separate from the wards, but the patients for these treatments can, as a rule (except the mental cases), care for themselves and need take no nurse from the ward.

DIETETICS

Our hospitals are particularly weak in the dietetic department. The students receive little accurate instruction in this necessary subject. Wherever possible the patients with diseases of metabolism should be grouped on one floor and as much pride taken in the work of the diet kitchen of this floor as the surgeon takes in his operating room.

VALUE OF CLINICAL HISTORIES

The records of patients should be kept in the same building as the patients, in a fire-proof vault, and should be available to the senior students, much as are the more valuable reference books of a library. Far too much attention is paid in the wards to the present condition of the patient and far too little to the history of the disease from its onset. The senior students will learn more concerning disease from the records of patients whom they have not seen than from a textbook. The use of clinical histories in education has not received nearly its deserved attention. We feel that a reading room where past histories may be studied is even more important than a reading room for past literature,—should be organized on the same lines, and that the student should be referred to the histories of the patients of the past just as he is referred to the literature of the past. It is, of course, important that the histories be under proper supervision, for they cannot leave the hospital on account of their unique character; but there should be a suitable table, well lighted, at which the student can inspect these volumes.

LIBRARY

Each hospital should have its own small library, a branch of a larger central one. The student needs at hand standard systems of medicine and surgery and other reference books, including of course dictionaries and encyclopedias. More extensive reading he would not do on the ward, but at other hours in the library of the medical school.

SOCIAL SERVICE

Each department should have its social service worker, and the records of the social service department should not only be at the disposal of the student, but also he should be required to consult these and to incorporate a summary of the information they contain into the current history of the patient.

Each hospital should have its pathologic laboratory, its morgue and if possible in connection with this, a chapel.

In conclusion we would sum up our recommendations in the following words: Abandon the present hospital plan which scatters each man's work, and put all of the work of each doctor at least in one building, if possible on one floor.

(Signed) CHAS. P. EMERSON, *Chairman.*
ALFRED L. GRAY.
H. W. LOEB.

Minutes of the Twenty-Seventh Annual Meeting, Held at Chicago, Feb. 6, 1917, Under the Presidency of Dr. John L. Heffron, Syracuse (N. Y.) University College of Medicine

Morning Session

The meeting was called to order by Vice President Dr. W. S. Carter at 9:30 a. m., in the Auditorium Hotel. Owing to the absence of the president, Dr. Heffron, because of illness, the vice president presided throughout the meeting.

Roll Call

The roll call showed that forty-seven of the colleges in membership were represented by delegates as follows:

University of Alabama, School of Medicine.—Tucker H. Frazer.

Leland Stanford, Jr., University Medical School.—A. W. Hewlett.

University of Colorado School of Medicine.—Chas. N. Meader.

George Washington University, School of Medicine.—William C. Borden.

Georgetown University School of Medicine.—Loren Johnson.

Howard University School of Medicine.—Paul Bartsch.

University of Georgia, College of Medicine.—W. D. Cutter.

Northwestern University Medical School.—C. W. Patterson, H. McGuigan and A. I. Kendall.

Rush Medical College.—John M. Dodson.

University of Illinois, College of Medicine.—D. A. K. Steele, G. P. Dreyer.

Indiana University, School of Medicine.—Chas. P. Emerson, B. D. Myers.

University of Iowa, College of Medicine.—J. F. McClintock.

University of Kansas, School of Medicine.—J. Sundwall.

University of Louisville, Medical Department.—Henry E. Tuley.

Tulane University, School of Medicine.—Isadore Dyer.

Johns Hopkins University, Medical Department.—Theo. C. Janeway.

University of Maryland, School of Medicine; College of Physicians and Surgeons.—J. M. H. Rowland.

Medical School of Harvard University.—Edward H. Bradford.

Tufts College Medical School.—Charles F. Painter.

Detroit College of Medicine and Surgery.—W. H. MacCraken.

University of Michigan Medical School.—C. W. Edmunds, V. C. Vaughan.

University of Minnesota Medical School.—E. P. Lyon, R. O. Beard.

St. Louis University, School of Medicine.—H. W. Loeb.

University of Missouri, School of Medicine.—Guy L. Noyes.

Washington University Medical School.—P. A. Shaffer.

John A. Creighton Medical College.—Jas. R. Clemens.

University of Nebraska, College of Medicine.—Irving S. Cutter.

Columbia University, College of Physicians and Surgeons.—Samuel W. Lambert, Frederic S. Lee.

Fordham University, School of Medicine.—William P. Healy, E. P. Tivnan.

Syracuse University, College of Medicine.—Frank P. Knowlton.

University and Bellevue Hospital Medical College.—S. A. Brown.

University of Buffalo Medical Department.—Thos. H. McKee, Frederick H. Pratt.

University of North Dakota College of Medicine.—H. E. French.

Ohio State University, College of Medicine.—W. O. Thompson, E. F. McCampbell.

University of Cincinnati College of Medicine.—Frank B. Cross.

Western Reserve University, School of Medicine.—C. A. Hamman, F. C. Waite.

Hahnemann Medical College and Hospital.—W. A. Pearson.

University of Pennsylvania, School of Medicine.—A. C. Abbott.

University of Pittsburgh, School of Medicine.—S. A. McCormick, T. S. Arbuthnot.

Medical College, State of South Carolina.—Robert Wilson, Jr., W. F. R. Phillips.

University of Tennessee, College of Medicine.—Herbert T. Brooks.

Vanderbilt University, Medical Department.—Lucius E. Burch.

Meharry Medical College.—George W. Hubbard.

University of Texas, Department of Medicine.—R. E. Vinson, William S. Carter.

University of Vermont, College of Medicine.—Henry C. Tinkham.

Medical College of Virginia.—A. L. Gray.

Marquette University, School of Medicine.—J. W. Van de Erve, C. J. Moulinier, H. S. Tracy.

University of Wisconsin, College of Medicine.—C. R. Bardeen.

VISITORS

The following colleges not in membership in the Association were also represented:

University of South Dakota, College of Medicine.—C. P. Lommen.

Dartmouth College, School of Medicine.—J. M. Gile.

Baylor University, School of Medicine.—E. H. Cary.

Ft. Worth School of Medicine.—S. A. Woodward.

OTHERS PRESENT

Council on Medical Education, American Medical Association —N. P. Colwell, Chicago; L. A. La Garde, National Board Medical Examiners, Washington; Walter L. Bierring, Federation of State Medical Boards, Des Moines, Iowa; Kendric C. Babcock, Urbana, Ill.; Herbert Harlan, Maryland Medical Examining Board, Baltimore; Chas. H. Cook, Massachusetts Medical Examining Board, Natick; A. S. Downing, Education Department, Albany, N. Y.; Wm. F. Snow, New York, C. E. Cantrell, Greenville, Tex.

Wm. J. Means, chairman of the Executive Council, and Fred C. Zapffe, secretary-treasurer of the Association, were also present.

MINUTES OF THE PREVIOUS MEETING

The reading of the minutes of the previous meeting being called for, the secretary submitted the minutes as published in the volume of Transactions for 1916, pages 84-113, and, on motion, they were adopted as printed.

REPORT OF THE SECRETARY-TREASURER

The report of the secretary-treasurer being called for, Dr. Zapffe submitted the following report:

The membership of the Association remains unchanged. Fifty-six colleges are now enrolled and the applications of several others are in the hands of the Executive Council.

Seven hundred copies of the Transactions of the 1916 meeting were printed and they have been distributed. Many requests for additional copies remain unsatisfied, likewise requests for complete files of transactions because the supply is exhausted. Each year the demand is becoming greater. By order of the Executive Council the proceedings of the 1916 meeting were published in one volume instead of two as had been suggested.

Reprints of the 1916 report of the Committee on Equipment dealing with certain phases of the dispensary problem were made and are ready

for distribution. Preference was given to the direct method of distribution so as to ensure certainty of delivery.

It will be remembered that two years ago Dr. Charles William White of Pittsburgh, representing the National Association for the Study and Prevention of Tuberculosis, presented a plea on behalf of that association with reference to instruction in tuberculosis in medical colleges (Trans., 1915, p. 78). The resolution was endorsed (Trans., 1915, p. 111). Since then forty representative medical schools have been investigated by that association and in only seven of these was adequate instruction in tuberculosis given. This is an important matter and this Association can do much to improve conditions with regard to teaching in tuberculosis. It is suggested that the question be referred to the Committee on Education and Pedagogics.

Letters have been received by the secretary from individuals and articles have been published pointing out the desirability of including psychology among the subjects required for admission to medical colleges. J. S. Moore of Western Reserve University calls attention (Science, 1916, N. S., xliv, p. 890) to the importance of a knowledge of normal and abnormal psychology to all persons engaged in the practice of medicine because of the inseparableness of mental states and processes from the physiologic conditions which underlie or accompany them, and the influence which mental states have on the health of the body. This matter, too, might be considered by this Association at this time.

At the 1916 meeting of the American Public Health Association a committee, of which Dr. M. F. Boyd of the University of Iowa, is chairman, was appointed to cooperate with the committee of this Association and the Council on Health and Public Instruction of the American Medical Association in the matter of devising ways and means for the best and most effective teaching of public health hygiene and sanitation in medical schools. This action was brought to the attention of our committee so that the desired cooperation could be brought about.

At the request of the Council on National Defense and the secretary of war, representatives of eighty-five medical schools convened in Washington Jan. 6, 1917, for the purpose of discussing ways and means whereby the depleted medical branches of the government medical services might be recruited to full strength from the eligible graduates of medical schools this year. Plans for courses on military and naval surgery were presented by medical officers in these services. Resolutions favoring universal military training and petitioning the secretaries of war and of the navy to supply the medical schools with instructors on military surgery and sanitation, and petitioning congress to make express provision for detailing medical officers of the army as instructors were presented and adopted. A communication has been received from a sub-chairman of the Advisory Commission of the Council on National Defense requesting that this Association take some action on this matter.

Finances: There is a cash balance on hand of $523.63.

(Signed) FRED C. ZAPFFE, Secretary-Treasurer.

On motion the report was received and the financial statement was referred for audit to the following auditing committee appointed by the chair: Drs. Robt. Wilson, Jr., Alfred L. Gray and Herbert T. Brooks.

REPORT OF EXECUTIVE COUNCIL

The report of the executive council was called for and was read by the chairman of the council, Dr. Means:

The Council has held two executive sessions for consideration of matters pertaining to the affairs of the Association. A quorum was present at each meeting.

Owing to illness our President, Dr. Heffron, was not present. Dr. Carter, the Vice President, assumed the responsibilities of the absent President and was with the Committee in both sessions. Dr. Lambert, because of delay in transportation, was not present.

Reports of inspections of medical colleges applying for membership were received and considered and recommendations were made as follows:

THE MEDICAL DEPARTMENT OF EMORY UNIVERSITY

ATLANTA, GA.

This college is better known, perhaps, as the Atlanta Medical College. An inspection was made on Jan. 26-27, 1917, by Drs. Waite and Means. Their report was to the effect that the school had met the requirements of an acceptable medical college. In view of this the Council recommends the college for membership. As a matter of information for the delegates, it might be well to explain that membership was postponed one year ago, pending certain improvements in clinical teaching. In the meantime the college withdrew its application but later on renewed it.

Atlanta Medical College is now an integral part of Emory University located in Atlanta, Ga., and has already received specifically large donations from Mr. Candler, a promoter and friend of the university, for the development of the science laboratories and clinical units.

A clinical building on the college campus is approaching completion that will house the outdoor dispensary in a very acceptable manner, and also provide for other teaching facilities. The cost of this building is about $65,000.

The plans for a new hospital on the college campus are already made and the sum of $250,000 donated for building same. The construction of the hospital building will begin early in the spring.

The science courses of the first two years will be taught and housed on the campus of Emory University, about 4 or 5 miles distant from the medical college buildings and connected by a direct street car line. The anatomy and physiology buildings are now approaching completion and the chemistry building is started. The future of this college seems to be bright.

BAYLOR UNIVERSITY SCHOOL OF MEDICINE

DALLAS, TEXAS

This college was inspected by Drs. Waite and Means in November, 1915. It had been formerly inspected by the same gentlemen, but was not considered up to the standard. The last inspection showed extensive improvements and evidence of a full recognition on the part of the University at Waco of its financial responsibility to the department.

In the summer of 1915 the Baylor University Medical College took over the Medical Department of the Southwestern Methodist University,

and thus strengthened its faculty equipment and clinical facilities. The school has been given a class "A" rating by the Council on Medical Education. On the favorable report of the inspection committee the college is recommended for membership.

FORDHAM UNIVERSITY SCHOOL OF MEDICINE

NEW YORK CITY

This college made application for membership prior to the meeting in February, 1916. An inspection was made by the Executive Council. Although a favorable report was received from Dr. Colwell and Dr. Baldy of Philadelphia, it was thought best to postpone membership until an inspection could be made by the Executive Council. The resolution recited that the college be admitted to membership subject to an inspection which should be made at an early date. Pursuant to this resolution, Drs. Waite and Means inspected the college in March, but were not satisfied with the conditions found, and notified the members of the Council that they could not recommend it for membership. Suggestions were made at the time for improvements.

Another inspection was made by Drs. Waite and Means in December. The suggestions made in the first inspection for improvements were carried into effect and the college was considered to meet the required standard. The Council therefore recommends this college for membership.

MEDICAL DEPARTMENT UNIVERSITY OF WEST VIRGINIA

MORGANTOWN

An inspection was made by Drs. Waite and Colwell. Their report was that the first two years of a medical course were amply housed and courses given in an acceptable manner. On this report the Council recommends membership for the Medical Department of West Virginia, with recognition for the first two years' work of the medical course.

JOHN A. CREIGHTON MEDICAL COLLEGE

OMAHA

A joint inspection was made of the Creighton Medical College by Drs. Colwell, representing the Council on Medical Education, and Dr. Means for the Association of American Medical Colleges. Their report was to the effect that the educational conditions—clinical and laboratory—have been materially improved, and the financial recognition of the university proper is adequate to the future development of the department.

On the report of the joint inspection the Council on Education will recommend an "A" rating. Your Executive Council recommends that the doubt as to its acceptability be removed and the college continued to full membership.

COLLEGE OF PHYSICIANS AND SURGEONS

LOS ANGELES

There still remains some doubt concerning the acceptability of this college. It is recognized that this school has many points of excellence and that the prospects for future developments are exceedingly good. The principles on which objections are based are: (1) The lack of finan-

cial support on the part of the University of Southern California; (2) the absence of evidence of administrative control of the activities of the college; (3) the limited laboratory and library facilities.

The Executive Council recommends that the college be retained in membership one year, pending improvements along the lines before suggested, and that the Council shall notify the president of the University of Southern California to the effect that, unless these conditions be remedied, the college will be dropped from membership without further notice at the expiration of one year.

RECOMMENDATIONS

Referring to the premedical college requirement after Jan. 1, 1918:

1. WHEREAS, The Council on Medical Education proposes the appointment of a committee of five to perfect a list of approved Liberal Arts Colleges and to outline a subject content of the two years' preliminary college requirement, the committee to be composed of one representative of the Council on Medical Education; one from the Association of American Medical Colleges; one from the Association of American Universities, Prof. K. C. Babcock, Dean of the College of Arts, University of Illinois, and Dr. Theodore Hough, Dean of the University of Virginia Medical College.

Therefore, the Council recommends that the Association should approve of such a committee, that the nominating committee be instructed to name a representative for the College Association, and that he shall be a member of the standing committee on education.

2. Concerning the conditions of the one year premedical requirement to be in force until Jan. 1, 1918, the Council recommends the following:

A student may be admitted with certain subject conditions, provided he has completed at least one year (thirty semester hours . . .) of work in an approved college of liberal arts or science, provided no conditions may be permitted in the prescribed eight semester hours of college chemistry. These conditions may be either in (1) or (2) but not in both: (1) In one-half (four semester hours) of the required course in physics, or (2) in one half of the required course in biology (four semester hours), or in zoology (three semester hours). These conditions must be removed before the beginning of the work of the second medical year, and the credits for these conditions must be in addition to the required thirty semester hours.

INSPECTIONS OF MEDICAL COLLEGES

3. WHEREAS, There is likely to be another inspection of the medical colleges of this country by the Council on Medical Education in the next year or two for the purpose of a reclassification; and

WHEREAS, The colleges, members of the Association of American Medical Colleges, will be largely interested in the final results of this inspection; and

WHEREAS, Past experience has demonstrated that joint inspections are much more satisfactory to all concerned than individual ones; and

WHEREAS, The Council on Education has requested the Association of American Medical Colleges to participate in the inspection of colleges members of the Association; and

WHEREAS, There are no funds available to pay expenses of a delegate to represent the Association, and we doubt the wisdom of asking each college to pay its own expense; therefore, be it

Resolved, That the Executive Council be authorized to join with the Council on Education in inspection of colleges members of the Association, and that, to meet the traveling expenses of the inspector, a fund should be created by an assessment of $50 on each college in membership—$25 of which to be collected in 1917 and $25 in 1918. This assessment to be in addition to the regular annual dues of $25.

COLLEGE RECORDS

WHEREAS, Information comes to the Executive Council that in some of the colleges there seems to be a neglect to conform with the rules requiring records in the college office of attendance of students in class, laboratory and clinical activities and scholarship attainments; therefore be it

Resolved, That it is the sense of the delegates here assembled that individual records of attendance and scholarship attainments of students should be reported to the teachers on proper blanks to the college office, on completion of every course, for filing, and that the permanent records should show term as well as final grades. Also, that specially required work, such as the number of obstetrical cases conducted, autopsies witnessed, anesthetics given and surgical operations in which the student assisted, should be reported and made a part of the student's permanent record.

REVISION OF CONSTITUTION AND BY-LAWS

4. That a committee be appointed to revise the Constitution and By-Laws and prepare amendments to conform to the proposed changes of schedule, etc., for submission at the next annual meeting.

STANDARD OF AN ACCEPTABLE COLLEGE

5. That the Executive Council be instructed to revise the outlines for a standard of *an acceptable medical college.*

(Signed)

W. J. MEANS.
C. R. BARDEEN.
F. C. WAITE.
ISADORE DYER.
W. S. CARTER.
FRED C. ZAPFFE.

The report was considered item by item.

On motion of Dr. Wm. C. Borden, duly seconded, the recommendation to accept the application for membership of the Atlanta Medical College, Medical Department of Emory University, Atlanta, Ga., was adopted.

On motion of Dr. Borden, duly seconded, the recommendation to accept the application for membership of the School of Medicine of Baylor University, Dallas, Texas, was adopted.

On motion of Dr. Borden, duly seconded, the recommendation to accept the application for membership of Fordham University School of Medicine, New York City, was adopted.

On motion of Dr. Borden, duly seconded, the recommendation to reinstate in membership the School of Medicine of the University of West Virginia, Morgantown, was adopted.

On motion of Dr. Borden, duly seconded, the recommendation made in the case of the John A. Creighton Medical College, Omaha, Neb., was adopted.

On motion of Dr. Borden, duly seconded, the recommendation made in the case of the University of Southern California Medical Department, Los Angeles, was adopted.

On motion of Dr. Borden, duly seconded, the recommendation to elect a representative from this association to be one of a committee of five, as suggested by the Council on Medical Education of the American Medical Association, was adopted.

Dr. Tucker H. Frazer moved the adoption of the recommendation made to levy a special assessment to defray the expense of inspection of colleges in membership in the association. Seconded by Dr. Phillips.

Dr. Borden moved as an amendment that the report of the inspectors be made constructive, that it be a detailed report of conditions found, that deficiencies be set forth in detail, with suggestions how they can best be remedied, and that a copy of this report be filed with the school inspected. The amendment was accepted by Dr. Frazer and the seconder of his motion, Dr. Phillips.

The amendment, and the motion as amended, were carried.

Referring to the suggestions made as to keeping records of the attendance of students on class exercises, Dr. B. D. Myers moved that this matter be referred back to the council for further consideration. Seconded.

Dr. Phillips moved as a substitute that the matter be referred to the committee on Education and Pedagogics. Dr. Myers accepted the substitute, which was duly seconded and carried.

Dr. H. W. Loeb moved the adoption of the suggestion that the Chair appoint a committee on revision of the constitution and by-laws. Seconded and carried.

The Chair appointed on this committee Drs. Wm. J. Means, C. R. Bardeen and Fred C. Zapffe.

On motion of Dr. Means, the Executive Council was authorized to prepare a standard of an acceptable medical college.

Dr. Myers moved the adoption of the recommendation providing for an extension of the time for allowing conditions in physics or biology to Jan. 1, 1918. Seconded and carried.

Dr. Means moved the adoption of the proposed amendment providing for increasing the entrance requirement to two years of college work. Seconded and carried.

On motion of Dr. Phillips, duly seconded, the report of the Executive Council was adopted as a whole.

REPORT OF THE COMMITTEE ON MEDICAL EDUCATION AND PEDAGOGICS

The report of this committee was read by the chairman, Dr. Edw. H. Bradford. It was as follows:

Your Committee on Education and Pedagogics begs leave to present the following report concerning amendments to the Constitution and procedure of the Association:

1. It renews the recommendation favorably acted on by the Association last year to strike out in Article III, Section 1, in paragraph (a) the words "American" and "and civics" and in paragraph (b) in A words "(U. S.) or civics."

2. It recommends the changing of Article III, Section 1, college requirements, to read as follows:

The two preliminary college years shall include didactic and laboratory courses in physics embracing at least eight semester hours, in chemistry embracing at least twelve semester hours, and in biology (to be changed to zoology effective September 1, 1918) at least eight semester hours, and courses in a modern language other than English, preferably French or German, at least eight semester hours.

3. It recommends the elimination of the schedule hitherto included in Article III, Section 1, college requirement, Paragraph C, with the exception of the retention of the footnote concerning the length of the laboratory period.

4. Your committee recommends the addition of a second paragraph to Article III, Section 2, to read as follows:

In exceptional cases where applicants for admission have not formal credentials covering secondary and collegiate requirements, but who present credentials or pass examinations in the prescribed college subjects, the Executive Committee of the Association may, on the recommendation of the medical faculty concerned, authorize the admission of such applicants if the evidence presented to the committee shows training and experience equivalent to the remaining work of the two college years.

5. Your committee is unanimous in agreeing that a very large part of the teaching in medical colleges is inefficient and depressing. We believe, therefore, that "better medical teaching" should be the slogan until marked improvement shall have been brought about.

We therefore recommend that a thorough investigation of medical teaching, covering the four medical years, be undertaken, and that this Association authorize this committee, its successors or a special committee to proceed at once under this paragraph. We believe that monographs covering the applications of pedagogy to the several subjects of the medical curriculum should be the outgrowth of this recommendation.

6. It is the opinion of the committee that it (the committee) would be a more useful instrumentality of the Association if the tenure of membership were increased from one year to five years and so ordered that the term of a member shall expire annually. The committee therefore recommends that the Constitution be amended accordingly.

(Signed) EDWARD H. BRADFORD.
W. F. R. PHILLIPS.
IRVING S. CUTTER.

On motion of Dr. Myers, duly seconded, that part of the report dealing with the "history" requirement was adopted.

Dr. Borden then moved that the report, as a whole, be laid on the table. Seconded. The motion was lost (nays, 20; ayes 18).

Dr. Wm. P. Healy moved that that part of the report dealing with the physics, chemistry and biology requirement be received. Seconded.

A motion was made by Dr. Theo. C. Janeway to table Dr. Healy's motion. The motion was lost (nays 16; ayes 10).

Dr. Healy's motion was then put and carried.

Dr. Phillips moved to adopt the recommendation to eliminate Article III, Sect. 1. Seconded and carried.

Dr. H. W. Loeb moved that the balance of the report be received and that further consideration be deferred. Seconded and carried.

REPORT OF COMMITTEE ON EQUIPMENT

Dr. Chas. P. Emerson, chairman of the committee, presented the report. (See page 32.)

On motion, duly seconded, the report was received.

The Chair here announced the appointment of the following Nominating Committee: Drs. C. A. Hamman, Irving S. Cutter and E. P. Lyon.

On motion of Dr. Myers an adjournment was taken until 3 o'clock.

AFTERNOON SESSION

The delegates reassembled at 3 o'clock and were called to order by Vice President Carter.

Dr. W. C. Borden moved that the Service Schools of the Medical Corps of the U. S. Army and Navy be elected to honorary membership in the association, with voting power but exemption from payment of dues. The motion was seconded and carried by a unanimous vote.

Dr. Borden then presented the following resolution:

Resolved, That the Association of American Medical Colleges, through the Surgeon General of the Army and the Surgeon General of the Navy, requests the Secretary of War and the Secretary of the Navy to detail to such colleges of the Association as request and as the Surgeons General approve, medical officers of the army and navy to give such medico-military instruction to the senior classes as the Surgeons General may designate; and, the Association further requests as certain graduates, of certain colleges of arts to whom military instructors are detailed, may be recommended for commission in the line of the army, that

if possible a method be adopted whereby certain graduates of the Medical Colleges approved by the Surgeons General of the Army and Navy, may be recommended for commission in the Medical Reserve Corps of the Army and the Medical Reserve Corps of the Navy without further examination than that which may be required to be given by the instructors detailed to the approved colleges.

The resolution was endorsed by Dr. V. C. Vaughan, and on his motion, duly seconded, was adopted.

At this juncture the chairman of the Auditing Committee, Dr. Wilson, reported that the accounts of the secretary-treasurer had been audited and found correct.

On motion of Dr. Myers, duly seconded, the report was accepted.

Dr. E. P. Lyon here moved that the rule requiring that two names be presented by the Nominating Committee for each elective office be rescinded. Seconded and carried.

REPORT OF THE NOMINATING COMMITTEE

Dr. Hamman, chairman of this committee, presented the following report:

For President: Dr. W. S. Carter, Galveston, Texas.

For Vice President: Dr. Edward H. Bradford, Boston.

For Secretary-Treasurer: Dr. Fred C. Zapffe, Chicago.

For Executive Council: Drs. Samuel W. Lambert, New York and C. R. Bardeen, Madison, Wis.

For Member Special Committee: Dr. W. F. R. Phillips, Charleston S. C.

C. A. HAMMAN.
IRVING S. CUTTER.
E. P. LYON.

On motion of Dr. Myers, seconded by Dr. W. D. Cutter, the report was accepted, and the secretary was instructed to cast one ballot for the election to office of the nominees. The secretary cast this ballot, and the Chair declared the nominees duly elected.

The next order of business was the reading of a paper by Dr. R. O. Beard of the University of Minnesota. The paper was entitled "Limitation of the Number of Matriculants to Medical Colleges." (See page 5.)

It was discussed by Drs. V. C. Vaughan, J. M. Dodson, Theo. C. Janeway, S. W. Lambert, N. P. Colwell, J. M. H. Rowland, W. O. Thompson, W. H. MacCraken, E. P. Lyon and R. O. Beard.

REPORT OF COMMITTEE ON TEACHING OF PUBLIC HEALTH, HYGIENE AND SANITATION

The following report was made by Dr. V. C. Vaughan, chairman of this committee:

Our investigation has shown that hygiene is very poorly taught in most medical schools and inadequately taught in all medical schools. This was brought out forcibly in the examination held by the National Board of Examiners last December in Washington. Graduates of Johns Hopkins, Rush, Bellevue and Michigan were examined and not one of these students passed the examination in hygiene. We are aware of the fact that in all medical teaching more or less of preventive medicine is involved. No one lectures on typhoid without telling how typhoid is prevented, on smallpox without speaking of vaccination, on the diarrheal diseases of children without pointing out the impurities in milk; in all these subjects hygiene comes in incidentally.

Your committee is of the opinion that at least three hours a week for one semester, that is, about forty-eight hours, should be devoted to the special subject of preventive medicine or hygiene. Two of the best textbooks on these subjects are published in this country—Rosenau's Preventive Medicine and Harrington's Hygiene, both most excellent books. Forty-eight hours is about as much time as can be devoted to the subject in an undergraduate medical course. Students should also be given an opportunity to elect courses in water analysis and to make sanitary surveys of certain districts, to study housing, sewage disposal, etc.

(Signed) V. C. VAUGHAN.
M. J. ROSENAU.
WILLIAM F. SNOW.

On motion of Dr. Myers, duly seconded, the report was received.

REPORT OF THE COMMITTEE ON MEDICAL RESEARCH

The report of this committee was read by the chairman, Dr. Frederic S. Lee.

(For report see page 19.)

The report was discussed by Dr. C. R. Bardeen.

On motion of Dr. Myers, duly seconded, the report was received.

REFORT OF COMMITTEE ON UNIFORMITY OF CATALOGS

In the absence of the chairman of this committee, Dr. George Blumer, the report was read by Dr. Waite.

REPORT OF THE COMMITTEE ON UNIFORMITY IN COLLEGE ANNOUNCEMENTS

The Eighth Annual Report of the Carnegie Foundation for the Advancement of Teaching discussed fully the question of college catalogs, and showed that in academic institutions a good deal of confusion existed as to the function of the catalog and as to the material which

should be included therein. At the present time a similar confusion as regards the function and content of medical school catalogues seems to exist. The first purpose of this report therefore must be to state briefly the object of the medical school catalogue, and this may be said to be the publication of accurate information regarding the institution and its work, in such form and language that the general public, the prospective student and the authorities of other institutions may be able to obtain complete information regarding the institution.

A survey of the catalogues of the Class A medical colleges shows a tremendous divergence in form and content. The study of the catalogues makes it clear that this report can be either a destructive or a constructive one. While there is no doubt that to attain the ideal the ax and the pruning knife must be freely used on many of the existing catalogues, it hardly seems worth while to your committee to spend much time in destructive criticism, inasmuch as a constructive statement will leave it open to the authorities of those institutions who desire to reform to plan their catalogue on the basis suggested. It may, however, be stated briefly that the main faults which we have found in medical school catalogues are exaggerated statements as to the facilities offered, the publication of unnecessary details, particularly regarding equipment, a certain diffuseness of style with an inclination to rhetorical flights of language, and a lack of clearness, especially as regards the assignment of time to the various subjects and courses. In addition, we may add that very few medical school catalogues contain any financial statement.

While your committee is of the opinion that absolute uniformity is highly undesirable, and believe that individuality is as desirable in medical schools as in other institutions, it is clear that there must be some sort of a logical arrangement of the matter which properly belongs in a medical school catalogue. We would therefore suggest tentatively the following arrangement, fully appreciating that it is not perfect and that experience and logical conditions may warrant alterations.

1. A calendar of the annual session, giving the dates of terms and recesses, vacations and commencement.

2. A list of the board of trustees or officers of the institution, especially if it is a privately incorporated institution, with their occupations and terms of office.

3. A list of the faculty of the institution, which should be properly graded, especially if different powers are conferred on different grades of instructors.

4. An introductory historical statement which should give a brief account of the development of the institution.

5. A brief general statement as to the organization of the institution.

6. A general statement as to the equipment of the institution, such as buildings and laboratory, library, hospital and dispensary facilities.

7. A brief financial statement showing the income and expenses and the sources of revenue.

8. The requirements for admission.

9. The requirements for advanced standing.

10. The rules for promotion and classification.

11. The requirements for the degree.

12. A statement covering fees and expenses of the course.

13. A statement regarding scholarships and aids to meet the expenses.

14. A statement regarding state board examinations in the state in which the institution is situated.

15. A statement regarding the courses of study, beginning with a general statement of the aims of the curriculum and a condensed curriculum, and followed by a brief description of each course, arranged under departments. The condensed curriculum should be arranged in the form of a table so that the number of hours per term and per year assigned to each subject may be readily available. The statements describing courses should be brief and should state the nature of the instruction, and without elaboration the general content of the course, with the name of the instructor, the time consumed and the period of the college year in which the course is given.

16. A statement regarding the privileges accorded to students of the school, especially if the school is connected with a university which permits medical students to share in privileges with other students.

17. A list of the graduates of the preceding year with honors and prizes.

18. A list of the students in the school at the time the catalogue is published. These two lists may be placed after the list of the faculty, just as well as at the end of the catalogue.

Your committee believes that an arrangement such as is suggested will cover the main points which are essential in medical school catalogues. It is needless to say that in carrying out this program, clear statements free from excess verbiage should be employed. Your committee has no objection to the publication in a catalogue of half tones of buildings or even of interior views of laboratories, providing these are not misleading. It is possible to publish an illustration of a hospital in a medical school catalogue, giving the impression that the institution is entirely controlled by the medical school, when as a matter of fact the institution may have a very minor service. We do not believe that views illustrating scenery and climatic conditions are either necessary or dignified.

Respectfully submitted.

(Signed) GEORGE BLUMER.
F. C. WAITE.
FRED C. ZAPFFE.

On motion of Dr. Lyon, duly seconded, the report was received.

The report of the committee on Rural Distribution of Graduates was called for. The secretary announced that no report had been received.

Dr. Lyon moved that the secretary send a telegram to President Heffron expressing regret at his enforced absence from the meeting and wishing him a speedy return to health. Seconded and carried.

Dr. H. W. Loeb moved that at the next annual meeting an amendment to the constitution and by-laws be considered providing for a five years' tenure for members of the committee on

education and pedagogics, one member to retire each year. Seconded and carried.

Dr. Myers moved that it be considered the sentiment of the Association that at least four (4) semester hours of English, preferably English composition, be included in the required subjects of the two years of college work. Seconded and carried.

Dr. J. W. Van de Erve moved that hereafter two days be devoted to the annual meetings of the Association. Seconded and carried.

Dr. Phillips then moved that Dr. Wm. J. Means of Columbus, Ohio, for many years chairman of the Executive Council, be elected to associate membership. The motion was duly seconded and carried.

Dr. Phillips moved that the secretary be instructed to extend to the management of the Auditorium Hotel the thanks of the Association for the courtesy shown and the quarters provided. Seconded and carried.

There being no further business to come before the Association, an adjournment was taken subject to the call of the Executive Council.

(Signed) W. S. CARTER, President pro tem.
FRED C. ZAPFFE, Secretary.

MINUTES OF THE ORGANIZATION MEETING OF THE EXECUTIVE COUNCIL

The following members of the Executive Council met in the Auditorium Hotel, Feb. 6, 1917: W. J. Means, C. R. Bardeen, W. S. Carter and Fred C. Zapffe.

On motion of Dr. Bardeen, seconded by Dr. Carter, Dr. Means was elected chairman of the council for the ensuing year.

On motion of Dr. Bardeen, seconded by Dr. Carter, Dr. Means was appointed the delegate to the Council on Medical Education of the American Medical Association, and Dr. Zapffe was appointed the delegate to the Federation of State Medical Boards.

On motion of Dr. Bardeen, seconded by Dr. Carter, an honorarium of $500 was voted to the secretary-treasurer for the ensuing year, and $200 to the chairman of the Executive Council.

The president, Dr. Carter, then announced the appointment of the following standing committees:

COMMITTEE ON EDUCATION AND PEDAGOGICS: Edw. H. Bradford, Chairman, Harvard Medical School, Boston; K. C. Babcock, University of Illinois, Urbana; Irving S. Cutter, University of Nebraska, Omaha; W. F. R. Phillips, Medical College of the State of South Carolina, Charleston; E. P. Lyon, University of Minnesota, Minneapolis.

COMMITTEE ON EQUIPMENT: Charles P. Emerson, Chairman, Indiana University, Indianapolis; Alfred L. Gray, Medical College of Virginia, Richmond; H. W. Loeb, St. Louis University, St. Louis.

COMMITTEE ON MEDICAL RESEARCH: Frederic S. Lee, Chairman, Columbia University, New York; R. M. Pearce, University of Pennsylvania, Philadelphia; W. B. Cannon, Harvard University, Boston.

The council then adjourned.

(Signed) WILLIAM J. MEANS, Chairman,
FRED C. ZAPFFE, Secretary.

OFFICERS AND COMMITTEES FOR 1917-1918

President: DR. WM. S. CARTER, Galveston, Tex.

Vice President: DR. EDW. H. BRADFORD, Boston, Mass.

Secretary-Treasurer: DR. FRED C. ZAPFFE, 3431 Lexington Street, Chicago, Ill.

EXECUTIVE COUNCIL

DR. WM. J. MEANS, 715 N. High Street Columbus, Ohio.
DR. ISADORE DYER, New Orleans.
DR. SAMUEL W. LAMBERT, New York, N. Y.
DR. CHARLES R. BARDEEN, Madison, Wis.
DR. JOHN L. HEFFRON, Syracuse, N. Y.
DR. WM. S. CARTER, Galveston, Tex.
DR. FRED C. ZAPFFE, Chicago.

COMMITTEES

Committee on Education and Pedagogics

EDW. H. BRADFORD, Chairman, Harvard University, Cambridge, Mass.
KENDRIC C. BABCOCK, University of Illinois, Urbana.
IRVING S. CUTTER, University of Nebraska, Omaha.
W. F. R. PHILLIPS, Medical College State of South Carolina, Charleston.
E. P. LYON, University of Minnesota, Minneapolis.

Committee on Equipment

CHAS. P. EMERSON, Chairman, Indiana University, Indianapolis.
ALFRED L. GRAY, Medical College of Virginia, Richmond.
H. W. LOEB, St. Louis University, St. Louis, Mo.

Committee on Medical Research

FREDERIC S. LEE, Chairman, Columbia University, New York City.
R. M. PEARCE, University of Pennsylvania, Philadelphia.
W. B. CANNON, Harvard University, Boston.

MEMBERS

ALABAMA

University of Alabama, School of Medicine, Mobile.

CALIFORNIA

Leland Stanford Junior University, School of Medicine, Palo Alto and San Francisco.
University of California, Medical School, Berkeley, San Francisco and Berkeley.
University of Southern California, Medical Department, Los Angeles.

COLORADO

University of Colorado, School of Medicine, Boulder and Denver.

CONNECTICUT

Yale University School of Medicine, New Haven.

DISTRICT OF COLUMBIA

Georgetown University Medical School, Washington.
George Washington University, School of Medicine, Washington.
Howard University, School of Medicine, Washington.
Army Medical School, Washington.
Navy Medical School, Washington.

GEORGIA

Emory University, Medical Department, Atlanta.
University of Georgia, College of Medicine, Augusta.

ILLINOIS

Northwestern University Medical School, Chicago.
Rush Medical College, Chicago.
University of Illinois, College of Medicine, Chicago.

INDIANA

Indiana University, School of Medicine, Bloomington and Indianapolis.

IOWA

University of Iowa, College of Medicine, Iowa City.

KANSAS

University of Kansas, School of Medicine, Lawrence and Rosedale.

KENTUCKY

University of Louisville, Medical Department, Louisville.

LOUISIANA

Tulane University of Louisiana, School of Medicine, New Orleans.

MARYLAND

University of Maryland, School of Medicine and College of Physicians and Surgeons, Baltimore.
Johns Hopkins University, Medical Department, Baltimore.

MASSACHUSETTS

Medical School of Harvard University, Boston.
Tufts College Medical School, Boston.

MICHIGAN

Detroit College of Medicine and Surgery, Detroit.
University of Michigan Medical School, Ann Arbor.

MINNESOTA

University of Minnesota, Medical School, Minneapolis.

MISSISSIPPI

University of Mississippi, Department of Medicine, University.

MISSOURI

St. Louis University, School of Medicine, St. Louis.
University of Missouri, School of Medicine, Columbia.
Washington University, Medical School, St. Louis.

NEBRASKA

John A. Creighton Medical College, Medical Department, Creighton University, Omaha.
University of Nebraska, College of Medicine, Lincoln and Omaha.

NEW YORK

Columbia University College of Physicians and Surgeons, New York City.
Cornell University Medical College, Ithaca and New York.
Syracuse University, College of Medicine, Syracuse.
University and Bellevue Hospital Medical College, New York.
University of Buffalo, Department of Medicine, Buffalo.

NORTH CAROLINA

University of North Carolina, School of Medicine, Chapel Hills.
Wake Forest College, School of Medicine, Wake Forest.

NORTH DAKOTA

University of North Dakota, School of Medicine, University.

OHIO

Ohio State University, College of Medicine, Columbus.
University of Cincinnati, College of Medicine, Cincinnati.
Western Reserve University, School of Medicine, Cleveland.

OKLAHOMA

University of Oklahoma, School of Medicine, Norman and Oklahoma City.

PENNSYLVANIA

Hahnemann Medical College and Hospital, Philadelphia.
University of Pennsylvania, School of Medicine, Philadelphia.
University of Pittsburgh, School of Medicine, Pittsburgh.

PHILIPPINE ISLANDS

University of the Philippines, College of Medicine and Surgery, Manila.

SOUTH CAROLINA

Medical College of the State of South Carolina, Charleston.

TENNESSEE

University of Tennessee, College of Medicine, Memphis.
Vanderbilt University, Medical Department, Nashville.

TEXAS

Baylor University, School of Medicine, Dallas.
University of Texas, Medical Department, Galveston.

VERMONT

University of Vermont, College of Medicine, Burlington.

VIRGINIA

Medical College of Virginia, Richmond.

WEST VIRGINIA

University of West Virginia, School of Medicine, Morgantown.

WISCONSIN

Marquette University, School of Medicine, Milwaukee.
University of Wisconsin, Medical School, Madison.

AFFILIATED MEMBER

Meharry Medical College, Nashville, Tenn.

ASSOCIATE MEMBERS

Dr. Jas. R. Guthrie, Dubuque, Ia.
Dr. Wm. P. Harlow, Boulder, Colo.
Dr. Geo. H. Hoxie, Kansas City, Mo.
Dr. Wm. J. Means, Columbus, Ohio.
Dr. W. F. R. Phillips, Charleston, S. C.
Dr. Henry B. Ward, Urbana, Ill.
Dr. Fred C. Zapffe, Chicago, Ill.

HONORARY MEMBERS

Dr. Henry S. Pritchett, New York, N. Y.
Dr. Kendric C. Babcock, Urbana, Ill.